

# The Symphony of Healing: A Review of Music Therapy's Efficacy in Enhancing Mental Health and Resilience

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## ABSTRACT

**Introduction:** Music has the power to deeply influence an individual's mental well-being by providing outlets for emotional expression and aiding in relaxation and stress relief. The therapeutic value of music in mental health is increasingly recognized, prompting significant interest and implications for both research and practice.

**Objectives:** This study explores the psychological and cognitive advantages of music, along with its role in fostering social bonds and aiding emotional regulation.

**Methods:** The study conducted thorough literature reviews using database searches, including Google Scholar, Medline, PubMed, Springer, Science Direct, and ProQuest. It scrutinized articles published between 2008 and 2023 to explore the impact of music therapy on enhancing mental health.

**Results:** The findings indicate that music therapy has a significant impact on mental health, particularly in terms of stress reduction, mood enhancement, and emotional well-being.

**Conclusion:** In conclusion, the review of research on the therapeutic benefits of music for coping mechanisms and mental health underscores the transformative role of music in fostering resilience and enhancing overall well-being.

## KEY WORDS

music, mental health, well-being, coping mechanism, music therapy

## INTRODUCTION

Music, with its profound ability to evoke emotions and connect with the human experience, holds remarkable therapeutic potential in mental health. Recognized as a powerful medium, music therapy has demonstrated efficacy in alleviating symptoms of various mental health conditions. Music can profoundly impact an individual's psychological well-being, from offering a means of emotional expression to serving as a tool for relaxation and stress reduction. The therapeutic potential of music in the context of mental health is a topic of growing interest and significance, with implications for both research and practice. The transformative power of music in mental well-being has been increasingly acknowledged, with music being used to promote social connectedness, enhance emotional expression, and foster diversity and inclusion. Its non-invasive nature makes it accessible to diverse populations, making music therapy a valuable and versatile component in the broader spectrum of mental health interventions.

Music has been utilized and studied as a support for mental health for many decades, with applications ranging from general mood elevation and stress reduction to clinical interventions designed to treat serious mental illnesses (SMIs). Research indicates that music-based approaches to mental health care can increase patients' likelihood of accessing care while reducing its costs. Studies of music's effects on mental health have been conducted within various disciplines, including psychology, neurology, music therapy, nursing, dance therapy, and psychiatry. Music therapy, in particular, is an evidence-based therapeutic intervention using music to accomplish health and education goals, such as improving mental wellness, reducing stress, and alleviating pain. It is offered in settings such as schools and hospitals<sup>1,2,5</sup>.

Recent research suggests that music engagement not only shapes

personal and cultural identities but also plays a role in mood regulation. Music therapy has shown promise in providing a safe and supportive environment for healing trauma and building resilience while decreasing anxiety levels and improving the functioning of depressed individuals. The increasing evidence of the benefits of music activities and music therapy provided by the literature is a driving force for developing music-based therapy services in the healthcare sector. By promoting physical and psychological health, music can be an effective treatment option suitable for every environment and people of every age, race, and ethnic background<sup>2,5</sup>.

In addition to its healing potential, music can magnify the message of diversity and inclusion by introducing people to new cultures and amplifying marginalized communities' voices, thereby enhancing understanding and appreciation for diversity. Various mechanisms have been proposed to explain the therapeutic effects of music on mental health, including psychological and specific neurobiological drivers. Elucidating these possibilities will help disentangle the complex associations between music and mental health and could be used to identify which individuals would benefit most from a music intervention, especially preventative interventions<sup>3-5</sup>.

## Purpose of the Study

The purpose of this study is to explore the therapeutic potential of music in enhancing mental health and coping strategies. Through this research, the aim is to investigate the impact of music on mental health, specifically focusing on its psychological and cognitive benefits. Additionally, the intention is to examine how music can serve as a coping mechanism, facilitating emotional regulation and social connection. Furthermore, this study aims to analyze different music therapy approaches, including active and passive music therapy, to understand

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their effectiveness in promoting mental well-being. Finally, the aim is to explore the integration of music with traditional therapeutic practices such as psychotherapy and mindfulness, and identifying potential synergies to enhance mental health treatment.

