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New theories and research findings on the positive influence of music and art on health with ageing

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This review is about the latest theories of the underlying mechanisms that explain why music and art promote health and have positive influences on the course of illness with ageing. It is also about the latest findings demonstrating the positive effects that music and the arts in general have on health with ageing; cost savings to society associated with these positive findings will also be discussed. Why *would* engaging in music and the arts in general have positive effects on health? In the modern world, without a clear understanding of the underlying factors to explain effects or outcomes, science and society become doubtful and dismissive of even positive reported findings. These issues will be reviewed with research examples illustrating how they can be effectively addressed and positively influence societal and scientific perceptions of the value of music, art, and creative engagement in promoting health with ageing.

Keywords: Review; theory; creative engagement; health; ageing

Introduction

This review is about the latest theories of the underlying mechanisms that explain why active involvement with music and art promote health and positive influences on the course of illness with ageing. It is also about the latest findings demonstrating the positive effects that music and the arts in general have on health with ageing; costs savings to society associated with these positive findings will also be discussed. Why *would* engaging in music and the arts in general have positive effects on health? When this does occur, why can't it simply be explained as a Hawthorne effect¹ or the like?

We live in an evidence-driven, outcomes focused society (Cutter & Aban, 2008). "Show me the evidence or outcomes demonstrating success if you want me to show you the money for programme support of what you are doing." But sometimes the evidence is not enough for results to be taken seriously. *If there is not an understanding of the underlying mechanism to explain why the results happened, then no matter how robust the findings of the research, they could be dismissed.* In the modern world, without a clear understanding of the underlying factors to explain effects or outcomes, science and society become doubtful and dismissive of even positive reported findings.

Positive outcomes in the absence of theory to explain the results

Without established and proven theory to explain positive effects of music and art on health with ageing, even observed changes would be questioned, trivialized, or viewed as

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not being real. To see even robust results as being real, science and society would need to understand the underlying dynamics or mechanisms that explained the findings.

I first profoundly learned that the absence of understanding why something happens can result in dismissal of what is observed right in front of your eyes when I was in medical school in 1969. I was among a group of students watching a film from mainland China showing abdominal surgery being conducted with acupuncture as the sole source of anaesthesia. The operation was completed, and the patient was conscious and comfortable throughout. At the end of the film, every one of my professors there had a frown on his face, with grousing ranging from “There was something wrong with that picture,” to “There has to be some other explanation,” to “That was a hoax.” The problem was that there was no underlying theory or explanation of an underlying mechanism to explain how the acupuncture could achieve an anaesthetic response (Jackson & Scambler, 2007). The results were doubted, ridiculed, and ultimately dismissed.

It was not until four years later, in 1973, that Solomon Snyder and colleagues demonstrated that human brains contain receptors to opiates such as heroin and morphine explaining the pharmacological properties of these drugs (Pert & Snyder, 1973). That discovery led Snyder and others to seek the body’s own opiates, called enkephalins and endorphins, that came to form the basis for phenomena like the “runner’s high” and “acupuncture anaesthesia.” Acupuncture was then looked at differently, viewed as triggering nerve impulses that go to the brain resulting in the release of pain-alleviating endorphins. Its observed effects were no longer being doubted or considered a hoax; instead, acupuncture gained status as a new alternative to the use of pharmacologic painkillers. Solomon Snyder was later awarded a Nobel Prize.

The influence of sense of control and social support on health with ageing – psychoneuroimmunology effects

In contemplating a major study (The Creativity and Aging Study) aimed at exploring the impact of creative engagement in music and the arts on the health of older adults, a major part of the theoretical background for the music and art interventions was built upon two major bodies of prior gerontological research associated with positive health outcomes: (a) sense of control and (b) social engagement. Studies on ageing have shown that when older adults experience a sense of control (e.g. a sense of mastery), they demonstrate positive health outcomes. All age groups show positive health effects in experiencing a heightened sense of control, mastery or efficacy. However, Judith Rodin demonstrated the finding to be most robust in older persons (Rodin, 1986, 1989). Subsequent biological studies assessing laboratory findings in persons experiencing a new sense of mastery revealed an increase in the level of T cells and NK cells in the bloodstream. T cells are lymphocytes that ward off bacterial infections; NK or natural killer cells combat cancer cells. These findings contributed to the start of the field of psychoneuroimmunology (PNI) – reflecting the influence of the mind on neurological centres of the brain, and, in turn, on the immune system (Coe & Lubach, 2003; Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002; Lutgendorf & Costanzo, 2003; Lutgendorf, Vitaliano, Tripp-Reimer, Harvey, & Lubaroff, 1999). This, in effect, contributed to the start of the mind/body movement.

