

A Review on Music Induced Emotion and Music Processing in the Brain

Sana Anees^{1*}; Basma Binth Basheer²; Rihana Sharin³; Sahla Liyakath⁴;
Shaik Samahat Raaziya⁵; Halima Umar Zubairu⁶

^{1,3}Faculty of Humanities and Social Sciences, MIE-SPPU Institute of Higher Education Doha - Qatar

^{2,4,5,6}Faculty of Science and Technology, MIE-SPPU Institute of Higher Education Doha - Qatar

Corresponding Author: Sana Anees^{1*}

Publication Date: 2026/10/16

Abstract: People's enthusiasm for music has never wavered. It is among the most important and traditional aspects of human society. One of the wonderful things about music is its ability to arouse strong emotions in us. Music has a way of hitting our hearts regardless of our emotions, whether they are joy, grief, enthusiasm, or memories. It is frequently regarded as the catalyst that most intensely aroused human emotion. Not only can music arouse our feelings, but it also has the power to amplify or dull them. You've undoubtedly seen how a happy song can instantly make you feel better or how a depressing tune may make you feel even worse. The power of music! It is astounding to learn that individuals frequently select their music based on how they are feeling or what they want to feel. We utilize music as a tool to direct our feelings and elicit the feelings we desire. Our lives seem to have a soundtrack! However, music serves purposes beyond our feelings. It also has a major impact on our ability to think clearly. Music helps prevent mental dullness while we perform boring, repetitive tasks. Because it keeps our thoughts active, it keeps us motivated and concentrated. When we listen to music, our brains go through a sophisticated musical processing mechanism. Multiple brain regions are active as we hear, analyze, and understand music. It's amazing to see how our brains respond to various melodies, rhythms, and harmonies. Our bodies are impacted by music in addition to our intellect. It has the ability to trigger the Autonomic Nervous System (ANS), which regulates the body's natural functions including heart rate, blood pressure, and respiration. Similar to how certain people may make us uneasy and uncomfortable, others can cause our hearts to race. All things considered, music is a powerful and intricate phenomena that affects not just our emotions and ideas but also our bodily states. It makes perfect sense that it had such a significant impact on people's lives for many generations.

Keywords: *Autonomous Nervous System (ANS), Emotion, Mood regulation, Music.*

How to Cite: Sana Anees; Basma Binth Basheer; Rihana Sharin; Sahla Liyakath; Shaik Samahat Raaziya; Halima Umar Zubairu (2026) A Review on Music Induced Emotion and Music Processing in the Brain. *International Journal of Innovative Science and Research Technology*, 11(10), 647-654. <https://doi.org/10.38124/ijisrt/26oct134>

I. INTRODUCTION

Have you ever wondered why so many people listen to music? Listening to music is a widely enjoyed and favored pastime, mostly due to its ability to effectively convey emotions through musical performances and evoke a range of feelings in its listeners. Since music may elicit a wide range of emotions in the listener, including happiness, excitement, and fright, it is well-known that music is an efficient way of emotional communication (Scherer, 2004).

Music is recognized by all healthy human brains. How does the brain accomplish this? Given that music seems to be universal, it follows that our entire spectrum of musical experiences is supported by fundamental mechanisms that are a reflection of the anatomical and physiological structure of the brain. Thus, similar to other higher brain processes, the

ability to perceive music may be compromised by certain illness conditions and brain lesions. Music has an indelible presence in every facet of our lives (Juslin and Laukka 2004). In politics (book VIII), Aristotle suggested that men listen to music as a way to unwind and find pleasure after a demanding day at work. Accordingly, music therapy may be used to treat mental health issues including depression (Maratos, Gold, Wang, & Crawford, 2008). "Music is therapy. Music moves people. It connects people in ways that no other medium can. It pulls heartstrings. It acts as medicine."-Macklemore. Music can be referential. (eg: it could be about a love story, a war, or a rainstorm).

In addition to evoking intense subjective emotions in listeners, music activates the human brain's extensive emotional processing and recognition network. On the contrary, although music is frequently described as the

language of emotions, there is much debate about whether or not music truly has the ability to directly induce emotions in listeners. Hanslick stated that the enjoyment of music is not connected to feelings.

Langer argued that music has a certain relationship with emotion because the rise and fall of tension, the interplay of uncertainty and determination in music mimics the passage of time in emotional experience. Meyer has argued that music expresses emotions.

According to his argument, musical emotions are evoked through musical uncertainty, future expectations, and the resolution of that uncertainty, just like other stimuli and events in the world. The physiological correlates of emotion can be found in the central nervous system (CNS) rather than in peripheral physiological responses because brain signals reflect a direct measure of evoked emotion and these changes can be assessed by electroencephalogram (EEG) or functional magnetic resonance imaging (MRI).

Hearing sounds is the first step in the perception of music. This information is then converted into cochlear neural activity and then gradually altered in the auditory brainstem. The inferior colliculi can trigger the fight-or-flight response based on musical factors such as rhythmicity/periodicity, consonance, and sound loudness.

This is because the dorsal cochlear nucleus projects music into the reticular formation. Since the auditory system contains projections from both the top and bottom, it is also possible that the thalamus projects neural impulses into the medial orbitofrontal cortex and the amygdala. As a result, the emotional valence of music, which is the antagonism of negative (sad) and positive (happy) feelings, has been linked to how music is perceived.

