A Critical Analysis of Music Lessons and Improvement of Aging Brain

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ABSTRACT

This study was to critically analyze the music lessons and its resultant impact on aging brain. Playing music could be associated with cognitive benefits and exercise session for the brain. Music is one of the most effective sources of stimulation in the hearing cortex and other brain areas. Music has also a well-known impact on the emotional state, while it can be a motivating activity. For those reasons, music lesson has become a useful framework to study the of aging brain. Music lesson could help the aging brain in the hope of preventing this advanced disease. The study concluded that the positive improvement of performance of music in the early child intellectual helps in brain development. It also reveals that music influences the brain to work fast as it concerns individual IQ level. Equally music unveils the contributions and effect of music in the child cognitive development. Music lessons seem to create a room for brain neurons cells that can transmit and receive nervous impulses. It also builds new neural bridges that are necessary for good spatial reasoning. One of the recommendations was that government and school authority should make available, music education or lesson to highlight the improvement of aging brain.

KEYWORDS: Critical Analysis, Music, Improvement and Aging Brain

Introduction

Music and the Aging Brain describes brain functioning in aging and addresses the power of music to protect the brain from loss of function and how to cope with the negative effects of the brain diseases that accompany aging. The power of music in aging through the lens of neuroscience, behavioral, and clinical science. Borella, Carretti, & De Beni, (2008) stated that aging is accompanied by changes in cognition and brain health. In general, adults show declines in the performance on cognitive tasks of executive function and memory, and performance decrease are accompanied by decreases in gray and white matter volume. (Allen et al 2005). However, there are individual differences and variability in the trajectory of changes in cognition and brain health with aging. Some individuals maintain cognitive skills and brain structure, while others exhibit decline

Delineating the musical abilities that are specifically linked to an intensive and

formal training from those that emerge through mere exposure to music and music is a key issue for music cognition, music education, and all of the disciplines involved in sound and music computing, particularly for disciplines which deal with content processing of audio signals, machine learning and sound design. Non-musicians do not learn a formal system with which they can describe and think about musical structures (Lalitte, 2008). Indeed, considerable evidence suggests that the brains of older age have the capacity for plasticity. For example, engagement in physical activity (e.g. aerobic and non-aerobic exercise with ballet) and cognitively stimulating leisure activities (e.g., music, dancing and chess) have been shown to benefit the aging brain and cognition, as well as to reduce the risk of dementia. It is important to determine lifestyle factors that benefit the aging brain.

Music is essential in the total growth of a child. It contributes to the physical, intellectual, social and spiritual growth of a child and therefore needs to be supported as an essential part of a child's education. According to Healthy Kids Magazine (2012), just 15 minutes a week with group singing may significantly improve spatial intelligence--the kind needed for high-level math and science. Frances Rauscher, a psychologist at the Center for Neurobiology of Learning and Memory, compared 19 preschoolers enrolled in music programs with 14 classmates who took no music lessons at all. After eight months, the children with musical training experienced a 46 percent boost in spatial IQ scores, while the IQ scores of the children with no music lessons had increased only six percent. Frances Rauscher concluded that music lessons seem to strengthen the links between brain neurons (cells that can transmit and receive nervous impulses) and build new neural bridges that are necessary for good spatial reasoning.

Concept of Music

Adeogun (2012), states that "music is a product of people and societies. Musical knowledge is a transmittable constellation of enduring socio musical traits which codify, articulate and validate the unique practice of human group. Its organization depends largely on the use of society-widely recognized theories of tonality and/or modality, thematic structures, rhythmic patterns, tempo, timbres, use of language and musical instruments in communicating ideas, thoughts, contents and meaning to members of the society". Odili (2008) viewed that music is a central phenomenon which is present in every society and is experienced by every person. It also gives life and identity to the human society. It is a cultural expression which is determined, coloured and moulded by the cultural environment of people (Okafor,2005).