The second area of prior research that became part of the theoretical background of the Creativity & Ageing study was that of social support, including meaningful social engagement and interchange. This area draws heavily from findings from cardiovascular research revealing better outcomes in patients recovering from heart attacks and coronary bypass surgery where strong social supports were in place (Avlund, Damsgaard, & Holstein, 1998;

Bennett, 2002; Glass, de Leon, Marottoli, & Berkman, 1999). Also, to state the obvious, most cardiac patients are older persons. The same underlying mechanism of an immune system boost was discovered in these individuals as well.

Brain plasticity and the importance of sustained challenging activities

The field of behavioural neuroscience has revolutionized the way we understand the brain's ability to adapt and keep itself vital (Kolb & Wishaw, 1998; Kramer et al., 2004). It has also revolutionized our understanding of what we ourselves can do to keep our brains and minds healthy through creatively challenging ourselves in a sustained manner. Basically, research in this area vividly demonstrates that when the brain is challenged through our activities and surroundings, it is altered through the formation of new synapses – the contact points between cells (LeDoux, 2002). More synapses means better communication among brain cells and increased opportunities for new ideas connecting. When branch-like extensions (known as dendrites) from one brain cell (neuron) achieve contact with axon extensions of other neurons, new synapses are formed.

Challenging activities and new experiences induce the sprouting of new dendrites, thereby enhancing brain reserve. The art activities proved to sustain involvement in the Creativity & Ageing Study, especially given the advanced age of the participants, and as with physical exercise, if you can stay at it, the brain, like muscles, benefits from ongoing challenge. Indeed, in the research on leisure activities that most contributed to the delay in onset of Alzheimer's disease for those at risk of the disorder, *dance* was at the top of the list; playing a musical instrument was third among the top five (Verghese et al., 2003). The theory here is that the build up of dendrites and synapses resulted in brain reserve in the extent and efficiency of brain cell connectedness. This then extended the period until that efficiency was sufficiently compromised and resulted in the clinical manifestation of dementia in Alzheimer's disease when too many neurons, synapses, and dendrites are lost or damaged through the progression of the disease. The Verghese paper discusses how having a greater reserve of neurons, synapses and dendrites can delay the onset of symptoms.

The hemispheres of the brain work in greater synchrony with ageing

One of the most intriguing examples of brain plasticity is referred to as the Harold Model, an acronym for "Hemispheric Asymmetry Reduction in Old Adults" where brain imaging studies have revealed that brain activity tends to be less lateralized in older adults than in younger adults (Cabeza, 2002; Cabeza, Anderson, Locantore, & McIntosh, 2002). The ability of the brain to redirect the use of some of its tissue to be recruited for another function may reflect an extraordinary way that the brain mobilizes reserve capacity. Many view this increased bilateralization as a compensatory response, but, regardless, it does appear to reflect a built-in mechanism to address the functional requirements of the brain. It is as if the brain moves to "all-wheel-drive."

Moreover, synchronized bilateral brain involvement, which is basically a mid- and later-life phenomenon, by its very nature enables better integrated left and right brain involvement. It has been hypothesized that activities that benefit from better integrated left/right brain engagement are appealing to the brain. It is hypothesized that they are like "chocolate to the brain" in how the brain metaphorically savours them (Cohen, 2005, p. 77). Virtually every form of art provides optimal utilization of the benefits of synchronized hemisphere involvement – optimally integrating left and right brain capacities. Especially for the ageing brain, art is like chocolate to the brain. The all-wheel-drive phenomenon

contributes to our understanding of why, for many, art becomes more appealing to them in the second half of life.

In general, what evidence is there that a change, indeed an increase, of the appeal of art occurs among individuals in the second half of life?

Folk art and the increased appeal of the arts in later life

Folk art, certainly in the US, makes a strong case for the increased appeal of art in the second half of life. This became apparent in a show at the Corcoran Museum of Art in Washington, DC that exhibited a half-century of folk art in America – from 1930 to 1980 (Livingston & Beardsley, 1982). In this show they were all African-American artists. An amazing realization emerged that was not mentioned in the write-up of the show or highlighted by the curator and art historian who put together this terrific exhibit: 16 of the 20 artists whose work was represented in the show did not get seriously involved in art or reach their mature phase until after the age of 65. Hence 80% of those in the show only started or did their best work at age 65 or older. Moreover, 30% had not become seriously involved in art or reached their mature phase until after 80 years of age. And the artist whose work was on the cover of the catalogue – Bill Traylor – did his first significant work at age 85. After the show, in-depth research on folk art in America found the same pattern: that it was dominated by older artists. Moreover, it was dominated by older artists regardless of racial and ethnic background (Hartigan, 1990). It was the ultimate statement of late blooming, and a poignant demonstration of the capacity to tap creative potential throughout the entire life cycle. Also, folk art is ultimately egalitarian in how it cuts across social strata with a heavy representation of artists from lower socio-economic backgrounds. Again, the critical point here is that folk art can flourish in the second half of life, providing a major example of the appeal of art increasing with ageing.