II. THE EMOTIONAL POWER OF MUSIC: EXPLORING HOW MUSIC ELICITS AND INFLUENCES EMOTIONS

Music is a great way to convey both happiness and melancholy (Juslin & Laukka, 2003). Compared to sad music, it was projected that cheerful music would lead to higher self-rated happiness, a decrease in one's own estimation of melancholy, no variations in the self-rated levels of fear, surprise, disgust, or rage increased activation of zygomatic muscles, a decrease in corrugator muscular activity, elevated heart rate, increased conductivity of the skin, and higher finger temperature. Many factors can influence listeners' emotions, such as their psychological state and mood, memories of past listening experiences, the environment and other situational factors, personal preferences and attitudes, and cultural conventions (Scherer & Zentner 2001).

Koelsch, Fritz, et al. found that listening to unpleasant excerpts triggered the parahippocampal gyrus, the amygdala, and the temporal poles more than pleasant excerpts did. The activation of the insula, inferior frontal gyrus (IFG, including

Brodman Area (BA) 44), and ventral striatum - a crucial region in reward and addiction circuits was linked to listening to pleasurable music as opposed to unpleasant music.

According to Juslin and Västfjäll (2008), emotional contagion is the process that occurs when a listener experiences the emotional expression of the music and then "mimics" this expression internally. Activation of the so-called mirror neuron system is associated with emotional contagion (Rizzolatti and Craighero, 2004). According to a meta-analysis by Juslin and Laukka (2003), certain acoustic cues are associated with emotions that are expressed in speech and music. For instance, higher-arousal emotions like euphoria and rage are linked to quicker speech rates and faster musical tempos, while lower-arousal emotions like melancholy and tenderness are associated with slower speech rates and tempos. The theory of music and emotion suggests that although we experience sadness when we listen to sad music, we also experience pleasure. René Descartes (1596 – 1650) developed a rather comprehensive theory of music's effects, arguing that the same music that moves some people to tears may also motivate others to dance. This is solely dependent on the memories that are triggered by our thinking.

➤ *Music and Mood Regulation:*

The field of music therapy has advanced significantly in the last ten years, with research showing its beneficial effects on a variety of physiological and psychological benefits. Music has been shown to be a powerful mood regulator that may be used to improve, produce, sustain, or modify feelings and moods in daily life for one's own benefit and to help with coping. (van Goethem and Sloboda, 2011). Music induces relaxation before and after surgery or diagnostic procedures, helping to save sedative drugs, which results in a positive effect on the course of the illness (Mok & Wong, 2003; Good et al., 2005; Siedlecki Good, 2006)

According to Wilhelm, Gillis, Schubert, and Whittle (2013), people who are depressed are more prone to utilize music to reflect their mood and convey their emotions. Music provides "an escape and a comfort from the difficulties of life" (Boer & Fischer, 2012). Pythagoras utilized music as a means of easing anxiety, tension, and anger back in ancient Greece. Research suggests that listening to music reduces stress by lowering physiological arousal, including cortisol levels, heart rate, and mean arterial pressure (Burrai et al., 2016; Koelsch et al., 2016; Kreutz et al., 2012; Linnemann et al., 2015). The mood Regulation model (MMR) identifies seven unique ways of regulating mood using music.

The seven strategies included are: Revival: relaxation and new vitality. Mental work involves reappraising preoccupations, discharging emotional unpleasant emotions, and diverting attention away from undesired thoughts, worries, and tension. Solace: comfort, support, and emotional affirmation. Strong Sensation involves powerful emotion induction, strengthening and entertainment as the enhancement and maintenance of a cheerful mood. (Saarikallio & Erkkilä, 2007). To help people with mental problems regain their mental equilibrium, music therapy can

be utilized as an additional non-pharmacological type of treatment.

➤ *Music and the Body: Investigating the Physiological Effects of Music on Autonomic Nervous System*

Few studies have thoroughly examined the therapeutic effects of music on autonomic nervous system (ANS) dysfunction, despite a plethora of evidence supporting the ANS's role in both health and sickness and its ability to be affected by music. Moreover, the quantification and analysis of ANS activity typically stem from pragmatic considerations rather than a thorough comprehension of its physiological foundation. A "Neurovisceral Integration" perspective on the interaction between the central and autonomic nervous systems is presented, and the implications for physiological, emotional, and cognitive health are examined. This is followed by a review of the experimental and therapeutic literature examining music and the ANS. The concept of heart rate variability is examined as a helpful tool for examining the occasionally nuanced impact of music on autonomic response, as well as an illustration of this intricate interaction. His study also looks at how music's demonstrated how music therapy greatly improved the ANS control and sped up wound healing. The experimental group saw quicker rates of wound healing due to enhanced parasympathetic activity and lower cortisol levels. Scores for tension and pain also dropped, with the biggest drop happening at the nine-month point. According to the study, patient-specific music therapy regimens are essential to getting the best outcomes.

➤ *The Neuronal Symphony:*

Understanding the Brain's Response to ToneMusic may have a special ability to engage and excite the brain.