## THE IMPACT OF MUSIC ON MENTAL HEALTH

### Psychological Benefits

Music is widely acknowledged for its profound psychological advantages on mental well-being. Multiple research studies have underscored the positive effects of music on emotional health, stress management, and overall mental wellness<sup>6</sup>. Participating in music activities or simply listening to music has been linked to a better quality of life, decreased depression and anxiety symptoms, and enhanced emotional control<sup>6</sup>. Specifically, music therapy has become increasingly recognized as a beneficial method for tackling mental health challenges, with techniques like group music involvement and music listening demonstrating encouraging outcomes in easing psychological stress<sup>7</sup>.

Research suggests that music offers more than mere enjoyment, impacting physiological processes crucial for mental well-being<sup>8</sup>. Studies indicate that music can positively affect heart rate, motor skills, brain activity, and immune function<sup>9</sup>. Moreover, music education correlates with favorable psychological outcomes like enhanced self-efficacy and self-esteem, leading to better mental health and academic achievement in students. The emotive content of music significantly influences psychological well-being, emphasizing its role in fostering emotional intelligence and cognitive growth, especially in children<sup>9</sup>.

Music therapy is increasingly acknowledged for its therapeutic advantages within mental health care environments. Research demonstrates that music therapy interventions effectively aid emotion regulation, identity expression, and individual freedom, particularly among children receiving inpatient mental health care<sup>10</sup>. Moreover, personalized music playlists are employed to address psychological and behavioral symptoms across various populations, including those with dementia, highlighting the diverse applications of music in fostering mental well-being. Explorations into the use of music-based interventions, such as silent disco headphones in hospital units, suggest a viable and efficacious method for enhancing positive engagement and well-being among patients, especially within mental health settings<sup>11</sup>.

In summary, research into the psychological advantages of music on mental health highlights the numerous ways in which music positively influences emotional well-being, stress alleviation, and overall mental health. Whether through avenues like music therapy, music education, or direct involvement with music, the evidence consistently affirms the therapeutic significance of music in enhancing psychological resilience and well-being.

### Cognitive Benefits

The cognitive advantages of music on mental health, particularly in individuals with cognitive impairments like Alzheimer's disease and dementia, have garnered increasing recognition. Research indicates that music therapy interventions can boost cognitive function by stimulating brain activity, enhancing memory, and prolonging attention span<sup>12</sup>. Furthermore, studies show that music therapy not only exercises memory and recall but also improves speech function and social interaction skills, leading to overall cognitive improvement in dementia patients<sup>13</sup>. Moreover, music has been found to aid performance in various cognitive tasks, including non-linguistic ones, suggesting its potential to enhance cognitive abilities<sup>13</sup>.

Beyond dementia care, music therapy also benefits individuals with traumatic brain injuries. Initial studies show promising outcomes in enhancing executive functions, emotional adjustment, and reducing depression and anxiety post-injury through music-based cognitive remediation therapy<sup>14</sup>. Additionally, music therapy aids in improving motor and cognitive function in individuals with complex blast injuries, highlighting its therapeutic potential in cognitive rehabilitation<sup>15</sup>. Furthermore, music therapy interventions effectively enhance focused attention, working memory, and reduce stress in individuals with type 2 diabetes, demonstrating the diverse applications of music in enhancing cognitive function<sup>16</sup>.

Meta-analyses and systematic reviews consistently affirm the effectiveness of music therapy in enhancing cognitive function across diverse populations. Research indicates that music therapy significantly enhances

cognitive abilities, including verbal fluency, attention, visual perception, spatial perception, and thought operations, particularly in individuals with dementia<sup>17</sup>. Moreover, music interventions prove effective in improving cognitive function and alleviating neuropsychiatric symptoms in elderly individuals with dementia, showcasing the broad impact of music therapy on cognitive and mental health outcomes<sup>18</sup>. Additionally, music therapy is demonstrated to boost cognitive function and serum dopamine levels in the elderly, emphasizing its potential in promoting cognitive health as individuals age<sup>19</sup>.