Developmental considerations with ageing

New research on psychological growth and development in the second half of life has led to a new understanding of the capacity for positive change and creative expression in the second half of life (Cohen, 2005). I have theorized from more than 35 years of research in this area with over 3000 research and clinical subjects that developmentally we, in effect, have a built-in inner push of positive drives that evolution has gifted us, fostering psychological growth throughout the life cycle (Cohen, 2004). As we age, how this inner push becomes manifest varies. The changing characteristics, the changing developmental dynamics of the inner push over time, reveal themselves as a series of psychological growth phases in the second half of life. Each new developmental phase creates a new inner climate within us that allows us to re-evaluate our lives and experiment with new strategies. This ongoing process results in new opportunities for us to access and activate untapped strengths as well as new and creative sides of ourselves (Andreasen, 2005). Engagement in art becomes one of those areas of untapped strength that in particular becomes tapped with ageing.

It is hypothesized that the inner push continues throughout the life cycle, but how it shows itself varies over time. Ongoing brain changes affected by our experiences and challenges are viewed as subtly influencing the way the inner push manifests itself at different points in the life cycle. Ongoing life experience is similarly hypothesized as altering the manifestation of the inner push, both by further altering the brain as well as affecting our perspective on matters. The inner push underlies not only our capacity for

ongoing psychological growth, but also that for ongoing creative expression. Moreover, ongoing psychological growth in turn affects our capacity for creative expression by helping our inner psychological climate to readjust itself, resulting in new readiness or fostering new ways to be creative. Meanwhile, ongoing changes in the neural network of the brain, effected by continuing life experiences and challenges, over time gradually alter how the inner push shows itself in four different ways in the second half of life – in four different psychological growth phases: the midlife re-evaluation phase; the liberation phase; the summing-up phase; the encore phase.

In her book *The creating brain* (2005), a year after the concept of the inner push was described, Nancy Andreasen elaborated a very similar concept as it related to the creativity part of our nature that we are born with and that influences creative capacity. In effect, she is describing the role of the inner push in relation to creativity. She makes the important distinction between a part of our nature that is hereditary and a part that is built-in to all of us. She writes,

Nature can be defined as an innate or inborn gift that drives an individual to creative achievement, without any obvious genetic contributions. We do not know yet how this kind of creative nature arises, but it appears to be more common than “nature” that is clearly hereditary. Once this creative nature arises, nurturing it through a variety of environmental factors will further enhance it ... Whatever the importance of “nature,” “nurture” is also important for creativity to flourish, and perhaps essential. The human brain is shaped by the world around it *from the time that a child is born to the end of adult life.* (my emphasis)

The inner push and Nancy Andreasen’s description of our non-hereditary nature both portray an evolutionary, built-in capacity for creative expression that continues to express itself throughout the life cycle.

The influence of four psychological growth phases on creativity with ageing

Psychoanalytic research has found that older adults are more in touch with their inner psychological life than at any point in the life cycle (Maduro, 1974). What an asset in a creative and artistic sense to be more in touch with one’s inner world which negotiates access to potential in new ways as we continue to develop with ageing (Cohen, 1988). The four newly described developmental phases (Cohen, 2000, 2005) in the second half of life that set the stage of positive change and creative expression, in more detail, are as follows.

The midlife re-evaluation phase generally occurs during one’s early 40s to late 50s: plans and actions are shaped by a sense of crisis or quest, *though considerably more by quest.* Midlife is a powerful time for the expression of human potential because it combines the capacity for insightful reflection with a powerful desire to create meaning in life. This quest is catalysed in midlife by one seriously confronting for the first time their sense of mortality; one contemplates time left instead of time gone by upon passing the midpoint in the life cycle. This dynamic new inner climate becomes a catalyst for uncovering unrealized creative sides of our selves. The inner climate is enhanced yet more in its capacity for reflection, re-evaluation, and quest in midlife in association with the brain hemispheres working in greater synchrony with one another (the all-wheel-drive phenomenon). It is in this context that many begin to experience music and art “like chocolate to the brain” and become newly attracted to it or attracted in a new way to an art form they had been exposed to in the past.

This is well illustrated with the rise of New Horizons Bands. Dr Roy Ernst founded the New Horizons concept in 1991 at the Eastman School of Music in Rochester, New York.² New Horizons Music programmes provide entry points to music-making for adults,

including those with no musical experience at all and also those who were active in school music programmes but have been inactive for a long period. Many adults would like an opportunity to learn music in a group setting similar to that offered in schools, and many who had been involved in music during their school years did not continue, but in their later years wanted to get involved again. Typically, those participating in these bands are 50 years of age and older, with a large percentage over 65. There are now more than 120 such bands across North America.

