

# Ten Reasons Why Everyone Should Learn To Play Musical Instrument

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Can you imagine living your life without music? It would be very hard to do so, as music has been hard-wired into our very existence as human beings. While everyone enjoys listening to good music, not many of us are what the world calls 'musicians'- the ones with the ability to play a musical instrument. This could be due to not having the opportunity to learn as kids or simply due to lack of inclination or proper instruction. However, music is something that is never too late to learn. And here are 10 good reasons as to why everyone should learn to play a musical instrument.

## 1. Playing a musical instrument relieves stress

Researchers studying the benefits of music have reported that playing a musical instrument on a regular basis can help bring down stress. Studies show that playing an instrument helps in lowering the heart rate and blood pressure, which in turn lowers the stress hormone cortisol, thus making us feel relaxed. While just listening to music also helps, learning to play an instrument brings with it a comforting routine of daily practice that helps in keeping the stress hormones away. Michael Jolkovski, a psychologist who specializes in musicians, feels that music also helps in bringing down stress by helping people connect with others. "It (music) can satisfy the need to unwind from the worries of life, but unlike the other things people often use for this purpose, such as excessive eating, drinking, or TV or aimless web browsing, it makes people more alive and connected with one another."

## 2. Playing a musical instrument makes you smarter

People who have received a music education are generally smarter than their non-musical counterparts are. Extensive research done in this area has proved that children who learn to play a musical instrument do better in academics. Shaw, Rauscher, Levine, Wright, Dennis and Newcomb, in their research paper titled Music Training Causes Long-Term Enhancement Of Preschool Children's Spatial-Temporal Reasoning, speak about, "a research team exploring the link between music and intelligence reported that music training is far superior to computer instruction in dramatically enhancing children's abstract reasoning skills, the skills necessary for learning math and science."

## 3. Playing a musical instrument improves your social life

Music helps you connect. Learning an instrument enlarges your social circle since you get to meet more people than you usually would. In children, music can help develop social skills. Maestro Eduardo Marturet, a conductor, composer and musical director for the Miami Symphony Orchestra, who also oversees the MISO Young Artist program in South Florida, has observed the effect that music has on a child's social skills. "Socially, children who become involved in a musical group or ensemble learn important life skills, such as how to relate to others, how to work as a team and appreciate the rewards that come from working together, and the development of leadership skills and discipline."

## 4. Playing a musical instrument helps build confidence

Choosing to take music lessons can help build confidence. Once you are aware that you are able to do something well, like play the flute for instance, you naturally become more confident of your skills. Learning to play an instrument can help both children and adults who face confidence issues. Elizabeth Dotson-Westphalen, a music teacher and performer, has found that music has helped many of students develop confidence. "They find that once they can develop a skill by themselves that they can get better and better."

## 5. Playing a musical instrument teaches patience

Music teachers feel that music can help teach patience. In a world of instant gratification, learning to play an instrument is not something that can happen overnight. It is the daily effort of everyday practice that can help a musician learn how to play without mistakes. This in turn develops patience. Most musicians go through years of regular practice that includes daily musical exercises and the tackling of progressively difficult musical pieces, which in turn helps them conquer the virtue of patience.

## 6. Playing a musical instrument fosters creativity

Stuck in everyday routine lives, many of us lose touch with our creative side. Learning to play a musical instrument, especially when you reach advanced levels, can foster that lost creativity. Since music education plays on your mental, emotional and cognitive abilities, the brain is stimulated to think out of the ordinary, which results in improved creativity.

## 7. Playing a musical instrument improves memory

Music and memory go hand in hand. Learning to play a musical instrument makes you use both parts of your brain and this in turn boosts memory power. Maestro Eduardo Marturet, reiterates this point when he says, "Further research has shown that participation in music at an early age can help improve a child's learning ability and memory by stimulating different patterns of brain development." Music education is also linked to higher IQ levels and the physical development of certain parts of the brain.

## 8. Playing a musical instrument develops discipline

Music requires dedication and regular practice. Allotting a specific amount of time to practice music daily develops discipline in the learner. This can prove to be extremely advantageous in children. Mira Stulberg-Halpert, of 3D Learner Inc., who works with children who have ADHD, has seen music discipline children when everything else fails. She has this to say on the effect of music on kids. "Exposing kids to musical instruments is the key. They are naturally curious and excited about them-and the discipline that parents and kids learn by sticking with it is a lesson in itself."

#### 9. Playing a musical instrument gives you a sense of achievement

Learning to play a musical instrument gives you an immense sense of achievement. Pianist Emily Singers, in her article titled, 12 Reasons You Should Learn to Play the Piano, writes that piano playing can bring true satisfaction. "It's truly one of the most satisfying things you can do," she says. "There's no feeling like playing a difficult song and playing it flawlessly. (It is) Quite an ego-boost." This feeling of satisfaction leads to a tremendous sense of self-achievement that can help you accomplish more in other areas of your life.

#### 10. Playing a musical instrument is fun

Lastly, learning to play a musical instrument is fun. "The art of music is so deep and profound that it has to be approached with a bit of intensity laced with great affectionate joy", says noted singer, musician and Bollywood film music composer Shankar Mahadevan. Playing a musical instrument can bring back the fun factor into your life. Music has the special quality to bring joy, peace and fulfillment that helps lift the spirit and make life enjoyable for everyone involved.

Learn Music Online:

Spreading the immense joy that music brings to all who wish to learn, has motivated Shankar Mahadevan to set up an online music academy with the aim of helping aspiring people learn music. The Shankar Mahadevan Academy, has been offering quality online music education via its website [www.shankarmahadevanacademy.com](http://www.shankarmahadevanacademy.com) and through regular classes conducted in schools for both vocal and instrument training. Online singing classes are conducted for Classical, Hindustani and Bollywood music through self-study OM (online music) books or with the aid of expert teachers. You can also choose to learn Indian musical instruments like the flute and tabla through online classes in the convenience of your home.

Did you know that learning to play a musical instrument has many benefits including the ability to bring down stress, improve memory power and increase confidence levels?

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# This is your brain on a musical instrument



Greg Toppo, USATODAY 6:03 p.m. EDT September 2, 2014



(Photo: Michael Penn AP)

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Learning to play a musical instrument produces such profound changes in children's brains that kids actually can hear and process sounds they couldn't hear otherwise, according to researchers using high-tech sensors.

The findings, published Tuesday, could provide a boost to music education programs that invite kids to play instruments rather than simply listen to music.

The study, by researchers at Northwestern University, examined a community music program serving low-income children in Los Angeles. They attached special electrodes to children's scalps and measured how their brains responded to sounds. The children's average age was about 8.

Researchers found that those who played an instrument for two years showed a stronger "neurophysiological distinction" between certain sounds than children who didn't get the

instrumental training. For instance, the music-makers more easily could tell the difference between the words "bill" and "pill," a key skill in learning to read.

The Los Angeles program already has shown improved academic results for kids, and the new research may offer an explanation, or at least part of one. The study found that the more hours kids played, the greater the neurological benefit.

"We're really able to measure what the nervous system has become, based on the experience that these children have had with sound," said Nina Kraus, a neuroscientist at Northwestern who led the research.

The new findings, she said, shouldn't be confused with those reported years earlier on the cognitive benefits of listening to certain types of music. The so-called "Mozart Effect" involved listening, not playing a musical instrument. "It turns out that playing a musical instrument is important," Kraus said. "We don't see these kinds of biological changes in people who are just listening to music, who are not playing an instrument. I like to give the analogy that you're not going to become physically fit just by watching sports."

She isn't sure why the difference is so pronounced but noted that playing music involves "not just the information that comes through our ears." Musicians experience the music through their fingers and throughout their bodies. And the work required to learn to play an instrument engages the brain's cognitive, sensory and reward circuits. The new research, she said, "is the tip of the iceberg."

The findings appear in *The Journal of Neuroscience*.

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## COLUMNS

# Music as a Modality in Pediatrics

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By Carolyn O. Cantu, MS, OTR

The beauty of music as a therapeutic modality is its adaptability and flexibility.

Classical, country, vocal, jazz, children's jingles or musical rhyme are all usable in homes, schools, hospitals, group homes, rehabilitation centers and private music therapy practices. Whether participating in a structured program in one of many therapeutic settings or listening to the wide variety of music available at home, children with special needs may develop performance skills applicable to all areas of their daily lives when specifically selected musical pieces are integrated into individual or group therapeutic intervention to meet therapeutic goals.

Music for special-needs children may be considered in a variety of therapeutic contexts; structured therapeutic settings such as music therapy under the guidance of a registered music therapist or therapeutic listening under the direction of a sensory therapist. Others include unstructured settings such as home programs designed by therapists and supervised by parents or caregivers.

We must keep in mind that there are very specific operational terms and definitions in this field, coupled with specialized training. When a pediatric practitioner gives time and effort to training, collaboration and consultation with both music therapists and occupational therapists with expertise and experience in the therapeutic use of music, children may benefit from the therapeutic selection, gradation and modification of music specifically designed to meet therapeutic goals.

### Responses to Music

Responses to musical intervention are as varied as there are special needs. For some children with psychosocial behaviors, music may offer an escape or conversely a way to express distress, confusion, even joy. For kids with physical (sensorimotor) involvement, music and song stimulate movement, facilitate neurodevelopmental organization, promote attention, develop self-calming and modulation and allow engagement in basic activities such as self-care through lyric prompts.

Music intervention also can affect those children with a wide range of developmental delays. Skills acquired through these musical experiences may well carry over to other areas of occupation in a child's daily life.

Therapeutically, music provides an activity that develops from individual to group participation, thereby promoting acceptable social behaviors. The orderliness, structure and anticipation of expected sounds develop awareness of order and structure generally, and children may transfer this cognitive awareness to other performance areas such as school, work or self-care.

Although proponents of music intervention promote its value in physical, social and cognitive realms, it is recommended that therapists investigate recent studies. Research tends to evidence both positive and negative results of effectiveness and efficacy questions. Therapists considering music as modality would benefit from an ongoing search of recent literature examining both effectiveness and non-effectiveness for specific populations. If the therapeutic objective is solely the child's participation in an activity enjoyed by the child, his/her therapy group and family members, research studies would have little to no bearing.

There are a wide range of music interventions that therapists can consider for their own use or suggest to parents and caregivers.