In summary, studies on the cognitive advantages of music therapy on mental health emphasize the pivotal role of music in augmenting cognitive function, memory, and attention across various populations. From individuals with dementia to those with traumatic brain injuries and diabetes, music therapy presents promising results in enhancing cognitive abilities and overall mental well-being.

## MUSIC AS A COPING MECHANISM

### Emotional Regulation Through expression and processing

Expressing and processing emotions through music is a fundamental aspect of using music as a coping mechanism. Research by Lin et al. has demonstrated that learning to generate emotional music correlated with music structure features can help individuals create music that aligns with specific emotions<sup>20</sup>. Similarly, studies by Collins have explored how musical expression of emotions can be a powerful tool for individuals to convey and process their feelings effectively<sup>21</sup>. By engaging with music that resonates emotionally, individuals can externalize and navigate their emotions, leading to enhanced emotional awareness and regulation.

### Distraction from Negative Thoughts

Music serves as a valuable distraction from negative thoughts, offering individuals a means to shift their focus and promote mental well-being. Kemp et al. have highlighted the influence of stress and optimism on music uses and preferences, indicating that music can be a coping strategy during challenging times<sup>22</sup>. Additionally, Overy have shown that music in service environments can improve well-being and help individuals cope with life stressors<sup>23</sup>. By immersing themselves in music that evokes positive emotions, individuals can effectively distract themselves from negative thoughts, fostering a sense of relaxation and emotional relief.

### Creating a Positive Emotional State

Utilizing music to create a positive emotional state is a common coping strategy that individuals employ to enhance mood and emotional well-being. Moors & Kuppens have explored the impact of music-listening behaviors during stressful periods, demonstrating that seeking out new music can elicit positive emotions and aid in stress coping<sup>24</sup>. Similarly, Juslin & Västfjäll has discussed the dynamic emotional narratives and vocal expression in music, emphasizing how music can evoke positive emotional responses<sup>25</sup>. By actively engaging with music that uplifts and inspires, individuals can enhance their emotional state, reduce stress, and promote a positive outlook on life.

### Music's Role in Social Connection and Support

Music serves as a powerful medium for building relationships and fostering social connections. Research by Saarikallio et al. has highlighted how adolescents' expression and perception of emotion in music reflect their broader abilities of emotional communication<sup>26</sup>. Through shared musical experiences, individuals can connect emotionally, strengthen interpersonal relationships, and enhance social bonds. Additionally, Goethem & Sloboda have explored adolescents' expressed meanings of music in and out of school, emphasizing the emotional significance of music in relationship-building and communication<sup>27</sup>.

Group music therapy offers a structured environment for individuals to engage in music-based activities collectively, promoting social connection and support. Studies by Cespedes-Guevara & Eerola have discussed the role of context and relationships in using systemic approaches with music therapy, highlighting how music can enhance emotional and cognitive benefits in therapeutic settings<sup>28</sup>. Furthermore, Fritz et al. have explored the composition of musical sound to express a robot's

emotion, showcasing how music can facilitate emotional expression and connection in various contexts<sup>29</sup>. By participating in group music therapy sessions, individuals can share experiences, express emotions, and receive support, fostering a sense of community and well-being.

Engaging in music-related activities can instill a sense of belonging and support, particularly during challenging times. Research by Wu *et al.* has examined the regulation of sadness through response-independent and response-dependent benefits of listening to music, highlighting how music can provide emotional comfort and support<sup>30</sup>. Additionally, Zorzal have discussed the locus of emotion influences on psychophysiological reactions to music, emphasizing the role of music in eliciting emotional responses and fostering a sense of connection<sup>31</sup>. By participating in music-related initiatives, individuals can feel a sense of belonging, receive emotional support, and strengthen their social networks, promoting overall well-being and resilience.

