

The POWER of Music as Therapy

"Musicogenic Eutherapeia"

by Dr. Arthur Harvey

Music is a *POWERful* expressive *SOUND* language serving many purposes, and involving specific combinations of timbre, rhythm, melody, harmony, form, and texture resulting in the diversity of styles that are able to produce a wide range of effects on any or all of the systems in our body. It is the uniqueness of the gestalt of *SOUND* organized rhythmically, melodically, harmonically, formally and stylistically that makes music so very *POWERful*, and causes it to have such unique effects on our brain, and in turn, all our body systems. Marshall McLuhan, a *pioneer* in communication theory, in his book **The Medium Is The Message** (*Message*) (1) presents a compelling argument for carefully choosing the medium used to communicate a message. The purpose and message of this chapter on the Music-Brain-Body Connection is to convey the *Power* of *MUSIC*, most specifically for its therapeutic effects.

Based upon the aesthetic premises that "*Music expresses the inexpressible*", "*Music is a Language of feelings*" and "*Music's uniqueness is its Ineffability*", that which cannot be fully captured in descriptive language, the clarity of these concepts would be enhanced using media, both audio and video, as documentation illustrating the points discussed. I have been teaching, both in person and online, courses titled *MUSIC AS THERAPY* for the University of Hawaii and use extensive media to complement the written texts.

To strengthen our ability to communicate to others Why, What and How music is therapeutic, this chapter will highlight examples of the amazing wealth of published material exploring many areas in which the *POWER* of music is documented. A bibliography representative of a variety of publications documenting music's *POWER* will be included at the end this chapter. The content will focus on a representative variety of therapeutic applications of *MUSIC*:

-Physiological Effects
-Oncology Applications
-Wellness Benefits

....Emotional Expression Through Music

....Rehabilitation and Medical Applications

An often quoted statement by William Congreve in the 18th-century, "...*Music hath charms to soothe a savage breast...to soften rocks, or bend a knotted oak*" reflected his awareness of the therapeutic *POWER* of music. Today, we have research to support earlier anecdotal accounts of music having an effect on everything from intelligence to health, learning, shopping, stress, strength, pain, self-knowledge, emotions, socialization, and spirituality. Popular publications as diverse as the AARP Bulletin (2), Working Mother (3), Ford Times (4), The World & I (5), ABCNEWS.com (6), Psychology Today (7), Going Bonkers (8), BBC Music Magazine (9), Country Living (10), UNESCO Courier (11), Integrity Network (12), PRINCIPAL (13), and COPING (14) have included articles exploring the *POWER* of music. Academic publications abound that examine many aspects of this topic. A few of these books are listed in the bibliography (I5a-i). During the summers of the early 2000s, I taught courses at the University of Hawaii, focusing on *THE MUSIC BRAIN CONNECTION*. A necessary, and important component of these courses included an examination of research dealing with the recent interest in the *POWER* of music to impact intelligence, or at least spatial-temporal reasoning (STR) intelligence. The seminal research by physicist Dr. Gordon Shaw and psychologist Dr. Francis Rauscher of the University of California at Irvine, is described in detail in the book **Keeping Mozart in Mind** (I6), ignited an explosion of subsequent publications, media presentations and challenges, recordings, ongoing research, and debate concerning whether music (Mozart) really does make you smarter. Don Campbell, in his 1997 publication, **The Mozart Effect**, (I7) and **The Mozart Effect for Children** (I8), published in 2000, popularized the term "*The Mozart Effect*" and increased public awareness of the unique *POWER* of music to have not only an impact on intelligence, but also on emotions and health. In 1999 I co-authored a book and CD, **Learn With the Classics** (I9), presenting a rationale for using music of the classics to facilitate better learning.

A few examples of reports published that have been used to promote the *POWER* of music in education follow:

....In 1999, according to a College Board report, students with coursework or experience in music performance scored 53 points higher on the verbal portion of the Scholastic Achievement Test (SAT) and 39 points higher on the math portion than students with no coursework or experience in the arts, for a combined total of 92 points higher.

....In a study headlined "*TEXAS ALLSTATE MUSICIANS SCORE 196 POINTS ABOVE NATIONAL AVERAGE ON THE 2000 SAT*", the Texas Music Educators Association reported that students involved in orchestra, band, or chorus had higher scores on their SAT's than students who were not involved in a music program. The students who scored highest were those in the schools' string orchestras.

....A two-year Swiss study involving 1200 children in 50 schools showed that students involved in the music program were better at language, learned to read more easily, showed improved social interaction, showed more enjoyment in school, and had a lower level of stress than non-music students.

