Music Therapy in the Modern Era: Three Discussions

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Introduction

When starting this process, I knew that I wanted to do some type of research into memories, specifically how memories were associated with music. This idea came to me from a poster session I saw at the 2016 American Music Therapy Conference where a presenter was trying to map the brain patterns of elderly individuals based on how often they listened to music. While continuing to think of ways that I could consider this idea more, I thought about the emotional impact that music has on people, and started to think of ideas of how I could tie emotion into the research question. Through my experience as a performer and by doing service-such as going to nursing homes and singing with my fraternity-I was able to witness what are called evoked emotions, in which music is able to clearly evoke an emotion in the listener. As a performer, I can witness many different emotions present themselves in audiences, especially during concerts that were fully instrumental, classical music. These emotions included a wide spectrum from excitement to the feeling of stillness that comes after performing a slow adagio. I found a different reaction that presented itself when a group of friends and myself went to a local nursing home and sang popular music in the fall and spring, or Christmas carols in the winter. This reaction was more introspective, and more powerful. People who hadn't noticed that we entered the room, and sometimes didn't seem to notice that we were singing to them at all, would light up when they heard a song that they remembered from their past and would start to sing along with us. Around Christmas when we would sing *Silent Night*, the residents would often cry; some happy, embracing their family who were there with them, others in a way that seemed sad, possibly remembering something or someone that they missed.

A similar story happens in Islene Runningdeer's book, *Musical Encounters with Dying*.

Islene Runningdeer is a music therapist that worked primarily in hospice and later started to record the stories and lives of her patients. In the book, Runningdeer tells the story of her patient Mavis. Mavis was an elderly woman who had eight children, six of which died before Mavis herself did. Despite this Runningdeer notes that she has always endured and was friendly and pleasant. Mavis, in her last few months, found comfort in the song *You Are My Sunshine*, a song that brought her memories she shared with her children, and would request from Runningdeer that they sing it in every one of their sessions. Both when singing, and after Mavis would smile and sit retrospectively as she thought about the song and all the things she had associated with it (Runningdeer, 2013). From all the emotions that I observed, the two that I chose to focus on were nostalgia and trauma. After deciding the emotions, I planned to research how music affects the memory recall of memories associated with nostalgia and trauma, and if there is any difference between classical and popular music. The way that I am using these two emotions in my paper may not be the same way that they are frequently thought of in society or pop culture so I have provided my definitions in the next section.

Defining Emotion

Two terms will be used in this paper that are different from their standard use, the first is nostalgia, the second is trauma. Nostalgia is an emotional state that recalls happiness or positive emotions of the past. Nostalgia is most commonly associated with memories, but can also affect a person's emotional being. Nostalgia can be contextualized in terms of this paper through the following example. A person driving in their car is idly switching through channels on the radio. As they change they hear the last part of their favorite song from when they were younger on one of the stations they scan past. This small part of the song brings happiness to the listener, and recalls memories of when they were younger, and the times they spent with the people and

places that they have associated with this song. The experience of hearing this song gave the listener both an emotional happiness as well as recall of pleasant memories, demonstrating nostalgia.

Trauma is another term that will be used throughout this paper. Trauma is defined as a negative emotion or experience from a person's past that when recalled has a negative bearing on a person's mental state, often coupled with a feeling of reliving the event. David Morris, an American novelist and former marine explains how trauma can appear from any ordinary object,

> Trauma destroys the fabric of time. In normal time you move from one moment to the next, sunrise to sunset, birth to death. After trauma, you may move in circles, find yourself being sucked backwards into an eddy or bouncing like a rubber ball from now to then to back again. ... In the traumatic universe the basic laws of matter are suspended: ceiling fans can be helicopters, car exhaust can be mustard gas.
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> — David J. Morris, The Evil Hours: A Biography of Post-Traumatic Stress Disorder

People experiencing trauma can experience flashbacks such as events during their service, which leads to panic attacks brought on from their post-traumatic stress disorder. In this example, hearing a ceiling fan, or smelling car exhaust are not the traumatic items themselves, the pairing of a past event to a current object is what causes the trauma, regardless of the sensory information that caused it.

Some musics can bring back emotions that fall on the continuum of nostalgia and trauma. A common one is sadness, which is not as severe as trauma but still has a negative bearing on the listener. Due to the level at which they differ, I have chosen to separate the standard concept of

sadness from trauma. Negative emotional responses that are not traumatic will be considered evoked sadness for this paper. The reasoning for this is that while sad memories do place a negative bearing on a person's emotional state, it is not as severe of a bearing that trauma would cause. Also, trauma implies that the person experiencing the event feels as though they are momentarily reliving the event, as opposed to just being reminded of it.

Nostalgia	When positive emotions or memories of the past are recalled, often improving the mood of the one experiencing the recall.
Evoked Sadness	When a person is made sad from a stimulus, however the sadness has no significant bearing on the person's state, and the experience fades relatively soon after.
Trauma	When a stimulus causes a person to relive an experience from their past that causes lasting distress to the affected. The experience causes severe distress.

Nostalgia is a trait commonly associated with the elderly. Stories are often told from the perspective of an older person reflecting on their life. People will often sit with the elderly and ask them to tell them details about their lives. Something that is usually not thought of in our society is the trauma that the elderly experience. These traumas are the same ones that are carried with them throughout their lives, and are not forgotten simply because they are aging. In this paper I plan to look into how nostalgia and trauma correlate with the elderly, specifically third agers. Third Agers are the population of people entering retirement or people in late life or assisted care.

The Aging Brain

Like many aspects of human life, the brain's strength is not consistent across all people or populations. And since it is an organic being, this power decays as we age. The decaying of our brains is partially what causes us to lose memories that have been stored in our long-term memory. Similarly, as we age it becomes increasingly difficult for the brain to commit memories from the short-term memory into the long-term memory, explaining why younger individuals remember small details more than older individuals (Davis et. al 2003). The memories that remain in the long-term memory after aging are memories that hold a stronger meaning for the person retaining them, and will create stronger responses.

There are many tracks that the brain follows as we age, the first being Age-Associated Memory Impairment (AAMI). This is the path the brain follows regularly as we age. (Chen et. al, 2001). If the person has standard lapses in memory or cannot recall certain things, it is likely AAMI. Causes of AAMI are a decrease in the functioning of the medial parietal lobe(MPL), as well as a shift in functioning in the hippocampus. This shift occurs because of the hippocampus needing to work extra to code stimuli for memory storage since the sensory identifiers in the MPL begin to shut down with age (Miller et. al, 2007). Another track of aging is Age Related Cognitive Decline (ARCD). This is another normal part of aging that leads to forgetfulness, decreased cognitive function, and decreased problem-solving abilities (Ferris and Kluger, 1996). The hippocampus also plays an important role in keeping the brain at a functional level in ARCD. Both AAMI and ARCD are standard tracks of deterioration that our brains follow as we age, and are not often looked at as disease tracks.

A more severe track is Mild Cognitive Impairment (MCI). Though not as severe as dementia, MCI is a higher form of cognitive impairment than what is considered to be standard. People experiencing MCI are likely to find difficulties in retaining memory, expressing themselves with language, and will experience decreased control over thoughts and actions demonstrate how looking at patients in third age or late-life care will require an alternate method than those who are younger or who have entered stages of dementia.

As the risk for dementia increases, so do the amount of memories that a person will forget. Masao Yokota conducted a study in which he tried to create a new test for dementia screening. This was done by comparing his team's test to a pre-existing test. When comparing the results of both tests, the rate of memory loss is positively correlated with dementia scores. (Yokota et. al, 2000). This finding means that for people who are even approaching dementia they already have increased memory loss, people who enter dementia levels continue to lose memories at a faster pace as their dementia worsens.

	Typical Age Range	Characteristics
AAMI (Miller et. al, 2007)	The typical adult can be considered for AAMI if they are at least 50 years old.	❖ A noticed Decline in Memory Impairment ❖ Lower scoring on memory tests ❖ The memory decline is not associated to any Health issues such as heart attack or Alzheimer's

ARCD (Salthouse, 2009)	Many Variables impact age range, most commonly associated with people in their 60's	❖ Decline of at least two memory functions (memory recall, verbal recall, attention)
MCI (Geda, 2012)	Median Age presented is 60 years old.	❖ Person doesn't exhibit complete signs of normal aging, or Dementia ❖ Person can live independently ❖ Clear loss of memory observed by both person and people close to them
Dementia Spectrum	Symptoms presented for diagnosis by age 70	❖ The Dementia Spectrum includes many advanced forms of mental deterioration, some of these are Dementia and Alzheimer's Disease (Davis et. al, 2008) ❖ Alzheimer's Demonstrates the severity of this spectrum as it has a mortality rate of 100% and acts within 15 years

The brain stores memories through a process of encoding based on the stimuli associated with the memory. The commonly accepted process follows this track. The memory enters the short-term memory where it is processed. While being processes it is decided if the memory should move into the long-term memory or be forgotten. If a memory is decided to be sent to the long-term memory it is sent through the hippocampus, where it is coded, then stored where it awaits recall (Greene, 1992). This process demonstrates why it is important to have a well-functioning hippocampus, and further demonstrates basic issues with AAMI and ARCD.

Different memories have different ways of being coded. In this essay, I have chosen to focus on Autobiographical Memories. Autobiographical memories are done by a *cyclic retrieval.* Cyclic retrieval means that the memories are retrieved by small cues, they are next the described memory is brought to consciousness where it is then evaluated in the context that the cue was given. (Collins, Gathercole, Conway, Morris, 1993). Autobiographical memories can be split into two different categories, *personal memories* and *flashbulb memories*. Personal memories are defined as a recollection of a specific episode from a person's past in which recalling the memory makes the individual feel as though they are reliving the event as it happened (Brewer, 1986). Personal memories are primarily based on a person's own introspections and the information that others present about the same episode. By contrast, Flashbulb memories are memories that are formed when an intense emotional event happens. The episode is then preserved very clearly as though the person obtained a mental photograph of the situation. The different between the two being that Flashbulb memories are less likely to be forgotten than personal memories because of the emotional significance of the event.

Autobiographical memories have a problem in research that would benefit the aging population. When coding the memory, the brain tries to break it down into too many facets such as how it relates to the self, to the individual, or to generic memory, and a trigger word that might further stimulate the recall of the memory, such as *California.* In this sense California would be able to draw memories of time spent in the state, experiences the person has in relation to the state, or general information facts that they may have learned about the state (Brewer, 1986). This would be able to benefit the elderly population where if they had forgotten one memory associated, the other possible coding tracks might be able to trigger related memories, helping to recall what they had forgotten.

Music and the Aging Brain

Another trigger that works to recall memories is music—both the physical act of playing music and listening to it. A study by Megan Metzler, Deborah Sacuier, and Gerlinde Metz found that people who participated in music during their childhood had both a better recall of their childhood, and general life (Metzler, Sacuier, Metz, 2013). Their study suggests that musical training in early life reduces the effects of age-associated decline in the neural motor and cognitive networks, keeping basic memory functions and body movements functioning longer than they would in a person with no musical training. Vuoskoski and Eerola conducted a study analyzing how music impacts emotional memory recall, and found that specific songs that were known to a person, regardless of how long the association was, could incite emotions into the listener through memory recall (Vuoskoski and Eerola, 2012).