## MUSIC THERAPY APPROACHES: HARMONIZING EMOTIONS THROUGH ACTIVE AND PASSIVE MUSIC THERAPY TECHNIQUES FOR ENHANCED SOCIAL CONNECTION

Singing and vocal expression as part of active music therapy have been shown to have significant therapeutic benefits. Engaging in singing activities can help individuals express emotions, improve respiratory function, and enhance overall well-being<sup>32,33</sup>. Singing in a therapeutic setting allows individuals to connect with their emotions and experiences through the power of music, providing a creative outlet for self-expression<sup>34</sup>. Research has indicated that singing can positively impact mood and emotional states, making it a valuable tool in music therapy interventions<sup>35</sup>.

Playing musical instruments in active music therapy sessions offers individuals a unique way to engage with music and express themselves creatively. Research has shown that playing musical instruments can improve cognitive function, fine motor skills, and coordination<sup>36</sup>. Active engagement in playing instruments can also enhance self-esteem and confidence, particularly in individuals with neurological conditions such as dementia<sup>37</sup>. Furthermore, playing musical instruments allows for individualized expression and can be tailored to meet the specific needs and preferences of each participant<sup>38</sup>. The act of playing instruments in a therapeutic context can promote relaxation, reduce stress, and improve overall emotional well-being<sup>39</sup>.

Songwriting and lyric analysis are powerful tools in active music therapy that enable individuals to explore their thoughts, emotions, and experiences through music. Engaging in songwriting activities can help individuals process complex feelings, enhance self-awareness, and promote emotional healing<sup>40</sup>. Through lyric analysis, participants can delve into the meaning behind songs, identify with lyrics that resonate with their own experiences, and gain insights into their emotions<sup>41</sup>. Songwriting and lyric analysis activities in music therapy sessions provide a creative outlet for self-expression and can empower individuals to communicate their innermost thoughts and feelings<sup>42</sup>. These approaches can be particularly beneficial for individuals struggling with mental health issues, providing a safe space for self-reflection and emotional exploration<sup>43</sup>.

Passive music therapy, such as listening to music, has been widely recognized for its calming and therapeutic effects on individuals. Research has shown that listening to music can reduce stress, anxiety, and pain perception, making it a valuable tool in healthcare settings<sup>44</sup>. Passive music listening can also improve mood, enhance relaxation, and promote a sense of well-being<sup>45</sup>. Additionally, listening to music has been found to increase synchronization of autonomic rhythms between individuals, fostering a sense of connection and shared experience<sup>46</sup>. Incorporating music listening into daily routines can have a positive impact on mental health and emotional well-being<sup>47</sup>.

Guided imagery and music combine music listening with visualization techniques to promote relaxation, reduce anxiety, and enhance self-awareness. This approach involves listening to specially curated music while engaging in guided imagery exercises led by a therapist<sup>48</sup>. Research has shown that guided imagery and music can help individuals access deep emotional states, process trauma, and improve overall mental health<sup>49</sup>. By combining music with guided imagery, individuals can create multisensory experiences that stimulate the imagination and facilitate emotional healing<sup>50</sup>. Guided imagery and music sessions provide a structured framework for individuals to explore their inner world,

address psychological issues, and promote personal growth<sup>51</sup>.

Music-assisted relaxation techniques involve using music as a tool to induce relaxation, reduce stress, and promote a sense of calm. Research has demonstrated that music-assisted relaxation can lower blood pressure, heart rate, and cortisol levels, leading to a state of deep relaxation<sup>52</sup>. By incorporating music into relaxation exercises, individuals can achieve a meditative state, improve sleep quality, and alleviate symptoms of anxiety and depression<sup>53</sup>. Music-assisted relaxation techniques can be tailored to individual preferences, allowing for a personalized approach to stress management and emotional well-being<sup>54</sup>. The use of music in relaxation techniques offers a non-invasive and accessible way to promote relaxation and enhance overall quality of life<sup>55</sup>.