The liberation phase usually emerges from one's mid-50s to mid-70s. Plans and actions are shaped by a new sense of personal freedom to speak one's mind and to do what needs to be done. There are often mounting feelings of "If not now, when?," "Why not?," and "What can they do to me?," that foster a sense of inner liberation. With retirement or partial retirement, common during these years, comes a new experience of external liberation and a feeling of finally having time to experiment with something different. The new sense of internal liberation through increased comfort, confidence, and courage plus the external freedom factor of increased time for personal use translates into creative expression for many.

Folk art likely has greatly benefited from the liberation phase. As alluded to above, in the US, folk art is dominated by older artists, a great many of whom did not seriously become immersed in art until age 65 or older – the period of one's life when the inner push of the liberation phase is mounting. The liberation phase inner push may also be influencing the significant number of individuals who are turning to music in the second half of life – such as those in the New Horizons Bands and those in singing groups that form in middle age and later life.

The summing-up phase comes most frequently in one's late 60s into our 80s – or beyond. Plans and actions are shaped by the desire to find larger meaning in the story of one's life as individuals look back, re-examine and sum up what has happened. This process motivates people to give of the wisdom they have accrued throughout their lives. In the role of keepers-of-the-culture, people who reach this phase begin to share their lessons and fortunes through autobiography and personal story telling, philanthropy, community activism, volunteerism and other forms of giving back.

In the case of Martha Graham, the great American dancer and choreographer, generally regarded as pioneering the movement called *modern dance*, her giving back during the *summing up phase* was through choreography. She continued dancing until her mid 70s, turning to full-time choreography over the next 20 years, until her mid 90s. Her long life with continuing creative expression, influenced in a new way during her summing up phase, enabled her to give back to society at the highest level in helping to grow modern dance.

The summing up phase is also a time to deal with unresolved conflicts, unfulfilled dreams, and unfinished business in manners that motivate us to develop creative new strategies. Again, in going through the process of summing up, we come to recognize or confront unwritten, unresolved, or incomplete chapters in our life. This appears to be the case with Giuseppe Verdi, who for 55 years lived with a gnawing sense of incompleteness in an area of music that he felt he had not yet fully mastered.

Many marvel that Verdi was in his 80th year when he composed his celebrated opera *Falstaff*. But why did Verdi choose to compose *Falstaff* rather than a different opera? The dynamics of the summing up psychological growth phase offer an explanation. As alluded to above, a number of older persons going through their summing up phase look back at any unfinished business. Verdi had unfinished business that gnawed at him for more than half a century. When Verdi was 25, he attempted to compose an *opera buffa* – a comic

opera – *Un Giorno di Regno* (King for a Day). It opened in the famous theatre *La Scala*, in 1840, but was received so poorly that it was cancelled after one performance. Verdi had recently lost his wife and, a year earlier, his infant son, and he became overcome with despair, vowing never to write another opera. The director of *La Scala* tactfully and sensitively released Verdi from his contract, but when he felt Verdi's emotional wound was healing, he gently encouraged him to compose a new opera. The result was *Nebucco*, in 1842, which established Verdi's reputation in Italy.

Fifty-five years after *Giorno di Regno* flopped, Verdi, in his summing up phase and at the top of his field, looked back at unfinished business – his failure to compose a successful comic opera. He decided it was time to set the picture straight, to provide the missing chapter. He composed a great comic libretto, *Falstaff*, and to leave no blemish unremoved, he arranged to have *Falstaff* open in the same theatre where the earlier sad disappointment occurred – at *La Scala*. *Falstaff*, of course, was greeted at *La Scala* as a resounding success, one of the finest operas ever written (Cohen, 2000).

The encore phase can develop from one's late 70s to the end of our years. Plans and actions are shaped by the desire to restate and reaffirm major themes in one's life, but also to explore novel variations on those themes and to further attend to unfinished business or unresolved conflicts (Cohen, 1991). The desire to live well to the very end has a positive impact on family and community, often influencing decisions to have family reunions and other events.

Vladimir Horowitz, in the encore phase during his ninth decade, poignantly illustrated the capacity for creative variations on prior distinguishing work. He was seen as one of the most remarkable pianists of any period. His technique and verve in performing were legendary. In his early 80s, complications from illness marred his performances, but with encore phase vitality he overcame this obstacle, and with great creative ingenuity characteristic of encore phase potential subtly modified his technique, substituting exquisite coloration and finesse for bravura, achieving a new round of success. In fact, his Moscow concert in 1986, at the age of 83, was released on a compact disc entitled "Horowitz in Moscow," which reigned at the top of *Billboard's Classical* music charts for over a year, and the following year at 84 he received a Grammy Award for Best Classical Performance – Instrumental Soloist or Soloists; it was both a continuation and another fitting encore to a long and distinguished career.³

The Delaney sisters after a filled century of life, engaged in an encore – a story about themselves titled, *Having our say: The Delaney sisters' first 100 years*, that became a best-selling book and was then adapted into a Broadway play. Writing the story reflected the *inner push* of the encore phase, while the widespread attraction to their story that resulted reflected capacity of persons in the encore phase to bring together community – in their case on Broadway.

