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MUSIC INFLUENCE ON EMOTIONAL STATE AND PHYSICAL HEALTH OF A PERSON

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The purpose of this paper is to understand as well as to define the effectiveness of music on emotional state and physical health of a person.

Therefore, the research questions of the paper are: Why does music make an efficient impact on emotional and physical health of a person? Why does it happen and generally take place to be?

What is music?

The Concise Oxford Dictionary defines music as "the art of combining vocal or instrumental sounds (or both) to produce beauty of form, harmony, and expression of emotion" [2]. Mousike, Henry George Liddell, Robert Scott state … music is an art form, and cultural activity, which medium is sound. General definitions of music include common elements such as pitch (which governs melody and harmony), rhythm (and its associated concepts of tempo, meter, and articulation), dynamics (loudness and softness), and the sonic qualities of timbre and texture (which are sometimes termed the "color" of a musical sound). Different styles or types of music may emphasize, de-emphasize or omit some of these elements. Music is performed with a vast range of instruments and vocal techniques ranging from singing to rapping; there are solely instrumental pieces, solely vocal pieces (such as songs without instrumental accompaniment) and pieces that combine singing and instruments [3].

In the following studies, we will see what way music affects the work of surgeons and patients in stressful situations when performing operations.

Music and Stress

A study from New York examined how music affects surgical patients. Forty cataract patients with an average age of seventy-four volunteered for the trial. Half were randomly assigned to receive ordinary care; the others got the same care but also listened to music of their choice through headphones before, during, and immediately after the operations. Before surgery, the patients in both groups had similar blood pressures; a week before the operations, the average was 129/82 millimeters of mercury (mm Hg). The average blood pressure in both groups rose to 159/92 just before surgery, and in both groups, the average heart rate jumped by 17 beats per minute. But the patients surrounded by silence remained hypertensive throughout the operation, while the pressures of those who listened to music came down rapidly and stayed down into the recovery room, where the average reduction was an impressive 35 mm Hg systolic (the top number) and 24 mm Hg diastolic (the bottom number). The listeners also reported that they felt calmer and better during the operation. The ophthalmologic surgeons had no problems communicating with their patients over the sound of the music, but the researchers didn't ask the doctors if their patients' improved blood pressure made them more relaxed as they did their work. Earlier research, though, found that surgeons showed fewer signs of stress and demonstrated improved performance while listening to self-selected music [4].

Music and Mood

Soothing jangled nerves is one thing; raising sagging spirits is another. Bright, cheerful music can make people of all ages feel happy, energetic, and alert, and music even has a role in lifting the mood of people with depressive illnesses. An authoritative review of research performed between 1994 and 1999 reported that in four trials, music therapy reduced symptoms of depression, while a fifth study found no benefit. A 2006 study of 60 adults with chronic pain found that music was able to reduce pain, depression, and disability. And a 2009 meta-analysis found that music-assisted relaxation can improve the quality of sleep in patients with sleep disorders [4].

Brain Wave Entrainment

Another powerful way to have an effect on the brain with the help of music, sound, and vibration is through brain wave entrainment. Heart entrainment discussed above shows how the internal rhythm of our heart can synchronize to the external rhythm of music to create more orderly, beneficial heart rhythms.

But music can also affect your mood by entraining the brain to more relaxed states, where we become more focused and attentive and can increase our cognitive abilities, sleep more soundly and learn to meditate.

While heart entrainment is based upon synchronizing the heartbeat to specific tempos, or beats per minute, brain entrainment is based on the brain synchronizing to specific musical frequencies, which are measured in hertz (Hz).

Specific frequencies induce different states in our brain [5].

These states we can see in the following table:

Wave Name	Hertz (Hz) Levels	Effect	Example
Beta waves	14-40 Hz	awake, normal alert consciousness	actively conversing or engaging in work
Alpha waves	8-14 Hz	calm, relaxed	meditating, reflecting, taking a break from work
Theta waves	4-8 Hz	deep relaxation and meditation, mental imagery	daydreaming
Delta waves	0-4	deep, dreamless sleep	expressing REM sleep

Table 1. Different states of a human brain

During a human's daily routine most of people are in beta states. Human beings are moving at a faster pace when their attention is on the outer world (work, family, etc.), and human's faster brain frequencies reflect this. As a person moves to more relaxed brain wave states, he/she falls into a calmer mood. A person can induce the alpha state in his/her mind by closing his/her eyes, breathing slower, and listening to calming music.

As a person travels into an even deeper state of relaxation, he/she moves into a theta brain wave state. This can occur through meditation and also through relaxation music. It is in alpha and theta states that a person is challenged into enhanced creative frames of mind. As a person's body progresses into deep sleep, he/she is in delta and the brain waves have fully slowed down.