### Music Therapy

A clear and thorough overview of music therapy for children with special needs is presented in the Internet text "Music Therapy for Special Children," by Sandra Cornies, BMT, based out of the Cochrane Temiskaming Resource Center in Timmins, Ontario Canada ([www.nt.net/~a815/music.htm](http://www.nt.net/~a815/music.htm)). According to Ms. Cornies, music therapy "is the structured use of music experience to facilitate positive changes in human behavior. Music therapy is a goal oriented process with sessions carefully planned, executed and evaluated to address the specific needs of the child." The Web page includes additional benefits such as increasing attention span, self-esteem, listening skills, turn-taking, non-verbal communication and self-expression through singing, playing instruments, moving to music, listening to music and creating music.

"Any style may be used, depending on preferences and needs of the child," Cornies adds.

If OT practitioners choose music therapy as modality, they may draw upon the extensive, intensive and specialized training of music therapists for training, collaboration and consultation, or make a referral to a certified music therapist for parents and caregivers.

### **Auditory Interventions**

Sheila Frick, OTR, and Colleen Hacker MS, OTR/L, present "Auditory Interventions: What is Right for my Child?" on their Web site (<http://www.music.nt4kids.com/auditory.html>).

This Web text presents a comprehensive overview of auditory interventions from their history to practice today. Among these interventions, Frick and Hacker include descriptions of such modalities as auditory integration training, the SAMONAS Method, integrated listening, the Listening Fitness Program, home listening programs using sound stimulation designed by Paul Modale, and Interactive Metronome therapy.

Of special interest is the review of therapeutic listening, "a highly individualized method of auditory intervention utilizing electronically altered compact discs in protocols specifically tailored by sensory integrative professionals to match client needs."

Pediatric occupational therapists and speech language pathologists who specialize in sensory interventions may collaborate their expertise and specialized training in this area, offering their young clients the most therapeutic music intervention fitting individualized needs.

### **Home Music Programs**

Pediatric practitioners are continually faced with suggesting therapeutic activities to parents that are inclusive of all members of the family. Music introduced at home may be just that activity designed for fun for the entire family. Both listening and participation develop skills such as attention, social connection, movement to rhythm, and group interaction to name a few. Imitation of siblings singing or moving to a tape, experimenting with a rhythm piece, or following along with a song's lyrics increase a child's sense of expression and participation which has potential of carrying over into other group (family) activities.

Two web pages most beneficial to parents and caregivers interested in the introduction of music to their special needs child are Tekete Ipurangi's Defining Space Using Instruments

([www.tki.org.nz/r/arts/music/specialneeds/instruments\\_e.php](http://www.tki.org.nz/r/arts/music/specialneeds/instruments_e.php)) and Sandra Cornies, Music Therapy for Special Children ([www.nt.net/~a815/music.htm](http://www.nt.net/~a815/music.htm)).

Music for the special-needs child can be one of the most rewarding modalities chosen to achieve therapeutic goals.

**Resources available at [www.advanceweb.com/OT](http://www.advanceweb.com/OT) or upon request.**

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## **Benefits of Music Participation for Senior Citizens: A Review of the Literature**

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### **Abstract**

*This article is a review of the literature in the physical, psychological, and social benefits of active music participation for healthy senior citizens. It shows a connection of these benefits to an overall quality of life of older adults. Evidence suggests that active music making has a positive effect on quality of life. Active music participation holds numerous benefits for senior citizens, including, but not limited to (a) an overall sense of physical and mental well-being, including the lessening of stress, pain and medication usage, (b) the slowing of age-related cognitive decline, (c) feelings of pleasure and enjoyment, (d) pride and a sense of accomplishment in learning new skills, (e) creation and maintenance of social connections, (f) a means of creative self-expression, and (g) the construction of identity at a time in life when sense of identity may be in flux.*

Most music education researchers tend to focus on studying the musical experiences of groups and individuals from pre-school age through the university level. The effect of music participation beyond the early years of adulthood has received relatively little attention (Myers, 1995). The importance of music participation in older adults cannot be overlooked. The United States Census Bureau (2008) projected that approximately 13% of United States citizens would be over the age of 65 in 2010, that over 20% would be over the age of 65 by 2050, and that average life expectancy would continue to prolong from 78.3 years in 2010 to 83.1 years in 2050. Globally, the population of senior citizens, 60 years of age and older, has been growing by 1.8% to 1.9% each year since 1950, and this rate of annual growth is expected to increase to 2.8% between the years 2025 and 2030. By the year 2050, the number of senior citizens will surpass the number of young citizens (15 years of age and younger) (United Nations, 2002). Senior citizens are increasingly an important component in society, and their window of musical opportunities is expanding.

Furthermore, research on older adults holds a strong potential value for all age groups. A leader in the field of aging and geriatrics states, “a focus on

aging or older adults in a given study might lead to new clues for younger subjects” (Cohen, 1992, p. 898). This principle may apply to music education as well. Senior citizens’ participations in music could be attempts to catch up on a music education that might have been missed in earlier years, or continuances of music education during their earlier years and reflections of their beliefs in music cultivated throughout their lives, all of which suggests that lifelong learning should be a consideration in the music education of school-aged children. In addition, music participations of senior citizens may contribute to music education of members of their family, community, and society.

In a study of age-related trends and differences in achievement, learning rate, and self-perceived attainment among groups of younger, middle-aged, and older adults in a music learning program, Myers (1986) found no evidence to support stereotypical assumptions that achievement declines with increasing chronological age. Even though older adults’ self-perceptions of skills in aural-manipulative tasks, such as playing the guitar, were lower, these lower self-perceptions were not supported in post-test results after 10 two-hour music classes.

Cohen (1992) recognized that many capacities continue to develop independent of age and that “some strengths *emerge* in association with aging” [emphasis in original] (p. 900). Among these strengths include (a) vocabulary, (b) specialized skills, and (c) psychodynamic growth, which was related to “personal insight, a component of wisdom” (p. 901). Cohen and his colleagues also found many benefits of arts activities in senior adults (Cohen, 2000, 2006a; Cohen, Perlstein, Chapline, Kelly, Firth, & Simmens, 2006). In music, certain strengths, values, attitudes, abilities, or benefits may emerge as age increases. As life expectancy continues to prolong, the impact of these emerging strengths must not be ignored.

The impact of music in the lives of senior citizens has been accompanied by a shift in attitude towards senior citizens in the United States (Davidson, 1982; Gibbons, 1985). In the 1960s, senior citizens were described as “forgotten souls,” “the needy elderly,” and “unutilized talents” (Voriss, 1962). Current senior citizens are not thought of as frail and

passive, but instead are viewed as “individuals interested in active lifestyles during their retirement years.” Accompanying this shift has been an “increased focus on improving the quality of life for older adults” (Coffman, 2002, p. 76).

Gates (1991) posited that, with regard to music, “there are three classes of people in any large segment of our society: music participants, music audiences, and people who perceive neither music activity to hold personal benefits” (p. 14). The last category of people was also described as “musically uninterested or uninvolved” (p. 15). This model clearly presented a difference between the active music participants and the spectators. Music professionals, apprentices, amateurs, hobbyists, recreationists, and dabblers were all music participants who “directly or indirectly produce musical events for an audience, even if the audience is the performer him/herself, and even if the audience is not yet present as when an individual learns or composes music for an upcoming performance” (p. 7). We adopted this definition for this review of the literature with a difference in that we focus on the production of musical sound rather than the production of the musical event, to exclude the dancers, producers, instrument makers, and others who contribute to the causes of a musical event but not making any musical sound. Senior citizens who participated in music making beyond being solely in the audience are considered in this paper.

While benefits of music participation for senior citizens could be idiosyncratic to each individual, there is an abundance of support in the literature concerning these benefits (e.g., Coffman, 2002; Gibbons, 1985; Jutras, 2006; Kraus & Chandrasekaran, 2010; Michalos, 2005; Solbu, 1987; Weinberger, 1995). Evidence came from studies conducted by researchers in fields such as music education, psychology, sociology, psychiatry, and various health professions. Detriments of music participation are hardly mentioned in the literature. Of the studies we reviewed, only Michalos’ (2005) study found a negative effect in that music participants who sang alone for a number of hours per week was negatively correlated with general health ( $r = -.19$ ,  $N = 315$ , age range = 18-86 years, average = 48 years). Michalos explained that those who sang alone were “not only alone but lonely, which might lead to moderate depression” (p. 38). We believe that detriments of music participation occurred in exceptional circumstances only, if they occurred at all, along with other reasons such as depression.

Over the course of this literature review, we have decided to exclude the literature that targeted those senior citizens who were not well, such as those suffering from aphasia, Parkinson’s disease, Alzheimer’s disease or other forms of dementia, or in

hospice, palliative care, or other intensive care facilities. We feel that the physical and psychological states of these senior citizens are vastly different from those who are healthy and that music educators are normally not expected to provide musical treatments for these patients. Music therapists and other health professionals are much better equipped to help them. Therefore, studies focusing on such samples deserve a separate treatment. A review of such literature with empirical data is found elsewhere (e.g., Hilliard, 2005).

The central question for this literature review is: What are the benefits of music participation for healthy senior citizens? “Healthy” here refers to those who do not have a medical condition that prevents them from living independently and do not need extensive medical treatments. They are assumed to have normal cognitive and physical abilities in congruence with their age. Based on the literature on healthy senior citizens’ music participation, the benefits could be grouped in three categories: physical, psychological, and social. They are presented in the next three sections, followed by a section on the benefit in the overall quality of life, a brief summary, and implications for music educators.

### **Physical Benefits**

A large body of literature addresses the physical well-being of senior citizens as a result of music participation. Due to the age of senior citizens, they are more prone to have various health issues. Evidence in the literature suggests that there were multiple physical benefits regardless of the senior citizens’ health conditions. A landmark two-year study examining the effect of arts participation on 300 senior citizens, aged 65 or older, in New York City, San Francisco, and Washington, D.C. showed remarkable results (Cohen, 2006a, 2006b). Compared to the control group with limited arts participation, those who participated in weekly arts programs, including music, showed better health, fewer doctor visits, less medication usage, more positive responses on mental health measures, and more involvement in overall activities. The findings “point to true health promotion and disease prevention effects” (Cohen, 2006b, p. 6). In Cohen’s (2006b) words:

The significance of the art programs is that they foster sustained involvement because of their beauty and productivity. They keep the participants involved week after week, compounding positive effects being achieved. Many general activities and physical exercises do not have this high engaging, thereby sustaining, quality. (p. 4)



Music participation, a social activity by nature, has offered a world of benefits for senior citizens regardless of their health conditions.