## CONCLUSION

In conclusion, music has the therapeutic potential in enhancing mental health and coping strategies as it has been shown to have an impact on mental health from the psychological aspect such as stress reduction, mood enhancement, and emotional well-being. Moreover, music also has an impact on mental health from the cognitive aspect including, cognitive function, memory, and attention improvement. As a coping mechanism, music facilitates emotional regulation by allowing individuals to express and process emotions, distract from negative thoughts, and create a positive emotional state. Besides, music fosters social connection by building relationships, facilitating group therapy, and providing a sense of belonging and support.

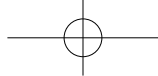
Music therapy approaches, both active and passive, provide specialized interventions to address mental health and coping needs. Active music therapy involving singing, playing musical instruments, and songwriting promotes active engagement and self-expression. Passive music therapy, such as listening to music, guided imagery, and music-assisted relaxation techniques, provides avenues for relaxation and emotional release. The various ways that music therapy is used highlight how adaptable it is in treating a variety of mental health issues and coping mechanisms.

Overall, the review of the research on the therapeutic benefits of music for coping mechanisms and mental health emphasizes how transformative music can be in developing resilience and overall well-being. Music is becoming recognized as a useful tool in mental health care, with benefits ranging from improving cognitive function to promoting emotional regulation and social interaction. Researchers can further develop the field of music therapy and its applications in promoting holistic well-being by exploring further into the mechanisms through which music influences mental health and coping strategies.

## REFERENCES

- Golden, T. L., Springs, S., Kimmel, H. J., Gupta, S., Tiedemann, A., Sandu, C. C., & Magsamen, S. (2021). The Use of Music in the Treatment and Management of Serious Mental Illness: A Global Scoping Review of the Literature. *Frontiers in psychology*, 12, 649840. <https://doi.org/10.3389/fpsyg.2021.649840>
- <https://www.psychiatry.org/news-room/apa-blogs/power-of-music-in-mental-well-being>
- Gustavson, D.E., Coleman, P.L., Iversen, J.R. *et al.* Mental health and music engagement: review, framework, and guidelines for future studies. *Transl Psychiatry* 11, 370 (2021). <https://doi.org/10.1038/s41398-021-01483-8>
- <https://www.verywellmind.com/benefits-of-music-therapy-89829>
- Rebecchini L. (2021). Music, mental health, and immunity. *Brain, behavior, & immunity - health*, 18, 100374. <https://doi.org/10.1016/j.bbih.2021.100374>
- Gustavson D., Coleman P., Iversen J., Maes H., Gordon R., & Lense M.. Mental health and music engagement: review, framework, and guidelines for future studies. *Translational Psychiatry* 2021; 11(1). <https://doi.org/10.1038/s41398-021-01483-8>
- Sanfilippo K. and Glover V.. How music may support perinatal mental health: an overview. *Archives of Women S Mental Health* 2021; 24(5): 831-839. <https://doi.org/10.1007/s00737-021-01178-5>
- Rebecchini L.. Music, mental health, and immunity. *Brain Behavior & Immunity - Health* 2021; 18: 100374. <https://doi.org/10.1016/j.bbih.2021.100374>
- Ning H.. Analysis of the value of folk music intangible cultural heritage on the regulation of mental health. *Frontiers in Psychiatry* 2023; 14. <https://doi.org/10.3389/fpsyg.2023.1067753>
- Klyve G., Rolvsjord R., & Elgen I.. Polyphonic perspectives: a focus group study of interprofessional staff's perceptions of music therapy at an inpatient unit for children in mental health care. *International Journal of Qualitative Studies on Health and Well-Being* 2023; 18(1). <https://doi.org/10.1080/17482631.2023.2197750>
- Hung L., Bmt K., Peake G., Poljak L., Wong L., Lld J. *et al.* Implementing silent disco