... .According to a Norwegian Research Council for Science and the Humanities report, there is a *very* high correlation between positive self-perception, high cognitive competence scores, healthy self-esteem, total interest in and involvement in school activities, and the study of music.

.. ..Researchers at the University of Munster in Germany have discovered through tonotopic maps (pathways in the brain involved in determining the pitch of a note played on a piano) that music lessons in childhood actually enlarges the auditory cortex of the brain. An area used to analyze the pitch of a musical note is enlarged 25% in musicians compared to people who have never played an instrument, as reported in *Nature*, April 23, 1998.

. ...Music can make a difference for young people from low socioeconomic status (SES). A 1998 research study published in the *American for the Arts Monograph Series No. 11*, found that low SES students who took music lessons from 8th through 12th grade increased their test Scores in math, and scored significantly higher than those of low SES students who were not involved in music. Math scores more than doubled. History and geography scores climbed by 40 percent.

... .A curriculum combining piano lessons, educational mathematics software and fun math problems can help second graders achieve higher scores on certain tests comparable to fourth graders, according to studies by the Music Intelligence Neural Development Institute (MIND) in Irvine, California.

. ...A research team exploring the link between music and intelligence reported that music training - specifically piano instruction - is far superior to computer instruction in dramatically enhancing children's abstract reasoning skills necessary for learning math and science. Neurology Research, February, 1997.

Physiological effects of music:

Music has been shown to be effective in positively affecting physiological stress parameters such as pulse rate, blood pressure, respiration, galvanic skin resistance (GSR), and electroencephalography (EEG). According to Weber, et. al, "Music can reduce stress hormones (ACTH, cortisone) and increase the emotional neurohormone, beta endorphin, acting as a protection mechanism against emotional excitation" (20). Ralph Spintge, M.D., co-founder and currently President of the International Society for Music in Medicine (ISMIM), writing in Applications of Music in Medicine (21), reports that levels of neurohormones and neurotransmitters such as dopamine, noradrenaline, endogenous morphines, enkephalin and phenylethylmine *can* be elevated through music. In summarizing the physiological impact of music in medical treatment, determined by both his research and clinical work as an anesthesiologist, Spintge is quoted, " ...Physiological parameters like heart rate, arterial blood pressure, salivation, skin humidity, blood levels of stress hormones like adrenocorticotropic hormone (ACTH), prolactin, human growth hormone (HGH), cortisol, betaendorphine, show a significant decrease under anxiolytic music compared with usual pharmacological premedication.

EEG studies demonstrated sleep induction through music in the preoperative phase. The subjective responses of the patients are most positive in about 97 percent of the 59,000 evaluated, These patients state that music is a real help to them to relax in the preoperative situation and during surgery in regional anesthesia."

As part of a *Body Watch* PBS health series, show number 14 featured "Music and Health", and included a section exploring the medical applications of music. Impressive evidence of music's *POWER* is illustrated by the effects of heart beat music on newborns. The "Baby Go-To-Sleep" tapes were designed by Terry Woodford utilizing traditional childrens' songs.. A second approach, "Transition" tapes, developed by anesthesiologist Dr. Fred Swartz, utilized a different genre of music, a style generically called 'New Age' music, and research has also been shown it to have a *POWERful* effect on babies.

On the other end of the life span, music has been shown to have a *POWERful* effect upon senior adults diagnosed with Alzheimer's disease. In workshops and courses I play a brief media example of a music therapist working with a man in an advanced stage of Alzheimer's, and in less than one minute is seen one of the most vivid examples of the *POWER* of music I have in my vast video library, as he is transformed from chaos to coherence in front of our eyes.

Mitchell Gaynor M.D. in his book **Sounds of Healing** (22), cites evidence that music has therapeutic *POWER* involving the effects of music on a variety of physiologic functions and parameters. They include:

..Reduced anxiety, heart and respiratory rates. When forty patients who had suffered recent heart attacks were exposed to "relaxing music", then assessed for heart rate, respiratory rate, and measurable states of anxiety, results indicated statistically significant reductions in all three measures.

...Reduced cardiac complications. Patients admitted to a coronary care unit after suffering heart attacks, if exposed to music for two days, had fewer complications than those who were not.

.. Lowered blood pressure, heart rate and noise-sensitivity in heart surgery patients. A 1997 study reported that the use of music intervention with cardiac surgery patients during the first postoperative day decreased noise annoyance, heart, and systolic blood pressure.