Simon (2013) asserted that music is highly valued in our society. In fact, we could make the argument that it is one of the most valued. The average liberal arts major may not have an extensive knowledge about physics, and vice versa. But both the chemistry student, and the French poetry student are sure to enjoy music to a degree that they themselves find to be very important. Perhaps this speak about humanity's intrinsic recognition and value for beauty. The vast majority of people in the world has music involved with their ways in some way. Of course, not everyone who listens to music could do a harmonic analysis of their favorite songs, but they can still hum their favorite melodies or recognize a popular tune, and this is definitely some kind of knowledge.

Music always involves various components, among others, melody, chord, tempo, rhythm, instrument, even language or lyrics of a nature (Surya, 2018). Levinson (2000) proposes that music is "sounds temporally organized by a person for the purpose of enriching or intensifying experience through active engagement (e.g., listening, dancing, performing) with the sounds regarded primarily, or in significant measure, as sounds." Kania (2011) defined music as any event intentionally produced or organized, to be heard and either to have some basic musical features, such as *pitch* or *rhythm* and to be listened to for such features." Obicheta, (2013) noted that music is the art, science and technology of "creating and making pleasant and organised sound with the human voice or other musical instruments".

Music captures and stimulates our imagination. The human brain has a number of major regions which are divided into two hemispheres: left and right, the cerebellum and the central cerebral structures: the basal ganglia associated with memory and the limbic system associated with emotion (Motluk, 2000). The left and right hemispheres are joined by a tract of white matter known as the corpus callosum. Rapid, efficient communication between the hemispheres is essential. The development of the corpus callosum has been associated directly with developmental of a person's ability to understand and process complex information and events.

Concept of Aging Brain

In a society that is getting much older, it becomes important to identify potential mechanisms promoting successful aging to prevent, limit, and rehabilitate cognitive and emotional impairments typical of normal or pathological aging. Music is a powerful stimulus able to modulate widespread brain activations. Recent research has increasingly considered music as a promising, stimulating training and rehabilitation tool for improving cognition and promoting well-being and social connection. It first focuses on the effects of music in normal aging, both in terms of musical expertise and simple musical exposure, with an additional section being devoted to the underlying brain processes. The principal of music-based on therapeutic approaches used in pathological aging. (Ferreri, et al. 2019).

Music arises as a particularly promising stimulus and able to stimulate the whole brain, thus modulating cerebral activity in brain areas involved in cognitive, motor, and emotional processes (Zatorre, 2005), music is increasingly considered as a powerful tool to improve cognition while promoting well-being and social connection. Furthermore, the use of music for aging brain stimulation seems to be particularly appropriate in adults, who can perform similarly to younger adults in music perception tasks (Johnson et al., 2011), and show well-preserved musical memory, even in cases where episodic memory is impaired (Baird & Samson, 2009; Cuddy, Sikka, & Vanstone, 2015). music and aging brain present the music driven beneficial effect on cognition and well-being. Music in normal aging, both in terms of musical expertise and simple musical exposure. A specific section is then devoted to the underlying brain processes.

Reasons for Music Lesson

Music lessons are a great choice. Not only will enrolling your child in music lessons prepare

them to join their school's marching band or orchestra when the time is right, but music lessons have been proven to help some students perform better on standardized tests. Whether your child is already enrolled in a band class at school or not, private lessons make sense for a variety of reasons. From getting better at their instrument to diving into music theory, here are five reasons why private music lessons work. (Music & Arts 2020)

Getting Better at Their Instrument: If your child is enrolled in a band or orchestra at school and doesn't seem to be improving at their instrument, it might be because they aren't getting the personalized attention they deserve. Just like some students learn better in smaller class sizes or during one-on-one tutoring sessions, the same can be said for learning music. In order to improve at their instrument, your child should surround themselves with players who are better than them. Taking private music lessons is the absolute best way to accomplish this. Your child's private music teacher will help them get better at their instrument through exercises that teach particular techniques, and songs that use those techniques so your child understands how to apply them.

Staying Motivated: In most cases, it's easier for a child to stay motivated when they're enrolled in private music lessons. This benefit is especially applicable to students who have been performing for more than a few years and may be in a "rut", so to speak. Once a child is out of the beginner stage of playing and learning their instrument, they may not know what to do next. Fortunately, private music instructors are knowledgeable about different music styles and genres, and can help your child decide what to pursue next. Sometimes, all the student needs are order and routine in order to remain stimulated and interested in their instrument. At the end of the day, it's always easier to find motivation when you know someone that is holding you accountable.

