The Psychological Effects of Music Distraction

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Author's Note

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Abstract

This paper investigated several studies and cases regarding music and music distraction. The literature studied focuses on the effects of music on human mood and both physiological and physical states in clinical settings. The hope of this paper is to expand knowledge of the therapeutic benefits of music in the medical field along with promoting music for applications such as personal health and well-being, stress reduction, pain relief, and physical relaxation. This paper found that music distraction aided parasympathetic recovery along with reductions in heart rate and systolic blood pressure. Psychologically, music distraction was found to have thousands of instances of audio analgesia, meaning that music alone could provide enough distraction to block pain signals during procedures. Music was also found to raise pain thresholds; music and pain may be connected by the fact that pleasant music tends to elevate mood and therefore can affect a patient's response to pain. Music distraction was also found to reduce anxiety, sadness, anger, and fear in alcoholics, patients undergoing dialysis, and patients undergoing mechanical ventilation. Suggestions for future research include engineering music to elicit therapeutic effects and finding more applications for music distraction that benefit human health.

Keywords: Auditory distraction, Music, Music Distraction, Audio Analgesia

Introduction

Music is a universal art form that has evolved from a ritualistic activity to a mean of entertainment and expression for many people. Music can be a major part of people's lives and impact more than lifestyles. Research findings have shown that music can be used as a point of focus and distraction to reduce other harmful sensations and perceptions.

Outline

This paper focuses on music distraction (MD) and its applications in the medical field. Three key applications of MD can be applied to the medical field and beyond: (I.) MD has implications in aiding stress, depression, anxiety, and pain. (II.) MD has implications in reducing the physical stress response and recovery time. (III.) MD can be utilized to alter mood and outlooks in medical environments.

Psychological Effects of Music Distraction

Music distraction can affect psychological disorders such as anxiety and depression along with altering pain perception. Silvestrini, N. et. al (2011) examines pain perception through a Nociceptive Flexion Reflex (NFR) with increasingly strong electrical impulses and a Cold Pressor Test where participants dipped a hand into an ice bath until no longer tolerable. Participants listening to pleasant music had a significantly higher pain tolerance in the cold pressor test compared to unpleasant music or silence. It was also suggested that the elevated emotions associated with the pleasant music may have an influence on the already positive effects of music distraction on pain perception. The results were inconsistent in the fact that other

studies found that an increased pain threshold was present during music listening for NFR; the small sample size of 20 may have led to this.

Audio analgesia is the blocking of pain perception that can be achieved through auditory distraction. Weisbrod, R. L. (1969) mentions several sets of data where audio analgesia was effective in dental settings. Weisbrod also discussed a study where 1000 dental patients found that 65 percent of the patients experienced no pain and 25 percent of patients had pain but did not require any other pain relief during the procedure. The study mentioned other physicians have later used audio analgesia and out of 5000 operations, 90 percent of audio analgesia was effective. It's possible that audio analgesia could also be achieved in non-dental settings such as minor operations and clinical procedures that may elicit pain or distress. In a more modern case, Bhagania, M., & Agnihotry, A. (2011) observed a dental patient that experienced audio analgesia with only topical anesthetic. The patient declined all anesthetic options and instead requested to listen to Hindu music. The dentists then proceeded to remove the tooth. Throughout the procedure, the patient remained still, quiet, calm, and reported no pain during the procedure. The patient did not react in any way that indicated pain or discomfort and seemed to be experiencing audio analgesia.

Lahmann et al. (2008) measured how music listening before and during procedures affected dental anxiety. Per participants' responses on The State Trait Anxiety Inventory (STAI) and Hierarchical Anxiety Questionnaires, music distraction reduced anxiety in comparison to the control. The largest effect was observed in patients with moderate anxiety.

In conclusion, music distraction has a long-standing history of being able to achieve analgesia and assist dental and medical patients avoid powerful pain perceptions. In addition,

listening to music can result in a higher pain tolerance. On top of blocking of pain, music listening can provide distraction and alteration of mood states, which can help with stress and anxiety.

Physical Effects of Music Distraction

Music distraction has been found to reduce the strength of response to stress along with improved parasympathetic recovery from stress after listening to music. Thoma, M. et al. (2013) and Knight WE, Rickard NS (2001) explored the reactions and effects of music and the sympathetic and parasympathetic nervous system. Both studies elicited a stress response through a public speaking situation. Thoma played music prior to and while participants prepared for the public speaking task and then after the task, while Knight & Rickard played music during the preparation period. Both studies found that music was beneficial in recovery and tolerance of stressful situations. Neither study could find a correlation of lowered cortisol levels and music. This could be true since the assigned tasks did not elicit strong or consistent reactions, as 42% of Knight & Rickard's participants did not perceive the public speaking task as stressful. Although cortisol level changes were not found to be significant, Thoma found that relaxing music drastically improved the speed of parasympathetic nervous system recovery. Knight & Rickard found that participants who listened to music while preparing had lower anxiety measures, systolic blood pressure, and heart rate than the control. Participants noted that they felt less stressed with music present. Binson, B. et al. (2013) found similar reductions of systolic blood pressure along with reduced pain and anxiety in patients distracted with music undergoing dialysis. Music distraction during dialysis was used to keep patients calm and at an elevated mood which assisted in making the experience less traumatic.

There is strong evidence that music distraction can positively impact how stress is handled and then mitigated by the parasympathetic nervous system. The mental and health benefits can be significant if heart rates and blood pressure were kept level in tense situations. Less intense stress responses can result in greater physical and mental longevity.