Neuroscience research has examined the neuronal symphonies that take place during music listening, examining the release of neurotransmitters and the activation of different brain regions. Understanding the brain mechanisms underlying music's potent emotional and mental impacts can help 500 in emotional and mental impacts can help therapy affect trauma victims' wound healing and autonomic nervous system (ANS). 500 trauma patients participated in cross-sectional brain mechanisms underlying music's potent observational research that explains anything from the feel-good effects of dopamine to the chemicals associated with stress.

➤ *Music Processing in the Brain*

Music perception is based on the relationship between elements such as pitch, tempo, rhythm, musical memory, emotion and musical performance rather than their individual values, and it shares neural substrates with other sounds.

About 30,000 nerve endings of an ear send electrical signals to the brain along the vestibulocochlear nerve and the elements of music mentioned above are analyzed by the brain. According to van Noorden, the balance between the various frequencies of a musical note is determined by musical coherence provided by the brain. The various methods of investigation of music processing in the brain include "study of dichotic listening, hemispheric anesthesia, study of patients with brain lesions and damage, and positron emission tomography (PET)". Music processing is based on brain specialization and the progressive unity between the two hemispheres. The right hemisphere is mainly responsible for musical rendition and global harmonic processing.

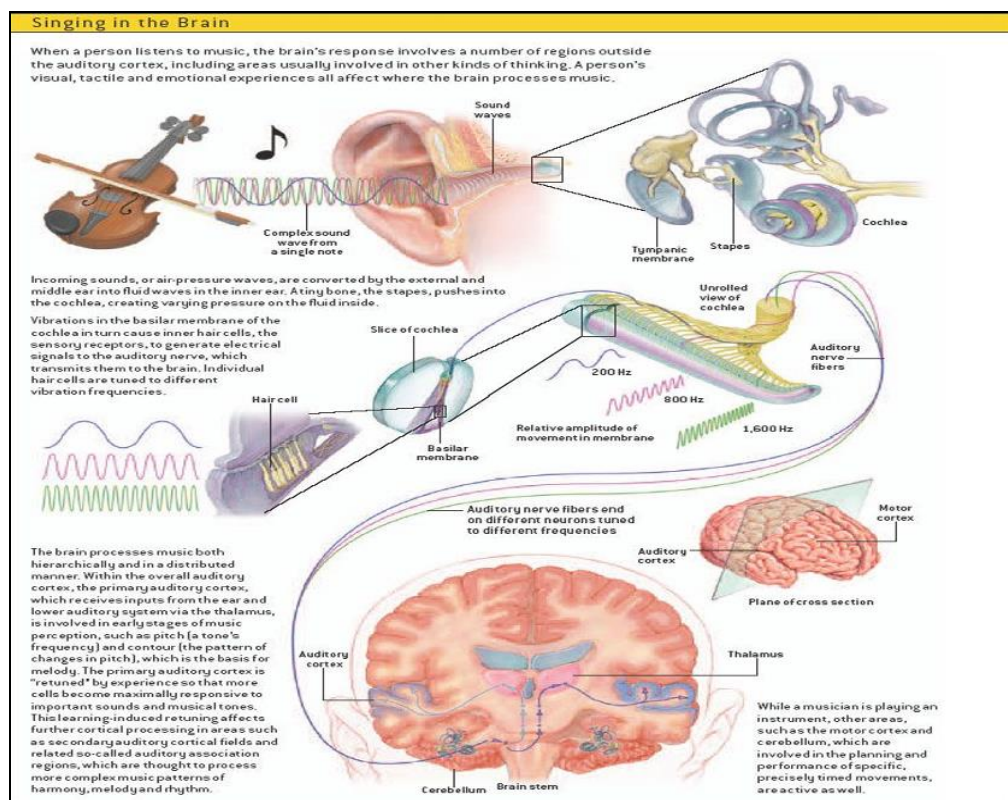


Fig 1 Source: Norman M. Weinberger (2004) Music and the Brain <https://www.hotdogstorm.com/alex/MusicandtheBrain.pdf>

The complex tones are differentiated from the subtle harmonic differences by the right hemisphere. “Superior sequencing and rhythmic ability” are functions of the left hemisphere. A basic theory regarding musical functions is the “distinction between pitch-based and time-based mechanisms”. Different structures in the brain such as the auditory, frontal, cerebral and motor cortex turn on when listening to music. The brain structures respond differently to pleasant, unpleasant, positive and negative stimuli respectively. The interval information extraction can be affected by unilateral brain damage in any of the hemispheres. The superior temporal gyrus (T1) is more important than the entire right temporal lobe during melody processing.

➤ *Music as a Cognitive Enhancer*

Music makes our lives better in many ways. It helps to change our mood, reduces stress, and erases the pain. Music is good for our health as it lowers blood pressure, lowers high heart rate and decreases stress. It also connects us with others and builds up social bonds. Music can make a difficult task easier. Maybe students often choose to listen to music while working on their homework. It helps to increase the resiliency of the brain. To play music and understand it, we need active participation in cognitive processes including the sensory and motor systems. Listening to music has been seen to lower the heart rate and respiration rate, which will highly affect cognitive performance. Listening to several types of music can change sustained attention, alertness, and attentional focus. Mental fatigue is a psychological term that is caused by more than seven days of demanding cognitive activity which results in slower reaction times and attention deficits. Mental fatigue affects the capacity to focus and crash the ability to make optimal decisions during a given task.