Alexandra Parbery-Clark and her team conducted a different study that measured the amount of change between the brains of life long musicians and third age non-musicians. Their findings report that there is a significant difference between the functional capability of the brain between the two groups. After this, they found that there is also no real difference between brain function of young musicians and third aged musicians. (Parbery-Clark et. al, 2012). These finding suggest that musical training at a young age has a strong enough impact on the shaping of the brain that the results are present many years into the future. The research next posed the question of if learning music in late age would help neural timing. To test this, they did a study on rats to see if exposure to music helped the rats develop a heightened sense of neural timing, to which the study found it did (Parbery-Clark et. al, 2012). This data suggests that if third agers are exposed to music, they too would be able to have an increased neural timing.

Third agers are also studied through less scientific means. Jacqulyn Wright writes about Dr. Pamela Pike of the University of Arkansas Little Rock, a piano faculty member who runs a program called *The Third Age Piano Class.* In this class, participants over the age of fifty are given exposure to musical ensemble by playing in a group of piano students all their own age. Dr. Pike is able to study the participants while engaging them, and allowing them to stay active in a way that lets them learn something new and interact socially (Write, 2007). While this type of exposure may not be done to study anything, the previous research suggests that in addition to a hobby, the participants are also getting the ability to prolong their neural timing and increase their emotional recall.

Music as an Emotional Stimulus

In western culture, people often associate music with emotions. An example of this for many people who are not musically trained is the common association that major keys are happy and minor keys are sad. While this is not true of all music, it gives an indication of how strong emotional stimulation is associated with music in the western culture. Several studies, referred to as mood-manipulation or mood-induction studies, use music to try and alter the emotions felt by the participant in the study. Vuoskoski and Eerola's previously mentioned study had a section in which they tested the theory that "sad" music can induce sadness in the listener. What they discovered is that music can induce sadness in two different ways. If the listener has a strong association with the music that they are listening to, autobiographical memories can come into consciousness as a result of the association, thus inducing sadness in the listener as a result of the memory. The second condition that they found is that regardless of if a person is familiar with the music they are hearing, if they have high levels of empathy then the listener will likely become sad as a result of the music (Vuoskoski and Eerola, 2012). Susann Eschrich, Thomas

Munte, and Eckart Altenmuller ran a similar study, with the primary difference being the observation of happy music. The research findings also demonstrated that music that was not previously known to the participants was able to induce emotions. However, with happy music a person's levels of empathy were not a factor of how well the person responds. They found that music that was happier tended to have quicker tempos, which was a partial reason for increasing mood. When compared to music that was still happy but slower, the researchers found that happiness levels still increased in listeners showing that the tempo and rhythm played a role in increasing mood, but general effect of a piece was by itself enough to influence emotions (Eschrich, Munte, Altenmuller, 2008).

Differences Between Musics

Classical music and popular music differ both in their composition and their use in society. To some, Classical music has become thought of as old-fashioned and boring, yet it is still used in advertisement. Reasonings for this use might be because of how widely known some piece are, allowing them to grab the attention of the listener for the ad. Popular music—which in this study will encompass Rock, Jazz, Folk, and all other musics that do not fall within the classical realm is—by definition, "popular". These are musics that active in current society, the repetition of popular music in the few weeks that it tends to stay around allows listeners to form several associations with the music, however because popular music rarely returning after new songs have replaced it, the association might not be reinforced. What then makes it so that we have strong memories with one piece of music and not another? One possibility put forth by Richard Middleton is that timbre is what influences the difference. There appears to be a difference in how we respond to acoustic instruments as opposed to synthesized ones (Middleton, 2007). He suggests that we are more stimulated by acoustic instruments as they are

associated with old time music and this triggers a nostalgic response in us. I am not sure the level that this is still prevalent because of the decrease in the number of acoustic instruments used in the music younger generations are starting to grow up with, but I see instrumentation taking effect in another way.

Popular music that uses more acoustic sounds tend to be slower ballads, which allows for the listener to hear more of what is being said and take time to process it. This would allow them to have both an experience based memory and a verbal based memory. Music that is highly synthesized tends to be harder to understand, resulting in only experience based memories. This could be a reason that there is a stronger stimulation from acoustic instruments. Classical and Popular music also differ from each other based on social roles. Many people view art music as sophisticated music, and therefore it is hard to understand and take part in. Conversely, popular musics are thought to be relatable. With this difference drawn so hard what happens to the music in the middle that blurs the lines between classical and popular? Pieces like *Rhapsody in Blue* by George Gershwin heavily rely on Jazz idioms for the pieces composition and performance style (Taruskan and Gibbs, 2013). Other pieces such as Schubert's *Ave Maria*, which is composed entirely in the Classical style, have made their way into popular culture because of widespread use.

Then there are pieces that walk a much finer line, such as Samuel Barber's *Knoxville: Summer of 1915*. Pieces like this one might be able to produces a stronger association as they pull many features from both sides of the spectrum. *Knoxville* is a piece in the Classical style, with the instrumentation being a standard symphonic orchestra, but the soprano soloist sings the text of James Agee, an American novelist, poet, and film critic. Agee's text reflects a popularized nostalgic recall for a past, below is the first stanza.

> It has become that time of evening when people sit on their porches, rocking gently and talking gently and watching the street and the standing up into their sphere of possession of the tress, of birds' hung havens, hangars. People go by; things go by. A horse, drawing a buggy, breaking his hollow iron music on the asphalt: a loud auto: a quiet auto: people in pairs, not in a hurry, scuffling, switching their weight of aestival body, talking casually, the taste hovering over them of vanilla, strawberry, pasteboard, and starched milk, the image upon them of lovers and horsement, squared with clowns in hueless amber.
>
> -James Agee, *Knoxville: Summer of 1915*

The references to people sitting on porches, or the acoustic imagery of the people and cars moving along the road, are images that could be found in any number of popular songs in the country or folk genres.

At the time of "*Knoxville*'s" premiere, shortly following the end of the second world war, it seemed to many, to be a piece that fit well into the popular oeuvre. Benedict Taylor researched how this piece fit with the American identity and found that there were several themes that presented in the piece that created an Autobiographical memory of America, referencing simpler times painting a picture of what the South felt like to live in. The text painting the picture, and the orchestration creating a simple timeless feel shapes the text and creates an affect for the audience (Taylor, 2008). This combination of orchestral music and folk like lyrics result in a pairing of stimuli that create stronger associations than if either were presented separately.

Storage of Musical Memories

Music, including the text of songs, are stored in separate areas of the brain than are the centers for speech production and language recall. As these two neurological centers are not the same, it means that musical recall is able to take place even when other aspects of recall are not (Melton and Martin, 1972). While researchers are not sure exactly where the music center is located in the brain, the distinction from the verbal center is important. When the brain experiences music multiple parts of the brain are activated. By connecting these centers, stronger memories are formed. The separation of the memory storage areas is a partial explanation for the instances that occur when a person who has become non-verbal has a musical stimulation and either sings or talks for a short period following.

Relation to Music Therapy

Music Therapists are therapists who use music to help their population. They work in several populations including schools, hospitals, geriatric centers, and private practice. They can use music to help with rehabilitation, stress release, and quality of life improvement for their clients. Islene Runningdeer found in work with her clients that music therapists can use their understanding of nostalgia and trauma to navigate how they approach working memory tasks with their clients (Runningdeer, 2013). This is important because someone who tries to do the work of a music therapist without the proper training could end up doing more harm than good if they are not cognizant of how to properly help the client. In fact this level of training is part of the purpose being the board certification in music therapy,

> The MT-BC [Music Therapist- Board Certified] is a legally defensible program, i.e., all of its documents and programs are developed and reviewed with this concept and responsibility in

> mind. This defensibility assures the right to work for the certificant within his/her scope of practice as developed through the Practice Analysis and identified in the Board Certification Domains. It also insures consumer protection for the public. The credential provides a means for the public to identify qualified practitioners who have passed a national exam measuring the knowledge, skills, and abilities necessary to competently practice in the field of music therapy (http://www.cbmt.org/frequently-asked-questions/)

A music therapist can correctly use their training and understanding of how music effects memories to be able to best benefit the client, regardless of if the client is a child or somebody in their last months of life.

Further Questions

The first section of this paper addressed research into how the brain creates memories and how emotions are associated with both music and memory. My hope is that music therapists and other interested parties would be able to use this research to develop a better understanding of how memories function in a therapeutic setting, and would be able to apply that knowledge to their own therapies, particularly when working with third agers. While there are several studies looking at brain processes, and some about music, few overlap—especially when studying the aging brain. As a result of researching and noticing the gap in research, I started to think of other questions. The next section of this paper will present three research ideas that I had while conducting the research for this paper. These studies have not been conducted and act as a representation of the direction that I would like to take this research in the future.

Study 1: Why does music evoke more emotions than other stimuli?

This study would look at why music causes a stronger emotional response than other stimuli. While there are other stimuli such as photographs that are strongly correlated with episodic and autobiographical memories, there is not a clear indicator of why music evokes stronger responses.

Previous research indicates that part of the reason music is so strong is because it activates more parts of the brain than do other stimuli. The areas most affected by music are the auditory cortex, the cerebrum, and the cerebellum (Bolles, 1988). The auditory cortex and the cerebellum make sense are they are associated with sound and movement respectively. The cerebrum holds the hippocampus which is a large memory center of the brain, this explains why music effects the region.

Music could possibly be such a strong stimulus as it has intense cultural associations. The previously mentioned major versus minor chord idea is something that represents emotion in a western society, but even with that idea there are still several examples of western music that break the mold of major:happy, minor:sad. If one were to travel outside of the Western culture this association would change, as other cultures do not build their music on the same tonality structure. Some cultures use rhythm, others a smaller selection of tones than are used in western music. This means that the possibility for music to be correlated with emotion is greater than the examples touched on in this study.

A difficulty that would need to be addressed in this study is that different people have different stimuli that activates their strongest response. Because of this the study would need to address what types of people, or cultural backgrounds, have music as their strongest stimulation.

The study would also need to consider the already seen difference in response between positive and negative emotions evoked by music, and see if that plays a role in stimulation.

I was not able to run this study at my current level as it came up late in the process and would not have fit my timeline. There are several stimuli that could be tested against music that I would need to choose from, pictures and photographs seeming the most likely (Belfi, Karlnel, Tranel, 2016).

Study 2: Why does certain music evoke stronger memories than others?

This study stems from my original research question in which I attempted to find which facets of music are the most important in memory recall. Since I could only find studies that mentioned the idea, or gave singular elements of what could help shape the processing I did not feel like this part of my question was fulfilled. Therefore, I tried to think of how a study would be possible that allowed for observation of specific facets, and focused on recall.

Research has found that there are several areas in the brain correlated with different musical facets, but none have been found to be the sole center of a singular facet. Since the brain has several areas activated by music, one step in this study would be trying find these definitive centers in the brain. This would allow for researchers to isolate specific facets of different musical styles and see if they have any impact on the recall of a memory.

This study would also need to account for re-enforcement. As music is something that people experience multiple times in their life, researchers would need to find a way to account for the difference between pieces that are heard frequently from pieces that are rarely listened to. This might be a response scale for strength of the association and speed of recall or it could be

that the researchers compose a new piece based on the regions and facets research, which they would then try to create an association with for the participants.