Creativity is universal

The thrust of my work as well as Nancy Andreasen's is that creativity is universal, and Howard Gardner's research provides further support for this view. I have described our evolutionary gifted inner drives, collectively referred to as the *inner push* which underlies not only our capacity for ongoing psychological growth, but also that for ongoing creative expression throughout the life cycle. Andreasen described a complementary perspective, asserting that, "nature can be defined as an innate or inborn gift that drives an individual to creative achievement" and that "nurture" is also important for creativity to flourish, and perhaps essential. The human brain is shaped by the world around it "from the time that a child is born to the end of adult life." Again, both views depict creativity as universal *and*

continuing across the entire life cycle. Gardner's work throws further light on the universal nature of creativity in his describing not just "Big C" creativity, but also "little c" creativity. If one thought of creativity mainly as "Big C," then it would be difficult to fathom it as universal.

Gardner's creativity with a "Big C" applies to the extraordinary accomplishments of unusual people – for example, Einstein and his theory of relativity, or Georges Braque's modern cubist form of painting. These forms of creativity not only changed entire fields of thought – in this case, physics and art, respectively – but also influenced other fields of thought and, in some ways, world history. Creativity with a "little c" is grounded in the various and sundry realities of life. "Every person has certain areas in which he or she has a special interest," Gardner explains, "it could be something they do at work – the way they write memos or their craftsmanship at a factory – or the way they teach a lesson or sell something. After working at it for a while they can get to be pretty good – as good as anybody whom they know in their immediate world" (Gardner, 1993). This is certainly how The Young @ Heart Chorus began in the US; they are a group of older singers, having had a centenarian among them. Their story is also one of "little c" creativity evolving into "Big C" creativity (Cohen, 2000) as they acquired acclaim and began to be invited to present concerts throughout Europe. Most recently, a feature film was developed around their story and impact, showing around the world.

The above theories as background help set the stage for the design of the Creativity & Ageing Study focused on studying the effects of active engagement in music and other art forms by older adults with the goals of health promotion and disease prevention. Health promotion was addressed in the context of the World Health Organization definition of health: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."⁴ The Creativity and Ageing Study looked at the impact of creative engagement on physical, mental, and social well-being.

The Creativity and Ageing Study

Brief overview

The Creativity and Ageing Study⁵ was the first peer-reviewed study, using an experimental or quasi-experimental design with a comparison group, examining the influence of professionally conducted, participatory art programmes on the general health, mental health, and social activities of older persons, with attention to cost utilization data (Cohen et al., 2006, 2007).

Participating sites

The project was a multi-site national study, carried out in the following settings.

- Elders Share the Arts (ESTA), Brooklyn, New York. *Project Director:* Susan Perlstein. (Diverse art forms apart from music were involved, including painting, writing, poetry, jewellery making, and oral history.)
- Center for Elders and Youth in the Arts (CEYA) Institute on Aging, San Francisco, California. *Project Director:* Jeff Chapline, MFA. (Diverse art forms apart from music were involved.)
- The Levine School of Music, Washington, DC. *Project Director:* Jeanne Kelly. (Three individual singing groups joined together to form one large chorale.)

There were approximately 300 subjects in the study (100 at each site) – 150 in the arts groups, 150 in the very well matched comparison groups. Any minor differences were completely adjusted for by the appropriate statistical techniques. To be in the study one had to be 65 years of age or older and living independently. The average age in the arts groups and comparison groups in all three settings was approximately 80 (greater than life expectancy in the US at the time of the study), with an age range of 65–103. Data analysis has been completed for the Washington, DC site, and is discussed in this paper; data analyses are still underway for the other two sites, with findings moving in similar directions.

The recruitment process for the Washington, DC site particularly focused on in this paper involved sending out two notices requesting volunteers for the comparison group and for the intervention group. Both notices indicated that the goal of the study was to assess the general state of health and mental health as well as involvement in overall individual and group activities of older adults living in the community. The notice for the intervention group differed only in that it sought singers for a chorale; no singing experience was required, and the study's purpose was to explore the impact of this activity on general health and mental health as well as involvement in overall individual and group activities of older adults living in the community. Both notices targeted the same neighbourhoods or programmes (e.g. senior centre, retirement community, or area of a given neighbourhood) where older adults were involved or residing. The goal was that both groups be comparable in age, other demographic considerations, involvement in activities, and in as many of the other major measures of the study as possible. Whereas participants in the intervention group altered their routines by becoming involved in the chorale, participants in the comparison group continued their regular activities as usual, with the study introducing no changes other than the assessments. The attrition rate in the intervention group was 14.5% and 15.8% in the control group.