Diving into Music Theory: Some parents who transfer their child from group lessons to private music lessons notice that their child's new teacher spends more time on music theory. While this is entirely dependent on the teachers you choose, music theory does make up a good portion of most private lessons. In private music lessons, your child will have the opportunity to learn how chords work together, get better at sight reading and, once they become more advanced at their instrument, they may even have the chance to compose music. Plus, just because your child is enrolled in private music lessons doesn't mean they can't still play in a group, many private studios have bands your child can join. If they don't, speak with your child's music teacher about any additional opportunities they may know about.

Minimizing Frustration: Remember how there was a kid in math class, who could never solve the equation on the board, and the rest of the class had to sit around and wait until he or she could figure it out? Sometimes, the same thing can happen in a group lesson setting. While group music lessons have plenty of benefits and will definitely help your child improve their social skills, they aren't the best idea if you want your child to make the most of every single second of their lesson time. Though frustration can make some students more determined, it discourages most. Every child deserves the opportunity to enjoy their instrument and not be frustrated with the learning process, and enrolling your child in private music lessons can help.

Setting Your Child Up for Success: At the end of the day, private music lessons will help set your child up for success in music. With a private music instructor, your child will learn the fundamentals of playing at a much quicker rate. Once that foundation is built, your child can keep learning, playing, and succeeding. Some parents enroll their child in group lessons for the first year or so. Once their child moves past the beginner level, they transfer them into private music lessons. This way, their child can take advantage of the specialized one-on-one attention. Plus, once your child is strong in instrumental skills, he or she can focus more on their ensemble skills and prepare themselves to join a band or orchestra at school.

Benefits of Music Lesson

Brown (2009) stated that children like to sing solos in the shower, to benefit from some form of music education. Research shows that learning the music can help children excel in ways beyond the basic ABCs. Nearly everyone enjoys music, whether by listening to it, singing, or playing an instrument. But despite this almost universal interest, many schools have do away with their music education programs. This is a mistake, with schools losing not only an enjoyable subject, but a subject that can enrich students' lives and education. Read on to learn why music education is so important, and how it offers benefits even beyond itself

More Than Just Music: Research has found that learning music facilitates learning other subjects and enhances skills that children inevitably use in other areas. “A music-rich experience for children of singing, listening and moving is really bringing a very serious benefit to children as they progress into more formal learning,” says Mary Luehrisen, executive director of the National Association of Music Merchants (NAMM) Foundation, a not-for-profit association that promotes the benefits of making music. Making music involves more than the voice or fingers playing an instrument; a child learning about music has to tap into multiple skill sets, often simultaneously.

For instance, people use their ears and eyes, as well as large and small muscles, says Kenneth Guilmartin, cofounder of Music Together, an early childhood music development program for infants through kindergarteners that involves parents or caregivers in the classes. “Music learning supports all learning. Not that Mozart makes you smarter, but it’s a very integrating, stimulating pastime or activity,”

Language Development: “When you look at children ages two to nine, one of the breakthroughs in that area is music’s benefit for language development, which is so important at that stage,” says Luehrisen. While children come into the world ready to decode sounds and words, music education helps enhance those natural abilities. “Growing up in a musically rich environment is often advantageous for children’s language development,” she says. But Luehrisen adds that those inborn capacities need to be “reinforced, practiced, celebrated,” which can be done at home or in a more formal music education setting.

According to the Children’s Music Workshop, the effect of music education on language development can be seen in the brain. “Recent studies have clearly indicated that musical training physically develops the part of the left side of the brain known to be involved with

processing language, and can actually wire the brain's circuits in specific ways. Linking familiar songs to new information can also help imprint information on young minds," the group claims. This relationship between music and language development is also socially advantageous to young children. "The development of language over time tends to enhance parts of the brain that help process music," says Dr. Kyle Pruett, clinical professor of child psychiatry at Yale School of Medicine and a practicing musician. "Language competence is at the root of social competence. Musical experience strengthens the capacity to be verbally competent."