A difficulty in running a study of this nature is that the population for the study would be hard to locate. While random selection would give you a wide variety of participants, peoples' general memory and musical taste can widely differ, resulting in a population that would be hard to control for. The population would likely become more stable if one were to limit the demographic to similarly aged participants. They would need to be old enough to have strong associations with music from their lives, but young enough that no real deterioration has begun in their brain. The study also holds the possibility of using two populations, one which is younger and studied to see if the researchers can determine zones in the brain that are specifically correlated to musical facets. The other would then be the older population who the researchers would be able to test ideas about recall on as the population is more likely to have developed stronger correlations as they have aged.

A way around the population problem would be to run a series of case studies. Case studies would allow for more in-depth research to be conducted on each participant, but would not be able to get the same correlational results that would be possible from a large population. The case study participants would be able to provide specific musical examples that they have strong associations with, which can result in the possibility of finding important musical facets by examining the music, instead of the brain, to look for similarities in the music that each person found to have strong recall. If these same musical facets present throughout several of the case study participants, researchers would then have an idea of what elements to focus on in future research.

Study 3: What difficulties can be studied while working with aged memories?

Working with aged memories can be difficult, as the brain tends to alter or forget memories as we age. This means that the memory that is being recalled in a clinical session or researcher's study might not be the true memory.

A study on forgetfulness and aging found that the most common reason we forget a memory is because we are not exposed to something associated with the memory, or we do not use the information pertained in the memory enough (Yokota et. al, 2000). This could present a challenge to researchers if they are using music that is of the appropriate time period for the participants, but they have not heard it recently enough to keep the memories tied to the music.

Another possibility of something to be researched is how the elderly respond to auditory tasks. The elderly are said not to be able to respond as well to musical memories because they have lost strength in their auditory cortex, the strength is even lower when the task involves short-term recall (Davis et. al, 2003). This poses an issue for researchers trying to research musical memories, as they would not be able to stimulate the participants. A possibility for overcoming this would be to either use music videos, or videos of performers. The thought here being while the participant cannot hear the music, the visual stimulation might be strongly enough paired with the missing auditory to allow the participant's memory to be recalled.

If this study were to take place the research team would need to be able to control for the fact that several important memories from the participant's life would likely be gone. This research is meant to be done on people in late life and the chances of all important memories being retained is low. Because of this, the researcher may find better success using participants in case studies. This is because the participants can be selected who fit the basic criteria necessary for the study. From there the researchers will need to adapt their methods and

measures to each individual participant and would again have specific details, but not generalizable results. This approach would be best if there was a certain population that the researcher wanted to study, such as veterans or musicians.

An alternative to the case study approach would be to study groups that regularly interact with each other such people who attend a community group for third-agers or a group from the same nursing home. While these participants would not have the same total life experience, they would likely have shared experience gained from years spent together that could then be tested for recall. This method would be beneficial, especially the nursing home, as health information about the participants could be available, and the researchers would know about any major differences between the participants before conducting research. The shared experiences of the participants would also act as a sort of control for the researchers, allowing them to have baseline details of the events being recalled, as well as how the recalled events differ for each person being studied.

Summary

The brain is a complex organ that adapts and changes as we age. All brains start to become impaired as they age, but the level and rate at which this happens varies between people. Sometimes there is a small decay in the brain such as Age Related Cognitive Decline; other times the decay is more severe and ends in Dementia or Alzheimer's.

While there are several aspects of memory processing we do not know, we know the general path memories follow while being stored in the long-term memory. We also know that autobiographical and episodic memories are two types of memories that exist and that these memories often have strong associations with their stimulus, a common stimulus being music.

Music has an impact on the brain of the elderly, regardless of previous musical training the aged brain responds to music, allowing the brain to be more active. Music is also stored in the brain through a process that differs from other stimuli, such as verbal. This allows for musical stimulation to activate memories and brain functions that other stimuli are not able to activate.

Music is also an emotional stimulus, meaning that different musics can induce emotions in their listeners. Whether that emotion is happy (nostalgic), sad (evoked sadness) or traumatic depends on the specific music and if the listener has an association previously formed with the music. The same music might be able to recall an autobiographical memory for the listener, transporting them to the mindset they were in when hearing the music.

Music also differs between the classical and popular genres, with both sides having different aspects that allow the listener to create memories. Popular and classical music are also not mutually exclusive, popular music can use traditionally classical music, and classical music can take idioms and texts from popular music. The cross-over of style could act as a stronger stimulus for memories. The music therapist would then be able to understand all of this and apply the techniques and theories that they are trained in to advance the life of their clients.

Research about the brain and how it is stimulated by music is growing, however there needs to be more done about it. Through the research presented in this paper, as well as the supposed studies, this research can be further conducted. Based on this research a working music therapist would be able to understand how their client’s brain works, as well as how to be a more effective therapist to their client, allowing for greater work to take place in the field.

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Synergy Should Tell the Story in Music Therapy

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If you were to walk up to random people on the street and ask them if they knew what music therapy is or if they know what a music therapist does, you would get a lot of different answers. Many of those answers might sound like “Isn’t it just listening to music? The music therapist probably plays music for people.” Those things do happen in music therapy sessions, but many other things happen as well. Music therapy is a misunderstood profession. People think they know what music therapists do, but the only have a small idea. Music therapists are not like most medical doctors, in the sense that most people know what a doctor does on a daily basis, but most people do not know what a music therapist does on a daily basis. The same comparison can work for an actuary and a lawyer. Most people don’t know that an actuary uses statistics to calculate how much it will cost to insure someone based on their past behaviors, but everyone knows that a lawyer helps people deal with legal matters. The goal for this paper is to explore how purposeful synergy of music therapy techniques, such as Nordoff-Robbins Music Therapy, Neurologic Music Therapy, and The Bonny Method of Guided Imagery, and more research can provide a more solid foundation for the music therapy profession. In order to achieve this, I think that the general public needs to become more aware of what music therapy is, how it works, and the ways in which it can help. The only way for this to happen is for music therapists to take action and tell their side of the story. In order to do this, music therapy needs be to clearly defined, as well as the different types of music therapy, and the ways in which music therapy is helpful. Music therapists need to come up with some inventive ways to make music therapy a household name. Once this happens, it will be easier for music therapists to fight for equal treatment of their profession and demand licensure in all 50 states, something that music therapists are working towards but having a hard time accomplishing within each state. By following a process like this, not only will a synergy of music therapy be created, but a synergy

between music therapy, the general public, doctors, insurance companies, and those who simply do not yet understand music therapy, will be created.

Defining Music Therapy

The very first problem when it comes to creating a foundation for the profession of music therapy is defining exactly what it is. Not the definition given to us by the American Music Therapy Association, but a breakdown of the definition that explains to the general public what music therapy is. The AMTA says that "Music Therapy is the clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program" (AMTA). Let's start from the very beginning. Music therapy is clinical because it pertains to an actual patient being observed and treated, not theoretically treated in a laboratory setting. Music therapy is evidence-based, meaning that it is a type of healthcare that looks at the experiences of the patient, as well as what the patient wants, and does not go straight to traditional methods to solve the patient's problems (i.e. medication). Those traditional methods are then replaced with music that is tailored to each individual client and their situation. This means that the music or methods of creating music that a music therapist may use for someone with PTSD could be completely different than what they might use for a child who has Autism. This happens by building a therapist-client relationship, in hopes that the therapist and client establish a meaningful connection to meet the individualized goals to the benefit of the client. A music therapist goes through schooling, an internship, and the CBMT exam in order to be considered "credentialed". In order for something to be considered music therapy, it must include all of these functions. This means that listening to music in your car on the way home from work, or pulling up that breakup playlist on Spotify when your friend gets dumped by their boyfriend or girlfriend, is not

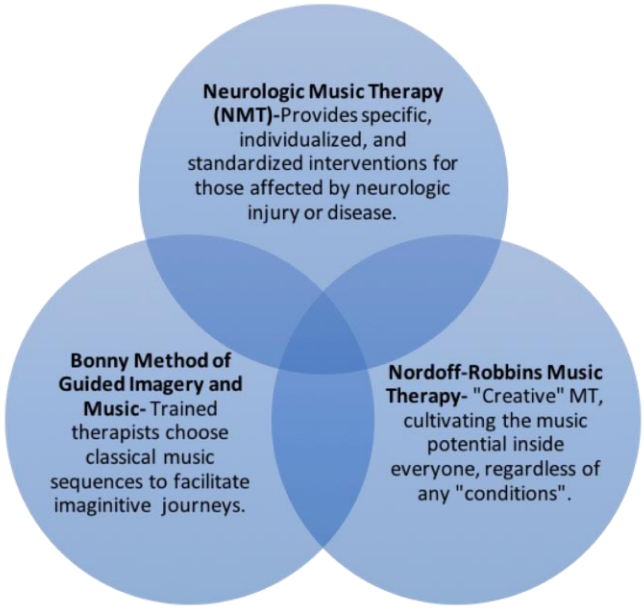
music therapy. While one might consider those situations therapeutic in some way, it is important to know that it is not considered music therapy. Once the general public has a definition that they can understand, synergy between the public and the meaning of music therapy can be created.

Approaches

The three main approaches to music therapy are Nordoff-Robbins Music Therapy, Neurologic Music Therapy, and The Bonny Method of Guided Imagery and Music. Some may argue that one approach is better than the other, but they all have the same goals in mind and use music in some way, shape, or form to get to that goal. Nordoff-Robbins focuses on neurologic rehabilitation. These music therapists encourage clients to create and be involved in listening or making of music, regardless of whatever "condition" or disability they are facing. Nordoff-Robbins music therapists work closely with other medical teams, as well as provide motivation and emotional support to clients and their families (Nordoff-Robbins, 2011). Nordoff- Robbins measures music therapy with outcome measures. These usually consist of scales or checklists that are developed by researchers (Cripps, Tsiris, and Spiro, 2016). Neurologic Music Therapy is specific and individualized for each patient depending on their neurologic injury and/or disease. Neurologic Music Therapy applies music to cognitive, sensory, and motor dysfunctions due to neurologic diseases (Thaut, 2005). Neurologic Music Therapy is measured through outcome measures as well as through fMRIs (Schlaug, Norton, Marchina, Zipse, and Wan, 2010) . The Bonny Method of Guided Imagery and Music (GIM) uses classical music to facilitate imagination and "guide imagery". This facilitates clients mental, emotional, physical, and spiritual sense of well-being. GIM uses music to explore the patient's life issues in hopes to bring out emotion, consciousness about the events, and become more aware of oneself, similar to

psychotherapy (Association for Music and Imagery, 2017). The Bonny Method of Guided Imagery and Music is probably the closest thing to what people think of when they think of music therapy, and this is the issue. Music therapy is much more than sitting around, listening to music, and talking about your problems. Knowing that these types of music therapy can create the same outcome for a patient creates a synergistic feeling between them. The chart below gives a visual of how the three different approaches are different but relate to each other.