Objective of study

The objective of this project was to evaluate the effects relevant to general health, mental health, overall functioning, health services utilization, and sense of well-being in older persons caused by active participation in cultural programmes provided by professional artists involved in visual and literary arts, music, and other cultural domains. These programmes drew upon a range of art and cultural disciplines, such as painting, pottery, dance, music, poetry, drama, material culture, and oral histories in a creative context.

Historical context of study

We are at the second major turning point in the contemporary focus on ageing – that of looking at individual potential and assets beyond problems and deficits. This focus on potential has profound possibilities for advancing health maintenance and health promotion efforts. Societal interest in potential in later life is soaring, and it is in this context that a project studying how cultural programmes affect older persons could not be more timely (Cohen, 2000, 2006).

Theoretical basis for the Creativity and Ageing Study

The theoretical basis for the Creativity and Ageing Study drew upon the studies described above elaborating potential underlying mechanisms of action to explain the positive

effects of music and art on health in later life, as well as on engaging and sustaining the involvement of older adults in the creative activities provided in the study. The theorized mechanisms of action included the following.

The influence of sense of control and social support on health with ageing, mediated through PNI effects and immune system boost

Observationally, the sense of control phenomenon is reflected in the following example of a 94-year-old woman who came up to me after one of the Washington, DC singing group rehearsals in the multi-site national study we designed, commenting:

I'm 94 years old, and wasn't sure I could sing, and was even less sure that I could follow the notes. [Becoming increasingly animated] But I found that I could sing! In fact, I'm improving! And, I can't believe it, but I'm finding it easier and easier to read the notes! I am so glad I decided to take a chance and join the chorale. This has been one of the most important experiences of my life. I hope it will never stop. My daughter feels the same way about it.

In the Creativity and Ageing Study we brought together both of these mechanisms associated with positive outcomes in older persons – sense of control and social support. All of the art groups required the active engagement of each individual involved in the art form available. And art provides a wonderful context for experiencing a growing sense of mastery. Week after week after week, for 30–35 weeks a year over two years, participants would engage in an art form. If they were singing they could see on a weekly basis how their singing quality and ability to read music were improving. It was instant feedback that continued and grew every week. If one were painting, they could see further development or a new piece of art every time they would go. These were empowering feelings. In the entirely Spanish-speaking jewellery-making group in New York City, one of the men shared that the experience was helping his marriage. At first nobody knew what he meant, and many speculated on what changed; was he talking about his love life, they wondered? Word got out about the comment and the buzz around it, and many new persons tried to join the group. What was happening was that the new jewellery maker was making his wife a new piece of jewellery every week, and a new glow came to their relationship.

Social support was very strong in the groups. In the writing group, one of the women had to enter the hospital, and the rest of the group came to visit her every day, bringing assignments and working on the writing together with her. In the poetry group, the oldest member of the study, turning 101, began to develop trouble with his vision, making it difficult for him to write his verse. But the others in the group suggested that he dictate his poetry and they would record it. He was strongly affected by the powerful sense of camaraderie. Typically, in this age group, when a spouse dies, the other spouse drops out for varying periods of time. This did not happen in the art groups around the death of a spouse; group support was so strong the surviving spouses derived much comfort continuing with their groups.

We then brought both of these factors together – sense of control and social support – creating what appeared to be a synergy between them. Every week participants in the study would experience a growing sense of mastery and deepening social support. The art brought them to the Creativity & Ageing Study and kept them coming. No matter how good a given intervention is, its value is diminished if it is not sustained. We all know the value of physical exercise, but if we engage in it only sporadically, we undermine its potential benefits. From participants' feedback it was clear that the music and art kept them coming. The creative experience puts many into what Csíkszentmihályi (1990) described as a "flow state." We also chose art because the programmes we developed

could easily be replicated in any community across America – urban, suburban, or rural – and artists are accessible in all these settings.

Therefore, the apparent synergy of sense of control with social support and the role of art on keeping them coming was the essence of the theoretical background of the study. Sense of control and social support had already been shown each alone to promote positive health outcomes with ageing. Now they were being brought together in a synergistic sense through the catalytic effect of art. Thus, positive outcomes would not be a mystery; there would be clear and proven underlying mechanisms to explain the positive results.

Brain plasticity promoting enhanced cognitive performance and health

Prior research shows how challenging activities and stimulating experiences induce the sprouting of new neuronal dendrites as well as new neurons themselves, enhancing brain reserve. Further studies suggest that engaging in general lifestyle activities may help to promote successful cognitive ageing (Newson & Kemps, 2005). The overall increase in activities a year into the Creativity and Ageing Study among members of the chorale was consistent with the finding of overall improvement in their health. In other words, the increased number of activities among those in the chorale was in effect a proxy consistent with sustained cognitive performance, as described in the paper by Newson and Kemps.