Although health and wellness are important concerns for many senior citizens, music participation is considered as a beneficial activity even for the normal and healthy. Based on in-depth interviews of 38 (Hays & Minichiello, 2005a) and 52 (Hays & Minichiello, 2005b) senior citizens in Australia, aged 60 to 98 years, music participation was a central contributor to the seniors' subjective experience of good health. The seniors felt a sense of well-being and good health due to their musical participations. One of the participants in the study stated that music was stimulating for her brain (Hays & Minichiello, 2005b). It kept her awake, thinking well, and functioning well. Music participation might even be perceived "as a way of slowing down the aging process because it kept them occupied, focused and, as one participant stated, gave him 'a youthful outlook on life'" (p. 447).

Senior citizens who participated in a band for older adults in the United States were not much different from the Australians mentioned above. Dabback's (2008) qualitative study revealed that the older band participants in the United States negotiated an identity of healthy productive older individuals through social interactions in the ensemble. The band was described as the "fountain of youth" that helped them to live longer. The connection between health and identity was interpreted through Marcia's (1966) identity theory, which posited that those with strong commitments to an identity tended to be healthier and happier individuals. The older band members seemed to have a strong commitment to the band given its reported low attrition rate.

The age-defying benefit of music participation was not only claimed by subjective perception of music participants. Evidence was found in classical pianists in a series of two studies in the maintenance of cognitive-motor skills when playing the piano. The older pianists' average age was 60.3 years, with ages ranging from 52 to 68 years, in one study, and the average age was 71.4 years, with ages ranging from 60 to 81 years, in another study (Krampe & Ericsson, 1996). As a form of active music participation, the amount of deliberate practice on the piano in later adulthood was a strong predictor of maintenance in musical-pianistic skills. In other words, deliberate practice on the piano had slowed the age-related decline on these domain-specific cognitive-motor skills.

Engaging in musical activities would help seniors be distracted from common wellness issues like anxiety, stress, and common pain (Hays & Minichiello, 2005b). Based on a survey of 711 piano students across the United States, whose average age was 51 years,

with a range from 24 to 94, stress reduction was reported as one of the more highly rated personal benefits of piano playing (Jutras, 2006). Scientific evidence using mRNA (messenger ribonucleic acid) analysis and induced stress as baseline on 32 adults, whose ages ranged from 18 to 76 with an average of 40.8 years, with no prior experience playing a musical instrument supported the fact that recreational music making activities could reverse stress-induced genomic expression (Bittman, Berk, Shannon, Sharaf, Westengard, Guegler, & Ruff, 2005). (*Gene expression* is the "translation of information encoded in a gene into protein or RNA", MedicineNet.com, 2003). The recreational music making was designed to foster "a group-based sense of nurturing, camaraderie and creative non-verbal musical expression in a non-threatening, relaxed and caring environment" (Bittman et al. p. 39). Enjoyable and relaxing music making activities seemed to make the stress reduction effect of music more clearly identifiable using scientific methods.

Drawing from a range of studies involving senior citizens, Table 1 presents examples of how music participation may have an impact on senior citizens' physical health. Some of them are clearly instrument-specific, such as singing for improving respiratory function, playing the organ or piano for finger dexterity. Others are rather general. Some physical benefits are often related to psychological health; at times, it is difficult to clearly divide physical benefits and psychological benefits because one type of benefit is often attached to the other.

### **Psychological Benefits**

Retirement is a time of significant psychological and social change for senior citizens. Variables that must be negotiated include cessation of full-time work, the aging process, increase in free time, changes in financial status, changing interpersonal relationships, and cultural perceptions of retirees. Depending on the capabilities of senior citizens to address these variables, retirement can range from a time of great fulfillment and adventure to a time of psychological crisis (Dabback, 2008).

Research from several fields suggests that active music participation can benefit senior citizens by contributing positively to their psychological well-being or mental health during the transitional years of retirement and beyond (Coffman, 2002; Coffman & Adamek, 1999; Dabback, 2008; Cohen, 2006b; Frego, 1995; VanWeelden & Cevasco, 2009). Through music participation, senior citizens are able to (a) increase self-understanding, (b) achieve success as learners, (c) participate in experiences that are rewarding and interesting, and (d) express themselves

creatively. These elements have been shown to enhance the quality of life of older adults (Coffman, 2002).

Some psychological or mental-health-related benefits of active music participation for senior citizens are accessed through the process of active music making (Chiodo, 1997; Coffman, 1996; Coffman & Adamek, 1999; Coffman & Levy, 1997; Ernst & Emmons, 1992; Hays & Minchiello, 2005a; Jutras, 2006; Murphy, 2003; Wise, Hartmann, & Fisher, 1992). Other psychological benefits also result from music participation, but may not occur during the process of music making. These benefits may emerge

and develop over an extended period of time in which a person participates in musical activities, and can be divided into the subcategories of (a) benefits related to perception of self (Coates, 1984; Dabback, 2008; Hays & Minchiello, 2005a, 2005b; Ruud, 1997; VanderArk, Newman, & Bell, 1983; Wise et al., 1992) and (b) benefits related to continuity of music participation (Bowles, 1991; Chiodo, 1997; Cohen, Bailey, & Nilsson, 2002; Dabback, 2008; Patchen, 1986; Ruud, 1997; Sheldon, 1998; VanWeelden & Cevasco, 2009; Wise et al., 1992).

Table 1  
*Reported Incidences of Music Participation and Physical Health for Senior Citizens*

Type of Music Participation	Effect on Physical Health	Reference
Singing	Improve respiratory function	Hays & Minichiello (2005a, 2005b)
Playing an organ	Keep fingers, feet, and the brain agile; maintain physical stamina	Hays & Minichiello (2005a, 2005b)
Playing the piano	Keep fingers reasonably free of arthritis; reduce stress	Hays & Minichiello (2005a), Jutras (2006)
Deliberate practice on the piano	Slowing the age-related decline on domain-specific cognitive-motor skills	Krampe & Ericsson (1996)
Being in band	Help aerobic capacity	Ernst & Emmons (1992)
Playing an instrument a number of times per year	Positively associated with general health	Michalos (2005)
Recreational music making	Reverse stress-induced genomic expression	Bittman et al. (2005)
Non-specific	Maintenance of muscle tone, increased cardiovascular strength	Hays & Minichiello (2005b)

*Benefits evident during active music participation*

Some of the most important psychological benefits received by senior citizens during active music participation are strong feelings of pleasure and enjoyment elicited through the act of music making (Coffman & Adamek, 1999; Coffman & Levy, 1997; Darrough, 1990; Ernst & Emmons, 1992; Hays & Minchiello, 2005a; Murphy, 2003). Ernst and Emmons (1992), in a study of a volunteer band comprised of older adults, reported that senior citizens involved in active music making experienced a heightened sense of vitality, an uplifting of the spirit, and strong feelings of enjoyment and fun. In a study of older Australians,

Hays and Minchiello (2005a) found that active music making helped participants to achieve feelings of inner happiness, contentment, satisfaction, and peace.

Another benefit of active music making for older adults is the challenge of learning new musical skills, resulting in pride and a sense of accomplishment (Coffman & Adamek, 1999; Darrough, 1990; Ernst & Emmons, 1992; Hays & Minchiello, 2005a; Jutras, 2006; Wise, et al., 1992). In a study of members of a volunteer wind band for senior citizens in the Midwest region of the United States, Coffman and Adamek (1999) found that 60% of the participants reported musical reasons (new musical knowledge, sense of

accomplishment from learning new musical skills, and personal musical development) as perceived primary motivations for senior citizens to join the band. In addition, it is worth noting that Wise, Hartmann, and Fisher (1992), in a study of a volunteer community chorus in a senior retirement village, found that even though one goal of the chorus was to improve and master musical skills, a larger, more important goal was that of working collaboratively to make music. Hence, occasional missed notes or lapses in concentration by individual chorus members were tolerated or overlooked by the group.

Closely related to the challenges of acquiring new musical skills, seniors also receive positive benefits from the demonstration of musical skills through music performance or other forms of active music making. In a qualitative study involving 28 musicians of varying instruments and levels of experience, Chiodo (1997) found that one of the most meaningful benefits of music participation for older adults was self-expression, which in this case was not focused on communication of emotions through music, but instead was concerned with the display of individual accomplishment. Senior citizens in Chiodo's study cited feelings of satisfaction and self-actualization they experienced while demonstrating or "showing off" of their musical skills to others. Other researchers have found self-expression to be a means through which older adults can express themselves creatively, and an important benefit of active music participation (Avery, 1997; Flatten, Wilhite, & Reyes-Watson (1988); Hays & Minchiello, 2005b; Jutras, 2006).

*Benefits resulting from extended periods of active music participation*

*Benefits related to perception of self.* Music is commonly thought of as a personal experience through which people can access their feelings and emotions. Evidence suggested that active music participation helps senior citizens access their emotions and construct meaning of their own identities, at a time of life when sense of identity may be in flux (Dabback, 2008; Hays & Minchiello, 2005a, 2005b). In a study of volunteer members of a senior citizen band in the Eastern region of the United States, Dabback (2008) reported that:

Identities emerge from and are shaped by the social interactions among members in the ensemble setting. Players form new musical identities, reclaim identities that were important in their youth, or revise existing identities by taking up new, social instruments. These musical identities are distinguished not merely by the acquisition of musical skills, but also by the

adoption of roles as valuable contributors to a larger musical ensemble. The approval and encouragement of significant others appears to confirm and reinforce musical identity, regardless of whether those others are themselves musicians. Members also use social interaction to negotiate identities as healthy, productive older people. (p. 267)

In addition, the elements of (a) connections made with like-minded peers in music ensembles, (b) pride developed through musical accomplishment, and (c) the positive reinforcement of appreciative audiences have been shown to raise senior citizens' levels of self-esteem and self-confidence (Chiodo, 1997; VanderArk, Newman, & Bell, 1983) and lessen feelings of alienation (Wise, et al., 1992), isolation, and loneliness (Hays & Minchiello, 2005a). Dabback (2008) found that the perceived increase in self-esteem associated with participation in a senior citizen band had a significant positive effect on participants' self-identities as musicians and as productive older adults.

