EFFECTS OF MUSIC IN OCCUPATIONAL THERAPY

by

GINNA KAYSER

A THESIS

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This thesis will demonstrate the relationship between music and patient recovery and well-being by citing relevant sources which shall support this thesis, and use those sources to argue that occupational therapists should be educated as to the benefits of music as therapy and henceforth employ it as a useful tool to promote recovery and wellness. The prospectus will be broken down into three sections: music's effects physical problems, psychological problems, and examples of music's use in occupational therapy. The use of atonal music (music without a key center) in occupational therapy as a genre will also be explored, as its unique tonality can have interesting effects on cognition, relaxation, and focus. While this thesis is not a complete review of existing literature, it serves as a starting point for future investigation into the benefits music can have in occupational therapy.

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Chapter 1: Introduction

Music is experienced in everyday life in a variety of ways. Listening to music is a common experience in an average person's day, whether it is listening to the radio on the way to work, hearing soothing music in a medical office, or playing an upbeat playlist during exercise. Many people also use music to evoke different emotions or produce a specific state of mind. Listening to slow, relaxing music may help someone reduce stress after a long day, an athlete may play a few of their favorite songs to get motivated for an event, and a college student may turn on classical music to help them concentrate on classwork. Music is a great tool that is experienced and used in a variety of ways on a day-to-day basis. Because of music's versatility, it can be used as a therapeutic tool, particularly in the field of occupational therapy.

How Is Music Used In Therapy?

Many studies have found music to have a substantial effect on the mind and body. In the physical realm, motivational music was found to increase motivation and overall performance. Additionally, runners who listened to relaxing music while running felt they exerted less effort than when they listened to motivational music or no music at all (Rahimi, Azarbayjani, & Ghaderi, 2009). It has also been found to reduce muscle tension before surgery (Hamel, 2001) and reduce perceived pain on patients in the intensive cardiac care unit (Hanser et al., 1985). Music can also be used to reduce lightheadedness during ambulation for patients who are recovering from surgery (Herth, 1978). Music can be applied to a treatment program in order for patients to have a positive recovery and healing experience.

People dealing with mood disorders have shown improvements after participating in music therapy. Patients dealing with depression and anxiety related to Alzheimer's had decreased anxiety levels both immediately after and six months after music therapy (Guétin et al., 2009). Compared with psychotherapy, patients experiencing moderate levels of depression who participated in music therapy presented less severe symptoms by the end of seven sessions (Castillo-Pérez, Gómez-Pérez, Velasco, Pérez-Campos, & Mayoral, 2010). Oncology patients who listened to relaxing music during their radiation treatment reported decreased anxiety overall and felt the treatment went by faster (Cook, 1982). Music can be used as a tool to help alleviate symptoms of depression and anxiety, and those benefits can be measured long after the therapy has ceased.

Music not only provides physical benefits and improves symptoms in mood disorders, but it has psychosocial benefits as well. It has helped people feel more connected to their past as they experience end-of-life care (Munro & Mount, 1978). It can increase social ability in patients who have suffered traumatic brain injuries (Nayak, Wheeler, Shiflett, & Agostinelli, 2000), those with a neurocognitive disorder (Millard & Smith, 1989), and people on the autistic spectrum (Edgerton, 1994). Furthermore, music therapy helped developmentally delayed people relate more positively to their surroundings (Parriott, 1979). Lastly, subjects who listened to music while in pain have reported less need for medication and decreased perceived pain (Herth, 1978). All of these articles support the idea that music can and should play a critical role in physical and mental well-being. Because of this, occupational therapists should closely examine the methods by which music promotes healing and wellness.

Why OT?

Occupational therapy is the practice of helping people across the lifespan with daily activities related to work or self-care. More simply, it is helping someone help themselves. Occupational therapists work with people dealing with neurocognitive disorders or other mental health problems. They provide therapy for people who have sustained traumatic brain injuries. They also help people dealing with chronic pain, Parkinson's, and pediatric disorders. Often, occupational therapists will help their patients perform daily tasks, and make changes in a person's place of work or home to help them learn how to perform those tasks themselves. They have a holistic perspective, and their goal is to help the person and their surroundings fit together in a way to give that person the best quality of life (AOTA, 2018).