- headphones in a hospital unit: a qualitative study of feasibility, acceptance, and experience among patients and staff. *Sage Open Nursing* 2021; 7: 237796082110213. <https://doi.org/10.1177/23779608211021372>
12. Moreno-Morales C., Calero R., Moreno-Morales P., & Pintado C.. Music therapy in the treatment of dementia: a systematic review and meta-analysis. *Frontiers in Medicine* 2020; 7. <https://doi.org/10.3389/fmed.2020.00160>
  13. Lyu J., Zhang J., Mu H., Li W., Champ M., Xiong Q. *et al.*. The effects of music therapy on cognition, psychiatric symptoms, and activities of daily living in patients with Alzheimer's disease. *Journal of Alzheimer S Disease* 2018; 64(4): 1347-1358. <https://doi.org/10.3233/jad-180183>
  14. Hegde S.. Music-based cognitive remediation therapy for patients with traumatic brain injury. *Frontiers in Neurology* 2014; 5. <https://doi.org/10.3389/fneur.2014.00034>
  15. Vaudreuil R., Avila L., Bradt J., & Pasquina P.. Music therapy applied to complex blast injury in interdisciplinary care: a case report. *Disability and Rehabilitation* 2018; 41(19): 2333-2342. <https://doi.org/10.1080/09638288.2018.1462412>
  16. Tumuluri I., Hegde S., & Nagendra H.. Effectiveness of music therapy on focused attention, working memory and stress in type 2 diabetes: an exploratory study. *International Journal of Yoga* 2017; 10(3): 167. <https://doi.org/10.4103/0973-6131.213471>
  17. Chang Y., Chu H., Yang C., Tsai J., Chung M., Liao Y. *et al.*. The efficacy of music therapy for people with dementia: a meta-analysis of randomised controlled trials. *Journal of Clinical Nursing* 2015; 24(23-24): 3425-3440. <https://doi.org/10.1111/jocn.12976>
  18. Wong T.. Effectiveness of music intervention on cognitive function and neuropsychiatric symptoms in the elderly with dementia: a meta-analysis. *Frontiers in Nursing* 2022; 9(2): 143-153. <https://doi.org/10.2478/fo-2022-0020>
  19. Laksmidewi A., Mahadewi N., Adnyana I., & Widyadharma I.. Instrumental balinese flute music therapy improves cognitive function and serum dopamine level in the elderly population of west denpasar primary health care center. *Open Access Macedonian Journal of Medical Sciences* 2019; 7(4): 553-558. <https://doi.org/10.3889/oamjms.2019.116>
  20. Lin M., Zhong W., Ma X., Ye L., & Qin Z.. Learning to generate emotional music correlated with music structure features. *Cognitive Computation and Systems* 2022; 4(2): 100-107. <https://doi.org/10.1049/ccs2.12037>
  21. Collins D., Davies and levinson on the musical expression of emotion. *Croatian Journal of Philosophy* 2021; 21(61): 71-92. <https://doi.org/10.52685/cjp.21.1.5>
  22. Kemp E., Williams K., Min D., & Chen H.. Happy feelings: examining music in the service environment. *International Hospitality Review* 2019; 33(1): 5-15. <https://doi.org/10.1108/ihr-10-2018-0019>
  23. Overy K.. Dynamic emotional narratives and vocal expression: comment on "an integrative review of the enjoyment of sadness associated with music" by tuomas eerola *et al.*. *Physics of Life Reviews* 2018; 25: 142-143. <https://doi.org/10.1016/j.plrev.2018.05.003>
  24. Moors A. and Kuppens P.. Distinguishing between two types of musical emotions and reconsidering the role of appraisal. *Behavioral and Brain Sciences* 2008; 31(5): 588-589. <https://doi.org/10.1017/s0140525x08005438>
  25. Juslin P. and Västfjäll D.. Emotional responses to music: the need to consider underlying mechanisms. *Behavioral and Brain Sciences* 2008; 31(5): 559-575. <https://doi.org/10.1017/s0140525x08005293>