...Increased immune cell messengers. A 1993 report at Michigan State University disclosed that levels of interleukin- I (an immune-cell messenger molecule that helps to regulate the activity of other

immune cells) increased by 12.5 to 14 percent when subjects listened to music *for* fifteen-minute periods. Subjects who listened to music they chose exhibited up 10.25 percent lower levels of cortisol, a stress hormone that can depress the immune system when produced in excess.

....*Boost in natural opiates.* In an experiment done at the Addiction Research Center in Stanford University in California, subjects listened to various kinds of music, including marching bands, spiritual anthems, and movie soundtracks. They reported feelings of euphoria, leading researchers to suspect that the joy of music is mediated by the opiate chemicals know as endorphins --the brain's natural painkillers. To test this theory, researchers injected listeners with naloxone, which blocks opiate receptors. The listeners experienced reduced sensations of pleasure, suggesting that certain types of music can boost endorphins, which have other health benefits, including a stronger immune system.

A music therapist at Duke University Hospital, Cheryl Benze, has found, while working with more than 1,000 patients annually for the past 18 years, that music therapy primarily helps patients by reducing stress and pain, crediting the listening to music with triggering the production of serotonin, which causes pleasure. A breakthrough study with a group of 61 retirees in Florida in 1998 taking group keyboard lessons over a period of two 10-week semesters found that music making had a significant effect on increasing levels of human growth hormone (HGH).

Oncology applications of music

Therapeutic music experiences applicable to oncology involve both passive listening and active music making. An important music with nature visuals program designed by Susan Mazer and Dallas Smith, Healing Health Care Systems, is described in their book **Sound Choices: Using Music to Design the Environments in Which You Live, Work, and Heal** (23). They were also featured in a Health Week report in 1998, along with others exploring the health applications of therapeutic music.

A study released in the January 2001 edition of *Alternative Therapies* explored the potential for biological benefits of group drumming music therapy to reverse specific immune system effects

of the classical stress response. A team led by Dr. Barry Bittman at the Meadville, Pennsylvania based Mind-Body Wellness Center, in conjunction with Loma Linda University Medical Center researchers in California, found that a single group drumming session conducted in a light-hearted manner fostered self-expression and developed camaraderie, while boosting the activity of Natural Killer (NK) cells that seek out and destroy cancer cells and vitally-infected cells. "The beauty of drumming as opposed to other activities is that you can take it anywhere, teach it in only a few minutes, and offer it to groups of ill and well people alike". Bittman adds, "Composite drumming enables people to enjoy myriad psychological and physical benefits. While immersed in this form of music making, their tension is rapidly transformed into a joyful, moving and enlivening experience." In modern cancer research, an important goal is to identify therapies that stimulate "cell-mediated" immune responses. This group drumming study appeared to stimulate just such a response. In the group drumming protocol tested by the Bittman team, test subjects showed significant increases in NK cell activity and other immune cell activity. The study also found that the participating drummers improved their ratios of dehydroepiandrosterone (DHEA) to cortisone, a condition beneficial to immune system function, and found similar increases in NK cell activity stimulated by interleukin-2 and interferon-gamma, two examples of substances call "cytokines" that help drive the immune system. A study done by Dr. Kubota in Japan also found music therapy sessions increased the number of NK cells in seniors in a hospital in Nagoya, Japan.

Several researchers have documented the impact of music on the immune system by measuring secretory IgA or Salivary Immunoglobulin A. In a study emphasizing the association of positive emotional effect and effect of a particular form of music on one parameter of the immune system, S-IgA, the results confirmed that secretory IgA levels can be enhanced by conscious thought (imagery) and by the use of music. (23).

Music has had a variety of roles in connection with death and dying. A new field of Music Thanatology, developed by Therese Schroeder-Sheker, makes a distinction between Music Therapy involving the systematic application of music to engage and support life processes, and Music Thanatology which addresses the complex needs of the dying. (24) The uses of Music Therapy in Palliative Care

(25) is well documented. Having served as Therapeutic Music Coordinator for Hospice Hawaii for several years, I have seen the important *POWER* music has to reduce pain, provide distraction, facilitate emotional catharsis, and provide an alternative communication experience for those in the process of transition.