Purpose

In my research, I have discovered numerous articles stating that the use of tonal and atonal music as a tool for healing is an untapped resource. This is particularly true in the field of occupational therapy. But the few examples I have seen in my research of music being used in occupational therapy show incredible gains to the patients and the occupational therapists alike. In this thesis, I will demonstrate how utilizing music helps patients struggling with a myriad of disorders and conditions that occupational therapists treat. It reduces chronic as well as acute pain, decreases anxiety and depression symptoms, promotes neuroplasticity, improves the ability to socialize, and helps focus and memory. The act of performing music will be explored as well, as learning and performing music can promote wellness in a way that passively listening to music does not.

One might be asking themselves why someone who wants to undergo music therapy wouldn't simply go to a music therapist. Music therapists frequently treat those suffering from mental disorders, while occupational therapists work with people suffering from mental disorders and physical complications alike. Often, mental and physical problems go hand in hand. People who have sustained injuries may experience depression related to those experiences, and patients with chronic pain often feel depressed or anxious about their condition. If those people are already seeking help for physical problems from an occupational therapist, using music to treat those physical issues can help relieve the mental problems they may have as well. Using music in occupational therapy will create a better treatment balance for those undergoing that treatment.

Chapter 2: Music and the Brain

Music, Neuroplasticity, and Traumatic Brain Injury

Few studies have examined the mechanism by which music causes changes in the brain, so François and colleagues decided to research how practicing a musical instrument has a positive mental effect (2015). The authors gathered evidence examining the effects of piano practice on brain activity. It suggests that this activity could promote neurogenesis and neuro-rehabilitation in people with traumatic brain injuries, though this has not yet been tested. They also discussed how passively listening to music can encourage dopamine release, reinforcing that activity, furthering neurogenesis, and aiding a person in having a positive mood (François, Sánchez, Duarte, & Rodriguez-Fornells, 2015). Playing an instrument can also promote neural connections not otherwise achieved, as explored by Maes and colleagues (2014). They write that when people are trained to play a music instrument, "auditory-motor linkages are developed as a result of that training". Music can help the brain create new connections in order to overcome injuries or help enhance cognitive processing (Maes, Palmer, & Wanderly, 2014). Because of this, music learning can be effective for people receiving occupational therapy.

One study demonstrated these positive effects on patients with moderate to severe brain trauma after suffering a recent, acute stroke (Nayak et al., 2000). Before the study, the social functioning of the subjects was evaluated both by the subjects themselves and by the subjects' families. Subjects were separated into two groups, one that received music therapy and one that did not. After up to ten session of music

therapy two to three times a week, both the social self-reported scores and the family-reported scores had improved significantly compared to the group that received standard treatment (Nayak et al., 2000). This provides strong evidence showing how the use of music can change the way people relate to the world, and potentially alter their cognitive processing.

Another study by Hedge provides evidence that music can play a role in recovery for those who have suffered a traumatic brain injury. Hedge conducted a study looking at patients who had sustained traumatic brain injury. They either received music therapy four times for thirty minutes, or were instructed to rest quietly for the same amount of time. The music treatment group had significantly improved in areas of executive mental functions and mental flexibility compared with the control group. While these changes did not persist long term, the authors stated that a longer period of intervention would be necessary to bring about concrete changes, and that this form of intervention is entirely possible (Hedge, 2014). Hedge hypothesizes that music is able to "facilitate neurogenesis… by adjusting the secretion of steroid hormones, leading to neuroplasticity" (2014). This preliminary study suggests that using music in conjunction with occupational therapy can enhance executive functioning for those who have suffered strokes.

Thaut and colleagues also found evidence to support the notion that music can improve executive functioning in people who have traumatic brain injuries (2009). In their meta-analysis involving the effects of music therapy on people with traumatic brain injuries, incorporating music into cognitive rehabilitation helped those with traumatic brain injury twofold: (1) the subjects all reported a high degree of enjoyment

during the study leading to improved mood, and (2) their ability to switch between cognitive tasks improved significantly. Concerning the latter, using music provided stimulation to promote "dendritic sprouting and enhanced vascularization of the brain", which gave the subjects more mental flexibility. This is demonstrated in Goldberg's research; different situations, like music practice, can increase cell growth in the brain (2002). Improved mood was generated by musical emotional exercises "designed to articulate and express positive emotions in order to overcome depression" (Thaut et al., 2009). Occupational therapists may use music to promote neuroplasticity in this way to help their patients overcome depression and have improved cognitive functioning.