Finally, participation in music can help senior citizens connect with feelings of spirituality, enhance spiritual health (Dabback, 2008; Hays & Minchiello, 2005a, 2005b), and on a lesser level, help them to achieve a sense of regeneration or renewal (Chiodo, 1997). Hays and Minchiello (2005a) found that participation in music promoted a sense of well-being in senior citizens, thus helping them balance "the intellectual, emotional, and spiritual facets of their lives" (p. 269).

*Benefits related to continuity of music participation.* Theories that support music participation as a contributing factor in the psychological well-being of older adults included those of activity and continuity. Activity theory, as applied to older adults, was based on the following premise:

More active older adults are happier and better adjusted to aging than less active older adults. This theory assumes that a person is validated by participation in various roles and activities from middle age. Therefore, it is desirable for older adults to maintain as many activities from middle age as possible, and to substitute new roles and activities for those that are lost. (Coffman & Adamek, 1999, p. 27)

In addition, activity theory supported the premise that activities in late life were essential to reconnect with one's self as defined in younger years, and boost one's sense of well-being in later years (Hampton & Russell, 2005). Atchley's (1989)

continuity theory posited that adults who were able to continue activities in which they participated in younger life were less susceptible to negative psychological changes associated with aging. The ability to persevere in cherished lifelong activities, such as music, contributed to the psychological well-being of older adults.

Research from the field of music education showed that there was evidence of a connection between early participation in music and continued music participation as older adults. Older adults who participated in music were likely to have participated in music as children and adolescents, during their schooling years (Wise, et al., 1992). Music participation in older adulthood can provide a sense of continuity and coherence in life for those who have continued their participation from younger years. This sense of continuity through music participation contributed to a sense of place and purpose in life (Coffman & Adamek, 1999; Dabback, 2008; Ruud, 1997), and thus enhanced psychological well-being and mental health.

### **Social Benefits**

Music has been shown to reflect patterns of human relationships (Blacking, 1995), and be influential in the construction of social identity (Crozier, 1997). This was especially evident in older adults, for whom music can serve as a critical vehicle for social interaction. Research showed that one of the primary reasons older adults choose to participate in music was the desire for social interaction (Coffman & Adamek, 1999; Coffman, 2002).

Music participation can provide a means of establishing social connections with others of different generations. Findings of Conway and Hodgman (2008), in a study of a collaborative intergenerational choir project whose participants were comprised of a college (tertiary-level) choir and a community choir who had not worked together prior to the study, showed that both choirs were able to establish positive connections with different age groups through music participation. Similar findings resulted from intergenerational music participation studies involving older adults (Bowers, 1998; Ernst & Emmons, 1992; Darrow, Johnson, & Ollenberger, 1996; Leitner, 1981).

In addition, music participation can create strong social connections among senior citizens. In a study of 52 Australian adults over the age of 60, Hays and Minchiello (2005b) found that social interaction during active music participation helped older adults feel connected to other older adults and that feelings of social connectedness grew increasingly important as they aged and experienced loss. One participant in this study "referred to music as 'social glue' because it facilitated people coming together" (p. 442). Other

research findings have been similar and showed that music participation helped older adults to find friends and form close, personal bonds (Coffman & Adamek, 2001; Gibbons, 1985; Hays & Minchiello, 2005a).

Connections with other like-minded, older musicians have been shown to enhance and intensify the feelings of joy and pleasure that accompany active music making (Ruud, 1997). Older adults in another study (Hays & Minchiello, 2005a) stated that they were able to share the emotion of music on a deep level by making music together, without the necessity of language or conversation about the music.

Positive associations with others in musical groups have been shown to be important means of facilitating a sense of community and belonging in older adults (Coffman & Adamek, 2001; Hays & Minchiello, 2005b; Ruud, 1997; Wise, et al., 1992), resulting in positive growth of the social self (Dabback, 2008). Ruud (1997) posited that music participation could serve as an "entrance ticket to a social group, to experience communality and attachments to others" (p. 95). Ernst and Emmons (1992) went so far as to suggest that participation in musical groups could replace the workplace as a source of friendships and a place of belonging. Musical groups can provide participants with heightened feelings of inclusion, as well as deeper bonding relationships with others (Coffman & Adamek, 2001), through collaborative work towards achievement of group goals (Chiodo, 1997; Dabback, 2008; Wise et al., 1992). Members construct both social and musical identity through their roles as musicians within groups (Dabback, 2008). Each individual's performance is important, especially in small musical groups where absence, musical accuracy, or interpretation have a clear effect on musical quality (Gibbons, 1985).

Research showed that bonding established through music participation often extended to non-musical situations (Ernst & Emmons, 1992), such as group members meeting socially outside the group for coffee or dinner (Coffman & Adamek, 2001), or providing social support in the death of a loved one (Coffman & Adamek, 2001; Dabback, 2008). Musical ensemble participation can also aid older adults in constructing identity outside musical groups but within their community, through outreach activities or performances of musical groups (Dabback, 2008). In addition, musical outreach activities and performances provide healthy senior citizens with a means of establishing communication with less-healthy senior citizens who have lost the ability to communicate through language, such as those having Alzheimer's disease, Parkinson's disease, dementia, aphasia, or those who have had a stroke (Hays & Minchiello, 2005b).

Finally, music participation in older adulthood can aid in the positioning of the social self within culture and history. Dabback (2008) found that older women who participated in the Rochester, New York New Horizons Band were able to transcend gender stereotypes and choose to play instruments traditionally played by men. One participant in this study related a prevailing view that “percussion instruments were reserved for boys when she was in school, yet New Horizons opened up the possibility of learning to play [percussion] instruments that were once off-limits to her” (p. 278). In addition, music participation can foster a sense of historical belonging, through which older adults were able to identify musically with their historical roots as well as their contemporary place in society (Ruud, 1997).

### **Overall Quality of Life**

The physical, psychological, and social benefits presented above were important components of quality of life. This was evident in many definitions and measures of quality of life (e.g., Arnold, 1991; Berzon, Donnelly, Simpson, Simeon, & Tilson, 1995; Kane, 2001; Testa & Simonson, 1996). At an individual level, judgments in quality of life may be idiosyncratic depending on the individuals’ value system (Bech, 1993; Center for Disease Control and Prevention, 2000). Most contributing factors to quality of life were generally related to the benefit areas mentioned above. For example, one may value mobility, family life, and a worry-free lifestyle, yet mobility was related to physical health, family life was related to sociability, a worry-free attitude was related to psychological health. This section of the paper offers a review of the literature on the effect of music participation on the overall quality of life as perceived by the senior citizens. The overall quality of life refers to a combination of contributing factors.

Coffman and colleagues conducted a series of studies focusing on senior citizens’ music participation and quality of life. A hint for a link between music participation and quality of life was revealed in Coffman’s (1996) study, where senior citizens in the United States who participated in band valued the social aspects of the ensemble and showed a strong desire to accomplish challenging musical goals. This seemed to be consistent through time and space as Coffman (2006) found similar desires ten years later in Australia. In an intergenerational band, “two individuals in their 50s and 60s had decided to intensively study music by pursuing Bachelor degrees at the University of Tasmania—they were not looking to have professional [music] careers, rather they just wished to learn as much as they could” (p. 19).

Although there was no systematic focus or data analysis on quality of life, Coffman and Levy

(1997) described their experiences involving the New Horizon Band in Iowa City for senior citizens, who had a minimum age of 55 years, in ways that contributed to many aspects of their quality of life. For example, band members were highly motivated and committed to the band. Band members seemed to have made musical progress with great enjoyment. In the words of Coffman and Levy, “without their capacity to laugh at themselves, they would not have progressed so rapidly” (p. 22). The senior citizens’ perseverance seemed to have overcome many barriers posed by health-related limitations also. They described:

One band member broke a leg within a month of starting, yet soon returned. Another broke a hip and returned after it had mended, then promptly broke the other one, but returned once more. Two seniors surprised us all by undergoing quadruple bypass surgery and returning within a month’s time. (p. 19)

Continuing to focus on senior citizens’ band participation, Coffman and Adamek (1999) found that social relationships, personal well-being, and recreational activities were dominant factors in defining quality of life, which was in line with the physical, psychological, and social framework used in this paper. Their findings were based on a survey of 52 senior citizens, aged 55 to 86 and averaged 70 years, who participated in a band in a small city in the United States. These senior citizens also described most frequently musical benefits from participating in the band. They have learned new knowledge, gained a sense of accomplishment and personal development. They also showed enjoyment in playing an instrument and playing in a band and believed that they had benefited socially, mentally, and physically.

In another study, Coffman and Adamek (2001) found that slightly more than half (17 of 33) of the New Horizon Band members considered other band members as part of their social support network. Participants could list up to 20 significant persons in their lives, and 17 of the 33 included at least one other band members to be such. Other network categories included key individuals such as spouse or partner, family, friend, neighbor, health care provider, minister, priest, or rabbi, and work associate. Five of the band members included other band members with reciprocity. This finding supported the fact that social interaction within the band was an important contributor to senior citizens’ quality of life.

Instead of looking at band participation, Wise, Hartmann, and Fisher (1992) examined the effects of senior citizens’ choral participation on quality of life. Chorus members ( $n = 49$ ) from a retirement village were compared against the same number of non-chorus

members from the same retirement village. The two groups did not have a significant difference in age, health condition, social class, education level, and religion. The average age of the entire sample was 64.1. The sample was described as upper-middle class, high school or better educated, Protestants, and in good health. Both the choral and non-choral groups scored near the top 20% in life satisfaction but the choral group showed greater homogeneity, meaning that the choral participants had a narrower range within the same high level of life satisfaction. In an earlier study (VanderArk, Newman, & Bell, 1983) of senior citizens from two nursing homes, one with bi-weekly music sessions for five weeks (average age was 78 years) and the other had no music session (average age was 82 years), senior citizens participated in music showed higher scores for life satisfaction, music attitude, and self-concept in music.

After a study of 21 participants in a banjo band, an instrumental/vocal ensemble, a handbell choir, and a recorder group, age between 61 and 84 years, Rybak (1995) developed a model for older adult leisure music, which pointed directly to achieving quality of life. The model was consistent with the senior citizens' need for optimal musical challenge, through music participation involving the body, mind, and spirit, to keep life going. Quality of life was interpreted as keeping life going.

As in the prior report of music participation contributing to good health (Hays & Minichiello, 2005a, 2005b), music participation was also central to senior citizens' overall quality of life, which entailed positive self-esteem, feelings of competence and independence, and the reduction of the feelings of isolation and loneliness.