Wellness benefits of music

In 1986, 1988, and 1990, I organized, and hosted three MUSIC AND HEALTH conferences at Eastern Kentucky University, the first national conferences devoted to bringing together music therapists, doctors, nurses, researchers, and musicians creating "healing music" to explore together the impact of music on wellness and health. In recent years the use of music to enhance wellness and health has expanded considerably. Since that time, legislative support in America has provided an impetus for research and program development in using music for aging individuals as a means of enhancing health. While on the faculty at the University of Louisville (Kentucky) School of Medicine I developed an experimental tape for one of the research projects focusing on using music as a means of facilitating healthier, and more pleasant times of awaking and going to sleep for geriatric clients. Exploring a variety of music genres and recordings, it became evident that baroque music provided just the right balance between consonance and dissonance, tension and release, stimulation and relaxation, chordal and polyphonic texture, and provided cerebral hemispheric integration. Recognizing the stimulus value of tempo, dynamics, harmonic dissonance and degrees of polyphonic complexity, as well as timbre (instrumentation) used, I created recordings to awaken individuals gently and healthily using the music of J.S. Bach. Also in conjunction with the Department of Family Practice, I developed a recording to assist with the challenges associated with "Sundowner Effect", using the music of G.F. Handel. In preliminary studies these proved to be so effective that eventually, in conjunction with LIND Institute of San Francisco, producers of the Relax With The Classics recordings, I created a two CD set of *Music for Health and Wellness - **Bach for the Morning**, and **Handel for the Evening***. These were created utilizing the entrainment principle, and in *Bach For The Morning* each selection is sequenced to progressively increase in tempo and stimulus complexity. *The Handel For The Evening* selections, after the initial

selections, progressively decrease in tempo and stimulus complexity, as well as dynamics. These, and other recordings are available through Music for Health Services. (26)

In an effort to quantify the link between music and wellness, Dr. Frederick Tims of Michigan State University reported in *Alternative Therapies* (27) a study showing that patients with Alzheimer's Disease (AD) who underwent music sessions four times a week had increases in their level of melatonin, a neurohormone linked with sleep regulation and believed to influence the immune system. The therapeutic music sessions involved male patients at the Miami Veterans Administration Medical Center playing, drumming, and singing along with their favorite old songs and new songs. The patients showed a 216 % increase in serum melatonin levels compared to readings taken just before the music therapy began. In addition, the levels had increased even more when researchers checked them again six weeks later. While the focus of this study was to study the effect of music therapy upon melatonin levels, the study also noted changes in other brain chemicals such as prolactin, serotonin, norepinephrine and epinephrine. The conclusion of the study was that increased level of melatonin following music therapy contributed to the patients' relaxed and calm mood. Therapeutic music experiences may involve a variety of music processes. These include not only listening-both passively and actively-but singing, playing instruments, moving to music, and creating music. One unique instrument appropriate for therapeutic use in a variety of applications is the Omnichord, or the latest version, the QChord. I have used these instruments created by Suzuki corporation, for all types of individuals and in many different educational and therapeutic situations with much success.

Emotional Expression through Music

Music therapy provides avenues for communication that can be useful to those who find it difficult to express themselves in words. Music 's unique power is evident in all ages, all cultures, and states of health. It is common knowledge that music touches the emotions. Aldous Huxley stated that "after silence, that which comes closest to expressing the inexpressible is music."

Goleman, in **Emotional Intelligence** (27), establishes the importance of emotion in everyday life and states that music is relevant to successful living. He believes that people need the education and development of the emotive limbic system that music stimulates; that being in touch with our own emotions, and those of others, leads to success; and that the more successful a person becomes, the less cognition matters, and the more emotional skills become critical. Music serves as a window to emotions. According to Kohut (28), music serves "...as an extra...*meta*...verbal mode of mental functioning, permits a specific, subtle regression to pre-verbal, i.e., to truly primitive forms of mental experience." This regression appears to occur regardless of human differences, age, gender, culture, or education. Music produces arousal of emotions and feeling states,

Aesthetician Susanne K. Langer (29) provides a strong rationale in her writings *for* the role of the arts in providing an education *in* feelings ... and emotions. Music objectifies feelings and emotions that are ineffable, and an education *in* the arts educates receptivity and expressivity for emotional intelligence and subsequent emotional literacy. Music lets us get in touch with our feelings, our intuition, and our hopes and fears. Eduard Hanslick (30), music critic and aesthetician, provided a description of the *ineffable* character of music as expressing and conveying emotions by two processes: (1) the symbolism of the sounds, and (2) the analogy of motion.