Music Therapy: Synergy



Roadblocks in Data

There have been many studies done on the effects of music therapy. Most of the music therapy research has received results from self-reporting. Typically, patients are reporting their own feelings of how music therapy has benefitted them through some sort of scale or self-report measurement. In many ways, this is great because it shows that people are mentally benefitting from music therapy and giving us plenty of qualitative data to look at and understand. On the other hand, receiving this type of qualitative data is not beneficial because some people like to see numbers or quantitative data. A review of 19 studies by Evans (2001) concluded that music

therapy intervention significantly reduced anxiety for hospital patients. The review also showed that research concluded that music produces a small reduction in respiratory rate in hospital patients not undergoing invasive procedures. The same goes for increase in mood of hospital patients. Music therapy may also reduce the need for sedation or analgesia during procedures. Again, the sample sizes of the studies reviewed were not large and need to be replicated or done with larger samples to produce greater quantitative data (Evans, 2001). There is no data that says the general public prefers quantitative over qualitative data, but there are some communities that do. In the scientific world, quantitative measures are more valuable and speak more to scientists and researchers, rather than qualitative data about feelings. Quantitative data proves to the scientific community (which seems to be trusted by more individuals) the legitimacy of music therapy. Insurance companies are not concerned about how their client feels and they most certainly do not want to have to pay out for feeling; they want to see statistics and results. However, as the world is growing and changing, the way people think and feel is becoming more important. Many are seeking professional help when it comes to their mental health. In addition, people are also seeking alternative medicines because they don't like the way being medicated makes them feel. I believe that this greatly affects how people perceive music therapy. In many cases, in order for people to believe that something works, they want statistics, numbers right in front of them saying "Yes, this works," but more and more people are willing to try things that they've heard about through friends or family members. An example that relates to this is when people make big or important purchases. Before making any important purchases, many look for ratings on the product they're interested in buying. They read all of the online reviews. If there are a lot of reviews on the product and the average amount of stars is satisfactory most people probably go ahead and buy the product. However, if there are not many reviews or not enough

stars, they're probably a bit skeptical of the product and decide to wait to purchase it. On the other hand, if your best friend or close family member recommends a product that has worked well for them in the past to you, you might be more inclined to make the purchase without much research beforehand. The general public may read about music therapy or hear about it on the news and think that it is completely ridiculous if there is no proof backing it up. They might read music therapy studies and think "there isn't enough here to tell me that music therapy could work for me," or "there is not enough quantitative data to show that this works", and while I believe in the qualitative data, as an aspiring music therapist, I would really love to have more quantitative data to back up the qualitative data we already have. That being said, quantitative data is only half of the story. Qualitative data has more relevance for palliative care sessions, sessions addressing development, and family support. Showing the public and insurance companies that quantitative and qualitative data work together synergistically to show how music therapy is beneficial is an important step in telling the stories of how music therapy benefits patients.

Specific Benefits

Music therapy has shown that it can be beneficial in many different settings and for many different people in many different settings. Music therapy is beneficial for those dealing with mental health problems, the elderly (specifically those with Alzheimer's), intellectually disabled children and adults, medical/surgical cases, neurological disorders and many more. Music therapists work in schools, geriatric facilities, mental health settings, medical settings, and many have private practices. (AMTA, 2016). This paper will explore just a few examples of how music therapy is beneficial, mostly for hospitalized patients. The reason for this is that originally I was only going to discuss how music therapy benefits hospitalized patients and the staff that serve them. However, after researching the benefits more, I came across a problem; There is not

enough quantitative data or hard evidence available to the general public for me to only discuss this in a 20-page paper. I even contacted music therapists working in other hospitals to see if I could receive any quantitative data. I knew that this might be a fruitless endeavor but I thought it was worth a shot. I emailed the Boston Children's Hospital and received a response from one of their four music therapists. Unfortunately, I did not receive any quantitative data because the data the hospital collects is on patients' medical charts and that information is protected by privacy laws. The music therapist there said that the data he collects, mostly in the cardiology unit, is most often observed heart rate, oxygen saturation, and respiratory rate. Most articles I have read report these findings as their quantitative data if they are not reporting any qualitative data. The most interesting and helpful thing that the music therapist said to me was "Music as a biopsychosocial intervention and a multi-dimensional therapeutic medium has the potentiality to positively impact all of these observable measures" (J. Danna, personal communication, April 11, 2017). I hadn't thought of music therapy in this way before and he was right in many ways. Music therapy is biopsychosocial because it focuses on psychological factors, such as mood, and social factors, such as cultural and familial aspects, as well as the biomedical model. The biomedical model focuses solely on biological and physical factors and excludes psychological, environmental and social influences. The music therapist then told me that they had recently done a department study to see if music and art decreased perceived pain and anxiety for patients but because it was an internal study he could not release any of the information to me. However, that study is a perfect example of how the biopsychosocial model works. The music or art focuses in on the patient's mood and cultural aspects, depending on what type of music they enjoy or art they enjoy making. The amount of perceived pain affects their mood and the amount of pain they are experiencing affects how doctors are able to decide, using the biomedical model,

if the patient is improving. While qualitative data is important, especially in a music therapy focus, ultimately music therapy will have to be proven quantitatively to attain acceptance for licensure. This does not mean that qualitative data should take a seat back, but perhaps music therapists conducting research should apply the biomedical model and other quantitative measures to collect quantitative data in support of music therapy.

The first group of patients we will explore that music therapy benefits is premature infants. In a review of 20 studies on hospitalized premature infants receiving music therapy, many consistencies were found within infants. (van der Heijden et al., 2016). There is not much published research on music therapy interventions with premature infants. In August of 2016, only 9 reviews had been published. One of these trials concluded that music therapy was beneficial and had a significant effect on heart rate, behavioral state, oxygen saturation, sucking/feeding ability and length of stay (Standley et al., 2010). Another study found a significant difference in respiratory rate and oxygen saturation during and after music therapy (Farhat et al., 2010). A study by Garunkstiene et al. (2014) showed a significant decrease in heart rate after recorded music intervention, as well as 2 other studies. Two other studies (Arnon, S., et al. 2006 and Garunkstiene, R., et al, 2014) reported a significant decrease in heart rate after live music intervention (van der Heijden et al., 2016). Several studies showed a significant increase in feeding rate, sucking behavior, oral volume intake, and oral feeds per day. An instrument commonly used in the NICU to help with feeding rates is called the Gato Box. The Gato Box is a drum with a slit in it that produces two tones. Going back and forth between the two tones encourages rhythmic sucking as well as tries to replicate the heartbeat of the infant's mother from inside the womb. There is another instrument commonly used in the NICU called an Ocean Disc. This instrument does exactly what it sounds like it does- it replicates the sound of an ocean.

This relaxes the infant and in doing so, helps with respiratory rate. The Ocean Disc is also intended to replicate the sounds a baby might hear inside the womb. Having a baby in the NICU can cause major anxiety for parents. The use of music therapy in the NICU has shown to decrease maternal and paternal anxiety. Many NICUs have a lullaby that they use for the entire unit. A common lullaby is "You Are My Sunshine." However, when the baby has available parents or caregivers, the parents/caregivers are usually encouraged to choose a specific song that has meaning to them to have sung and sing to the child during music therapy. This creates a bond and increases attachment between the parents/caregivers and babies, plus it is a technique they can take home with them and use to soothe the baby (Beer, L. & Palmieri, S., 2016).

Another group of people that benefit from music therapy are leukemia and cancer patients. A study by L. Uggla et al. (2016), focuses on children receiving haematopoietic stem cell transplantation (HSCT), a treatment for leukaemias. Children who go through this treatment are at an increased risk for post-traumatic stress disorder (PTSD). The study found that providing music therapy to these patients significantly lowered the heart rate of children undergoing HSCT for four to eight hours, potentially lowering their risk for PTSD. Another group of cancer patients that music therapy benefits are breast cancer patients. A study by Palmer et al. (2015) focused on the effect of live and recorded perioperative music therapy on anesthesia amount, anxiety levels, recovery time, and patient satisfaction in women undergoing surgery for breast cancer. The results of the study showed that although the amount of anesthesia did not decrease significantly, groups receiving both live and recorded music therapy had lower anxiety scores pre-surgery than the control group. The group that received live music therapy before surgery had a shorter recovery time than the recorded music groups and control group. The problem with both of these studies is that there were not a lot of participants in the studies and even in the

Palmer et al. study, they mention that quantitative research in the future would help to solidify the evidence supporting music therapy. This quantitative research is important for insurance companies to see in order to increase the use of music therapists within hospitals.

Not only does music therapy help patients or clients receiving the therapy, it also helps hospital staff. In one study, medical staff who work in oncology were asked to give feedback on music therapists that work with the staff. The staff, mostly nurses, said that they rarely thought that the music therapist was intrusive. In fact, they felt that the music therapist was helpful in providing new ways for the staff to look at emotions and self-awareness, in turn, improving the individual staff members and the oncological teams life in their work environment. The staff felt that when the patient was able to pick music for themselves, it helped them to better understand the patient. Others said that the music therapy provided was helpful in caring for another part of the patient and staff well-being that medicine simply does not cover. Another staff member said that they had observed moments during the music therapy session that brought on such strong emotion to the patient that they were able to discuss and share their feelings better than ever before (O'Callaghan, 2009). Once again, this information is all about feelings, not statistics or quantitative data.

In addition to music therapy being beneficial for patients and staff members, it is also cost-effective among different populations. A study on cost-effectiveness by Walworth focuses on pediatric medicine and the ways in which music therapy lowers the cost and time of invasive and noninvasive procedures done on hospitalized children with acute or chronic illnesses. In Walworth, D.'s (2005) study, when patients interacted with music therapists it was through preferred live music, or music that the patient enjoyed and wanted to hear. Results showed that patients who listened to their preferred live music had lower anxiety levels overall. Children who

are 6 years or younger are usually more fearful and have more anxiety about procedures, therefore sedation is used on them more often, sometimes even for noninvasive procedures. This puts young patients at a higher risk and is tricky for physicians deciding what type and how much sedation to provide. Decreasing the need for or completely eliminating sedation in pediatric patients who are receiving noninvasive procedures is not only cost-effective but it also benefits patients and their families. Less sedation means less concern for patients well-being as well as less anxiety for the patient, their family, and even their nurses. Furthermore, reduced distress about the procedure avoids medical treatment for long-term anxiety. Walworth's study focused specifically on pediatric patients receiving echocardiograms (ECGs), computerized tomography scans (CT), and a smaller sample of noninvasive and invasive procedures. The goal of the music therapist for the ECG was to provide distraction from what was happening to the patient in order to reduce anxiety. Results showed a 100% success rate in eliminating sedation for patients receiving an ECG. The goal of the music therapist in the CT scans was to induce sleep, yielding a success rate of 80.7%. The success rate for all other procedures was 94.1%. These procedures included IVs, X-rays, ventilator extubation, and electroencephalograms (EEGs). Without music therapy, a nurse spends on average 2 hours on an ECG which costs the patients $55.00. The sonographer spends 1 hour on the ECG, costing the patient $23.00. The cost of sedation is $9.45, making the average cost of an ECG $87.45. With a music therapist, a nurse is no longer needed and the sonographer spends only 20 minutes on the ECG, costing the patient $7.66. The music therapist spends the same amount of time and costs the patient $5.55. Sedation medication is no longer needed, making the total cost of an ECG with a music therapist only $13.21, saving the patient $74.24. In Walworth's study, using a music therapist while performing 92 ECGs, $6,830.00 was saved, as well as 184 hours saved for nurses to complete other tasks,

and 62 hours saved for sonographers. This shows us that the use of live music therapy during procedures saves money and time.