➤ *Music and Mental Fatigue*

Mental fatigue is a complex idea admissible to different areas of study including physiology, sports medicine, psychology and therapy. Mental fatigue is described as the feeling that people may experience during and following prolonged periods of cognitive activity requiring sustained mental activity.

Mental fatigue leads to decreased attention, delayed reaction times and more errors during visual reaction tasks as a result of lower levels of brain activation. People tend to listen to music while working, writing, and driving. It is believed that music may help reduce mental fatigue and improve work organization. Listening to music was a helpful strategy to reduce mental fatigue compared with no music condition.

Moving music has a higher arousal level, and the compensation effect of mental fatigue is more prominent. Listening to music during a task may make people feel less mentally fatigued and maintain high usefulness. Listening to music can lower anxiety, and blood pressure, and improve sleep quality, mental alertness, and memory. Prolonged demanding cognitive activity provokes mental fatigue.

➤ *Personal Soundtrack: How Individuals Use Music to Regulate Emotions and Create Desired Emotional States*

Listening to music has always been an emotion-laden experience. People utilize recorded music as a tool to manage their emotions, boosting desired affective states and reducing unpleasant ones, according to early study conducted on analogue platforms comprising creating, playing, or taking in musical performances. Several studies have indicated that generating feelings is the primary objective of listening to music: individuals utilize music for a variety of purposes, including stress relief, enjoyment or solace, emotional release, and matching their present mood. (e.g., Behne 1997; Juslin & Laukka 2004; Sloboda & O'Neill 2001; Zillman & Gan 1997). The thalamus, hippocampus, amygdala, prefrontal cortex, orbitofrontal cortex, midbrain/periaqueductal gray (PAG), insula, and nucleus accumbens are among the brain regions that listeners' responses to music are known to be associated with emotional responses (Blood & Zatorre 2001); Blood et al 1999; Brown et al. 2004; Koelsch et al. 2006; Menon & Levitin 2005. People who listen to music have been observed to laugh, cry, grin, and wrinkle their brows, as well as to self-report and use electromyographic assessments of their facial muscles. When participants were bored, fatigued, depressed, or at ease, they opted to listen to music. Becker 2004; Frey 1985; Gabrielsson 2001; Sloboda 1991; Witvliet & Vrana 2007. The music may be distracting for the listener. From a situation, relax them, take care of their stress, concentrate on themselves thinking, or help them think in a new way about the situation. To support different techniques for regulating emotions, future research ought to explore the reasons behind people's preference for particular genres of music.

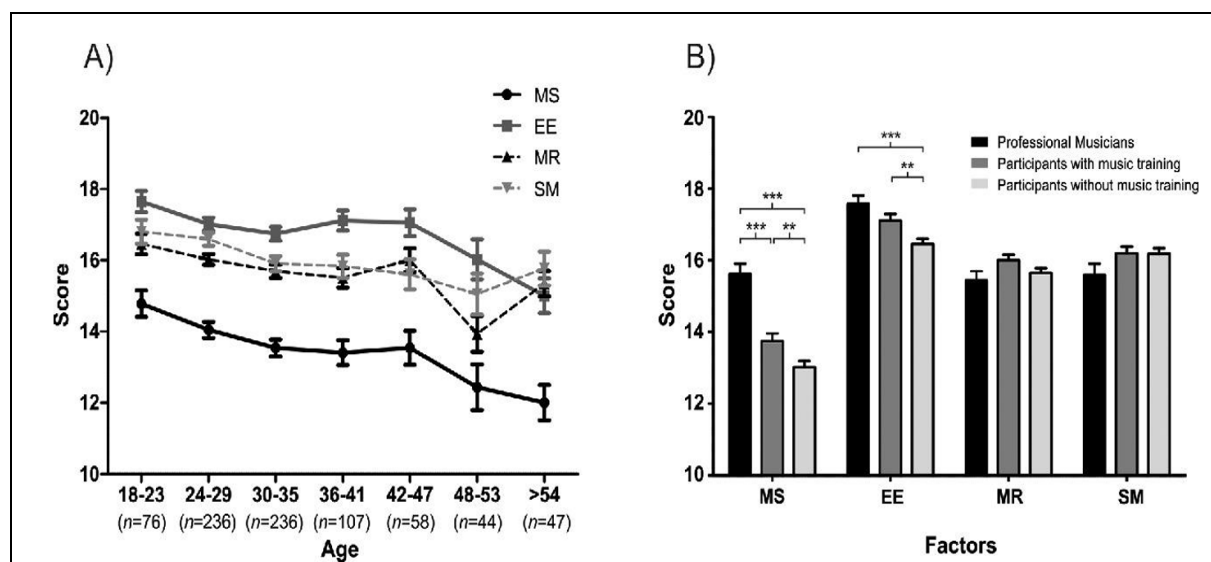


Fig 2 Mas-Herrero,Macro-Pallares, Rodriguez-Fornells, (2013),Individual Differences in Music Reward Experiences, <https://www.semanticscholar.org/paper/786b57fdd09c55bf437cbb4dd19f28bffad919a6>

Prosocial lyrics may improve empathy, according to some recent research on the subject of lyrics' emotional impact. Lyrics can also influence how listeners perceive the emotional tone of music Tempo, time signature, rhythm, melody complexity, tonality, and key can all vary amongst different music genres. Even though listening to depressing music negatively affected their emotional states, Garrido and Schubert (2015) discovered that people who were predisposed to depression were more likely to enjoy doing so. Garrido (2018) discovered that when participants listened to nostalgic music, their implicit mood measures - where they are not aware that their mood is being measured - showed significantly more negative mood responses than what they would have said if direct questioning had been used. Since music appears to be effective at evoking emotions, one may conclude that listeners can utilize music to control the emotions they are experiencing at the moment.

