

Music in Well-Being Development, Memory, and the Medical Application

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Abstract: *Broadly speaking, music refers to the combination of melodies, rhythms, and tones. In ancient times music was often used in celebrations or religious ceremonies. Today, music is more widely applicable and has become an industry and a means of entertainment. Even though the music does not guarantee the survival of human beings, it does not fade or vanish and instead becomes more and more flourishing and varied with time. Therefore, besides the function of music for societal development, we should also consider what roles music plays in people's well-being development and memory from a psychological perspective and how to apply these effects to the medical field to innovate an advanced path for mental or physical disease treatment.*

Keywords: *Music, Memory, Well-Being, Music Medicine, Music Therapy*

1. Music in Well-Being Development

According to the PERMA model of positive psychologist Seligman, we can discuss what well beings are from five aspects, which are "positive emotions", "emotions", "relationship", "meaning," and "achievement". Positive emotions refer to the feelings or emotions that make people feel pleasurable or positive, such as excitement, love, and joy. According to Mandler and Huron, when an impending stimulus matches our expectations, we often receive positive emotions. In contrast, we usually have negative emotional feelings if the incoming signal or stimulus does not match our expectations. Therefore, when we listen to music, we feel happy when it constantly matches our expectations and thoughts in our minds. In this way, musicians can assign many emotions to music, such as surprise, happiness, sadness, etc. according to people's desires for expectations. Biologically speaking, music has been proven to be able to affect many parts of the brain, such as the amygdala and hippocampus. These two parts of the brain both play a vital role in emotion control and management for human beings, which further asserts that music can affect people's emotions to a certain extent. According to Nilsson in Heart and Lung, listening to soothing and relieving music boosts oxytocin production in the human body (201–207). Oxytocin is a type of pro-social hormone, which aids in intimate relationship development, empathy ability improvement, mood regulation, and stress relief. When musicians perform, the oxytocin being released would help them to bond better with others and develop their relationships. Flow refers to a state of being completely focused on one thing without feeling disturbed. The state of flow occurs when people focus on music performance as the music would reduce the background noise and can help facilitate one's attentive engagement with their current activity. In the Psychology of Optimal Experience authored by psychologist Csikszentmihalyi, people who are experiencing flow are happiest. Moreover, people who have experienced a flow state are more likely to be happier than those who have not (821–827). People enjoy music performances often not only because of the music but also because of the entire show including how the performers perform. Therefore, to meet the expectations of the audience, musicians will spend time and effort practicing, thinking about the way of performance, and improving their etiquette and confidence. When they finish their performances, they would receive a sense of accomplishment as they provide material or emotional value to others and make themselves better people. When performing in an orchestra or multi-person music performance, the musical performer would even have a greater sense of responsibility to assist others to perform well or make sure they would not hinder the whole performance. This sense of responsibility also makes them aware of their social worth and status, so that when they complete the performance, they will also have a sense of accomplishment. Therefore, I argue that music may facilitate a person's well-being development as it fulfills all the elements of the PERMA model.

2. Music in Memory Storage and Retrieval

In addition to the effects of music on well-being, many studies have shown that music can also affect memory. Lutz claims that pieces of music are usually recognized by the brain as a single voice unit through melody or rhythm, so the brain is likely to treat pieces of music as a kind of working memory, which is stored in the brain temporarily (21). It is being discovered that musicians had a greater gray matter in the region of the frontal lobe known to occupy neural networks associated with critical working memory tasks than non-musicians do according to the research. Thus, people deduce that musical performance and verbal memory processes undergo a type of positive transmission.

The influence of music on memory is usually accompanied by the appearance of emotion. Through experimentations, music proved to affect the whole limbic system, which is a part of the brain in charge of generating emotional reactions and aiding in memory collection and access. In our daily life, when we hear some familiar songs or have listened to them before, some of our familiar memories or experiences would be evoked with the accompaniment of emotion usually. According to Scherer and Zetner, music usually accompanies important social occasions such as weddings and funerals. When people hear music from these previous occasions, people's emotions and memories are often evoked. Therefore, it means music links the emotions presented in the memory and events together. Even passively listening to music stimulates a variety of brain networks that are engaged in emotion, memory, arousal, and other mental processes according to Lutz (166). Hence, we can argue that music also plays an important role in memorization and triggering memory with emotions.