Music not only has positive effects on mood, but it can enhance speaking ability as well. Baker, Wigram, and Gold tested the effects of fifteen weeks of music therapy, specifically singing, on people who had suffered strokes (2004). After the experiment was complete, each participant showed a greater vocal range and the potential for enhanced expressive speaking. The participants reported singing was an enjoyable outlet, and that it helped them cope with symptoms of depression related to their traumatic brain injury. The authors stated that professionals who utilize singing in patients who had suffered strokes would result in improved intonation, leading to greater expressive potential. They argued that these benefits would not be achieved through other methods of therapy (Baker et al., 2004). An occupational therapist can weave music into treating a stroke victim to help them regain vocal expression as well as promote positive mood.

Music and Anxiety

Occupational therapists will sometimes work with people who have anxiety related to their other ailments. Using relaxing music during a treatment session can be a great way to decrease someone's anxiety level, as it has been shown to have significant benefits for people in a medical setting. One thing that can trigger anxiety is the aftermath of cancer treatment; people whose cancers are in remission may feel anxious about their cancer returning. Chuang, Han, Li, and Young attempted to remedy this anxiety in post-cancer patients with two hours of music therapy (2010). Their findings showed significant reduction in fatigue and anxiety after the session, and the subjects reported feeling more relaxed (Chuang et al., 2010). The study would have been stronger had the researchers attempted to replicate their results across multiple therapy sessions. However, it still shows that even one session of music therapy can help someone suffering from anxiety related to another medical condition, which an occupational therapist can employ easily.

Music may help reduce the mental experience of anxiety, even in the absence of physical effects. Hanser explored evidence of this in a literature review (1985). Three studies she examined by Jellison, O'Connell, Bradstreet and colleagues involved subjects listening to music before or during a stressful event. The subjects were asked to report their anxiety levels before and after listening to music. Heart rate, blood pressure, and galvanic skin responses were collected and analyzed. In each of the three studies, the level of perceived anxiety after listening to music was significantly lower than anxiety beforehand. But there was no change in any of the physiological measurements in any of the three studies (Hanser, 1985). While there was no physical change for those

subjects, they still perceived a decrease in anxiety. This is still beneficial; if occupational therapists could continue to help patients feel less anxious through music therapy, physical changes may follow with time.

Another study did show a decrease in both mental and physical symptoms of anxiety, however (Hamel, 2001). Researchers played a soothing instrumental track for patients for fifteen minutes before a cardiac catheterization procedure. Blood pressure and heart rate measures were significantly lower after listening to the soothing music. The authors concluded that listening to music was a useful way to reduce anxiety before this procedure. However, the authors also stated that patients should be allowed to choose music they think is the most soothing, as every person and their reaction to music is unique (Hamel, 2001). To extrapolate this point, a person who is allowed to choose the music they listen to could exhibit decreased procedure-related anxiety. In summary, music helped reduce anxiety in these pre-surgical patients, and may decrease anxiety before some forms of treatment for patients in occupational therapy.

People suffering from Alzheimer's disease can also experience anxiety related to their declining cognition. Guétin and colleagues conducted a randomized control trial in order to observe the effects of music therapy on anxiety levels (2009). For sixteen weeks, subjects with Alzheimer's either received music therapy, or reading and rest. Throughout the experiment, the music therapy group showed significantly less anxiety than the reading group, and this difference persisted eight weeks after the experimental portion had concluded. One thing the authors believed made this experiment a success was that the music each subject listened to was personalized for them through intricate questionnaires. The authors suggested that this had significant impact into the success

of their results, and that if professionals wish to employ music therapy, they should take the time to ensure the music each person listens to be personalized for them (Guétin et. al., 2009). Overall, these studies suggest that anxiety signs and symptoms, both mental and physical, are improved by using music. Anxiety has a high comorbidity with other disorders, so occupational therapists may see a benefit in their patient's mental states through the use of music.