The hemispheres of the brain working in greater synchrony with ageing

Synchronized bilateral brain involvement, which is basically a mid- and later-life phenomenon, by its very nature enables better integrated left and right brain involvement. It has been hypothesized that activities that benefit from better integrated left/right brain engagement are appealing to the brain. It is further hypothesized that they are like “chocolate to the brain” in how the brain metaphorically savours them (Cohen, 2005, p. 77). Virtually every form of art provides optimal utilization of the benefits of synchronized hemisphere involvement – optimally integrating left and right brain capacities. This underlying mechanism was viewed as likely influencing the engagement and sustained involvement of older adults in the Creativity & Ageing Study.

Developmental considerations with ageing

Each new developmental phase with ageing creates a new inner climate within us that allows us to re-evaluate our lives and experiment with new strategies. This ongoing process results in new opportunities for us to access and activate untapped strengths as well as new and creative sides of ourselves (Andreasen, 2005; Cohen, 2000). Engagement in art becomes one of those areas of untapped strength that in particular becomes tapped with ageing. Developmental changes with ageing were expected to have a positive influence on the part of older persons to participate in and stay involved with the Creativity and Ageing Study. The liberation phase, in particular, was anticipated to have an important role with its mounting developmental feelings of “if not now, when?,” “Why not?,” and “What can they do to me?” (Cohen, 2005). The new sense of internal liberation through increased comfort, confidence, and courage plus the external freedom factor of increased time for personal use in the liberation phase translates into new creative interests and expression for many, such as with music and art.

Summary of findings from The Creativity and Ageing Study

This multi-site national US study taking place in Washington, DC, New York City, and San Francisco began with a staggered start – initially in Washington, then New York, then San Francisco. The analysis of the two years in Washington has been completed, while the data for New York and San Francisco are still under analysis. But while data analyses for the latter two sites are still in progress, what is being reported is moving in similar directions to that of the Washington, DC findings. In Washington, DC all the participants were engaged weekly in three singing groups, coming together to form one large chorale. This went on for two years. In New York City and San Francisco, several different art forms other than music were involved, including painting, jewellery making, writing, and poetry. The summary of results from two years of participation in the chorale follows (Cohen et al., 2007).

Results from standardized questionnaires and self-report measures revealed positive findings for the effectiveness of the intervention, when baseline differences were controlled for. The intervention group (chorale) reported a higher overall rating of physical health, fewer doctor visits, less medication use, fewer instances of falls, and fewer other health problems than the comparison group. Among the mental health measures, the intervention group also evidenced better morale and less loneliness than the comparison group. In terms of activity level, the comparison group showed a significant decline in total number of activities, whereas the intervention group reported a trend toward increased activity. These were remarkable positive findings in a population group with an average age greater than life expectancy, where one would typically expect increasing decline, as occurred in the comparison group.

Figure 1 graphically illustrates the change in the direction of the two groups, comparing the number of overall health problems over time. Those in the comparison group had an increase of problems over time, while those in the intervention group (the chorale) demonstrated a decline in problems over the course of the study.

In conclusion, in examining the positive impact of participatory art programmes for older adults in the Creativity and Ageing study on overall health, we are witnessing true health promotion and prevention effects. This is reflected in the significant reduction in doctor visits, medication use, and loneliness in comparing those in the art programmes versus the comparison groups; it is also reflected in improvements in the measures for depression and morale and in greater involvement over time in activities among those in

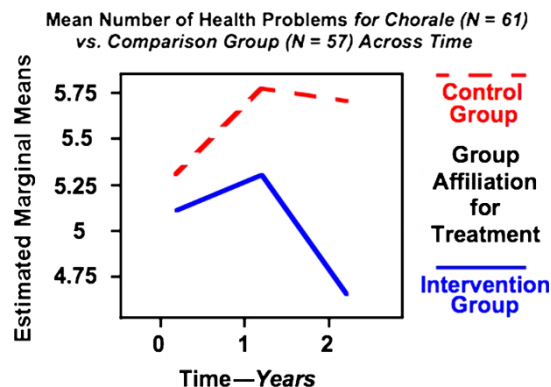


Figure 1. Increased health problems in the comparison group vs. a reduction in the chorale.

the art groups in contrast to those in the comparison groups. Moreover, the actual improvement reported in general health and the sustained level of involvement in overall activities two years into the study among subjects with an average age greater than life expectancy reflects a reduction in risk factors driving the need for long-term care. This improvement came through continuing involvement in a high-quality participatory art programme – in this case, in an ongoing chorale directed by a professional conductor.

Results from the Creativity and Ageing Study pointing to societal cost savings

Apart from the remarkable findings in actual improvement in a group with an age greater than life expectancy, the cost savings ramifications are comparably noteworthy. Medication usage was being monitored in the study a year before Medicare D in America went into effect. Medicare is essentially national health insurance for those aged 65 and older in America. Medicare D is a new part of the coverage that now includes reimbursement for prescription medicine. Medicare data reveal that in 2007, the average benefit per enrollee was \$1575 for the year; the total Medicare expenditures for medications in 2007 was \$48.6 billion.