➤ Individual Differences in Music-Emotion Regulation

Despite having no clear biological benefit, listening to music is one of the most enjoyable human experience. To do this, three sizable samples were given the Barcelona Music Reward Questionnaire (BMRQ). Our findings demonstrated that the five consistent components of the musical experiences are Musical Seeking, emotional evocation, Mood Regulation, Social Reward, Sensory-Motor. Musical reward, individual variability, sensitivity to music, and music processing. Everyone agrees that one of the most enjoyable stimuli is music and that it plays a significant role in evoking emotions and regulating mood (Dube' & LeBel, 2003; Juslin & Västfjäll, 2008; Schellenberg, 2003). When listening to music, people can understand how it affects their mood by using emotion regulation techniques. The effects of emotion management techniques on the suppression and augmentation of emotional experiences when listening to music are not well understood. When listening to music in an effort to lessen bad sentiments and/or raise positive feelings, suppression or amplification of emotions may serve hedonic functions. Enhancement can also be used to let go of unpleasant or happy feelings, de-stress or make chores easier. In their

investigation on suppression and enhancement when listening to music, Randall et al. 2014; understanding individual variations in how people process emotions through music has been made easier by the creation of standardized music libraries expressly for experimental use. (Eerola & Vuoskoski, 2011; Imbir & Golab, 2017; Lepping et al., 2016; Song et al., 2016; Vieillard et al., 2008). Eerola & Vuoskoski (2011) Reward Particular melodic styles may have one-of-a-kind impacts on emotionality. For occasion, Sharman and Dingle (2015) found that instead of causing outrage, extraordinary overwhelming metal music (metal music characterized by uproarious and overwhelming disobedient and candidly serious vocals, regularly counting topics of sadness and depression) appeared to diminish outrage whilst keeping up physiological excitement. Person contrasts in identity and music preparation seem to offer assistance to recognize audience members who preferred music that made them feel cheerful, audience members who preferred music that made them feel pitiful, and so on. We shaped five unused (idle) factors from the initial evaluations.

For each member, we relapsed their enjoying evaluations independently on each of the five other music-response factors (i.e., feeling concentrated, upbeat sentiments, pitiful sentiments, blended sentiments, and scene complexity). It is crucial to note that recognizing and sensation of musical emotion are distinct from one another. They include various temporal characteristics of processing and may also represent different processing modes that interact with time, circumstance, context, and listeners' distinctive musical histories.

III. CONCLUSION

Music can convey both happiness and melancholy, with cheerful music leading to higher self-rated happiness and decreased melancholy. Factors influencing listeners' emotions include psychological state, past listening experiences, environment, personal preferences, and cultural conventions. Music therapy has gained significant advancements in the last

decade, with research showing its benefits in physiological and psychological aspects. Few studies explore the therapeutic effects of music on autonomic nervous system dysfunction, highlighting the importance of understanding its physiological foundation. Neuroscience research reveals that music can engage and excite the brain, releasing neurotransmitters and activating various brain regions. Understanding these mechanisms can help therapy affect trauma victims' wound healing and autonomic nervous system, influencing the feel-good effects of dopamine and stress chemicals. Music processing is based on brain specialization and the progressive unity between the two hemispheres. The right hemisphere is responsible for musical rendition and global harmonic processing, while the left hemisphere functions for sequencing and rhythmic ability. Active participation in cognitive processes, including sensory and motor systems, is crucial for music comprehension.