From a music educator's standpoint, offering music education to young citizens could be aimed at improving the quality of life for their lifespan (Jellison, 2000). This idea has been suggested by many others (e.g., Cohen, Bailey, & Nilsson, 2002; Gibbons, 1985; Palisca, 1976; Ruud, 1997). Positive experiences with music earlier in life could contribute to music participation later in life, which in turn would contribute to the senior citizens' quality of life.

### **Summary**

From a review of the literature on the benefits senior citizens receive from music participation in the form of active music making, the evidence is clear in that senior citizens who participate actively in music reap benefits in almost all areas of their lives. In the areas explored in this review (physical, psychological, and social), it is apparent that not only do benefits exist for senior citizens in each area, but also that numerous benefits exist in each area. These benefits can be placed on a continuum from

being merely an enhancement of life (fun, enjoyable), to serving as a medium through which senior citizens construct and maintain self-identity and coherence in life, and to "keep life going."

Secondly, the benefits of music participation for senior citizens are compounded by interaction with each other and length of participation. As was stated earlier, many benefits apply to more than one of the areas examined in this review. For example, the benefit "lessens stress" can be considered to be both a physical and psychological benefit. The benefit "provides sense of community and belonging" falls under both the categories of psychological and social benefits. Benefits that apply to more than one area or several areas could be considered to be heightened or magnified benefits, because they overlap or triangulate to positively affect the overall well-being of senior citizens. In addition, these benefits have been shown to be continuous over an extended period of time in which senior citizens participate in music, suggesting that senior citizens who participate in music for a lifetime may receive more and deeper positive benefits than those who only participate for a short time. See Figure 1 for a listing of benefits that fall under the categories of physical, psychological, and social, as well as benefits that overlap categories.

In summary, the many benefits senior citizens receive through active music participation clearly appear to have a positive relationship to physical and psychological health, as well as sense of social well-being. Since these three areas have been frequently identified in literature and research as major components of quality of life (e.g., Arnold, 1991; Berzon, Donnelly, Simpson, Simeon, & Tilson, 1995; Kane, 2001; Testa & Simonson, 1996), it is logical to conclude that active music participation has a positive effect on the quality of life of senior citizens and that most senior citizens would benefit from opportunities to participate in music.

### **Implications for Music Educators**

The benefits of music participation for senior citizens, coupled with research findings that seniors who participated in music younger in life are more likely to participate in music as older adults (Wise, et al., 1992), convey an important message to music educators, to those who serve in administrative roles in the field of education, and to those who generate funding for education. As was stated earlier, offering music education to young citizens could be aimed at improving the quality of life for their lifespan (Jellison, 2000). Positive experiences with music earlier in life could contribute to music participation later in life, which in turn would contribute to the senior citizens' quality of life.

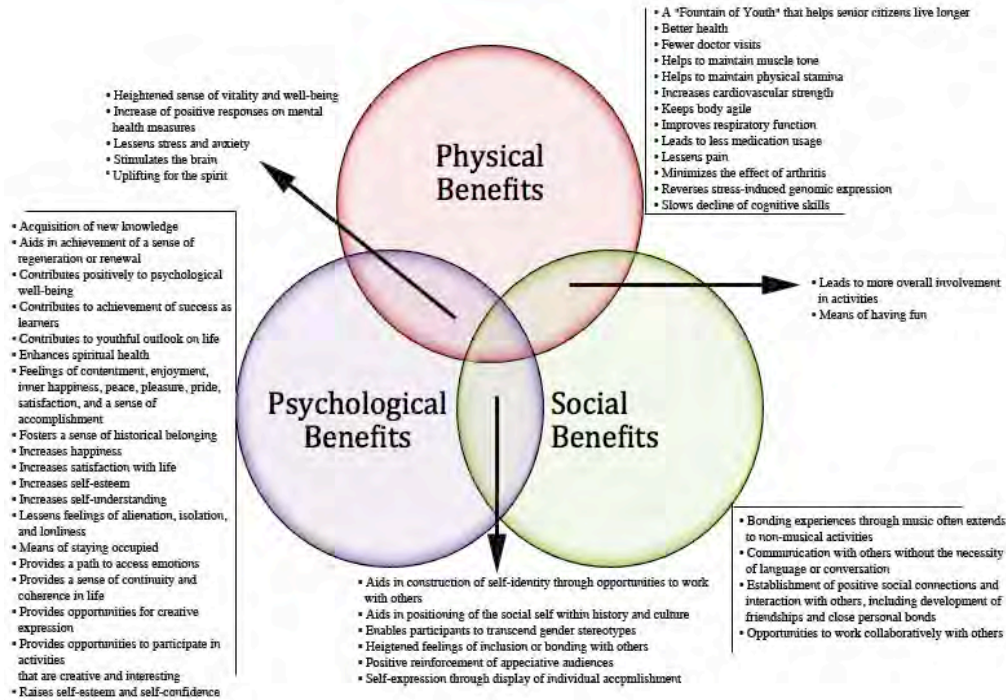


Figure 1. Senior citizens' participation in music: Benefits that enhance quality of life.

These research findings should be considered in the context of the prolonging lifespan in the population. If music education were limited to the schooling years, most people in the population would not have it for the majority of their lifespan. Music educators should expand the window of musical opportunities for adults who are not in schools anymore. They may integrate their music curriculum in the schools with musical offerings in the community. Intergenerational music groups could be a good option. Collaborating with non-school music organizations in the community is another. Musical opportunities should be available for various age groups throughout the entire lifespan to ensure continuous opportunities in music. This could lead to better quality of life for more people.

Finally, more research is needed to learn about the role of active music participation in the lives of senior citizens. Extant research has mainly concentrated on the experiences of healthy senior citizens in community music ensembles and less healthy senior citizens involved in music therapy activities in long-term care facilities. Although the latter is excluded in this review of the literature, factors of ethnicity, culture, and socioeconomic status on the role of music in the lives of senior citizens warrant further investigation. Some case studies of successful community musical groups for senior citizens could help unfolding the relationship between their current music participation and their past musical experience and skill acquisition.

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## CHINESE ABSTRACT

### 中文摘要

老年人參與音樂活動的益處：文獻回顧與梳理

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本文回顧與梳理了老年人積極參與音樂活動從而獲得的生理、心理、以及社會效益的研究文獻。研究發現，積極參與音樂活動所獲得的益處與老年人的生活質量有一定的關聯，而且參與音樂製作能夠提高他們的整體生活質量。積極參與音樂活動主要有以下幾方面的益處：1，能够使老年人從生理和心理上受益，例如減輕壓力、疼痛、以及由於藥物治療帶來的生理和心理痛苦；2，減緩心理年齡的老化；3，有愉悅感；學習新知識和新技巧能夠帶來自豪感和成就感；5，促進并保持社會交往；6，成為顯示創造力的方式之一；7，幫助老年人重新建立與認同自己新的社會身份。

## Physiological effects of a technology-based music-making program in skilled nursing residents

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### Abstract

This study evaluated the effectiveness of a technology-based music-making intervention (the Beamz) in elevating heart rate and producing a relaxation response in skilled nursing home residents. Using a quasi-experimental counterbalanced design, results indicated that this brief intervention produced a statistically significant elevation in heart rate and systolic blood pressure when played at a fast tempo. Heart rate was also significantly elevated when slow tempo music was used. In addition, participants reported a statistically lower level of relaxation following the slow tempo session and expressed that they found this new activity intervention enjoyable. Implications of findings and future research possibilities using technology-based music-making interventions in recreation therapy practice are discussed.

Key words: Beamz, geriatrics, music, older adults, physical activity, relaxation, skilled nursing, technology, therapeutic recreation

### Introduction

According to a recent report by the Centers for Disease Control and Prevention, there are approximately 1.5 million Americans residing in skilled nursing facilities.<sup>1</sup> Of these individuals, most have at least one chronic health condition, with an increasing number of older adults experiencing multiple chronic conditions. Additionally, research has found that most nursing home residents spend the majority of their time sitting idle with little to do.<sup>2</sup> As previous studies have clearly established the negative association between a sedentary lifestyle and health outcomes,<sup>3</sup> the need to identify interventions that can lead to improved health outcomes for frail older adults is pressing.<sup>4</sup>

Participation in recreation therapy interventions has been identified as one kind of treatment for improving or maintaining the health of skilled nursing facility residents. However, it is often a challenge for recreational therapists to identify age-appropriate physical activities for elderly residents of nursing homes due to

their physical and cognitive limitations. Such interventions are important as physical activity, particularly exercise, is a recognized health promotion intervention for individuals with and without disabilities.<sup>5</sup> More importantly, even though physical activity has been shown to improve physical functioning in frail older adults,<sup>6</sup> participation rates in physical activity tend to decline with increasing age and physical limitations.<sup>7</sup>

Relaxation interventions are seen as another important activity given the number of individuals residing in skilled nursing facilities who experience levels of anxiety or agitation which impact their quality of life.<sup>8</sup> Unfortunately, as participation in traditional exercise and relaxation programs typically requires a certain level of physical and cognitive functioning, many frail nursing facility residents, who have multiple health conditions and limited functional abilities are often excluded. Therefore, recreation therapists frequently struggle to identify alternative options to promote physical activity and relaxation in this frail population.

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### **Technology and physical activity**

In recent years, skilled nursing facilities have begun to use technology-based activity interventions to promote physical activity in older adults. Most specifically, the Nintendo Wii has introduced new and innovative physical activities in this population. While it was unknown how older adults would respond to a new technology, many recreation therapists have found Wii sports games a popular activity once individuals gain experience with use.<sup>9</sup>

Nintendo Wii sports games have been effective interventions in improving the overall physical well-being of seniors in long-term care facilities.<sup>10</sup> Specifically, previous literature has found that the Wii sports games can increase energy expenditure and heart rate in older adults<sup>11</sup> and have positively impacted psychological outcomes, such as affect and self-esteem.<sup>10</sup> The Wii Fit program has also shown promise in improving balance in older adults<sup>12,13</sup> as well as in individuals with acquired brain injuries.<sup>14</sup>

Given the success in using technology-based interventions to promote physical activity in the older adult population, additional resources beyond the Wii would be helpful in adding diversity to therapeutic recreation programming; in particular, interventions that focus on activities unrelated to sports might better appeal to individuals who are not interested in sports and fitness activities. Therefore, one aim of this study was to examine the feasibility of using a new technology-based music-making intervention, the Beamz, with the older adult resident population of a skilled nursing facility.