Music is a delivery system of frequency to the mind. Each note has a specific frequency, but a person can also embed additional brain wave frequencies outside of the standard notes into music to allow the brain to entrain to his/her desired states.

As a consequence, when a person's internal brain waves are affected by the external brain wave frequencies that are contained in the music; the brain of a person is entrained. This state is called brain wave entrainment [5].

Four Ways That Music Affects the Brain

The field of music and neuroscience is greatly expanding and is indicating many beneficial ways. Music can engage and change the brain. Music affects the brain and mood by engaging emotion, memory, learning and neuroplasticity, and attention. In looking at the many ways that music engages the brain, we can begin to understand how creating a consistent musical program can target and enhance certain brain functions.

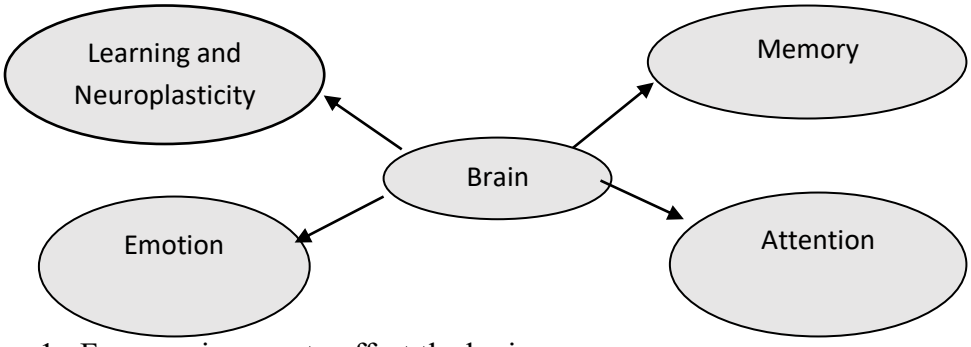

Figure 1. Four music ways to affect the brain.

1. Emotion

Research indicates that music stimulates emotions through specific brain circuits. We see this when a parent and a child connect through a song. It is probably one of the most significant bonding experiences between people.

Outside of music affecting the brain as an emotional experience, it is also a physical experience. One reason for this is a hormone related to bonding called oxytocin. The "cuddle hormone," as it is sometimes called, can be released by singing.

Listening to music can create peak of emotions, which increase the amount of dopamine, a specific neurotransmitter that is produced in the brain and helps control the brain's reward and pleasure centers. We often feel emotions are experienced from our heart but an enormous part of emotional stimulus is communicated through the brain.

Another research was conducted at the L. N. Gumilyov Eurasian National University (ENU), Kazakhstan. The senior lecturers of Foreign Languages Department implemented the research questions of this paper into practice and made evident the efficiency of music. The first-year students of non-linguistic specialties have been experienced and engaged to develop their writing skills at Foreign Language lessons listening to great classic music of Beethoven, Chopin and Mozart at the same time fulfilling creative writing tasks. There were no specific criteria for the selection of students; those who participated all were volunteers.

Listening to music inspired the students with the opportunity to use a wide range of grammatical structures, rich vocabulary and their great positive ideas.

Music can evoke the deepest emotions in people and help them process fear, grief, sadness, and resentment, even if these emotions are held on a subconscious level. Undoubtedly, great music encouraged students under the research to reach the aim of creative writing.