  26. Saarikallio S., Vuoskoski J., & Luck G.. Adolescents' expression and perception of emotion in music reflects their broader abilities of emotional communication. *Psychology of Well-Being Theory Research and Practice* 2014; 4(1). <https://doi.org/10.1186/s13612-014-0021-8>
  27. Goethem A. and Sloboda J.. The functions of music for affect regulation. *Musicae Scientiae* 2011; 15(2): 208-228. <https://doi.org/10.1177/1029864911401174>
  28. Cespedes-Guevara J. and Eerola T.. Music communicates affects, not basic emotions – a constructionist account of attribution of emotional meanings to music. *Frontiers in Psychology* 2018; 9. <https://doi.org/10.3389/fpsyg.2018.00215>
  29. Fritz T., Jentschke S., Gosselin N., Sammler D., Peretz I., Turner R. *et al.*. Universal recognition of three basic emotions in music. *Current Biology* 2009; 19(7): 573-576. <https://doi.org/10.1016/j.cub.2009.02.058>
  30. Wu T., Wang H., Ho C., Lin Y., Hu T., Chan L. *et al.*. Interactive content presentation based on expressed emotion and physiological feedback. 2008. <https://doi.org/10.1145/1459359.1459554>
  31. Zorzal R.. Emotion-related words and emotional analogies as teaching strategies for expressivity. *Research Studies in Music Education* 2020; 43(3): 498-512. <https://doi.org/10.1177/1321103x19899169>
  32. Sachs M., Damásio A., & Habibi A.. The pleasures of sad music: a systematic review. *Frontiers in Human Neuroscience* 2015; 9. <https://doi.org/10.3389/fnhum.2015.00404>
  33. Ratcliff C., Prinsloo S., Richardson M., Baynham-Fletcher L., Lee R., Chaoul A. *et al.*. Music therapy for patients who have undergone hematopoietic stem cell transplant. *Evidence-Based Complementary and Alternative Medicine* 2014; 2014: 1-9. <https://doi.org/10.1155/2014/742941>
  34. Wöllner C., Ginsborg J., & Williamon A.. Music researchers' musical engagement. *Psychology of Music* 2011; 39(3): 364-382. <https://doi.org/10.1177/0305735610381592>
  35. Situmorang D., Mulawarman M., & Wibowo M.. Comparison of the effectiveness of cbt group counseling with passive vs active music therapy to reduce millennials academic anxiety. *International Journal of Psychology and Educational Studies* 2018; 5(3): 51-62. <https://doi.org/10.17220/ijpes.2018.03.005>
  36. Sakamoto M., Ando H., & Tsutou A.. Comparing the effects of different individualized music interventions for elderly individuals with severe dementia. *International Psychogeriatrics* 2013; 25(5): 775-784. <https://doi.org/10.1017/s1041610212002256>
  37. Nasrullah M.. Music: entertainment media with millions of benefits for physical performance. *Indonesian Journal of Social Sciences* 2020; 12(1): 12. <https://doi.org/10.20473/ijss.v12i1.21155>
  38. Kratus J.. Music listening is creative. *Music Educators Journal* 2017; 103(3): 46-51. <https://doi.org/10.1177/0027432116686843>
  39. Galal S., Vyas D., Hackett R., Rogan E., & Nguyen C.. Effectiveness of music interventions to reduce test anxiety in pharmacy students. *Pharmacy* 2021; 9(1): 10. <https://doi.org/10.3390/pharmacy9010010>
  40. Howlin C., Stapleton A., & Rooney B.. Tune out pain: agency and active engagement predict decreases in pain intensity after music listening. *Plos One* 2022; 17(8): e0271329. <https://doi.org/10.1371/journal.pone.0271329>
  41. Priya A., Applewhite B., Au K., Oyeleye O., Walton E., Norton C. *et al.*. Attitudes surrounding music of patients with anorexia nervosa: a survey-based mixed-methods analysis. *Frontiers in Psychiatry* 2021; 12. <https://doi.org/10.3389/fpsyg.2021.639202>