Music and Neurocognitive Disorders

The last section touched on how music can help people with Alzheimer's deal with anxiety related to their disease, but music has also been shown to have profound effects on the Alzheimer's itself. Millard and Smith began a music therapy program in a nursing home for ten subjects with moderate Alzheimer's with the intention of improving social and physical skills for those people (1989). Compared with the beginning of the trial, the authors observed more smiling, more affection toward other residents, better sitting posture, and increased likelihood of the subjects walking with other residents. Although some of the observed effects are difficult to measure, the observers in this experiment reported a better sense of group unity and improved mood overall after the experiment had concluded. Furthermore, the nursing staff felt those residents were more pleasant to interact with and they were pleased to see those residents enjoying themselves (Millard & Smith, 1989). Using music to help those with Alzheimer's can bring benefits to everyone in their community, including those in an occupational therapy setting.

Thus far, active participation in music seems to have a profound effect on mood in people with Alzheimer's. Bannan and Montgomery-Smith created a choir filled with

people with Alzheimer's and their caretakers to investigate that idea (2008). Alzheimer's patients and their caregivers participated in three sessions of group singing. At the end of the sessions, a significant number of Alzheimer's patients reported feeling physically stronger, felt their singing voices had improved, and felt an increase in vitality. The authors observed more resonance and confidence in the group sound after three sessions. After the experiment was over, CDs of the final performance were circulated between the participants with Alzheimer's, and their caregivers reported that listening to the CDs continued to elicit musical participation months after the sessions had concluded (Bannan & Montgomery-Smith, 2008). Singing with a group is possible even in people with Alzheimer's, and is something occupational therapists should consider adding to their treatment plans.

Music is a relatively new form of treatment for Alzheimer's, whereas hormone replacement therapy is a better understood treatment used to diminish symptoms caused by Alzheimer's disease. While hormone replacement therapy can help reduce Alzheimer's symptoms, it can cause unwanted side effects. Fukui and colleagues studied the possibility of music therapy affecting hormone levels associated with Alzheimer's disease: testosterone and estradiol. Decreased levels of these hormones has been linked to the progression of Alzheimer's symptoms (2012). The authors had subjects participate in music therapy for one month, and observed a significantly larger amount of testosterone and estradiol in the music therapy condition compared with traditional hormone replacement therapy. The authors concluded that music therapy may be a viable option to delay the onset or slow the progression of Alzheimer's, and can be an alternative for people who don't want to undergo hormone replacement

therapy (Fukui, Arai, & Toyoshima, 2012). While this is only one study and the results are only correlated with one another, it provides interesting findings that can be developed in future research. Occupational therapists can include music while treating people with Alzheimer's to give them the best quality of life for the greatest period of time.

Music and Mood

Significant evidence exists regarding the effects of music on depression, an extremely common mood disorder. One possible cause of depression is a low level of dopamine and dopaminergic receptors in the brain. Castillo-Pérez and colleagues measured the effects of using music to help stimulate dopamine release for people with moderate depressive symptoms (2010). Compared with psychotherapy, people who underwent music therapy showed better improvement of symptoms. Based on this evidence, the authors believe that music can be a way to treat anhedonia: the loss of pleasure in daily activities that frequently accompanies depression (Castillo-Pérez et al., 2010). An occupational therapist can use music to encourage their patients to participate in their treatment plan and help improve symptoms of depression.

Earlier in the paper, actively creating music was shown to improve confidence in people with Alzheimer's. Singing has also been used to decrease symptoms of depression in people suffering from chronic pain. Subjects in a study conducted by Kenny and Faunce underwent an intensive cognitive-behavioral program, some of which included singing, to reduce the amount of pain medications needed to relieve pain and to improve depressive symptoms (2004). The subjects in the singing group were less likely to report psychopathologies and depressive symptoms after the

rehabilitation had ceased (Kenny & Faunce, 2004). Singing can help patients undergoing occupational therapy by improving mood and decreasing the risk of psychopathology.