Music therapy benefits many different types of people and is cost-effective. Establishing these facts should be enough to convince the general public, state legislators, and insurance companies that music therapists should be given the opportunity to have licensure, and be covered under insurance plans. The adaptability, utility, and cost-effectiveness, combined with more quantitative data should support the reasons why music therapy licensure is necessary in all 50 states.

What People Are Thinking

The problem is, people don't know any of these things about music therapy. Some people think music therapists just play music for people off of a playlist and ask them about their feelings. This is not what music therapists do. I believe this is partially because there is not much media attention on music therapy. There are some YouTube videos of people listening to music on iPods, but this is not music therapy. A YouTube video that is often brought up to me is from a documentary called "Alive Inside" (2014), that is about people who are living with Alzheimer's disease receiving iPods and finally reacting to the things and people around them. While this is fascinating and a part of music therapy, it is not considered music therapy because the music is not being administered to the patient by the music therapist. In some ways, this is actually very dangerous. The wrong music could trigger a bad memory, not only for people with Alzheimer's but for people suffering from PTSD as well. Unfortunately, this is some of the most popular type of media that concerns music therapy and is available to the general public. If every music therapist used their social media accounts, whether it be Facebook, Twitter, or Instagram, word about music therapy would be more accessible to the public. This is the first step for music

therapists getting the word out and telling the story of how much therapy is really happening in the lives of many people every single day.

Who is Helping Tell the Story

The American Music Therapy Association tries to help tell music therapy's story by picking artists to be spokespeople for the association. The most recent spokesperson they have announced is Renee Fleming. Some others have been Ben Folds, Robin Spielberg, Maureen McGovern, Stanley Jordan, Craig Chaquico, Russ Freeman, David Lanz, Pat Martino, and Diane Ponzio. While Renee Fleming is an accomplished vocalist, and people within the music community know her name, young adults probably wouldn't know her name or know that she is a professional opera singer. Although Ms. Fleming is a highly acclaimed singer and has accomplished many achievements in her life, such as receiving the National Medal of Arts in 2013, she is not an expert in music therapy. After researching Ms. Fleming, I found out that she is involved in two charities. The first is Sing for Hope, an organization in New York that provides music lessons to kids free of charge because they believe that the arts should not be only for the privileged. The organization also has a health care outreach program in which volunteers provide music for those in hospitals, nursing homes, hospice and other treatment centers. Although this brings joy to patients and residents in those places, it is not considered music therapy because it is only providing a performance or entertainment. The other charity Renee is involved in is the Polyphony Foundation which is an Israel-based organization that brings Arab and Jewish children together in Israel through music and the arts. Once again, although this is a great idea, it is not considered music therapy or related to music therapy in any type of setting you might see a music therapist. These charities are also not related to any medical or mental health practices that may coincide with music therapy. This makes having

Renee as a spokesperson a bit unhelpful to the AMTA. With Renee Fleming, they are only reaching musicians and older adults who may know her name. It is important to have a recognizable people representing the music therapy community. However, I think that it would be more beneficial to have artists or celebrities that are in the public eye more often representing the AMTA. Specifically, celebrities who have a wide enough audience that they also reach younger citizens. A celebrity who comes to my mind is Demi Lovato. She reaches a wide age range for her audience and is an advocate for mental health and eating disorders, both of which can benefit from music therapy. Having a spokesperson who can reach more people and has already spoken out about common problems that can benefit from music therapy would be most beneficial. Sheryl Crow would be another good candidate to be a spokesperson for AMTA. She is involved in many other health-related charities including the Crossroads Centre, a charity created by Eric Clapton that helps people and their families when they are battling alcohol, drug addiction, or other compulsive behaviors. She is also involved with the Sarah McLachlan School of Music, a free school of music in Vancouver that allows inner-city children to receive music instruction. Perhaps combining or working together with these organizations to provide music therapy and further spread the word could be a possibility if Sheryl Crow were to ever become a spokesperson or advocate for the AMTA.

Licensure for Music Therapy

Licensure in music therapy is a controversial topic. Music therapists go through extensive training, an internship, and an examination to become board certified music therapists (MT-BC). Becoming MT-BC means that music therapists are credentialed and protected. This also ensures public consumption of music therapy, showing that the music therapist is up to national standards. This certification, however, does not mean that a music therapist is licensed like other

medical professionals such as occupational therapists or physical therapists. In fact, music therapists are currently only required to be licensed in 10 out of 50 states. The states that require licensure are Connecticut, Georgia, New York State, Nevada, North Dakota, Oklahoma, Oregon, Rhode Island, Utah, and Wisconsin. Licensure is important for many professions but it is especially important for music therapists who wish to protect the public from untrained music therapists. Just as you wouldn't go to an untrained medical doctor, you would not want to go to an untrained music therapist. As I mentioned earlier, being given the wrong kind of music in the wrong state of mind can cause psychological damage. A reason people may not be going to music therapists is because they see that they are not licensed by the state. Citizens put their trust in the state and the people who are licensed and deemed safe by the state to treat them. Licensing music therapists would increase public awareness on a state by state level. Becoming licensed only makes sense for music therapists in being able to expand their practice opportunities as well. Currently, many music therapists are working in 2-3 different places each week for various reasons. I had the opportunity to shadow a music therapist for a day last year and learned about the different places she visits in her workweek. On the day I shadowed her she was working at a center for adults with intellectual and developmental disabilities. The first building we arrived at was a day center for the individuals participating and there we had 3 group sessions with 8-12 people participating. Then we went down the street to another building where the individuals actually lived and had 1 more session with them. After we were done I got to talk to the music therapist about what her daily schedule was like and found out that she went to different places every day. She went to different elementary and middle schools throughout the week, in addition to the center for adults with intellectual and developmental disabilities. The reason for this was that she works for a music company that outsources music therapists to different places. In the

American Music Therapy Association Survey and Workforce Analysis from 2016, the work settings served by music therapists was split up into 6 different categories: 12% in Children's Facilities/Schools, 15% in Geriatric Facilities, 13% in Mental Health Settings, 16% in Medical Settings, 9% Self Employed & Private Practice, and 35% for All Others. There is no specificity for where the other 35% of music therapists are working, however, I can guess that it is in multiple places throughout the week, such as the music therapist I shadowed. If only 16% of music therapists are working in medical settings, it is no wonder that there is not much available information on music therapy within hospital settings, simply because most music therapists aren't working in hospitals. If music therapists aren't working in hospitals, data isn't being collected and therefore it is not getting published and out to the public. Without more than 16% of music therapists working within the health care system, how will they collect meaningful data? Becoming licensed in all 50 states will make music therapy a more legitimate practice for insurance companies to notice and provide reimbursement for.

History Behind Licensure

At the 2016 music therapy conference, I attended a session on licensure in music therapy called, Music Therapy Licensure: Where It's At by Bryan J. Muller Ph.D., MT-BC. He gave us a bit of background on the beginnings of licensure. Physicians were the first health professionals to be regulated in the U.S. The first law came into effect in 1639 and its purpose was to prevent physicians in Virginia from charging high fees for their services. The next two statues happened in Massachusetts in 1649 and in 1665 in New York because the physicians there wanted recognition for their practices. Within the colonies, the physicians were in competition with each other as well as those practicing alternative medicines, such as homeopaths, osteopaths, and

botanists. Becoming licensed for these physicians meant that they were being protected against those practicing alternative medicine (Muller, 2016).

Samuel Thomson was a target for the physicians trying to protect themselves. Thomson was a farmer and self-educated botanist. He spoke against the practice of physicians who were making sure they were getting licensed in order to give alternative medicine a bad name. Thomson used his knowledge of herbs and plants to cure people who were given up on by the licensed physicians. Typically, these patients were people who had been given up on by regular physicians because they were going to either face amputation or death and were desperately looking for other alternatives. In 1809, Thomson was indicted, jailed, and tried for murder after the death of one of his patients. A licensed physician, who was supported by the local medical society, was the one who acted on Thomson's indictment. Before this trial happened, Thomson was only known locally, but after his botanical remedies and his feud with the licensed physicians became known throughout the nation, a grassroots campaign against the licensed medical elite began. This led to a repeal of medical licensure statutes. Since then, many health professionals, once ostracized by the medical elite, have since made vital contributions to modern medicine. Among the groups not allowed into the initial fold were those laying the foundation for modern dentistry, optometry, podiatry, and chiropractic (Caldwell, 1923), not to mention all those whose approach to healing embraced more than the body, many of whom remain unrecognized to this day. Music therapists are also now a part of this group. Obviously, since Thomson's trial and the repeal of the medical licensure statutes, licensure has been brought back for medical professionals and many other professions such as psychologists, social workers, occupational therapists, and massage therapists.

Music Therapists Licensure

Music therapists are already doing something about licensure. It's important to understand that for licensure to become available to music therapists in every state, the music therapists need to go straight to the source by going to the state legislature and asking them what the best way is for them to get recognition. Muller (2016) divides state recognition into two categories: recognition and regulation.

> "Examples of recognition are: having the state officially recognize the profession; be listed as an eligible service under a state Medicaid waiver program; creating exemption language to address instances where music therapy services are prohibited under the licensure statute of another profession; or amending other regulatory language that limits access to music therapy services either by exclusion or inaccuracy. Examples of regulation are certification, registration and two types of licensure: title and practice. Title licenses only regulate the use of a title, Licensed Professional Counselor. Practice licenses regulate the use of a practice: music therapy and the use of a title: licensed music therapist" (B. Muller, personal communication, August 18, 2017).

An important note from Muller's presentation was that music therapists should not mention to state legislature that being licensed will create practice opportunities, secure reimbursement, and protect against competition.

The Current Situation

In Wisconsin, music therapists have state registration. In Utah, they have state certification. These are essentially the same thing. You apply for the registration or certification voluntarily. The state checks the music therapist's qualifications and registers the music therapist

as registered or state certified. In Connecticut, music therapists have true title protection and only those who apply can refer to themselves as a music therapist. The title protection prohibits those who are not certified music therapists from using (1) the title “music therapist” or “certified music therapist” or (2) any title, words, letters, abbreviations, or insignia indicating or implying that he or she is a certified music therapist (Ch. 383f, Connecticut, 2016). The last six states, Georgia, New York State, Nevada, North Dakota, Oklahoma, Oregon and Rhode Island, are regulated. In these states, only those with a license can practice music therapy or refer to themselves as a “licensed music therapist”. All of this means that music therapists who work in these states are protected. However, once they are licensed, they cannot practice outside of the scope of practice defined by the state. Specifically, they cannot go against the scope of other practices. For example, Oklahoma law states that “Initiation of music therapy services to individuals with medically related conditions shall be based on a referral from any qualified health care professional who, within the scope of his or her professional license, is authorized to refer for health care services.” But, “Prevention, wellness, education, adaptive, related and specialized instructional support and services shall not require a referral” (Music Therapy Practice Act Title 59 O.S. § 889 – 889.12, 2012). If a music therapist goes over another licensed profession, such as a medical professional, there could be major consequences. On the other hand, it seems that licensed health care professionals are exempted from music therapy laws. Georgia’s law states “After January 1, 2014, no person without a license as a music therapist shall use the title 'music therapist' or similar title, or perform the duties of a music therapist, provided that this chapter shall not prohibit any practice of music therapy that is an integral part of a 96 program of study for students enrolled in an accredited music therapy program. Nothing in this Code section shall be construed as preventing or restricting the practice, services, or

activities of any profession including occupational therapists, speech-language pathologists, physical therapists, or audiologists that may also use music in the scope of their practice" (Georgia Senate Bill 414, 2016). Essentially, this is saying that other licensed professions can use music within their therapies without consulting a licensed professional music therapist. This goes back to music being used in a harmful way by untrained professionals.