  42. Vidulin S. and Kazic S.. Cognitive-emotional music listening paradigm in professional music education. *International Journal of Cognitive Research in Science Engineering and Education* 2021; 9(1): 135-145. <https://doi.org/10.23947/2334-8496-2021-9-1-135-145>
  43. Ikeuchi M.. Effects of music on physiological and biochemical markers in patients with a mood disorder. *Japanese Journal of Complementary and Alternative Medicine* 2022; 19(2): 65-74. <https://doi.org/10.1625/jcam.19.65>
  44. Loewy J.. Underlying music mechanisms influencing the neurology of pain: an integrative model. *Brain Sciences* 2022; 12(10): 1317. <https://doi.org/10.3390/brainsci12101317>
  45. Bernardi N., Codrons E., Leo R., Vandoni M., Cavallaro F., Vita G. *et al.*. Increase in synchronization of autonomic rhythms between individuals when listening to music. *Frontiers in Physiology* 2017; 8. <https://doi.org/10.3389/fphys.2017.00785>
  46. Tervaniemi M., Makkonen T., & Nie P.. Psychological and physiological signatures of music listening in different listening environments—an exploratory study. *Brain Sciences* 2021; 11(5): 593. <https://doi.org/10.3390/brainsci11050593>
  47. Dobashi S., Matsuura F., & Ando D.. Listening to fast-tempo music during a post-exercise passive rest period improved subsequent sprint cycling. *Perceptual and Motor Skills* 2021; 128(4): 1747-1764. <https://doi.org/10.1177/00315125211022701>
  48. Raglio A., Oddone E., Meaglia I., Monti M., Gnesi M., Gontero G. *et al.*. Conventional and algorithmic music listening before radiotherapy treatment: a randomized controlled pilot study. *Brain Sciences* 2021; 11(12): 1618. <https://doi.org/10.3390/brainsci11121618>
  49. Lai J. and Amaladoss N.. Music in waiting rooms: a literature review. *Herd Health Environments Research & Design Journal* 2021; 15(2): 347-354. <https://doi.org/10.1177/19375867211067542>
  50. Kunikullaya U., Kunnaveil R., Goturu J., Prakash V., & Murthy N.. Short-term effects of passive listening to an indian musical scale on blood pressure and heart rate variability among healthy individuals – a randomised controlled trial. *Indian Journal of Physiology and Pharmacology* 2022; 66: 29-44. [https://doi.org/10.25259/ijpp\\_126\\_2021](https://doi.org/10.25259/ijpp_126_2021)
  51. Card E.. Music, movement, and mind: use of drumming to improve strength, balance, proprioception, stamina, coordination, and emotional status in a 12-year-old with agenesis of the corpus callosum: a case study. *Journal of Holistic Nursing* 2019; 38(2): 186-192. <https://doi.org/10.1177/0898010119871380>
  52. Fritz T., Halfpaap J., Grahl S., Kirkland A., & Villringer A.. Musical feedback during exercise machine workout enhances mood. *Frontiers in Psychology* 2013; 4. <https://doi.org/10.3389/fpsyg.2013.00921>
  53. Altun Z., Bülbül K., & Türkkan T.. The relationship between university students' music preferences and drug abuse tendencies and personality traits. *Universal Journal of Educational Research* 2018; 6(12): 2931-2941. <https://doi.org/10.13189/ujer.2018.061229>
  54. Hallam S., Creech A., & McQueen H.. Teachers' perceptions of the impact on students of the musical futures approach. *Music Education Research* 2015; 19(3): 263-275. <https://doi.org/10.1080/14613808.2015.1108299>
  55. Soldiuk J., Jantz B., Fuller M., Osterling D., Foxman H., Graff N. *et al.*. The use of music by adolescents and young adults with sickle cell disease. *Creative Nursing* 2020; 26(3): 189-196. <https://doi.org/10.1891/cnmr-d-19-00069>



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