Control over what kind of music someone listens to has its own effects on improving symptoms of depression. In an experiment performed by Li and colleagues, a group of women who were recovering from radical mastectomy for breast cancer treatment were able to listen to music from a preselected music from a music library, while a control group was not offered that choice (2011). After the procedure had concluded, the women who were able to listen to music and choose what they listened to had significantly lower depression scores compared to the control group. These effects persisted long term, with the authors finding that the music therapy satisfied long-term therapeutic effects. They concluded that music therapy is a cost-effective, non-threatening way to help people cope with depression related to mastectomy (Li, Zhao, Yan, Wang, & Zhang, 2011). It is also beneficial because the patients were provided with tools to perform their own versions of therapy after the formal therapy had concluded. Occupational therapists seek ways to have their patients help themselves, so using music therapy is a great tool for improving patients' quality of life both in and out of a clinic.

Depression can be present in someone who is near the end of their life. Music can help patients who are receiving end-of-life care feel more at peace with death, and it can improve how they relate to others during a time of suffering. Munro demonstrated these findings in six case studies of patients in hospice care (1978). One of these studies stands out among the rest, and provides great evidence for how music can improve

overall social functioning. This patient, a Russian woman with an abdominal carcinoma, was incontinent, refused to eat, and turned down any kind of treatment or palliative care for her condition. But after intervention from a music therapist in which they played for her a Russian song from the patient's childhood, her mood dramatically shifted. Her face lit up as the song reached the chorus, and she then felt compelled to tell the music therapist about her childhood in Russia. The patient explained that music and fine arts were very important to her and her family, and that being reconnected with it gave her a deep sense of peace and happiness. Music was then used to increase communication between her and the rest of the staff (Munro et al., 1978). Music has abilities to spontaneously elicit emotion and help people recall memories because it presents a unique way of processing the world (Antonietti, 2009). Music could be used in this way by occupational therapists to allow a patient who is struggling to relate to their surroundings to feel more at home while undergoing end of life care and treatment.

Atonal Music and the Brain

Every study discussed so far made use of tonal music, which is by far the most common kind of music heard in today's world. Everything heard on the radio would be considered tonal music, meaning a key signature can be perceived quickly, even in someone with no musical training. Atonal music is defined as music without a key center (Newlin, 2017), so it is often described as a series of unrelated, random notes, unpleasant to the ear, and anxiety inducing. Even a highly trained and experienced musician may not enjoy listening to atonal music, and is typically only appreciated when played by an incredibly skilled musician and in the company of those who understand its theory. However, atonal music has been shown to stimulate the brain in

unique ways compared to tonal music. According to a study conducted by Tobón and colleagues, brains of people listening to atonal music displayed more activity in the temporal lobe, cerebellum, and fusiform region than brains listening to tonal music (2016). This suggests that atonal music is processed differently by the brain than tonal music, and therefore can have different outcomes on those who listen to it.

Arnold Schoenberg is famous for creating atonal music, like *Five Orchestra Pieces* (1909), *Erwartung* (1924, "Expectation"), and *Die Glückliche Hand* (1924, "The Hand of Fate") (Newlin). Some of his works were used during a study that explored the effects of different kinds of music on relaxation abilities (Stratton & Zalanowski, 1984). Subjects were separated into six groups, each with a different music condition: no music, soothing classical, stimulating classical, easy listening, atonal music, and romantic music. Subjects entered a quiet, dark room and were encouraged by the administrators to relax and empty their minds. If the subjects were in a music condition group, then the specific type of music was played for 15 minutes. Afterward, administrators asked the subjects how relaxed they felt, how easily they were able to empty their minds, how pleasurable they found the experience, and to what degree they enjoyed the music presented to them. Atonal music was the only condition that yielded significant results; participants were less able to relax when listening to atonal music compared to no music or variations of classical music. The authors concluded that the biggest variable that affected overall relaxation was how much subjects enjoyed the music they heard, and since atonal music was the least favorable of all the music conditions, it promoted the least amount of relaxation. It can be concluded that music with a discernable key center is crucial in allowing subjects in a medical setting to relax.