Increased IQ: A study by E. Glenn Schellenberg at the University of Toronto at Mississauga, as published in a 2004 issue of Psychological Science, found a small increase in the IQs of six-year-olds who were given weekly voice and piano lessons. Schellenberg provided nine months of piano and voice lessons to a dozen six-year-olds, drama lessons (to see if exposure to arts in general versus just music had an effect) to a second group of six-year-olds, and no lessons to a third group. The children's IQs were tested before entering the first grade, then again before entering the second grade. Surprisingly, the children who were given music lessons over the school year tested on average three IQ points higher than the other groups. The drama group didn't have the same increase in IQ, but did experience increased social behavior benefits not seen in the music-only group.

The Brain Works Harder: Research indicates the brain of a musician, even a young one, works differently than that of a non-musician. "There's some good neuroscience research that children involved in music have larger growth of neural activity than people not in music training. When you're a musician and you're playing an instrument, you have to be using more of your brain," says Dr. Eric Rasmussen, chair of the Early Childhood Music Department at the Peabody Preparatory of the Johns Hopkins University, where he teaches a specialized music curriculum for children aged two months to nine years.

In fact, a study led by Ellen Winner, professor of psychology at Boston College, and Gottfried Schlaug, professor of neurology at Beth Israel Deaconess Medical Center and Harvard Medical School, found changes in the brain images of children who underwent 15 months of weekly music instruction and practice. The students in the study who received music instruction had improved sound discrimination and fine motor tasks, and brain imaging showed changes to the networks in the brain associated with those abilities, according to the Dana Foundation, a private philanthropic organization that supports brain research.

Spatial-Temporal Skills: Research has also found a causal link between music and spatial intelligence, which means that understanding music can help children visualize various elements that should go together, like they would do when solving a math problem. "We have some pretty good data that music instruction does reliably improve spatial-temporal skills in children over time," explains Pruett, who helped found the Performing Arts Medicine Association. These skills come into play in solving multistep problems one would encounter in architecture, engineering, math, art, gaming, and especially working with computers.

Improved Test Scores: A study published in 2007 by Christopher Johnson, professor of

music education and music therapy at the University of Kansas, revealed that students in elementary schools with superior music education programs scored around 22 percent higher in English and 20 percent higher in math scores on standardized tests, compared to schools with low-quality music programs, regardless of socioeconomic disparities among the schools or school districts. Johnson compares the concentration that music training requires to the focus needed to perform well on a standardized test. Aside from test score results, Johnson's study highlights the positive effects that a quality music education can have on a young child's success. Luehrisen explains this psychological phenomenon in two sentences: "Schools that have rigorous programs and high-quality music and arts teachers probably have high-quality teachers in other areas. If you have an environment where there are a lot of people doing creative, smart, great things, joyful things, even people who aren't doing that have a tendency to go up and do better." And it doesn't end there: along with better performance results on concentration-based tasks, music training can help with basic memory recall. "Formal training in music is also associated with other cognitive strengths such as verbal recall proficiency," Pruett says. "People who have had formal musical training tend to be pretty good at remembering verbal information stored in memory."

Being Musical: Music can improve your child' abilities in learning and other non-music tasks, but it's important to understand that music does not make one smarter. As Pruett explains, the many intrinsic benefits to music education include being disciplined, learning a skill, being part of the music world, managing performance, being part of something you can be proud of, and even struggling with a less than perfect teacher. "It's important not to oversell how smart music can make you," Pruett says. "Music makes your kid interesting and happy, and smart will come later. It enriches his or her appetite for things that bring you pleasure and for the friends you meet." While parents may hope that enrolling their child in a music program will make her a better student, the primary reasons to provide your child with a musical education should be to help them become more musical, to appreciate all aspects of music, and to respect the process of learning an instrument or learning to sing, which is valuable on its own merit. "There is a massive benefit from being musical that we don't understand, but it's individual. Music is for music's sake," Rasmussen says. "The benefit of music education for me is about being musical. It gives you a better understanding of yourself. The horizons are higher when you are involved in music," he adds. "Your understanding of art and the world, and how you can think and express yourself, are enhanced."