### **Music as a preferred activity**

Looking specifically at the activity preferences among older adults in a long-term care facility, Kracker et al.<sup>15</sup> found that music was one of the high-interest activities in this population. Music has also been identified as a positive coping strategy for individuals in skilled nursing homes,<sup>16</sup> and activities that engage older adults in music-making may even contribute to positive physiological changes and immunological responses aligned with decreased stress.<sup>17</sup> Music can be incorporated into a variety of activity interventions, and Sole et al.<sup>18</sup> documented improvement in the quality of life of

older adults following participation in several different music activities that included not only music listening but also music-making.

### **Technology-based music-making**

As technology begins to play a greater role in all aspects of people's lives, including leisure, new devices have emerged that enable individuals to participate in music-making activities in new ways. The Beamz is a new device that has been embraced by some therapists and therefore has begun making its way into activities for individuals in healthcare facilities.

The Beamz is a laser-based music-making technology device, built on the concept that anyone can create music. It comes in two different models (C6 and C4) and sits on a table top. It is played by passing hands through the laser beams (six different beams on the C6 and four different beams on the C4), which trigger multiple streams of musical notes and sounds. The unit allows for different musical selections and tempos. It is simple to use, requires very limited physical skills, is portable, and can be used while sitting in a wheelchair (Figures 1 and 2).

The Beamz may have particular appeal for individuals living in skilled nursing facilities who have limited functional skills, but a strong interest in music. Additionally, the Beamz might be a particularly useful intervention in skilled nursing facilities as music-based interventions are generally considered to be low risk and appealing<sup>19</sup> and the movements



**Figure 1. The Beamz C6 system.**



**Figure 2. Technique for playing the Beamz.**

required to play the Beamz may be sufficient enough to provide physical activity in this frail population.

Although studies have paired music listening with exercise adherence<sup>20</sup> and music listening with a relaxation response<sup>21</sup> or heart rate elevation,<sup>22</sup> few studies exist that examine the physiological response that occurs when music is created using a technology-based system like the Beamz. Music tempo and heart rate are both measured in beats per minute (bpm), so the ability to set the Beamz tempo at different rates allows one to either create a stimulating (120-140 bpm)<sup>22</sup> or relaxing (60-80 bpm)<sup>23</sup> music-making experience.

Previous studies have addressed the potential benefits of using a new technology as well as the benefits of music creation in this population. However, little is known regarding the pairing of these two interventions. Additionally, the use of the Beamz with this population and how residents respond to this new activity have not been documented. Therefore, this study was designed to evaluate the following questions:

1. Does participation in technology-based music-making at a fast tempo (120-130 bpm) safely elevate heart rate in skilled nursing residents?

2. Does participation in technology-based music-making at a slow tempo (60-70 bpm) produce a relaxation response in skilled nursing residents?

3. How long are skilled nursing residents able to maintain participation in a technology-based music-making activity?

4. Do skilled nursing residents enjoy participating in technology-based music-making activities?

## Methods

### Study design

A quasi-experimental, counterbalanced design was used, with individuals participating in two 10-minute sessions using the Beamz technology. One 10-minute session was at a fast tempo, and the second 10-minute session was at a slow tempo. Between the two 10-minute sessions, there was a 10-minute resting period. To control for order effects, half of the participants completed the fast tempo session first, whereas the other half completed the slow tempo session first. At the beginning and end of each 10-minute session, the following data were collected: heart rate, blood pressure, and Visual Analog Scale-Anxiety (VAS-A) for relaxation score. In addition, individuals were also asked to rank their enjoyment of the activity on a 10-point scale. The therapist not only encouraged each participant to play continuously during each 10-minute session but also instructed them that they were permitted to stop at any point. The time of participation was recorded to capture the length of each session for individual participants.

### Participants

The 20 participants in this study were skilled nursing residents, aged 70 or above, who had physical clearance from their physician or nursing staff to engage in a physical activity for a total of 30 minutes. Individuals were excluded if they 1) had a score of 15 or less on the Mini-Mental State Examination (MMSE), 2) were younger than 70 years, or 3) had a health condition that would restrict participation in a physical activity for 30 minutes, as determined by their physician or nursing staff.

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### **Informed consent**

The study's procedures and consent process were reviewed and approved by the affiliated institution's Institutional Review Board. All participants had the opportunity to discuss the purpose and procedures of the study with the investigator and to ask questions prior to their consent to participate. Participants were required to agree to participate in two activity sessions which involved a seated music-making activity using the Beamz music system. They were informed they would need to move their arms up and down but did not need any musical training or skills to participate in this intervention study. Participants were made aware that each session would last approximately 15 minutes. During this time, their blood pressure and heart rate would be taken and they would need to report their feelings of relaxation and enjoyment of the activity.

### **Intervention**

Music-making sessions used the Beamz C6. Activity sessions were held in a quiet room with just the participant and recreation therapist. All participants were given basic instructions on how to play the Beamz and were asked for preferences on background music. Half of the participants participated in the fast tempo session first, whereas the other half completed the slow session first.

**Fast tempo session.** During the fast session, the Beamz music was set at 125 bpm. Individuals were given a choice of different music selections including Moonlight Redux, Café" Carnival Jams, Louie Louie Jam, Chamber Concerto, and Celebration. Participants were instructed to move their arms up and down through the Beamz attempting to keep pace with the beat of the music. They were encouraged to maintain participation as long as possible for up to 10 minutes.

**Slow tempo session.** During the slow session, the Beamz music was set at 60-65 bpm. Individuals were given a choice of different music selections including 3 AM Blues, Classique, Moonlight Redux, and Chillaxin Jam. Participants were told the goal was to try and relax, so they could play as slow as they wanted to promote a relaxed feeling. Movements could be as simple as slowly moving their hands in and out of the Beamz or just moving their fingers.

### **Measurement**

A combination of physiological and self-report measures was used to evaluate response to the intervention. A wrist blood pressure monitor was used to collect physiological measures of heart rate and blood pressure, and participants were asked to self-report their level of relaxation using the VAS-A and level of enjoyment of the activity using a 10-point enjoyment scale. Duration of participation was also recorded using a stopwatch.

**Wrist blood pressure monitor.** The wrist blood pressure monitor device used in this study (Panasonic EW3003W) collected heart rate and both systolic and diastolic blood pressures. This instrument was selected because of its size, portability, and ability to collect these measures in a nondisruptive manner. The device is capable of measuring blood pressure within a range of 0-280 mm Hg with an accuracy of readings of  $\pm 3$  mm Hg. It measures heart rate within a range of 30-160 pulses per minute with accuracy readings of  $\pm 5$  percent.<sup>24</sup>

**VAS-A.** The VAS-A scale is a self-report measure using a 100-mm visual analogue scale with five descriptors along the continuum (0 mm = "at peace"; 100 mm = "very tense"). The VAS-A has been found to be significantly correlated to the 20-item Spielberger State Anxiety Inventory.<sup>25</sup> The VAS-A is considered a sensitive subjective measure and is accurate in assessing levels of anxiety and relaxation. The tool is noted for its ease of administration, so as not to interfere with relaxation. Its simplicity is also well suited for use with older adults with some levels of cognitive impairments.

**Enjoyment of activity.** Following each session, participants were asked "On a scale from 1-10, how much did you enjoy this Beamz music-making activity?" with one corresponding to "not at all" and 10 indicating "very much so." The visual rating page also had other words linked with numbers including "slightly," "moderately," and "quite a bit."

**Duration of participation.** The timing of each session was started as soon as the participant began to move their arms. If an individual paused at any time, the therapist would ask, "Are you finished playing?" or "Do you feel you need to stop?" to either cue

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the participant to continue playing or identify whether the individual was fatigued or disinterested. If participants chose to stop before meeting the desired 10-minute session limit, the total time of participation was recorded as well as the reason for discontinuing the activity.

### **Data analysis**

The statistical data were analyzed using SPSS 17.0. Descriptive statistical analysis was performed to understand the characteristics of the participants in this study. In addition, normality tests were computed to understand the distributions of all dependent variables. For normally distributed variables, parametric inferential statistics (ie, paired-sample t-tests) were used to examine the effects of a technology-based music-making intervention (Beamz) on promoting physical fitness and feelings of relaxation and enjoyment. For those variables which were not normally distributed, nonparametric inferential statistics (ie, Wilcoxon signed rank tests) were performed to understand how the Beamz intervention impacted the dependent variables.

## **Results**

### **Characteristics of participants**

A total of 20 participants enrolled in the study and all completed both activity sessions. Most participants were Caucasian females (80 percent), who were permanent residents in the skilled nursing facility (65 percent), and scored above 25 on the MMSE (70 percent) which indicated their cognitive abilities were in normal ranges. The mean age of the participants was 87.65 years, ranging from 72 to 100. On average, they participated in the activity for 6.51 minutes during the fast tempo session and 7.03 minutes during the slow tempo session. Summary information on the demographic characteristics of all participants is given in Table 1.

### **Physiological response**

**Fast tempo session.** The results of the Shapiro-Wilk tests indicated that the data for heart rate in the fast tempo session were not normally distributed.

Therefore, a Wilcoxon signed rank test was conducted to examine if the mean heart rate before the fast tempo session was different than the mean heart rate after the session. It was found that the average heart rate significantly increased from time 1 to time 2 ( $z = 2.52$ ,  $p = 0.01$ ). In addition, the results of paired t-tests suggests that there was a statistically significant difference between systolic blood pressure at time 1 and time 2 ( $t = -2.93$ ,  $p = 0.01$ ). It was found that the mean systolic blood pressure increased from time 1 to time 2. The results of the physiological responses during the fast tempo session are given in Table 2.

**Slow tempo session.** The results of the Shapiro-Wilk tests suggested that the data of both systolic and diastolic blood pressures were not normally distributed. Therefore, Wilcoxon signed rank tests were used to compare the mean systolic and diastolic blood pressures before and after the slow tempo session. Results indicated the mean systolic and diastolic blood pressure readings were not significantly different between two time points. However, the results of paired t-tests suggested that there was a statistically significant difference between the mean of heart rate in time 1 and time 2 ( $t = -2.241$ ,  $p = 0.04$ ). It was found that the participants experienced an increased heart rate at time 2. A summary of physiological responses for the slow tempo session is given in Table 3.