All states require a minimum of a bachelor's degree. This is strange because a master's degree is the usual minimum education requirement for licensure as a health professional. Music therapy is also the only creative arts therapy that has bachelor level entry. This could be another deciding factor for state legislation deciding whether or not to allow music therapists licensure. However, if music therapists are bumped up to master's degree entry level, like the others, they may have a better chance. All states also require that music therapists be CBMT certified and put in all required hours.

Synergize

In an article called "Music Therapy Practice Status and Trends Worldwide: An International Survey Study" by Kern and Tague (2017), 2,495 music therapists answered a 30-item online questionnaire that was designed and translated into seven different languages. The results concluded that

> "Professional music therapists worldwide are well-educated, mature professionals with adequate work experience, who are confident in providing high-quality services primarily in mental health, school, and geriatric settings. Due to ongoing challenges related to recognition and government regulation of the field as an evidence-based and well-funded healthcare profession, most individuals work part-time music therapy jobs and feel

> underpaid. Yet, many music therapists have a positive outlook on the field's future" (p. 1).

This shows that not only the music therapists in the U.S. feel strongly about the benefits of music therapy and that licensure or recognition of some sort needs to be obtained by professionals. The research article by Kern and Tague (2017) also states "Continued advocacy, research efforts, and advanced training as well as global perspective of the field will be crucial for drawing attention to the field a valid healthcare profession in all regions of the world" (pp. 29-30). If music therapists strive for synergy between furthering the understanding and thought of music therapy and collecting more data from qualitative and quantitative research, they will be able to further music therapy in the U.S. and possibly throughout the world. Once that synergy has been set, I believe it will be easier for music therapists to receive recognition throughout the world and licensure in the U.S.

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Music and Its Effect on Stress

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Music and Its Effect on Stress

According to the American Institute of Stress (2014), 77% of adults report regularly feeling stressed. Continuing, there is constant information on the radio or television news channel stating that students are reporting that they are feeling more stressed out than ever before. The American College Health Association (2015) found that about 30% of students reported that their stress levels affected their academic and personal lives; furthermore, more than 50% of students reported that they experienced an overwhelming or above average amount of stress within the last year. Daily stress can be caused and magnified by multiple personal and environmental factors. These could easily include mental health diagnoses, financial problems, or relationship problems. Though these issues can be quite debilitating at times, research has shown that there are effective coping mechanisms in order to handle our stress. Bland et al. (2010) conducted a study in which they compiled a list of 10 coping strategies that typical-functioning college students used to deal with stress. The study found that the number one coping strategy for participants was listening to music (Bland et al., 2010). Music is a convenient coping mechanism to come by due to the overwhelming majority of the population constantly being on their phones every day. So what would be the downsides of using music as a coping mechanism since it is so easily accessible? If listening to music can help relieve some stress, shouldn't this idea be researched more? This Senior Inquiry project delves into the already present research on stress, its effect on the body, and what type of role music can play in help relieving this stress. Additionally, there is a study and its results that will be extensively discussed.

Stress can be defined as external or internal stimuli that causes an impact on physiological and psychological aspects of our everyday life. External stimuli could be financial

burdens or an upcoming Psychology midterm, and internal stimuli could be the constant drive for perfection or the need to do well on every assignment. There are two main types of stress: acute and chronic. Acute could be considered any short term stress that occurs on a semi-regular basis, but this stress is for such a small amount of time that causes no harm to an individual's physical and psychological well-being. Stress can act as natural motivator (APA, 2017). For example, one may feel stressed because there are an excess of items on your to-do list. By slowly checking things off of one's to-do list, it relieves your stress levels but also motivates you in a positive way to accomplish some of your tasks. Though there are times where stress can be viewed as a positive psychological factor, often times stress becomes chronic occurring quite regularly, and it is severe enough that it has an extremely negative impact on daily life (APA, 2017).

Physiologically, the main mechanism that controls our body's response to stress is the nervous system. There are two components to this system, somatic and automatic, and automatic is the system that directly relates to our body's stress response. This part of the nervous system is also divided into two parts: sympathetic and parasympathetic. The sympathetic nervous system (SNS) is the location of our body's response to stress, called 'fight or flight'. 'Fight or flight' is typically defined as our body's reaction to a stressful stimuli in which we either avoid the stimuli or we fight/face it(Mash & Wolfe, 2016). Once this stimuli appears, our SNS begins our body's stress response by signaling the hypothalamus–pituitary-adrenal (HPA) axis (APA, 2017). Within this axis, the hypothalamus signals the pituitary and adrenal glands to releases epinephrine and cortisol (stress hormones); additionally, depending of the severity of stress, adrenaline may also be released into the body (APA, 2017; Mash & Wolfe, 2016). Due to the excretion of these hormones, the liver begins to produce a high level of glucose which will provide enough energy for the body to engage in its 'fight or flight' defense mechanism. After

the release of stress hormones, ‘fight or flight’ manifests itself more visibly throughout the body through blood vessels beginning to direct blood to larger muscles, and the heart dilates so that blood pressure is heightened (APA, 2017). An individual undergoing ‘fight or flight’ may also experience feeling sick to the stomach, dry mouth, tiredness, or lack of concentration (Mash & Wolfe, 2016).

Though our body’s defense mechanism is an extremely useful tool, prolonged exposure to stress can be extremely detrimental to our physical and mental health. If an individual is experiencing chronic stress, it can actually lead to early aging. In one study, researchers were interested in examining the effects of stress in middle aged caregiver’s skin aging. In an experimental design, participants were split into two conditions: participants with ill children and those with healthy children. Though the group with ill children experienced more stress, overall, the researchers found that prolonged stress lead to specific indications of a decrease in skin’s durability, which translates into an increase in the onset of our skin’s aging (Epel, et al., 2004). Additionally, there are other negative impacts on the body that can be caused from prolonged stress exposure. When our bodies are stressed, our muscles become active and tense. If stress is not relieved, the muscles then undergo a constant state of being tense, which can lead to chronic pain conditions. Auvinen et al. (2017) were interested in examining the effects of psychological distress (stress) and the prevalence of long term musculoskeletal pain in adolescents. In this correlational study, participants were given questionnaires over the span of two years that asked them to rate their levels of anxiety, psychological distress, musculoskeletal pains, duration of these pains and levels of physical activity. The researchers found that there was a strong positive correlation between psychological distress and pain, especially chronic pain (Auvinen et al., 2017). It seems clear that stress can magnify biological issues that many individuals face every

day; however, chronic stress can also lead to much more serious negative biological and psychological effects.

Though the external effects of prolonged exposure to stress are extremely detrimental to one's health, the internal effects of prolonged stress on our bodies is even greater. Looking at a larger aspect of our internal mechanisms, our immune system is the primary defender against disease. If our immune system is not working properly, there is greater risk of becoming sick. Thus it is noteworthy to establish the effects that chronic stress has on our immune system. For example, chronic stress can lead to a higher risk of developing a cold, and in medical students, it was found that chronic stress can higher this population's risk for developing mononucleosis (McEwen, 2003). In addition, chronic stress can cause immense harm to our cardiovascular system. When discussing the cardiovascular system in regards to stress, it was already established that this system's response to a stress stimuli is increased heart rate and blood flow to the rest of the body. If the body is unable to return to 'baseline' then heart rate could continue to stay elevated, which puts these individuals at a higher risk for developing a related heart disorder (Shubert, Lambertz, Nelesen, Bardwell, Choi, & Dimsdale, 2009). Finally, research has shown that chronic stress also negatively affects both male and female reproductive systems. Testosterone levels is a general indicator of sperm count and fertility rates in men. Unfortunately, studies have found that stress greatly reduces the amount of testosterone that men produce (McGrady, 1984). The reproductive system of females is slightly more complicated than their male counterparts. Female's reproductive systems are controlled by the HPO (hypothalamus-pituitary-ovarian) axis. This axis controls a chain reaction that mediates the release of proper hormones (i.e. progesterone) into a female's ovaries. Additionally, there is a hormone contained within the tissue of the ovaries, uterus, and placenta, the Corticotropin-

releasing hormone (CRH). This hormone plays a key role in helping regulate a woman's reproductive system as well. When the HPA-axis is activated in the ‘fight or flight’ response, the HPO-axis’s flow of hormones to a women’s ovaries is halted. If a woman suffers from chronic stress, it is likely that her reproductive hormones will suffer thus causing fertility issues. Moreover, due to the extra release of CRH due to chronic stress, women can suffer from early ovarian failure, premature labor, and preeclampsia (Kalantaridou, Makrigannkis, Zoumakis, & Chrousos, 2004). It is quite obvious that chronic stress can cause severe impairment within an individual’s body. Unfortunately, this type of stress can cause even more damage within an individual’s physical well-being in regards to memory and movement.

Though debilitating neurodegenerative diseases are fairly rare, they are still noteworthy, especially due to the fact that chronic stress can serve as a risk factor for these diseases. Alzheimer’s disease is typically seen in elderly individuals, and is one of the leading factors in developing dementia. Chronic stress causes severe impairment upon the HPA-axis, which in turn can cause early aging. This early aging can then have an adverse effect on glucocorticoid receptors (GCR) which is a part of the neural anatomy of the brain that is closely related to Alzheimer’s disease and other associated diseases. Thus if there is a dysregulation of the HPA-axis and the glucocorticoid receptors, it can lead an individual to have an increased risk of developing Alzheimer’s disease (Machado et al., 2014). An additional neurodegenerative disease that affects about 1% of the population is Parkinson’s disease. In many individuals, this disease can be portrayed as “slow movements, tremor, stiffness and postural instability” (Sugama, Sekiyama, Kodama, Takamatsu, Takenouchi, Hasimoto, Bruno, & Kakinuma, 2016, p. 39). The effects of chronic stress on an individual’s HPA-axis and GCRs can also increase their risk for developing Parkinson’s disease. There are similar brain functions involved in both

Alzheimer's disease and Parkinson's disease; however, there is also a role in dysregulation of cortisol and dopamine levels, both hormones that are associated with 'fight or flight', that can cause an increase in risk for developing Parkinson's disease as individuals age (Hemmerle, Herman, & Seroogy, 2012). All in all, it is clear that chronic stress has an extremely negative effect on our bodies; however, chronic stress can also negatively impact our psychological well-being as well.