But if the goal is to have a patient be focused and concentrated, atonal music can be a middle ground for a patient who still would like music playing when undergoing occupational therapy.

Listening to atonal music does not necessarily have solely negative consequences, however. Researchers studied the effects of music atonality and tonality on vocabulary test performance and found some positive effects of music on learning (Pearsall,1989). Ninety non-music major college students at the University of Missouri-Kansas City completed a standardized vocabulary test while under one of three conditions: no music, tonal music, and atonal music. The study accounted for variance in vocabulary level, and administered a separate listening comprehension test with subjects under the same condition they were in in the first test. After accounting for variance in vocabulary level, results showed significantly higher scores in listening comprehension and vocabulary test scores for the atonal music condition compared to the tonal music condition. Overall, the authors discussed how the tonality of music might have distracted the subjects during the tests, causing a significant decrease in scores, since those in the no music condition also performed better than those in the tonal music condition. Importantly, the ambiguity of the melody in the atonal music did not affect the test results. Atonal music may be useful during listening comprehension, but does not necessarily present any advantage over listening to no music at all. This study may prove useful for a professional who has a patient that would like to listen to music, but also needs their patient's focus during a task.

Atonal music's unique properties allow for a new category of music treatment to be explored. An occupational therapist can use atonal music if they are working with

someone who has some form of aphasia, particularly because of its abilities to influence activity in the temporal lobe, the main part of the brain involved in speech production and understanding. It is a non-traditional music option to help stimulate areas of the brain not ordinarily stimulated by music. This tool can be useful for occupational therapists as well as their patients when working together during treatment.

Chapter 3: Music and the Body

Music and Pain Management

People dealing with chronic pain or post-operative pain often take prescription medications to dull their pain, and dependence on these drugs can lead to unpleasant withdrawal symptoms. A literature review exploring how music can reduce pain in patients who just had surgery found that music can be used as a low-risk intervention to help reduce perceived levels of pain (Good, 1995). The methods for each study were inconsistent, but the results were promising, especially for people who are dealing with low-grade anxiety related to their recovery. Additionally, a case study had a woman participate in music therapy as a means to reduce her chronic pain symptoms (Colwell, 1997). With the exception of one session in which the patient's nervousness about performing prohibited her from fully participating, she reported reduced pain levels after each music therapy session. An occupational therapist can help a patient recover from surgery or reduce their levels of chronic pain by using music as a way to ease their pain.

Music may also be a useful tool for pain management during end-of-life care. Krout looked at people who were experiencing pain as a result of terminal illness. Subjects' pain levels were measured before and after music therapy (2001). Pain levels were significantly reduced, and comfort and relaxation levels increased after a single session of music therapy (Krout, 2001). Music can also be used in hospice care to help people transition into death peacefully and with lower levels of pain. A study conducted by Schorr explored the effects of listening to music on amount of pain medication

needed for women with rheumatoid arthritis (1993). At the end of the experiment, subjects reported needing less medication to help cope with pain than they did at the beginning of the experiment. This research suggests that even passively listening to music can improve pain levels for people coping with a variety of issues (Schorr, 1993). Since occupational therapists work with many different kinds of people with many different ailments, music can be a great baseline treatment to help patients decrease pain levels, even in those nearing the end of life.

One of the goals occupational therapists have is to get their patients to a place where they don't need therapy anymore or where they can continue to perform therapy techniques on their own. Siedliecki and Good had similar goals in a study investigating how music can be used to reduce pain levels in people with chronic, non-malignant pain (2006). Feelings of depression, powerlessness, and disability often accompany chronic pain, so the investigators measured those characteristics as well. After a week of music therapy, the results showed that all subjects who were in the music group had less pain than the control group. The music group also reported feeling more power, less depressed, and less disabled than the control group (Siedliecki & Good, 2006). Not only did music reduce their pain levels, but it helped them feel more in control of their situation. This provides further evidence that occupational therapists can use music for people with chronic pain to help them help themselves.

Chapter 4: Examples of Music Use in Occupational Therapy

Below I explore how music already has been incorporated successfully in occupational therapy. Occupational therapy seeks to address both physical and psychological issues in tandem, so although the effects described below primarily address physical symptoms, psychological effects are mentioned as well.