REFERENCES

- [1]. Shibazaki, K., & Marshall, N. A. (2015, December 15). Exploring the impact of music concerts in promoting well-being in dementia care. *Aging & Mental Health*, 21(5), 468–476. <https://doi.org/10.1080/13607863.2015.1114589>
- [2]. Eller-Smith, O. C., Nicol, A. L., Christianson, J. A., & Willis, M. A. (2018). Wound healing and inflammation: Embryos reveal the way to perfect repair. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 373(1750), 20160535. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3011183/>
- [3]. Cepeda, S. L., & Bowers, T. (2021). Evidence-based wound care: A clinical primer. *International Wound Journal*, 18(1), 44–53. <https://onlinelibrary.wiley.com/doi/full/10.1111/iwj.14790>
- [4]. Guo, S., & DiPietro, L. A. (2010). Factors affecting wound healing. *Journal of Dental Research*, 89(3), 219–229. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10770821/>
- [5]. Kreutz, G., & Lundqvist, L.-O. (2021). Researching how music affects the autonomic nervous system and influences wound healing processes in trauma patients. https://www.researchgate.net/publication/378576092_Researching_how_music_affects_the_autonomic_nervous_system_and_influences_wound_healing_processes_in_trauma_patients
- [6]. Thoma, M. V., Zemp, M., Kreutz, G., & Janke, S. (2020). Emotions and music: Further arguments for a cognitive neuroscience of music. *Frontiers in Psychology*, 11, 74. https://www.researchgate.net/publication/378576092_Researching_how_music_affects_the_autonomic_nervous_system_and_influences_wound_healing_processes_in_trauma_patients
- [7]. Curran, M. W., & Haring, C. T. (2022). Listening to music as an intervention for pain and anxiety in spine surgery: A narrative review. *Global Spine Journal*, 12(1), 204–209. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8906590/>
- [8]. Huang, Y., Feng, Y., & Zhang, L. (2022). Music therapy improves the quality of life in patients with advanced cancer: A meta-analysis. *Journal of Clinical Nursing*, 31(1–2), 16–26. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8906590/>
- [9]. Khushboo, M., & Divya, T. (2020). Music Induced Emotion and Music Processing in the Brain– A Review. *Journal of Clinical and Diagnostic Research*, 14(12), CE01–CE04.
- [10]. Samuel, S., & Ramesh, M. (2021). Music-induced emotion and music processing in the brain: A review. <https://research.vit.ac.in/publication/music-induced-emotion-and-music-processing>
- [11]. Alves, R. M., de Araújo, L. V., de Andrade, D. F., & Pereira, T. T. (2017). Music and the brain: A review of the literature. *Neurology Research International*, 2017, 3549192.
- [12]. Hernandez-Ruiz, E. (2019, March 17). How is music processed? Tentative answers from cognitive neuroscience. *Nordic Journal of Music Therapy*, 28(4), 315–332. <https://doi.org/10.1080/08098131.2019.1587785>
- [13]. Peretz, I., & Zatorre, R. J. (2005, February 1). Brain Organization for Music Processing. *Annual Review of Psychology*, 56(1), 89–114. <https://doi.org/10.1146/annurev.psych.56.091103.070225>
- [14]. Hachinski, K., & Hachinski, V. (n.d.). Music and the brain. Retrieved January 15, 2023, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1336919/pdf/cmaj00051-0039.pdf>
- [15]. Geethanjali, B., Adalarasu, K., & Jagannath, M. (2018). Music Induced Emotion and Music Processing in the Brain– A Review. *JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH*. <https://doi.org/10.7860/jcdr/2018/30384.11060>
- [16]. Cindi May, (2020), Does music boost cognitive performance, from <https://www.scientificamerican.com/article/does-music-boost-your-cognitive-performance/>
- [17]. Besty Mills, (2019), Does music benefit the brain, from <https://www.alzdiscovery.org/cognitive-vitality/blog/does-music-benefit-the-brain>
- [18]. Patricia Y.sanchez, (2022), Listening to relaxing music can improve cognitive performance, from <https://www.psypost.org/listening-to-relaxing-music-can-improve-cognitive-performance-study-suggests/>
- [19]. Denmark, (2020), music intervention and mindfulness reduces the effect of mental fatigue, from <https://www.sciencedaily.com/releases/2020/03/200306122509.htm>
- [20]. Wei guo, (2015), effects of relaxing music on mental fatigue induced by a continuous performance task, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4549311/>
- [21]. Hockey, (2013), effects of music style on mental fatigue, from