### **Feelings of relaxation and enjoyment**

Participants reported the same level of enjoyment for the fast and slow tempo session. On average, participants rated the level of enjoyment as “quite a bit” (6.75 on a 10-point Likert scale). In rating their level of relaxation, participants reported a statistically lower level of relaxation following the slow tempo session ( $t = -2.175$ ,  $p = 0.04$ ), as indicated by a higher rating on the VAS-A. Results of the VAS-A are included in Table 3.

## **Discussion**

Results indicate that participation in this technology-based music-making intervention was effective in elevating heart rate in skilled nursing residents. Although it was hypothesized that playing along with

<b>Table 1. Demographic characteristics of participants (N = 20)</b>					
<b>Variable</b>	<b>N</b>	<b>Percent</b>	<b>M</b>	<b>SD</b>	<b>Range</b>
Age, y	20		87.65	6.92	72-100
Duration of participation, min					
Fast	20		6.52	3.43	1.00-10.00
Slow	20		7.04	3.35	0.66-10.00
Enjoyment					
Fast	20		6.75	2.20	3-10
Slow	20		6.75	2.34	3-10
Gender					
Male	4	20			
Female	16	80			
Race					
Caucasian	20	100			
MMSE					
Normal	14	70			
Mild impairment	4	20			
Severe impairment	2	10			
Residency status					
Permanent	13	65			
Short-term rehab	7	35			

fast tempo music would facilitate physical activity that could elevate heart rate, this study revealed that movements to slow tempo music increased heart rate as well. The elevation in heart rate occurred after a very short period of participation (10 minutes or less). This is noteworthy as brief interventions would be very easy for staff to provide and individuals with both cognitive and physical limitations will benefit from physical activity that elevates heart rate.

Although it was hypothesized that playing along with slow tempo music might produce a relaxation response, this was not supported by the study's results. Rather, the direct opposite occurred, and the Visual Analog Scale results indicated that individuals were more relaxed before participation in this activity. It appears that the physical activity involved in this

particular intervention was more stimulating than relaxing regardless of the tempo of the music. Given the physical limitations of many participants, any movement at all appeared to be arousing rather than calming. Therefore, although the Beamz may not be suited for relaxation in this population, future studies may find that it is a good intervention to stimulate, arouse, and engage frail, elderly individuals presenting with lethargy.

### ***Evaluation of the protocol***

The protocol was designed so that participants would engage in continuous physical activity (music-making) for 10 minutes. However, many of the individuals in this study had physical limitations (use of only one arm or poor endurance), sensory impairments (hearing loss), and cognitive limitations



Variable	Mean T1 (SD)	Mean T2 (SD)	t value	p
Systolic blood pressure	123.35 (10.85)	130.40 (13.23)	-2.93	0.01*
Diastolic blood pressure	69.45 (7.78)	75.25 (13.17)	-1.86	0.08
Heart rate <sup>†</sup>	65.30 (11.72)	67.65 (11.85)	2.52	0.01*

\*p value < 0.05.  
<sup>†</sup>Related samples Wilcoxon signed rank test run.

Variable	Mean T1 (SD)	Mean T2 (SD)	t value	p
Systolic blood pressure*	124.21 (14.02)	126.89 (16.62)	1.16	0.25
Diastolic blood pressure*	68.40 (9.50)	72.90 (10.89)	1.55	0.12
Heart rate	64.70 (11.15)	69.15 (12.37)	-2.24	0.04 <sup>†</sup>
Visual Analog Scale	36.57 (19.89)	43.86 (19.79)	-2.18	0.04 <sup>†</sup>

\*Related samples Wilcoxon signed rank test run.  
<sup>†</sup>p value < 0.05.

(decreased attention) that prohibited them from participating for the full duration (10 minutes). Many had a very limited range of motion and struggled to reach all levels of lasers on the equipment. Therefore, while this study demonstrated that this is an appropriate intervention for some individuals in skilled nursing facilities, this particular device and protocol may have even greater potential and be better suited for older adults in Assisted Living or Personal Care facilities and/or for individuals receiving short-term rehabilitation services in a skilled nursing facility.

Based on the investigator's observation, it is also possible that a simple restructuring of the protocol with skilled nursing residents may yield more successful results in terms of duration of participation. In this study, the protocol developed required individuals to play continuously during the session. Once participation stopped, the session was ended. Future studies may want to examine whether introducing or allowing brief rest periods would be effective in increasing endurance and physical activity over greater periods of time.

### **Additional findings**

Although this particular intervention was a new activity for participants in the study, the majority indicated that they found it enjoyable. Some admitted to initial reservations about trying something unfamiliar as they did not know what to expect, and this may have contributed to the individuals feeling less relaxed following participation. However, participants did indicate that they enjoyed the activity. As this study only involved one intervention session, it is unknown if increased exposure to the equipment and activity would result in even greater interest and/or ability to participate for longer periods of time. Additional sessions might also lead to an increased sense of competency and motivation based on past experiences.

During this study, it was noted that not only was this novel device accepted by the older residents but also it generated interest from the facility staff. Many individuals from a variety of departments were curious about the equipment and how it was being used. Several employees asked if they could try it and expressed enthusiasm after engaging with the device. This suggests that

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staff would be highly motivated to use the equipment with residents if it was available in public areas. Therefore, it could be a resource not just for structured therapeutic recreation programming but could also be available for diversion and supplemental opportunities for residents to engage in meaningful activities.

### **Future study possibilities**

The intervention in this study used individual sessions held in a quiet space to minimize distractions. However, holding sessions in a public or more visible space may also have benefits, enabling residents to see their peers participating in the activity, thereby inspiring curiosity and intrigue. Interest from other individuals may also motivate the participant to engage for longer periods of time. Variations on the intervention that incorporate some type of group interaction might also be beneficial as higher levels of social engagement in skilled nursing residents have been linked to longer survival<sup>26</sup> and a greater sense of fulfillment in life.<sup>27</sup>

A greater selection of music might also have led to increased engagement. For this study, the researchers selected four or five songs for participants to choose from based on the researchers' opinions about the musical styles the skilled nursing residents would prefer and enjoy. Future studies might look at evaluating additional preloaded songs and their appeal to skilled nursing residents to see if there are other selections older adults may prefer, as using preferred music would most likely contribute to increased interest and motivation to participate.

This study primarily focused on whether the Beamz would be a feasible device to increase heart rate and promote physical activity levels in the older residents in a skilled nursing facility. However, through the sessions with participants, it was noted that recreation therapists could certainly develop additional protocols to focus on other outcomes that might be addressed with the Beamz. For example, given the different levels of lasers, there is the potential to work on increasing range of motion. The software has notations indicating where instrument sounds are located on different laser beams. Therefore, cognitive goals such as reading and problem-solving could be addressed by asking individuals to locate and

play specific instruments. Once located, the written information specifying instrument location could be removed to work on memory. As physical activity has been linked to increased alertness, the increased physical activity may also reduce the risk of cognitive decline<sup>28</sup> and enhance cognitive functioning in older adults.<sup>29</sup> The physical nature of engaging with this device could also be a good outlet for individuals with the excess energy or agitation sometimes associated with various types of dementia. Additionally, the Beamz can be played either sitting or standing, so it could be a motivating leisure activity while clients work on standing balance.

### **Conclusion**

Given the large number of skilled nursing residents who have limited options for physical activity due to their chronic health conditions, this intervention provides an opportunity to engage in an activity that promotes physical activity in frail older adults. The fact that positive physical outcomes can be achieved in only a short period of time makes it extremely practical for widespread use.

The Beamz appears to be an activity that older adults are interested in and enjoy, which is important to motivate individuals to participate on a regular basis. The fact that individuals find the intervention enjoyable indicates that therapeutic recreation sessions using this protocol hold the potential to not only impact physical functioning but also enhance quality of life.

Recreation therapists should be able to incorporate use of the Beamz into their regular schedule of therapeutic programming with very little time and effort. The cost of the equipment is minimal, and training to develop skill in use can be completed in a very short period of time. The diversity of ways that the equipment can be used enables flexibility in program design and holds the potential to meet a variety of therapeutic goals for clients.

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## Education and Care

### Music

Music has power—especially for individuals with Alzheimer's disease and related dementias. And it can spark compelling outcomes even in the very late stages of the disease.

When used appropriately, music can shift mood, manage stress-induced agitation, stimulate positive interactions, facilitate cognitive function, and coordinate motor movements.

This happens because rhythmic and other well-rehearsed responses require little to no cognitive or mental processing. They are influenced by the motor center of the brain that responds directly to auditory rhythmic cues. A person's ability to engage in music, particularly rhythm playing and singing, remains intact late into the disease process because, again, these activities do not mandate cognitive functioning for success.

**Music Associations.** Most people associate music with important events and a wide array of emotions. The connection can be so strong that hearing a tune long after the occurrence evokes a memory of it.

Prior experience with the piece is the greatest indicator of an individual's likely response. A melody that is soothing for one person may remind another of the loss of a loved one and be tragically sad.

If the links with the music are unknown, it is difficult to predict an individual's response. Therefore, observe a person's reaction to a particular arrangement and discontinue it if it evokes distress, such as agitation, facial grimaces or increasing muscular tension.

**Top Ten Picks.** Selections from the individual's young adult years—ages 18 to 25—are most likely to have the strongest responses and the most potential for engagement.

Unfamiliar music can also be beneficial because it carries no memories or emotions. This may be the best choice when developing new responses, such as physical relaxation designed to manage stress or enhance sleep.

As individuals progress into late-stage dementia, music from their childhood, such as folk songs, work well. Singing these songs in the language in which they were learned sparks the greatest involvement.

**Sound of Music.** Typically, "stimulative music" activates, while "sedative music" quiets. Stimulative music, with percussive sounds and fairly quick tempos, tends to naturally promote movement, such as toe taps. Look to dance tunes of any era for examples. Slightly stimulative music can assist with activities of daily living: for example, at mealtime to rouse individuals who tend to fall asleep at the table or during bathing to facilitate movement from one room to another.

On the other hand, the characteristics of sedative music—ballads and lullabies—include unaccented beats, no syncopation, slow tempos, and little percussive sound. This is the best choice when preparing for bed or any change in routine that might cause agitation. Responses that are opposite of those expected can occur and are likely due to a person's specific associations with the piece or style of music.