The recent explosion of neuroscience research caused a marked increase in approaches to understanding human emotions, from theoretical, philosophical and psychological perspectives to neurophysiological, medical and therapeutic. Music Therapist and researcher Mark Rider (31) suggested that techniques which stimulate a dynamic balance of all emotions will also promote healing processes. He has found that depression and chronic stress are characterized by imbalances of emotionality, neurotransmitters and electrical brain wave activity. In contrast to other researchers, Rider believes that, there are really only four basic feeling states, "Bad (fear), Mad, Sad, and Glad", and a vehicle for working through them is music. He states that ". . . the consequences of repressing these emotion as opposed to expressing them can be disastrous"

Recent interest *in* the applications for music in medicine, has produced research that helps clarify the processes involved in music

as a stimulus for emotional development. The neuroaudiological pathways allow music to have an effect upon the hypothalamus and limbic system, structures in the brain most responsible for emotional behavior in humans. Through music, emotional states can be affected, influenced, experienced and modified. According to Carlson (32) the biomedical basis for positive emotional effects of music is that "Endogenous opioids have been shown to play a role in reinforcement" of emotional development, and that they, the endorphins, have been shown to be activated by music. The pioneering researcher, Candace B. Pert provides a detailed neurochemical explanation for why we feel the way we feel, in her book *Molecules of Emotion* (33). The neurochemical, dopamine, has been shown in studies to also be involved in reinforcement of emotions. Although musically activated brain changes appear to affect a wide range of neurological structures, the overt behaviors, autonomic responses, and hormonal secretions that comprise emotion are controlled by separate systems. The amygdala appears to be the integrating mechanism for controlling these responses, according to Carlson (32). Taylor (34) describes the amygdala as.....a limbic system structure located in the temporal lobe and is responsible for behavioral reactions to objects or stimuli that are perceived to be of special biological significance. It serves as, the focal point between sensory systems, such as the auditory reception system for music, and effector systems that are responsible for the three components of emotion: behavioral, autonomic, and hormonal."

English psychiatrist, Anthony Storr (35) makes a distinction similar to Langer between feelings and emotions, and writes that ..."The patterns of mathematics and the patterns of music both engage our feelings, but only music affects our emotions. Herein lies the difference in our response to each. Emotions involve the body; feelings do not. Music promotes order within ourselves in a way which mathematics cannot because of music's physical affects.. .Music is less abstract than mathematics because it causes physiological arousal and because the sounds from which it probably originated are emotional communications. It is both intellectual and emotional. restoring links between mind and body."

A revolution in understanding how we experience and communicate emotions was begun by Manfred Clynes (36), linking the movement of music with emotion through the body. Clynes shows

in his development of "Sentic Theory" the exact connection between the physiology of emotional experience and its precise musical counterparts in musical gesture . Since emotions do have a biological and neurological basis, and music offers a significant vehicle for expressing, symbolizing, and educating emotions, Clynes asserts there ought to be some evidence of specific neurochemical changes as a result of musical experiences. Important recent research interest focuses on the health benefits of music, demonstrating that emotional experiences evoked by music produce empirical evidence of the need for music as a means of developing emotional intelligence in individuals of all ages.

In 2001 our second child, a 39 year old daughter, Laurie died. She, as a young lady developed mental illness and later a progressive physical disability as well. During the last 15 years of her life she listened to music constantly - day and night and watched music videos ...When she was not watching videos, she was listening to music on CDs, radio and tapes. Music was as important for her as the oxygen and many medications she required in the later years of her life. In a tribute article I wrote for Laurie titled "Music Marks Memorable Moments of Meaning," I described music as her "feeling food," as well as an escape stimulus, reality checker, sleep inducer, faith feeder, memory recaller, thought manager...and much more.

At an International Society of Music in Medicine Symposium (37) in California in the early 1990's, I was privileged to hear the preliminary report of a research project involving Parkinsonian patients using the rhythmic beat of music as a vehicle for facilitating more fluid walking. A documentary from that research, headed up by Dr. Michael H. Thaut, on "Auditory Rhythmic Facilitation" shows the *POWERful* effect that the beat of music has on individuals, utilizing rhythmic cueing as a stimulus for increased mobility. Over the past several decades It has been my privilege to be part of many conferences, workshops and symposia on Sound Therapy and Music Therapy. Because music, in all its creative permutations of SOUNDS: rhythms, pitches, timbres, dynamics, textures, organization (form) and styles, provides such a universally strong stimuli affecting individuals from all cultures, at all ages, in all mental states, it has been the purpose of this chapter to explore some of the complex human responses to music. Music serves many purposes, but in more than forty-eight years as a musician, educator and researcher, I

know of no more important application to illustrate music's *POWER*, than it's therapeutic role. I am honored to have been part of a pioneering partnership that is developing between music as therapy and medicine, and the growing recognition that music can indeed make a positive contribution to our health, as music produces responses in our brains, which in turn affects our body systems' responses, illustrating the *POWER Of Music* to establish Music-Brain-Body-Health Connections.

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