As previously shown, actively engaging in music by performance can bring benefits that are not present when passively listening to music. These effects were formally explored in a study conducted by Lee and Nantais (1996). The subjects were patients with spinal cord injuries who had been receiving traditional occupational therapy. Their team of professionals created a way for the patients to compose electronic music by manipulating the angle of their elbows. These patients were then able to work in bands they formed themselves to compose music that was pleasing to them, and then practice and perform that music for members of their community. At the end of this program, the subjects not only felt physically stronger, but noticed increased self-esteem and self-worth because music composition and performance was not something they thought previously possible with a spinal cord injury. The social benefits they received from music performance were unparalleled by any previous treatment they had received (Lee & Nantais, 1996). This article provides excellent evidence for occupational therapists to incorporate music into their treatment programs, as this article suggests that music improves both physical and mental health.

People who have traumatic brain injuries may experience an unsteady or uneven gait, but this symptom may be reduced with music therapy. Specifically, different tempos of music have been used to help people in gait training. People who have

traumatic brain injuries may experience an unsteady or uneven gait. Hurt and colleagues used rhythm training to help patients take longer, stronger, and more even strides (1998). At the end of the experiment, all subjects showed improvements in their gait, both in the length of their strides and in their confidence and strength while walking (Hurt, Rice, McIntosh, & Thaut, 1998). Occupational therapists will frequently treat people with Parkinson's to help them get longer, stronger strides. Using music, or even a metronome, might coax them along and facilitate improvement at a faster rate.

Some occupational therapists in my community have already incorporated music into their treatment plans, either deliberately or through a natural ebb and flow of treatment progress. Rebecca Moyer, MOTR/L, has used music to help people across the lifespan, namely in her geriatric patients and with pediatric patients (2018). In the geriatric population, loud, rhythmic music is a great way to encourage big, strong steps for people who have Parkinson's disease and have trouble walking. It can also loosen up shoulder movement and keep people from getting stuck in a particular, unsteady gait. Rebecca also uses music to help those with dementia as a cognitive strategy to help bring back memories that are otherwise inaccessible. She recalled a time when she treated a non-verbal, low arousal patient with dementia. He was typically "glassy eyed" and not responsive to staff's attempts to engage with him. But one day, there was a song playing on the radio in the clinic from when he was in his 20's, and his whole demeanor changed when the song was on. His eyes were open and alert, and he started singing along and moving to the beat. Rebecca reported a great sense of fulfillment in that moment; watching someone improve so rapidly gave her a deep sense of satisfaction (Kayser, 2018).

In her pediatric patients, Rebecca has used music as a means to help keep children focused on a task. She uses an integrated listening system with a combination of classical and binaural tone (a tone with two slightly different frequencies), which when listened to with headphones promotes alpha waves in the brain and keeps kids calm. She has also used sound based protocol for vestibular training to help improve dizziness, and playing calming music during treatment can slow down hyperactive kids and keep them focused and engaged on the current tasks. Sometimes, background music can be unpleasant or distracting in patients who have suffered strokes, so she will not use it (Kayser, 2018). But for the most part, music intervention has been a success for Rebecca in her practice.

Music doesn't always have to be used deliberately to help someone feel relaxed and focused on treatment. Karen Benjamin, MOTR/L, CTL, came across a patient who was non-verbal because of a stroke. However, the patient could respond yes or no by vocalizing a certain way, which prompted Karen to sing her questions and responses to this patient. Upon hearing Karen doing this, the nurses started to join in, and pretty soon the whole floor was singing everything they were doing. The patient really appreciated this and enjoyed the music surrounding her. In a similar event, a man who had dementia had trouble communicating, so Karen decided it would be more fun to sing her questions and treatments to him. He joined in on the music and sang responses to her. This made his speech clearer and Karen was able to communicate with him much more efficiently (Kayser, 2018). Music, whether it is being used on purpose or if it comes about organically, is useful to many patients in an occupational therapy setting.