Understanding and researching the negative effects that stress has on individuals psychologically is important. Marin et al. (2011) discuss the extant in which chronic stress can negatively impact our psychological health. There are indications that due to the high and constant levels of stress that is accompanied by many jobs that this can lead to high burnout rates and risk for developing depression. This connection derives from the notion that due to the body's constant heightened state of 'fight or flight' it can lead adults to be fatigued and lose some keen cognitive abilities. If an individual experiences a traumatic event and feels chronic levels of stress after the event, this could be a risk factor for developing PTSD (Marin et al, 2011). While these diagnoses are treatable, they can still have lifelong impacts. In regards to depression, though recovery is possible, individuals diagnosed with this disorder tend to have at least 1-2 relapses over their lifespan. Furthermore, typically PTSD is a disorder that constantly affects individuals because something as little as a door slamming could set off the recurring traumatic memory (Mash & Wolfe, 2016). It is clear that stress can adversely impact an individual's mental and physical well-being, no matter the age.

While researching the negative effects of chronic stress on older adults is highly integral, examining how this type of stress effects other population is also noteworthy. Alzheimer's and Parkinson's diseases are two typical degenerative diseases that affect older adults; as well as, the

studies that examine the cardiovascular, skin, and reproductive systems also use an older populations for their studies. Thus, up to this point in the paper, no other population has really been discussed. Being a college student could be considered an extremely stressful portion of one's life. The American College Health Association recently completed a mass data collection through a survey completed by 20,840 college students that examined "students' habits, behaviors, and perceptions on the most prevalent health topics" (ACHA, 2015, pg. 2). According to these researchers, 30% of college student's reported that within the past 12 months they had experienced academic impairment due to stress. Student's also reported experiencing academic impairment due to drug use, eating disorder/problems, anxiety, depression, etc. Stress is easily a risk factor in many of these issues, especially mental health disorders, or chronic stress can be a major symptom of many of these issues as well. Continuing, the report found that 90.8% of respondents stated that overall they felt an average level of stress or more within the past 12 months, and of these 90.8%, 53.5% felt an above average or an enormous about of stress (ACHA, 2015). Other studies have researched a similar concept and have found supporting statistics in regards to college students feeling chronic stress (Shatkin, Diamond, Zhao, DiMeglio, Chodazek, & Bruzzese, 2016). Other researchers have examined the effects of chronic stress and college student's mental and physical health.

Because of the media, it is becoming more and more apparent of the growing prevalence of mental health disorders in college students today. In examining the ACHA's (2015) survey again, 14.5% of students reported being diagnosed with a mental health disorder. This number does not account for the percentage of college student undiagnosed with a psychological disorder, which could be caused by their high stress levels. In one study, researchers examined college student's mental health through self-administered questionnaires. The study was able to

conclude that 47.1% of respondent experienced moderate or severe symptoms of anxiety, and 27.1% experienced moderate or severe symptoms of depression (Bayram & Bilgel, 2008). Though this study did not examine the correlation between chronic stress and depression and anxiety, chronic stress is a risk factor for developing both of these mental health disorder so one can infer that chronic stress played a role in these college students developing their depression and anxiety symptoms. Other research reports that because of students chronic stress they experience negative behavioral and lifestyle changes, sleep problems, and have an increased risk for developing physical ailments (Shatkin et al., 2016). With all of the data presented and collected, the outcome for college students may seem quite bleak, especially given the risk for developing lifelong illness, so we are left with the question of, what can be done? Rightfully, many clinicians have examined resilience factors and coping mechanism aimed at reducing the negative effects of chronic stress.

Many students would most likely agree that in order to stay sane they must take some type of mental break throughout their homework or study period. Whether this break is meditation, listening to music, exercising, or internet scrolling, these are all things that are helpful in combating the negative impact of stress on one's physical and psychological well-being. Clinicians examined college student's cognitive coping strategies and levels of stress. It was found that accommodation, or accepting the stressor for what it is, and approach, facing the stressor one step at a time, were to two most common forms of cognitive coping mechanisms (Brougham, Zail, Mendoza, & Miller, 2009). Using this type of information is useful in understanding how college students can self-regulate their chronic stress through their cognitive abilities. In regards to external avenues, other common coping strategies include discussing with close friends, exercising, and leisure activities (Pierceall & Keim, 2007). Though these specific

categories under ‘leisure activities’ were not specifically denoted, it could be assumed that activities like reading or actively listening to music could fall under this category.

Music has been around since the ancient Greeks and has always been well-revered within society. It has not been until recently that individuals have begun to research and practice with music as a therapeutic treatment. It is noteworthy to state now that the study discussed later in this paper is not an attempt or research for the validity and use of music therapy; however, the evidence for the use of music as stress relief is heavily influenced and aided by the use of music therapy research. With the current literature, there is deep and substantial support the use of music as a way to relieve stress (Darnley-Smith & Patey, 2003). As stated prior in the Bland et al. (2012) study, the top rated coping mechanism for college student’s stress was listening to music. Further support is seen within research conducted by Goethem & Sloboda (2011) in which the researchers examined affects, or moods, that are affected by active listening to music. Between two studies the researchers conducted, they concluded that the highest rated use of music was for relaxation, and participants also reported the music positively affected how excited, calm, and less tense they felt (Goethem & Sloboda, 2011). From this evidence, one can gather that music has some type of positive effect on a person’s cognitive abilities which would allow them to feel less stress. Those experiencing chronic stress have also reported experiencing lower levels of cortisol, blood pressure, heart rate, and pain when exposed to music (Fratianne, Prensner, Huston, Super, Yowler, & Standley, 2001; Leardi, Pietroletti, Angeloni, Necozione, Ranalletta, & Gusto, 2007; Smolen, Topp, & Singer, 2002). It is clear that music has a profound effect on a person’s mental and physical well-being while under stress, and understanding how and why music affect’s our bodies the way it does is extremely noteworthy as well.

At times, music can be an extremely subjective and mysterious area to study. For example take a typical pop tune on the radio today, and ask someone how they feel about the song. To you it might be a great musical composition, but to someone else it may be awful. So when it comes to distinguishing what music is 'good' and 'bad', it can be extremely sticky for any individual to do so. Additionally, it is not until recently where society has had the technological ability to understand how music affects certain parts of our bodies, especially the brain. Though there is little research targets exactly how music impacts the brain, the body of research that is published do have promising results. Weinberger (2004) examined what areas of the brain are affected when music is playing and found that there was increased activity within the temporal cortex, which is the auditory area of the brain. Furthermore, the researcher noted that previous clinicians have found that musician's brains are different from non-musicians' brains. Musician's brains have a more active left-hemisphere, increased motor coordination and larger areas of the brain altogether (Weinberger, 2004). Why exactly this occurs within musician's brains compared to non-musician's brains is still yet to be understood. Stanford conducted a study in which they found that music activates regions of the brain that deal "with paying attention, making predictions and updating (an) event in memory" (Baker, 2007). This research indicates that music has some type of positive effect on the brain. There is something to be said about the melodic and rhythmic content of music; however, there is little researching pinning down how exactly these musical ideas affect the brain. Continuing, one of the main ways the music affects individuals is through their mood, and since mood is a psychological process focused in the brain, this is a another clear way the music. For some individuals, music can act as trigger for positive memories or act some way to improve someone's mood; however, again, what mechanisms in the brain mood sets off is yet to be fully understood. Finally, in their book,

Darnley-Smith and Patey (2003) make the argument that, from the time that we are born, music is something that is innately human. So when individuals have such a profound experiences due to music and its use as therapy that it is due to the fact that music taps something innate within humans. For example, when infants begin to babble, it could be said that it is sing-song like, and parents can mimic the sounds back to the infants; thus, even from our youngest utterances, humans can make music by altering pitch (Darnley-Smith & Patey, 2003). Taking all of this research and formulating it together, one can infer that music impacts us on some type of innate level and affects our brain and body in a clear way; however, the mechanism found within music responsible for our body's response to it still needs to be researched further. Regardless of this point, music has been shown to greatly reduce symptomology of chronic related stress disorders discussed earlier in this paper.

One of the disorders previously discussed was Alzheimer's disease which primarily affects a person's memory. A symptom that can commonly accompany Alzheimer's disease is agitation. This symptom is typically "defined as the inappropriate verbal, vocal, or motor activity that is not explained by needs or confusion of the individual…" (Gerdner, 2000, p. 51). Music therapy has been used to significantly decrease this symptom; as well as, there were positive emotional responses elicited from the therapy (Gerdner, 2000). Music therapy can also be a useful tool in treating depression. Hanser and Thompson (1994) demonstrated the effectiveness of music therapy with individuals diagnosed with depression compared to a waitlist control. Overall, they concluded that participants reported a reduction in symptoms due to the music therapy and continued to implement techniques taught in therapy at home throughout the next nine months (Hanser & Thompson 1994). Regardless if the disorder's symptoms manifest physically or psychologically, music therapy has been shown to reduce symptoms over the

course of treatment. Music, without its use in therapy, has also been shown to reduce the negative effects of chronic stress in many college students.

While there are plenty of effective tools for chronic stress management, music is one of the most accessible and most used tool for stress management in college students (Bland et al., 2010). A study was conducted on college aged females that examined the effects of music on naturally occurring stress. The participants were given music to listen to at various points of the day during the middle of their university's semester, and before and after they were asked to rate their stress levels on a 5-point Likert Scale. The researchers found that overall, when music was used for 'relaxing', it was the best reducer of stress (Linnemann et al., 2015). This study demonstrates the common belief that music is used as a relaxing mechanism, and it also suggests the effectiveness of music used as chronic stress relief without its use in a therapy setting. Researchers have also examined the effects of music on induced stress in college students and found that music had a significant effect on reducing the induced stress effects on the participants (Jiang, Rickson, & Jiang, 2016). Using the basis of Linnemann et al. (2015) and Jiang, Rickson, & Jiang (2016)'s studies, the purpose of this study is to examine the effects of music on induced stress with the hypothesis being that music will have a significant impact on reducing the effects of stress.

Methods

Participants

Participants (N=28) were found through the Psychology department's SONA website. This website is home to the list of current psychological studies occurring at Augustana College. As an incentive, class credit for Intro Psychology was given to students that completed the study. The participant's ages ranged between 18 and 22 years old, and there were double the amount of

females compared to males (female N=19; male N=9). There was no exclusion criteria for the study, and a written consent form was given out to the participants prior to the study being conducted.

The State-Trait Anxiety Inventory

The State-Trait Anxiety Inventory was discovered by Spielberger et al in 1983. Most of the research conducted with this inventory is used to distinguish among types of anxiety and depressive indicators and tendencies (American Psychological Association, 2011). In order to look at purely somatic and cognitive responses to stress and anxiety, a modified version of State-Trait Inventory for Cognitive and Somatic Anxiety was used (Gros, Simms, Antony, & McCabe, 2010). Additionally, the modified version of the inventory was meant to combat the limitations of the original STAI. In the inventory, there are 17 questions that measure a participant's anxiety and stress in 'the way they are feeling now'. The cognitive items were meant to measure a person's internal response to stress (i.e. thinking work was good); whereas, somatic items were meant to measure a person's external response to stress (i.e. tense muscles). The inventory is based on a 10-point Likert type scale. The higher the score, the more anxious the individuals are. The current inventory has a high internal consistency for the somatic measure (α = 0.871) and the cognitive measure (α = 0.859).