3. Music in Therapeutic Method

After noticing the positive effects of music on people's memory and well-being development, people began to apply music listening or performance in various aspects to improve people's physical, emotional, and mental health. The most common two applications of music in medicine are music therapy and music medicine. According to the American Music Therapy Association, music therapy is a musical treatment under the instruction of certified music therapists to assist patients in achieving specific goals. Music therapy could date to the early 1900s. Since then, music therapy has been continuously developed through research and experiments. Through the patient's response to music, the music therapist creates patients' musical language to evaluate their emotions, physical and mental health, social skills, and communication abilities. Patients could reach their own goals, discover themselves, and connect with others and the outside world by generating personalized music, listening to, and responding to music. Alfredo Raglio claims that music therapy can improve functional rehabilitation and alleviate the mental and behavioral deficiencies associated with neurological disorders (160). Music therapy could also help patients in reducing anxiety and depression, improve self-esteem and identity, and communicate with others. Since music therapy also involves music production. By specific muscle use and training in music production, specific motor regions could rehabilitate too. Music medicine is a new subfield of medicine that aims to employ music to relieve stress, physical pain, and motor disorders. Music listening reduced anxiousness and nervousness before surgery more effectively than prescription stress-relieving medications. According to a study by the University of Alberta, patients who listened to relaxing music while receiving IV injections reported significantly less pain compared to patients who did not listen to music. This is because music decreases levels of the stress hormone cortisol and stimulates the production of cells that boosts immune system utility in the body. Sound is produced by the vibration of objects, and music is no exception. Vibroacoustic therapy is a new way to relieve physical or mental illnesses, such as Parkinson's and depression, through the vibrations the body absorbs. According to an experiment done by Lee Bartel, the patient will sit in a specific chair or bed, and the patient will hear and feel vibrations simultaneously through speakers in the chair or bed. (230) According to the research done by Lauren K. King and staff, vibroacoustic therapy can effectively improve Parkinson's symptoms, such as reducing the frequency of tremors and stiffness. (303). Moreover, according to Bartel's experiment, a patient with mild Alzheimer's disease was stimulated at 40hz three times a week for 4 weeks. After 4 weeks, the patient's symptoms were relieved, and memorized names better according to her husband. (506) Consequently, we may anticipate how music may advance medicine in the future, whether via the improvement of mental health or the treatment of physical disorders.

4. Conclusion

Music is one of the most important forms of entertainment in the 21st century as it has occupied a

large part of people's daily lives and the whole economy. People would like to spend their money on brand-made headphones or concerts only for good-quality music. They also like to spend their time and engagement in music. In terms of cultural communication, music is a form of human civilization and art, representing the development of human beings and the dissemination of cultural ideas. With the continuous development of cognitive science and psychology, numerous studies and investigations have demonstrated that music also has psychological impacts on people. It affects our emotions and enables us to improve our well-being, how we evaluate ourselves, our ability to communicate with others and society, and how we discover meanings in our lives and pursue goals. Music could also affect the storage and retrieval of our memories, linking memories and emotions together. Following the discovery that music has several possible impacts on our cognition and memory, people started to apply music as a small branch of medicine, attempting to use music to treat psychological or physical diseases. Music therapy and music medicine are the most two common applications of music in medicine. Music therapy is an innovative therapeutic approach applying music to help subjects reach their objectives. Patients could relieve physical and mental illness and improve their motor performance by listening to music or producing music in music therapy. Since music also contributes to people's well-being, music therapy could also relieve patients' anxiety and depression and improve self-esteem and self-identity. According to past research on music medicine, soothing music can effectively relieve patients' anxiety and nervousness before surgery. Additionally, music could help evoke emotion and memory together. Listening to music could help patients to improve memorization and memory retrieval. Therefore, in the future, music may be able to help cure psychological and physical diseases or other diseases related to memory and emotions.

5. Discussion

This paper mainly focuses on the impact of music on the human mind and memory, and the application of music in medicine to relieve or cure physical and mental diseases. However, we did not discuss the factors that might affect the research result in depth, such as music preferences, music genres, and cultural differences. Different people prefer different music genres and react to music differently. For example, if a person likes rock or hip-hop rather than relaxing or relieving music, will he still relieve anxiety while listening to soothing music? In the same way, in music medicine, we employ relieving music more. However, could other genres have equal impacts on humans as soothing music? Specifically, if a person likes to listen to EDM or country music, how will the memory storage be different when he/she listens to these different genres? More importantly, the same type of music may have different effects on different cultural groups. Some groups, due to cultural beliefs and habits, may not like music with a gentle rhythm and repeated melody. Therefore, when listening to this kind of music that people think can relieve anxiety and depression, will they feel more relaxed, or will they feel more anxious since listening to music they do not want to hear? For further research, I contend that we could apply different music genres to the memory storage process and see if all music genres have a similar effect on music storage as it is easier to control other variables. Particularly, in the experiment, the experimenters would listen to different music genres and memorize the same number of vocabulary in the same amount of time. Then we can compare the percent of correct vocabulary they recall to estimate if music genres also affect memorization.

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