- http://link.springer.com/chapter/10.1007/978-3-031-25191-7_14#:~:text=The%20results%20showed%20that%3A%20
- [22]. Hui kwan, (2019), mental fatigue, from https://www.researchgate.net/publication/336650847_The_effects_of_music_on_mental_fatigue_and_endurance_performance
 - [23]. Thomas jacquet, (2017), music to counteract mental fatigue, from <https://www.sciencedirect.com/science/article/pii/S0306452221004863>
 - [24]. Qin zhu, (2015), effects of relaxing music on mental fatigue, from <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0136446>
 - [25]. Juslin, P. N. (2013). What does music express? Basic emotions and beyond. *Frontiers in Psychology*, 4(596). <https://doi.org/10.3389/fpsyg.2013.00596>
 - [26]. Coleman, N. V., & Williams, P. (2013). Feeling Like My Self: Emotion Profiles and Social Identity. *Journal of Consumer Research*, 40(2), 203–222. <https://doi.org/10.1086/669483>
 - [27]. Cook, T., Roy, A. R. K., & Welker, K. M. (2017). Music as an emotion regulation strategy: An examination of genres of music and their roles in emotion regulation. *Psychology of Music*, 47(1), 144–154. <https://doi.org/10.1177/0305735617734627>
 - [28]. Mirjam Irene Thoma, Ryf, S., Ehlert, U., & Nater, U. M. (2006). Regulation of emotions by listening to music in emotional situations. *University of Bologna EBooks*, 1088–1093. <https://doi.org/10.5167/uzh-65452>
 - [29]. Sakka, L. S., & Juslin, P. N. (2018). Emotion regulation with music in depressed and non-depressed individuals. *Music & Science*, 1, 205920431875502. <https://doi.org/10.1177/2059204318755023>
 - [30]. Stewart J, Garrido S,Hense, Mcferran.K, (2019), Music use for mood regulation, https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2019.01199/full?fbclid=IwAR3qJe4WmfTpsp-Z1vh3bFw9w2_biRSzLRUtMhIjm-4Kv8y8zG_zX2w9stA
 - [31]. Mas-Herrero, Macro-Pallares, Rodriguez-Fornells, (2013), Individual differences in music reward experiences, <https://www.semanticscholar.org/paper/786b57fdd09c55bf437cbb4dd19f28bfad919a6>
 - [32]. H. Pickard, (2019), Individual differences and emotional regulation through music, https://www.semanticscholar.org/paper/IndividualdifferencesandemotionregulationmusicPickard/3239a28d5347f9cd7b7feea1b2323624184727dd?utm_source=directlink
 - [33]. Scientiae, M. (n.d.). Retrieved April 30, 2024, from https://repositori.uji.es/xmlui/bitstream/handle/10234/196779/79145_FuentesSanchezN_2021.pdf?sequence=1&isAllowed=y
 - [34]. Cook, T., Roy, A. R. K., & Welker, K. M. (2017). Music as an emotion regulation strategy: An examination of genres of music and their roles in emotion regulation. *Psychology of Music*, 47(1), 144–154. <https://doi.org/10.1177/0305735617734627>
 - [35]. Kreutz.G, Lotze.M, (2007), Neuroscience of music and emotion, https://www.researchgate.net/profile/Martin-Lotze/publication/254342023_Neuroscien
 - [36]. Juslin, P. N., & Västfjäll, D. (2008). Emotional responses to music: The need to consider underlying mechanisms. *Behavioral and Brain Sciences*, 31(5), 559–575. <https://doi.org/10.1017/s0140525x08005293>
 - [37]. Wadley, G., Krause, A., Liang, J., Wang, Z., & Leong, T. W. (2019). Use of music streaming platforms for emotion regulation by international students. *Proceedings of the 31st Australian Conference on Human-Computer-Interaction*. <https://doi.org/10.1145/3369457.3369490>
 - [38]. Trainor, L. J., & Schmidt, L. A. (2003, July 10). Processing Emotions Induced by Music. *The Cognitive Neuroscience of Music*, 310–324. <https://doi.org/10.1093/acprof:oso/9780198525202.003.0020>
 - [39]. Daly, I., Williams, D., Hallowell, J., Hwang, F., Kirke, A., Malik, A., Weaver, J., Miranda, E., & Nasuto, S. J. (2015). Music-induced emotions can be predicted from a combination of brain activity and acoustic features. *Brain and Cognition*, 101, 1–11. <https://doi.org/10.1016/j.bandc.2015.08.003>
 - [40]. Balasubramanian. G, Kanagasabai. A, Mohan. J, N.P. Guhan seshadri, (2018), Music induced emotion using wavelet packet decomposition, <https://www.sciencedirect.com/science/article/pii/S1746809418300223>
 - [41]. Hermida, J., Ferrero, M., Marin, M., & Bhattacharya, J. (n.d.). In: *Music Education MUSIC INDUCED EMOTIONS: SOME CURRENT ISSUES AND CROSS-MODAL COMPARISONS*. Retrieved April 30, 2024, from http://musicpsychology.at/documents/Marin_Bhattacharya_2011.pdf
 - [42]. Aydın, S., & Onbaşı, L. (2023). Graph theoretical brain connectivity measures to investigate neural correlates of music rhythms associated with fear and anger. *Cognitive Neurodynamics*. <https://doi.org/10.1007/s11571-023-09931-5>
 - [43]. Trost, W., Trevor, C., Fernandez, N., Steiner, F., & Sascha Frühholz. (2024). Live music stimulates the affective brain and emotionally entrains listeners in real time. *Proceedings of the National Academy of Sciences of the United States of America*, 121(10). <https://doi.org/10.1073/pnas.2316306121>
 - [44]. Lars-olov lundqvist, Juslin. P, (2009), Emotional responses to music: Experience, Expression, Physiology, https://www.researchgate.net/profile/Lars-Olov-Lundqvist/publication/209436300_Emotional_responses_to_music_Experience_expression_and_physiology/links/00b7d51f01739c4f7c000000/Emotional-responses-to-music-Experience-expression-and-physiology.pdf
 - [45]. Scherer, K., & Coutinho, E. (n.d.). How music creates emotion: a multifactorial process approach.