Related to pediatrics and OT, music gives children opportunities to be social and perform. Twyford and colleagues developed a program using active music participation within occupational therapy to help children who struggle with sensory processing due to developmental delays and/or traumatic brain injury (2016). The children were enthusiastic about participating in the treatment, and their parents reported feeling empowered watching their children progress. At the end of the experiment, the children had better attention skills when listening to others and engaging in the tasks. The staff enjoyed having music as part of their regimen as well. Making and performing music gave the children a creative outlet for them to improve their sensory processing, and provided positive mood benefits to their parents and staff (Twyford & Watters, 2016). Occupational therapists will see improvements when using music as part of a treatment plan, especially when working with children.

Chapter 5: Conclusions

Conclusions

All of the above evidence suggests that music has vast potential to be a therapeutic tool in occupational therapy. Occupational therapists treat people dealing with issues ranging from depression, anxiety, traumatic brain injury, dementia, chronic pain, Parkinson's, and difficulty socializing. Music has been used as an aid to all of the above problems. Incorporating music as a potential treatment intervention will provide a more positive environment for those patients, can help them see benefits more quickly, and those benefits may persist long term. Not only that, but music therapy is a form of treatment that most people can continue to perform on their own after a professional teaches them how to do so. This makes it a cost-effective and versatile form of intervention. It has much room for experimentation and personalization, and lets the occupational therapist and patient work together. This strengthens the bond between caregiver and patient, and gives every patient the unique program best suited for them.

Music is often referred to as a universal language. As seen in the example of the Russian woman in hospice care, it helped her overcome the language barrier between herself and her care team. It is something everyone can understand, and something many people enjoy. While music may not be useful for some people who have suffered strokes and have difficulty processing both language and music, it can give those who are non-verbal a means of communication. This applies to those with dementia or Alzheimer's as well. It can activate areas of the brain otherwise inaccessible and help people recall memories they would not be able to otherwise. Related to cognitive

benefits, music can instill a sense of peace and relaxation to those who are dealing with anxiety, whether that anxiety has an unknown cause or is because of another medical problem. It makes people more open and receptive to their care staff, makes treatment appear to go by faster, and soothes fears for people who are anxious about an illness returning. It can also improve mood in people with depression related to cancer, dementia, or hospice care. Since occupational therapists work with people suffering from a myriad of problems in the brain, using music can be an important part of that person's treatment.

Physical problems are also remedied by music. Music can induce neuroplasticity and physical changes in the brain, which, overtime, influences how someone thinks. This is useful for people with traumatic brain injuries who need to relearn how to perform everyday tasks. Occupational therapists work specifically to improve quality of daily life, so using music to increase neuroplasticity is incredibly useful. Loud, rhythmic music is useful in gait training for people with traumatic brain injuries or with Parkinson's. Gait training is a common action performed by occupational therapists, so professionals who music during gait training can help their patients see results faster and for a longer duration of time.

One theme present in all the research I reviewed was music's ability to improve overall mood and social functioning. Even if the measured results were not significant, almost every participant reported feeling improved mood. Sometimes those who are close to the participants, whether they were part of a care team or a loved one, also noticed those positive changes. Music use in treatment can bring about unexpected benefits, even if those benefits are not those that were sought out at first. It can make

people more receptive to treatment as well, and that can improve their quality of life too. Occupational therapists would be wise to recognize that even though improvements may not be seen in a person's physical condition at first, music therapy is still very likely improving that person's mood.

Implications

As demonstrated above, occupational therapists are already using music while treating patients, and it seems to be beneficial. With a few exceptions, music provides many positive outcomes for the patients of occupational therapists, whether the use of music is intentional or spontaneous, or whether the benefits are the ones that were intended. It gives patients and occupational therapists options that improve quality of life for both parties involved.

Because music is such a functional tool, it would be difficult to ignore its therapeutic properties. Furthermore, music is easily incorporated into treatment. Patients and occupational therapists can work together dynamically to determine the best use of music for that patient. This strengthens the patient-professional bond and makes patients much more receptive to treatment. Music absolutely has a place in occupational therapy due to the benefits it provides to both patients and practitioners alike. Its low risk, cost-effective, and well-loved nature makes it a viable treatment option for anyone receiving or providing occupational therapy.

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