Impacts on Mood

Music distraction can also have beneficial effects on people's mood, emotions, and additionally as an aid in times of life trauma and poor health. A case study by Heiderscheit, A., Chlan, L., & Donley, K. (2011) recounted two experiences of patients receiving mechanical ventilation in the ICU and how listening to music affected their stay. Both patients met with a music therapist daily who would bring new music to add to the patients' collections after learning their tastes. The first patient was skeptical of the study, but after being informed of the therapeutic and helpful nature of music, found that choosing music to play gave him comfort and a degree of control in very difficult situation. The patient also had to go through dialysis frequently and used his mp3 player to help reduce anxiety prior to treatment (in one instance he was able to be completely distracted by the music during a dialysis treatment). Even though the patient's health deteriorated to the point of death, he could find joy and coping with his conditions with music. The second patient enthusiastically embraced the music therapy and was already an avid listener. He actively used music as a coping mechanism and a distraction from the stress of his health. Music listening served an important purpose of distraction and empowerment for these two patients in potentially morbid situations. They also benefitted by learning that music served other purposes than enjoyment.

Hwang, E., & Oh, S. (2013) explored music therapy among alcohol-dependent men. Structured music listening reduced the “negative mood states” of anxiety, stress, and anger. Music listening had the strongest reductions for both stress and anger in participants. Participants noted that listening to music helped them calm down and reduced stress. Participants also had stronger responses when the music therapist chose the music to listen to.

Although Silvestrini, N. et. al (2011) did not focus on measuring pain thresholds with music, it was noted that higher pain tolerance may have been affected by elevated emotions associated with the pleasant music. This hints that not just distraction, but mood also may play a part of pain perception.

Music distraction can be an effective and important tool to assist those in mental distress or a simple tool to alter mood. Alteration of negative mood states can assist the recovery of people stricken with illness, poor life situations or dire health.

Conclusions

Music has utility not just for culture and entertainment, but also one that can be utilized for health and wellness. It is significant that the body’s stress response can be mitigated by music. Audio analgesia can be attained and used as a safe alternative to anesthetics in specific cases where typical methods cannot be used. Overall, music can be utilized by physicians to ensure safer and less traumatic experiences for patients. Music and music distraction can help to reduce anxiety, stress, depression, and anger in many areas of life such as dire health situations, mood regulation, and end-of-life comfort.

Directions for further research should include research into engineering specific sound patterns to induce relaxation or therapeutic effects. More research should be conducted into discovering

what aspects of music bring about certain reactions. There could be a potential market for engineering music specifically for mood alteration, pain distraction, or deep relaxation based on research and science.

Recommended Reading

Knight WE, Rickard NS (2001) Relaxing music prevents stress-induced increases in subjective anxiety, systolic blood pressure, and heart rate in healthy males and females. J Music Ther 38: 254-272. PubMed: 11796077.

- A study on the effect of music on human stress response; there was a robust reduction of blood pressure, heart rate, and anxiety in participants who listened to music during a public speaking stressor.

Weisbrod, R. L. (1969). Audio analgesia revisited. *Anesthesia Progress*, *16*(1), 8–14.

- Case study reviewing audio analgesia studies; 90% of instances were effective and 65% involved no pain response.

Hwang, E., & Oh, S. (2013). A Comparison of the Effects of Music Therapy Interventions on Depression, Anxiety, Anger, and Stress on Alcohol-Dependent Clients. Music & Medicine, *5*(3), 136-144.

- Study of effect of singing, music listening, and music playing on alcohol-dependent males; stress and anger significantly reduced by music listening.

References

Bhagania, M., & Agnihotry, A. (2011). Extraction of a Grossly Decayed Tooth Without Local Anesthesia But With Audio Analgesia. *Music & Medicine, 3*(4), NP1-NP3.

Binson, B., Lertmaharit, S., Satayaprakop, P., Chongthanakorn, K., Boonyakrai, C., Klinphaetkit, S., . . . Boonpob, C. (2013). Effects of Music Intervention on Patients Undergoing Hemodialysis in the Bangkok Metropolitan Administration Hospitals. Music & Medicine, *5*(3), 188-193.

Heiderscheit, A., Chlan, L., & Donley, K. (2011). Instituting a Music Listening Intervention for Critically Ill Patients Receiving Mechanical Ventilation. Music & Medicine, 3(4), 239 245.

Hwang, E., & Oh, S. (2013). A Comparison of the Effects of Music Therapy Interventions on Depression, Anxiety, Anger, and Stress on Alcohol-Dependent Clients. Music & Medicine, *5*(3), 136-144.

Knight WE, Rickard NS (2001) Relaxing music prevents stress-induced increases in subjective anxiety, systolic blood pressure, and heart rate in healthy males and females. J Music Ther 38: 254-272. PubMed: 11796077.

Lahmann, Schoen, Henningsen, Ronel, Muehlbacher, Loew, . . . Doering. (2008). Brief Relaxation Versus Music Distraction in the Treatment of Dental Anxiety: A Randomized Controlled Clinical Trial: The Journal of the American Dental Association, 139(3), 317-324.

Silvestrini, N., Piguet, V., Cedraschi, C., & Zentner, M. (2011). Music and Auditory Distraction Reduce Pain. Music & Medicine, 3(4), 264-270.

Thoma, M. V., Marca, R. L., Brönnimann, R., Finkel, L., Ehlert, U., & Nater, U. M. (2013). The effect of music on the human stress response. *PLoS One, 8*(8) doi: http://dx.doi.org/10.1371/journal.pone.0070156

Weisbrod, R. L. (1969). Audio analgesia revisited. *Anesthesia Progress*, *16*(1), 8–14.