- https://livrepository.liverpool.ac.uk/3002879/1/S%26C_EPM_Chapter_Final.pdf
- [46]. Chapin, H., Jantzen, K., Scott Kelso, J. A., Steinberg, F., & Large, E. (2010, December 16). Dynamic Emotional and Neural Responses to Music Depend on Performance Expression and Listener Experience. *PLoS ONE*, 5(12), e13812. <https://doi.org/10.1371/journal.pone.0013812>
- [47]. Flaig, N. K., & Large, E. W. (2014, March 17). Dynamic musical communication of core affect. *Frontiers in Psychology*, 5. <https://doi.org/10.3389/fpsyg.2014.00072>
- [48]. Mohiyeddini, C., Eysenck, M., & Bauer, S. (n.d.). In: *Handbook of Psychology of Emotions*. <https://www.utm.utoronto.ca/~w3psygs/CorrigallSchellenberg2013.pdf>
- [49]. Kawakami, A., Furukawa, K., Katahira, K., Okanoya, K. (2013), Sad music induces pleasant emotion, https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2013.00311/full?source=Blog_Email_%5B8%20Ready-Made%20Job%20Des%5D
- [50]. Schaefer, H.-E. (2017). Music-Evoked Emotions—Current Studies. *Frontiers in Neuroscience*, 11(600). <https://doi.org/10.3389/fnins.2017.00600>
- [51]. Freitas, C., Fernández-Company, J. F., Pita, M. F., & García-Rodríguez, M. (2022). Music Therapy for Adolescents with Psychiatric disorders: an Overview. *Clinical Child Psychology and Psychiatry*, 27(3), 135910452210791. <https://doi.org/10.1177/13591045221079161>
- [52]. Richard von Georgi, (2007), Music, mental disorder and emotional reception behavior, https://www.researchgate.net/profile/Richard-Von-Georgi/publication/248393884_Music_mental_disorder_and_emotional_reception_behavior/links/0c96051df0be6b8aec000000/Music-mental-disorder-and-emotional-reception-behavior.pdf
- [53]. Krause, A. E., Scott, W. G., Flynn, S., Foong, B., Goh, K., Wake, S., Miller, D., & Garvey, D. (2021). Listening to music to cope with everyday stressors. *Musicae Scientiae*, 102986492110303. <https://doi.org/10.1177/10298649211030318>
- [54]. Solanki. S. M, Zafar. M, Rastogi. R, (2013), Music as a therapy: Role in psychiatry, <https://www.sciencedirect.com/science/article/abs/pii/S1876201812002328>
- [55]. De Witte, M., Pinho, A. da S., Stams, G.-J., Moonen, X., Bos, A. E. R., & van Hooren, S. (2020). Music therapy for stress reduction: A systematic review and meta-analysis. *Health Psychology Review*, 16(1), 1–26. <https://doi.org/10.1080/17437199.2020.1846580>
- [56]. Barcelos. M, Teixeira. R. V, Ribeiro. N. D. E, Silva, Siqueira, Sandro. A, (2018), Music therapy in patients with mental disorders, <https://openurl.ebsco.com/EPDB%3Agcd%3A10%3A9984682/detailv2?sid=ebsco%3Aplink%3Ascholar&id=ebsco%3Agcd%3A129759945&crl=c>
- [57]. Karreman, A, Laceulle. M. O, Hanser. E. W, Ad J.J.M. Vingerhoets, (2017), Effects of emotion regulation strategies on music elicited emotions, https://d1wqtxts1xzle7.cloudfront.net/102991807/120861-libre.pdf?1685881732=&response-content-disposition=inline%3B+filename%3DEffects_of_emotion_regulation_strategies.pdf&Expires=1714499118&Signature=PRcy9WDHEHqQygGuE-1~IZdsrCDBBkZGBjVMEL19gPsvRNIMEoC78aSR9pihi08QmrBZNPCC7NsG9UGFPF0qGfPb2avaHscX7DRRL2dt~ayaq4UtSqAqZvQzOP1xTVPPRMu5DIFmCkKd5fdIX3w9E2yU7iEOo1U3zC~pTCfgQbpStJvEOVGxxV5iby3lNNcxeljsxrSjelZLLmm8BSh1YHOTCAmX7HuQc32xONRAVjSzSQB3dQjblpU1oFW9h-cgFWODrhHmJ99bkjgxoOKmFROdIT~-ZXsjinrpUKCv7KdJ2fy5ghdavg4YdEORVOew0psWSDxeR7QDEZzcSw4PaA__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA
- [58]. Ladinig, O, Schellenberg. G. E, (2011), Liking unfamiliar music: Effects of felt emotion and individual differences, https://d1wqtxts1xzle7.cloudfront.net/47221277/Liking_Unfamiliar_Music_Effects_of_Felt_20160713-3495-6639o0-libre.pdf?1468429726=&response-content-disposition=inline%3B+filename%3DLiking_unfamiliar_music_Effects_of_felt.pdf&Expires=1714499361&Signature=aMuX518E5svrYbPwZl003su9Vsriel4fIDCdqvGygjukgBafxpHfxiCYnCe~ehrs54oLuyNZW8V7EsUm8r3wZTIG2zAbzVgyBvqQlFbxxWgNw134tKH2w-j9YkQqpPiNqcJp5crc~wfeX6HVIvMsa460HrRntWpnyxYNkFlpI9tOA0x0GczZQerZcOTDkZjg8nS9Ya5rvDZHP7sUXCRN1ZMc8tEF4CGsIBWh5ua6smmtaBfRfs5mfY6OewJvbKaXBf8~tiTjXe6pijn00SERBhUi2vaMU5lfnYkNp1kdWyJntMJxTGeGxLP3EZVPFBX9I3G7Di59FWwoceLSOLw__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA
- [59]. Norman M. Weinberger (2004) Music and the Brain <https://www.hotdogstorm.com/alex/MusicandtheBrain.pdf>
- [60]. Thomson, C. J., Reece, J. E., & Di Benedetto, M. (2014, February 6). The relationship between music-related mood regulation and psychopathology in young people. *Musicae Scientiae*, 18(2), 150–165. <https://doi.org/10.1177/1029864914521422>