The comparison group reported fewer medications than the intervention group at baseline, while by the two-year follow-up the comparison group was reporting more medication use than the intervention group (chorale). These were significant differences. To illustrate the potential magnitude of savings due to less medication utilized by older adults in art programmes – specifically here in a chorale – compared to those not in art programmes or a chorale, consider the impact of even a minuscule amount of cost savings on a daily basis. The results in this study point to more than minuscule savings. As an example of a minuscule daily amount of savings, consider a saving of 8 cents a day. If one multiplies that 8 cents by the 365 days in a year, and in turn multiplies this figure by the 36.3 million individuals eligible for Medicare D in America, then the estimated savings would be over a billion dollars a year in the Medicare D eligible population group; a dollar-a-day savings for that group would be approximately \$13 billion a year.

Regarding doctor visits, Medicare data reveal physician fees on an outpatient visit to have cost Medicare \$58.7 billion in 2007. Average benefits for Medicare enrollees outside the hospital averaged \$4573 per individual in 2007.

In the Creativity & Ageing Study, mean values suggest a decrease in total number of doctor visits from baseline to first follow-up for the intervention group (chorale) with an increase in total number of doctor visits for the comparison group during the same time. Both groups evidenced an increase in doctor visits from first to second follow-up, with the comparison group reporting, on average, two additional doctor's visits than the intervention group.

Meanwhile, The Centers for Medicaid and Medicare in the US revealed the following payments that Medicare makes for different types of office visits; they reflect the national average, where there are different amounts depending on where one lives:⁶

- a new office visit: \$36.18;
- an office visit for an established patient/10 minutes: \$37.33;
- an office visit/established patient/15 minutes: \$59.80.

Most visits would be established patient visits, and if one averaged the 10- and 15-minute visits, it would come to \$48.57 per visit. In The Creativity & Ageing Study, comparing the chorale to the comparison group for the two years, there were on the average 3.56 more visits in the comparison group than the chorale. Multiplying 3.56 visits by an average cost

of \$48.57 per visit comes to a savings of \$172.91 a year for a chorale participant. Extrapolating this to the Medicare D-eligible population as whole, the savings would come to an extrapolated savings for the Medicare D population as whole of approximately \$6.3 billion a year.

Clearly, these analyses reflect potentially major cost savings for Medicare, without incurring any apparent Medicare costs in the process. They reflect the cost savings impact of tapping into individual potential apart from the cost impact of treating problems. They reflect the cost savings impact of creative engagement that has a positive effect on the health of older adults; in this case the creative engagement is through community-based participatory art programmes, with the specific example here that of ongoing involvement with a professionally conducted chorale. Of course, these analyses reflect outcomes that might occur if *all* Medicare-eligible older adults participated in the arts, just as all older adults and the public in general are encouraged to be involved in physical exercise. Moreover, this is of course but one study, although the potential magnitude of cost savings with but a small change in medication usage and/or doctor visits in the older population is enormous. Further research is certainly indicated in this highly promising area.

Dynamics underlying creativity in the second half of life and the mechanisms through which creativity influences health with ageing

What the above review reflects is the depth, breadth, strength, and continuing capacity for creative expression with ageing. It identifies and explains built-in dynamics that influence psychological growth and creative capacity throughout the life cycle, and the inter-relationship between them. It then elaborates the varied underlying mechanisms through which creative engagement has a positive effect on health promotion and coping with illness. Social, psychological, and neurobiological factors are all involved, and a new state of the art in brain and behavioural science clarifies the underpinnings of how our mind, brain, and body work together in the second half of life to help maintain, promote, and restore health. A biopsychosocial model with attention to a psychoneuroimmunologic feedback loop is presented to improve our understanding of how active involvement in participatory art programmes can enable older adults to improve their health. The multiple underlying mechanisms of action that are discussed demonstrate why positive changes occur because of ageing, not despite it, and in the process how involvement with the arts mobilizes many of these mechanisms in the service of health with ageing. The outcome is not only the betterment of the health of older individuals, but the consequent cost savings benefit for society as well.

Notes

1. The Hawthorne effect is the alteration of behaviour by the subjects of a study due to their awareness of being observed. Some view it like a behavioural placebo effect.
2. <http://www.newhorizonsmusic.org/>
3. *Wikipedia* http://en.wikipedia.org/wiki/Vladimir_Horowitz
4. <http://www.who.int/about/definition/en/print.html>
5. The study has had a mix of federal and private sector sponsors: National Endowment For The Arts (NEA), the lead sponsor; Center for Mental Health Services, SAMHSA, DHHS; National Institute of Mental Health (NIMH), NIH; AARP/National Retired Teachers Association; Stella and Charles Guttman Foundation, NYC; International Foundation for Music Research.
6. www.cms.hhs.gov

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