**Agitation Management.** Non-verbal individuals in late dementia often become agitated out of frustration and sensory overload from the inability to process environmental stimuli. Engaging them in singing, rhythm playing, dancing, physical exercise, and other structured music activities can diffuse this behavior and redirect their attention.

For best outcomes, carefully observe an individual's patterns in order to use music therapies just prior to the time of day when disruptive behaviors usually occur.

**Emotional Closeness.** As dementia progresses, individuals typically lose the ability to share thoughts and gestures of affection with their loved ones. However, they retain their

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Ambulatory individuals can be easily directed to couple dance, which may evoke hugs, kisses or caresses; those who are no longer walking can follow cues to rhythmically swing their arms. They often allow gentle rocking or patting in beat to the music and may reciprocate with affection.

An alternative to moving or touching is singing, which is associated with safety and security from early life. Any reciprocal engagement provides an opportunity for caregivers and care receivers to connect with one another, even when the disease has deprived them of traditional forms of closeness.

#### How-to of music therapy:

##### Early stage—

- Go out dancing or dance in the house.
- Listen to music that the person liked in the past—whether swing or Sinatra or salsa. Recognize that perceptual changes can alter the way individuals with dementia hear music. If they say it sounds horrible, turn it off; it may be to them.
- Experiment with various types of concerts and venues, giving consideration to endurance and temperament.
- Encourage an individual who played an instrument to try it again.
- Compile a musical history of favorite recordings, which can be used to help in reminiscence and memory recall.

##### Early and middle stages—

- Use song sheets or a karaokeplayer so the individual can sing along with old-time favorites.

##### Middle stage—

- Play music or sing as the individual is walking to improve balance or gait.
- Use background music to enhance mood.
- Opt for relaxing music—a familiar, non-rhythmic song—to reduce sundowning, or behavior problems at nighttime.

##### Late stage—

- Utilize the music collection of old favorites that you made earlier.
- Do sing-alongs, with "When the Saints Go Marching In" or other tunes sung by rote in that person's generation.
- Play soothing music to provide a sense of comfort.
- Exercise to music.
- Do drumming or other rhythm-based activities.
- Use facial expressions to communicate feelings when involved in these activities.

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# THE ISSUE IS

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## Should Music Be Used Therapeutically in Occupational Therapy?

**T**he healing power of music has been recognized by various cultures for many centuries. This power, however, was often attributed to magic, either of the performer, such as a shaman or medicine man, or of the music itself (Deschenes, 1989; Hamel, 1979). The past century has brought forth efforts to empirically understand the effects of music on the human mind and body. Belief in the healing value of music has spawned the development of new disciplines, such as music and dance therapy. Occupational therapists have not fully explored its potential as a therapeutic modality. Should music be included in the repertoire of occupational therapy? I believe that music is not only a legitimate healing tool, but also an appropriate expression of the philosophy of occupational therapy. Music is a vocational activity for some and an active or passive leisure pursuit for others. It is a pleasurable, intrinsically motivating activity that can be easily graded and used to promote overall health through relaxation and movement. Music is both versatile and powerful in that it has the potential to involve all of the components of occupational performance—motor, sensory, cognitive, social, and emotional. In this paper, I describe the healing effects of music and discuss its present and potential uses in occupational therapy.

### Therapeutic Effects of Music

The experience of music occurs “physiologically, psychologically, affectively, and esthetically” (Rouget, 1985, p. 119). On the physiological level, music affects auditory perception. The sensorial manifestations, however, go far beyond audition. Music is also vibration, which is palpable (tactile) and, possibly, even visible (Rouget, 1985). In addition, mu-

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sic has somatic qualities in that it is essentially body movement. That is, we receive the vibrations and, in the case of participatory music, we can feel ourselves singing and interacting with the instruments.

Deschenes (1989) stated, “Music has much more than a simple physical impact on our body. In influencing the body kinetics and posture through the cerebellum and our emotions through the pneumo-gastric nerve, music happens to have a dynamogenic effect on humans. . . .When music reaches our ear, it also reaches our whole body and emotions imprinted in our muscles” (p. 2). The effects of music on the human mind and body occur simultaneously, but it is perhaps in the emotional and affective spheres that music has its greatest therapeutic potential. “Nothing is more laden with emotional associations than music; nothing is more capable of recreating situations that engage one’s entire sensibility” (Rouget, 1985, p. 123). Music can facilitate mood changes, alter states of awareness, modify one’s consciousness, and increase affective response.

Considering the wide range of human response and ease of access, it is reasonable to assume that music has great healing potential. Heinze (1990) suggested that music can be used to un-

cover formerly buried memories and emotions. Also, music can be effectively used to shift a person’s attention, to soothe agitation, and to aid with visualization techniques. Hamel (1979) stated that relaxing music can be used by healthy persons as well as by those with a wide variety of disorders, including active psychosis.

### Application of Music in Occupational Therapy

Occupational therapy addresses the dysfunction found in a wide variety of psychiatric, developmental, and physical disorders. The motor, sensory, cognitive, social, and emotional components of a person’s functional performance are all addressed. Considering the holistic philosophy of occupational therapy, its broad client base, and its traditional use of creative and purposeful activity, music would seem to be an ideal modality. Unfortunately, a search of the occupational therapy literature reveals that although music is being used in specific areas of practice, its full potential as a therapeutic tool has not been explored. Published accounts of the therapeutic use of music by occupational therapists appear to be limited to the practice areas of pain management, motor and sensory dysfunction, and certain forms of cognitive dysfunction.

### Pain Management

Heck (1988) used an experimental design to determine the effectiveness of activity in prolonging tolerance to pain. He concluded that significant pain relief can be obtained through engagement in activity that is purposeful, that is intrinsically motivating, and that captures the attention and interest of the patient.

Unfortunately, there was minimal discussion of the specific activity used in this study, and activity involving sound or music was not mentioned. McCormack (1988) concurred with the conclusion of Heck's study and provided specific examples of music as purposeful activity for pain reduction. These examples include active listening (including motoric involvement), auditory distraction, the use of background music to promote muscle relaxation, and rhythmic breathing.

### *Motor and Sensory Dysfunction*

Van Deusen and Harlowe (1987) described a study in which dance with accompanying music is used in an exercise program for persons with rheumatoid arthritis. An audiotape with the ROM [range of motion] Dance (1984) was used in a group format and then provided to each participant for home use. The experimental group in this study reported "significantly greater enjoyment of exercise and rest" as well as "better scores in range of motion than did the control subjects" (Van Deusen & Harlowe, 1987, p. 94).

Miller (1979) also supported the use of music and movement for increasing range of motion. In addition, she suggested specific musical techniques to be used with persons with limited muscle strength, abnormal gait, lack of proprioception, loss of sensation, speech and communication problems, and muscular tension. Unfortunately, there have been no efficacy studies on the use of these techniques.

### *Cognitive Dysfunction*

Farber (1982) stated that auditory input is useful in the treatment of comatose patients. Although music is not specifically mentioned, it is suggested that a small radio, conversation, and tape recordings of family members be used. Farber cautioned against the continuous use of the radio, because adaptation may result, thereby rendering the treatment ineffective.

Miller (1979) stated that musical recordings can increase reality orientation to persons, places, and things. Time orientation is not specifically mentioned, but it is certainly plausible that music could enhance one's sense of time by

increasing awareness of the environment and the relationship between timing and rhythm. However, it is also possible for the opposite effect to occur. Heinze (1990) reported that some persons lose time orientation while involved in a musical activity.

Silberzahn (1988) stated that there is a unique cell-firing rhythm in the brain that appears to be related to learning and memory. Therefore, rhythmic repetition may be an appropriate therapeutic modality. However, information on specific techniques or efficacy data is not available.

Music is used extensively with mentally retarded patients. Orff-Schulwerk techniques, originally developed for children, have been easily adapted for use with this population (Bitcon, 1969) and are employed by many rehabilitation specialists, including occupational, recreation, and music therapists. These techniques do not specifically address the cognitive deficits of this population; rather, they are designed to facilitate self-expression in a nonjudgmental atmosphere.

### **Discussion**

The therapeutic potential of music is multifaceted and profound. It legitimately belongs in the domain of occupational therapy because it can promote health through the use of activity that involves all of the occupational performance components. Yet the occupational therapy literature shows limited use of music as a modality.

It is especially surprising to find a lack of documentation regarding music as a facilitator of emotional health and social skills. A possible explanation for this deficit is that occupational therapists are indeed using music for such purposes but are not publishing their protocols or clinical results. It is interwoven into the fabric of our culture to believe that music, particularly with active involvement (song) and movement (dance), can heighten social involvement and can have an emotional effect. Because this knowledge is considered commonplace or intuitive, it may not be given sufficient consideration in formal studies. This is unfortunate, because the effectiveness of music as a therapeutic modality would have increased significance if its use were specifically applied

and goal directed, as in clinical protocols and research.

I believe that the occupational therapy profession could enhance its repertoire of skills while simultaneously increasing the validity of its methods by undertaking the rigorous study of music as a therapeutic modality. The studies conducted by music therapists and psychologists provide important background information for the occupational therapist interested in the therapeutic application of music. We need research specifically grounded in an occupational therapy frame of reference.

This topic lends itself to a wide variety of research methods. Certainly, rich descriptive information could be culled with the use of ethnographic or phenomenological methods, and many aspects of this topic could be studied using quantifiable studies. In addition, it is possible to use existing research designs in occupational therapy settings and modify them to study the effects of music. For example, Llorens (1986) employed a laboratory model to study tasks and activities, with the goal of assessing the degree of agreement among participants "regarding the sensory stimuli, intersensory stimuli, sensory integrative processes, motor activity, and sensory feedback" (p. 106). None of the activities used in Llorens's study had a strong auditory component (i.e., drawing, spinning, buttoning), but the model could easily lend itself to the study of musically oriented activities such as dance.

Boyer, Colman, Levy, and Manoly (1989) also used an experimental design with 45 subjects. The purpose was to document variation in affective responses to several activities. As with the Llorens (1986) study, none of the chosen activities involved music. However, this design would also be an ideal vehicle for a study of the effects of music as a modality.

### **Summary**

It has long been common knowledge that music profoundly affects human beings on a variety of levels. Occupational therapists have at their disposal a potentially powerful therapeutic tool, but the specific effects of this tool have not been documented.

Occupational therapists have a history of using music in their treatment,

probably to a greater extent than is documented in the literature. It would be advantageous for us to engage in research regarding the application of music to occupational therapy. ▲

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