Rationale for Music Choice

The term 'relaxing' music is tossed around quite a bit within the vernacular on a regular basis; thus, it was important to find a piece of music that was short enough for the researcher to use in a study but was empirically support to be 'relaxing'. In the case of this study, 'relaxing' or 'stress relieving' music was deemed as low in arousal and high in valence. Arousal means to elicit a strong response, and emotions associated with low arousal are feeling calm and satisfied.

Valence means to invoke enjoyment, and emotions associated with high valence are pleased and delighted (Jiang, Rickson, & Jiang, 2016; Grekow, 2016). The little research that has been done on what is considered 'relaxing' music supports the notion that this music is low in arousal and high in valence (Linnemann et al., 2015). Thus, a study by Grekow (2016) examined the arousal and valence levels of piece by the Beatles and Beethoven. Through multiple statistical tests, the researcher was able to determine that *Pathetique* mvmt. 2 by Beethoven had the lowest scores in arousal and high score in valence; thus, the use of the piece as the music in the music condition (Grekow, 2016).

Procedure

Participants were randomly assigned to participate in an experimental condition with music as a coping mechanism for stress or a control condition. After informed consent was given, the researcher gave the participants a mental arithmetic test. This type of test has been used to induce modest amounts of stress in previous research (Jiang, Rickson, & Jiang, 2016; Yuko, Tetsumi, Mihoko, Kyoshi, & Kazuyoshi, 2005). Stress was induced in at least three ways. First, there were items on the test that were nearly or completely impossible (spec. item 6). Next, neither a calculator or scratch paper were allowed which places greater demand on working memory. Also, the participants were instructed that they will have 5 minutes to complete as many items on the test as possible, but that most participants are able to finish the test in 3 minutes. Finally, the researcher turned a computer around to show participants a stopwatch when 2 minutes 30 seconds were left in the time allotted. After the 5 minutes have passed, the researcher ended the arithmetic test and handed out the modified version of the State-Trait Anxiety Inventory. After completion, the researcher collected the scale and instructed the participants that they will be back after grading the test. The participants in the music condition

were given *Pathetique* mvmt 2 by Ludwig van Beethoven (approx. 5:35) to listen to while the researcher was grading the test compared to the control group that waited in the lab. After the tests are graded, the researcher administered the STAI again (to measure reduction in stress). Once the posttest questionnaire was completed and collected, the participants in all conditions were debriefed.

Results

The main hypothesis of this experiment was that the music condition would result in a greater reduction in stress levels over a 5 minute increment compared to the control. Out of the 28 participants, one was omitted from data calculation due to technological difficulties, i.e. the computer lost internet connection so the music could not be played. If the data from this participant was kept, it would eliminate the validity of the study due to a lack of randomized condition assignment. For the remaining participants (N=27), items on their questionnaires were categorized into pre/post somatic and cognitive scales, and each scale's mean was calculated. In order to examine if there was a statistical significance of the interaction between the effect of music and time, a 2(Time) x 2(Music) mixed ANOVA with time being a repeated measures variable and somatic stress as the dependent variable was ran. The mixed ANOVA demonstrated that there was a significant main effect of time on somatic stress $F(1, 25)=17.595$, $p<.001$, $h_p^2 =.413$; however, there was no statistical significance of a main effect of music on somatic stress $F(1,25)= .717$, $p=.405$, $h_p^2= .028$. Additionally, there was not a significant interaction between music and somatic stress levels $F(1, 25)= 1.178$, $p=.288$, $\eta_{p^2}= .045$.

Table 1

Means and standard deviations of stress responses prior and post 5 minutes with or without music present

	Control		Music	
Stress	M	SD	M	SD
		Somatic		
Pre	5.161	2.048	4.946	1.723
Post	4.241	2.087	3.385	1.208
		Cognitive		
Pre	5.611	2.000	4.392	2.322
Post	4.392	2.323	3.966	1.356

The same 2(Time) x 2(Music) mixed ANOVA statistical test was conducted again, but cognitive stress was used as the dependent variable. Like the first test, there was a significant main effect of time on cognitive stress $F(1, 25)=29.915$, $p<.001$, $h_p^2=.545$. However, there was no significance of a main effect of music on cognitive stress $F(1, 25)= .405$, $p=.53$, $h_p^2=.016$, and no interaction was found between music and time's effect on cognitive stress $F(1, 25)<.001$, $p=.99$, $h_p^2< .001$. In looking primarily at the means of both groups, between pre and post scores,

they are quite similar which could be considered an early indicator of no statistical significant. With the current results, the main hypothesis is not able to be supported.

Discussion

The primary purpose of this paper and study was to investigate the role of music's effect on stress. Stress has been shown to have tremendous negative effects on our physical and psychological well-being, and numerous music therapy articles have demonstrated the positive effects of music on individuals who continuously cope with chronic stress (Gerdner, 2000; Leardi et al., 2007). Also, other research has examined positive effects of music on college student's stress level (Jiang, Rickson, & Jiang, 2016; Linnemann et al., 2015). With the evidence presented, it led to the hypothesis that music will have an effect on reducing stress symptoms compared to a control. As stated previously, the questionnaire used in the study examined somatic and cognitive indications of stress. Though two separate data tests were ran, neither the somatic nor the cognitive subscales of the questionnaire came back significant in regards to being affected by music. In total, this unfortunately means that the null hypothesis cannot be rejected, or music had no significant effect on the participant's reduction in their stress levels post-stress inducing task.

The next question is to address is why the hypothesis was not supported because the literature appears to support the notion. On a statistical level, a Type II error could have occurred within the study. In layman's terms, a Type II error can occur due to human error, item-measure error, or lack of power (Leary, 2012). While there was most likely some degree of human error, as much care as possible was taken by the researcher to make sure all conditions and participants received the same care and instructions throughout data collection. Furthermore, both the music selection and the State-Trait Anxiety Inventory use were supported by literature. The most

logical conclusion as to why a Type II error may have occurred would be in regards to the amount of power found within the study. Power is defined as the likelihood that the null hypothesis will be correctly rejected if it is truly false. This statistical data allows researchers to examine the total effect that an independent variable will have within their study. One of the largest components of power is the study's sample size. The larger the sample size, the more the sample is representative of the population, and the more power the study will have (Leary, 2012). The present study only had 27 participants that were used for data collection. It would be quite understandable that there was no significance found with such a small sample size. Researchers who examined the effects of music on college student's stress levels had 280 participants, which is astronomically larger than the current study's sample (Jiang, Rickson, & Jiang, 2016). Sample size cannot be the only factor that influenced the data due to the large number of other articles that found that music had a significant effect on reducing stress whose sample sizes where also small (Fratianne et al., 2001; Linnemann et al., 2015; Smolen, Topp, & Singer, 2002).

A consequential step in determining why the hypothesis wasn't supported in this study is to examine the study's design. One of the key aspects of this study is the induction of short term chronic stress upon participants. While this worked quite successfully in Jiang, Rickson, & Jiang (2016)'s study, most of the consequential research has examined the effects of music on stress in naturally occurring situations. For example, Leardi et al. (2007) used participants who were undergoing a day-surgical procedure as their sample; as well as, Fratianne et al. (2001) examined burn victims as their subjects. While both studies examine stressors that are not necessarily common, although day surgery could be considered common to a point, they do examine naturally occurring chronic stress due to the invasiveness and disruption of these medical procedures. In applying this idea to the examined population of this study, Linnemann et al.

(2015) examined the effects music on stress when college students were less stressed (beginning semester) compared to when college students were more stressed (end semester). Thus since stress was induced upon participants, the stressor could have been one of two thing. Either the stressor was not chronic enough. This meaning that the arithmetic exam was not difficult enough so that the participants felt a high level of stress. Or, the stressor was not presented to the participants for a long enough period of time. This meaning that the duration of the arithmetic exam needed to be longer. In order to gage the reliability and validity of the mental arithmetic task, statistical tests on these principles would need to be ran across multiple samples in order to see if the task was chronic inducing enough. Also, individualized studies need to be ran on different periods of time in order to see what amount of time given to participants is the most stress inducing. In all, one of the main reasons why the hypothesis was not supported could be the lack of chronic stimuli and it's duration of time. Following this idea of duration of stimulus, another issue that could have contributed to the hypothesis not being supported is the duration of music presented.

In the music condition, the music was played for 5 minutes and 35 seconds because that's how long the recording was. In hindsight 5 minutes does not seem like a significant amount of time. Thus, the music may not have been present for a long enough period of time in order for it to have any effect on the participant's stress levels. Typical music therapy sessions can last from 45 minutes to an hour; however, they can also last as few as 20 minutes (Darnley-Smith & Patey, 2003). Furthermore, the studies that used music either as a therapy or coping mechanism for stress tended to have participants listen or partake in therapy for 30 minutes to an hour (Fratianne et al., 2001; Linnemann et al., 2015). So in order to have any type of stress relieving effects for the sample size, the study most likely would have benefited from having a longer duration in

which participants listened to music. Two final components are key in understanding why the hypothesis could have not been supported: active listening and degree of 'likeness' of the music selection.

There is clear rationale that in order to benefit from a therapy or a program one must actively participate. For example, family-based therapy is an effective avenue for the treatment of many mental disorders. In order for the client to get the most out of the therapy, both they and the family need to actively participate in the therapy (Mash & Wolfe, 2016). This concept also applies heavily in academics. Many professors begin their semester by telling the students that if they apply and actively engage in class, they will get more out of it compared to not applying themselves. In many cases, this idea is true. In the current study, participants were not required to be active in their engagement of the music. While they noticed the music, they were not given any guidelines in how to listen or engage with the music. So, by passively listening, the participants may not have been able to take in the effects of the music given. Continuing, it is also important to note the degree of preference that a participant has to the music they listened to. In this study, music preference, or the degree a person enjoys a piece, was not taken into consideration; however, research has demonstrated that the more a participant enjoys the music, the better stress reliever it is (Jiang, Rickson, & Jiang, 2016; Leardi et al., 2007). With the current sample, the music condition may have consisted of individuals who do not enjoy Classical/Romantic compositions or these participants may find a different genre of music more stress-reducing than the 2nd movement of *Pathetique.* In future research, it will be beneficial the researcher if multiple genres and pieces are examined along with the participants' preference of the music listened to. The final step in understanding the purpose of this study as a whole is where to go from the current point.

In most researchers' eyes, it would make sense that there is a hope that their research can serve some type of purpose within their field or the world. In reality, it could appear that this study is a great foundation to build upon for other research. To reiterate again, it would be extremely beneficial to examine a stimuli that is more stress inducing to see if there is an effect of music on induced chronic stress. Also, it would be interesting to investigate how small an amount of time of active listening to music is needed in order to feel relieved of stress. In order to examine this idea, a researcher could give out IPod to students and instructed them to listen to music with specific increments of time, and then rate themselves on how tense or stressed they feel before and after the experience. Overall, there needs to be more research done on music therapy and music's use as a coping mechanism for chronic stress, especially in college students. While there is published research, the body of research is fairly small. Music therapy is a growing field, and in order for it further recognized, more effective and efficacious research on music therapy needs to be conducted. Also, students who are in college could be considered the next Einstein's or Susan B. Anthony's. This population of individuals need to be learning as much as they can in order to help better society, and since stress is one of the main inhibitors of this population, music is an easily accessible and reliable tool for coping mechanisms. The more research that is conducted in order to understand and support this notion, the more awareness and acceptance can be brought forth.

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