How Music Lesson Improves Aging Brain

Experiential learning through doing seen in a Kodály based program incorporates the three main learning styles identified by educators: visual, auditory and kin aesthetic (Pashler, McDaniel, Rohrer, & Bjork, 2009). A well-structured music program blends and implements these effortlessly. illustrate this, when learning a new song, the teacher initially models the song and actions, which are continually reinforced and cued until the song is secured, providing aural cues, which are mapped into the temporal lobe and visual reinforcement, which is mapped into the occipital lobe. This also refers to the inclusion and performance of different actions which then maps and encodes the memory traces of the song onto

different areas of the cortex, including the parietal lobe and cerebellum, areas responsible for motor memory and physical action (Hodges, 2009).

Several strategies or environmental interventions, in addition to lifestyles, have been investigated mainly to improve cognitive functions and to prevent and/or delay cognitive deficits. Such interventions include learning other languages (Abutalebi et al., 2015), physical activity (Loprinzi et al., 2018), and music (Schneider et al., 2018). In particular, music makes unique demands on our nervous system (Justel and Diaz Abrahan, 2012), and therefore, over the last years, music and each of its components have been used as a tool to investigate human cognition and its underlying brain mechanisms, because music affects the cortical and subcortical areas (Pantev and Herholz, 2011; Koelsch et al., 2018). Some studies show that listening to music improves cognitive skills such as fluency (Thompson et al., 2006), working memory (Mammarella et al., 2007), and recognition memory (Ferreri et al., 2013), among others. For example, background music was investigated as a focal and acute strategy that could improve cognitive skills. This technique refers to any music that is played while the listener's primary attention is focused on another task or activity (Bottiroli et al., 2014). Different studies about the effect of background music have shown some improvements on cognitive abilities. For example, Judde and Rickard (2010) performed a study in which participants listening 3 min of music after the acquisition of information and they had a better recognition memory 1 week later. However, there is some evidence of reduced cognitive performance when music is present (Kämpfe et al., 2010; Rickard et al., 2012).

Among the interventions that involve musical production, musical training is the one that has received the most attention. Training includes learning how to play an instrument, and most studies evaluate the effect of moderate or long-term learning (Barrett et al., 2013), leaving a gap as far as focal interventions are concerned. Another intervention that involves musical production is musical improvisation, which is defined as an example of musically creative behavior, conceived as an original and novel process requiring divergent thinking (Bengtsson et al., 2007; Manzano and Ullén, 2012; Diaz Abrahan and Justel, 2015). Research is scarce in this area, and most studies emphasize the use of improvisation in musicians (Limb and Braun, 2008); assuming that improvising musically implies having some degree of expertise in music. However, it is also used with people without musical training as a technique for the patient population (e.g., neurological music therapy, Thaut et al., 2009). In this perspective, music improvisation is conceived as the combination of sounds created in a specific framework inside an environment of trust, which is established to address the needs of the participant or patient (Wigram, 2004). In this sense, music improvisation is not only performed by musicians, but it is also a real-time ability that every person has (Wigram, 2004). Still, research on the use of the musical improvisation technique in people without a pathology and in non-musicians is infrequent. In addition, older people are unlikely to begin learning an instrument at an advanced age. Therefore, providing the opportunity of a focal intervention where the participants play instruments and create something novel in groups, without long-term demands, could result in low dropout rates.

Conclusion

The study reviewed that the positive improvement performance of music in the early child intellectual brain development. It also reveals that music influence the brain to work fast as it concerns individual IQ level. Equally unveil the contributions and effect of music in the child cognitive development. Music lessons seem to strengthen the links between brain neurons cells that can transmit and receive nervous impulses also build new neural bridges that are necessary for good spatial reasoning.

Recommendations

Based on the findings of this study, the following recommendations were deemed necessary:

1. Government and school authority should make available, music education or lesson to highlight the improvement of aging brain.

2. Education board should make music mandatory in their school so that it can support the high quality and accessible in musical opportunities throughout the life-course.

3. Music educators should add more effort in teaching music so that it can improve the brain and Individuals that choose music as a discipline should use it to touch lives in positive manner and be a role model to the younger ones.

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