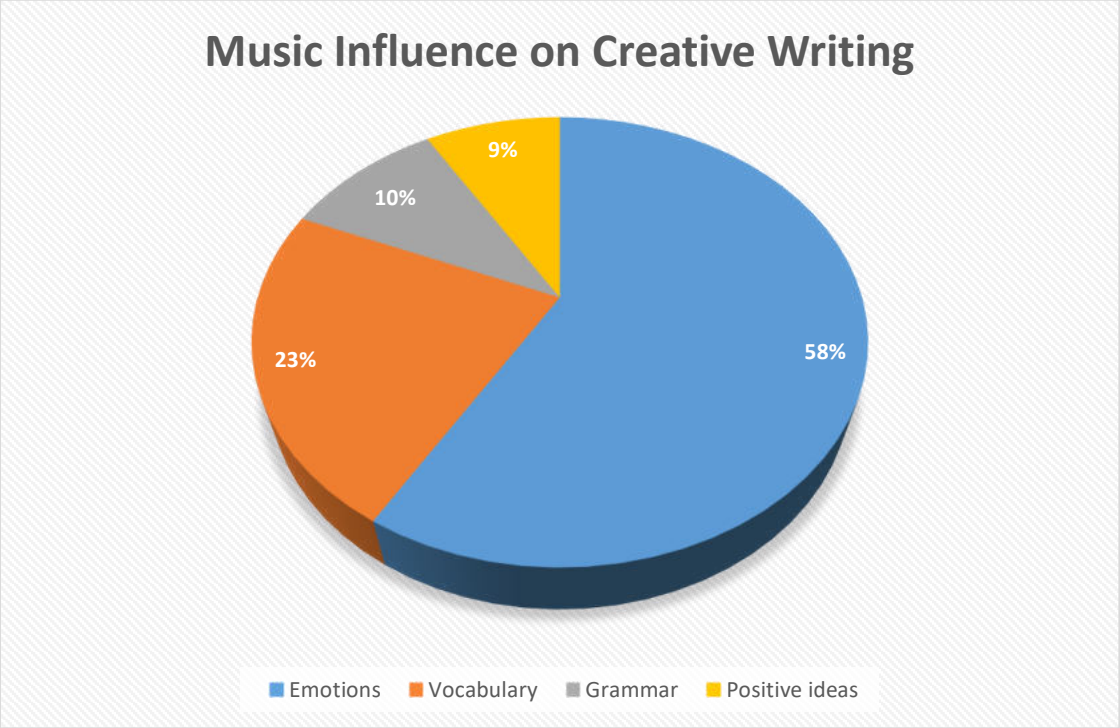

Diagram 1. Music influence on emotional state of students to carry out creative writing.

2. Memory

A 2009 study from Petr Janata at the University of California, Davis found that there is a part of the brain that associates music and memories when we experience emotionally salient episodic memories that are triggered by familiar songs from our personal past. In other words, familiar music can reconnect people with deep, meaningful memories from their past.

3. Learning and Neuroplasticity

Neuroplasticity is the brain's ability to reorganize itself by forming new neural connections throughout life, and can be greatly affected by the harmony of music and the brain. According to MedicineNet.com, "Neuroplasticity allows the neurons (nerve cells) in the brain to compensate for injury and disease and to adjust their activities in response to new situations or to changes in their environment" [7].

In a groundbreaking study by the University of Newcastle in Australia, popular music was used to assist patients with severe brain injuries in recalling personal memories. The music affected the patients' brains ability to reconnect to memories they previously could not access.

A great example of this is shown in the case of former congresswoman Gabrielle Giffords. Congresswoman Giffords experienced a brain injury as the result of a gunshot wound, which affected her brain language center and left her almost unable to speak [8]. By engaging her brain through music therapy, singing, and melodic intonation, she was able to provide new information to the mind through music and create a reorganization that helped her to make the connections necessary to relearn language.

4. Attention

Music is able to activate, sustain, and improve attention of a person.

Using brain images of people listening to short symphonies by an obscure eighteenth-century composer, a research team from the Stanford University School of Medicine investigated the power between music and the mind to hold attention of people and showed that peak brain activity occurred during a short period of silence between musical movements when seemingly nothing was happening. This caused the researchers to theorize that listening to music could help the brain to anticipate events and hold greater attention, just as the listeners demonstrated when they seemed to pay closest attention during the anticipatory silences between musical movements [6].

Conclusion

Music has a great impact on a person's life, namely on emotions and physical health. Consequently, music makes an influence on the mood of a person, thereby, encouraging people and attuning them to productive mental activity.

As a result, we found out that classical music helps in learning, when we listen to, for example, Mozart or Beethoven. Music also helps in managing your mental health. For instance, listening to melodies with waves at a certain frequency, rhythm and pace helps us to relax or achieve an energetic state. This knowledge can help us achieve a balance in our health and emotion.

References

1. **Error! Reference source not found.Error! Reference source not found.**http://www.med.mcgill.ca/epidemiology/Hanley/bios601/Mean-Quantile/Mozart_ sunscreen.pdf
2. Allen, R.E., The Concise Oxford Dictionary. ed. 1992. Clarendon Press. Oxford: 781
3. "Mousike, Henry George Liddell, Robert Scott, A Greek–English Lexicon, at Perseus". perseus.tufts.edu http://www.perseus.tufts.edu/cgibin/ptext?doc=Perseus%3Atext%3A1999.04.0057%3Aentry%3D%2368891
4. Harvard Health Publishing. https://www.health.harvard.edu/staying-healthy/music-and-health
5. Book by Barry Goldstein. The Secret Language of the Heart: How to Use Music, Sound, and Vibration As a Tool for Healing and Personal Transformation (p. 35)
6. Barry Goldstein. Music and the Brain: The Fascinating Ways That Music Affects Your Mood and Mind
7. Medical Author: William C. Shiel Jr. MedicineNet.
8. Katie Moisse. Music Therapy Helps Gabrielle Giffords Find Her Voice After Tucson Shooting

https://abcnews.go.com/Health/Wellness/gabrielle-giffords-music-therapy-rewires-brain-tragedy-tucson/story?id=13075593