MUSIC AND TRAUMATIC BRAIN INJURY: AN ARTS-BASED FIRST-PERSON RETROSPECTIVE CASE STUDY

A THESIS

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BY

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ABSTRACT

LAURA WILLIAMSON

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The purpose of this arts-based first-person retrospective case study was to explore the impact of music during the researcher's recovery from a traumatic brain injury (TBI). The research process included journaling before, during, and after viewing the researcher's medical records from her TBI and creating a performance to artistically communicate what she found about the impact of music in her life during this time and the benefit of music therapy to patients with this condition. The researcher discovered that music did indeed greatly benefit her recovery from a severe TBI, and existing literature indicated clear benefits of music for TBI patients in the form of music therapy. The researcher artistically communicated these findings in a performance which was recorded and is linked in Chapter IV.

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CHAPTER I

INTRODUCTION

Background on Researcher's Story

An exploding crash that sounds like a bomb going off. Shattered glass into my skin. Broken bones. Blood everywhere. Sirens. Hands from everywhere reaching in to help. Fear. Darkness. Foggy moments of awareness in a hospital where I hear doctors discussing procedures, serious medical conditions, and scary-sounding treatments. Who are they talking about? What am I doing here? Why can't I remember anything? What happened to my body?

In January of my junior year of high school a severe car wreck almost ended my life. My injuries after this accident included a traumatic brain injury (TBI), skull fractures, broken left orbital socket, broken facial bones so that they disconnected from my skull, broken jaw, knocked out teeth, glass embedded in my face, torn carotid artery, elbow dislocation, lacerated spleen, and severed tendons and bone damage in my ankle. I lay in a coma with doctors unsure of if I would ever come out. They told my parents to prepare for the worst: either death or significant impairment from the TBI. My parents, fueled by their faith in Jesus, began to pray for a miracle with friends and family all around the world.

A miracle did occur. Three days after the accident, I came out of that coma, and I spoke! Now I, Laura Williamson, will use my rediscovered voice to offer an arts-based first-person retrospective case study to tell my story and to examine the extraordinary nature of my recovery through a scientific and artistic lens.

Before the accident, my life at 17 years old consisted mostly of basketball practice, school, piano and violin lessons, activities with friends, and church. I dreamed of playing college basketball, and the possibility of earning a music scholarship for piano seemed more and more

likely. My hard work over many years began producing many exciting possibilities for my future. My parents wondered if this accident and the injuries I received put an end to my future plans and even to my quality of life.

Since 1975, doctors use the Glasgow Coma Scale (GCS) most in determining the outcome of a TBI because of its reliability, validity, and accessibility; this scale focuses mostly on the social aspect of TBI recovery (McMillan et al., 2016). A TBI may be classified according to this scale as mild, moderate, or severe (Vos et al., 2015). Symptoms of TBI vary depending on the individual and severity of the injury but may include short- or long-term memory loss, impairment of speech, social, or motor skills, impairment in various forms of cognition, personality changes, and more. Doctors, because of the GCS rating of my brain injury, told my parents that I may never speak again.

Role of the Researcher

In this study, I hold both the role of the researcher and the participant. I will conduct a retrospective study on myself, specifically my own brain injury and how music affected my recovery. This first-person research provides a unique and more personal perspective on experiencing a TBI and resuming life after.

First-person research offers invaluable perspective to many fields because of the validity and the uniqueness of a lived experience told by the one who lived it (Cotter, 2017). First-person research also provides a deeper level of meaning in writing for topics difficult to understand or imagine. I will use arts-based research to capture the level of depth and emotion that my first-person research will provide. Arts-based research consists of using art to process information and to depict data at the end of a research study using art as the data, or final product (Ledger & McCaffrey, 2015).

Music impacted my life greatly at the time of the TBI and continues to impact my life today; therefore, I analyze how music impacted my recovery and use music to communicate the transformation it brought to others through arts-based research. Arts-based research also communicates and advocates for social issues (Barone et al., 2012). The field of music therapy, my field which I will discuss greatly in this project, provides many benefits for those diagnosed with a TBI. However, a lack of awareness or resources means that many individuals with a TBI who might benefit greatly from music therapy do not receive it. I hope this project shows others the benefits of using music therapy for someone with a TBI.

Purpose Statement

The purpose of this arts based retrospective first-person case study was to explore the impact of music during the researcher's recovery from a TBI.

Research Questions

I aimed to answer the following research questions: How did music influence the researcher's recovery from TBI? What new findings will occur through looking back on this time in the researcher's life with these data collection methods? How can a musical performance capture the experiences of the researcher's recovery from a TBI?

While existing literature on music therapy being used to treat TBI indicates many benefits, this area is still under-researched. With this project, I sought to add literature to this area and to share an account of the role of music during my recovery from a severe traumatic brain injury. This study is essential and will be useful because the more awareness that is raised for this topic, the more resources others will have to consult in times when they may need treatment options for this issue.

Below, I describe my life before the accident that led to my brain injury, during my recovery, and after. I also describe my relationship to music and how it changed through these three stages. I explore and describe existing literature in this area as well. Finally, I share a recital I created from my research that reflects a performance depicting my journey of healing and the power of music in my life.

CHAPTER II

LITERATURE REVIEW

Defining Music Therapy

The American Music Therapy Association (AMTA, 2005) defines music therapy as "the clinical & 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." Music therapy provides opportunities for a therapist and client to work together using music to address goals such as alleviating pain, expressing emotions, improving communication, enhancing cognition, and much more depending on the client's situation. According to the AMTA Standards of Clinical Practice (AMTA, 2013), the music therapy process begins with a referral. A music therapist receives this usually from another healthcare professional, a family member, a friend of the client, or the client herself depending on the setting. After receiving the referral, the music therapist will schedule an assessment with the client to learn more about them, assess their strengths and clinical needs, observe how the client responds to music, and determine if music therapy is a good fit for them. The music therapist will then design and implement treatment plans made to fit the client's individual needs, skills, musical preferences, and background in a way that provides opportunities for the client to make progress toward their therapeutic goals. The therapist will document what occurs in each session pertaining to the predetermined therapeutic goals and objectives of treatment, evaluating if goals are being met. Once goals are met, progress is no longer attainable, or a patient is discharged from services at an institution, a music therapist will begin the termination process with the client.

Existing Literature

A traumatic brain injury may be classified according to the GCS as mild (13-15), moderate (9-12), or severe (3-8) (Vos et al., 2015). A clinician obtains each number through assessing and scoring according to the scale the patient's eye response (1-4), motor response (1-6), and verbal response (1-5), with 1 being the most severe (Vos et al., 2015). The total of these three numbers comprises the GCS rating given by the clinician. Symptoms of TBI vary depending on the individual and severity of the injury but may include short- or long-term memory loss, impairment of speech, social, or motor skills, impairment in various forms of cognition, personality changes, and more. Existing literature on this topic documents the use of music to treat TBI during specific historical periods in the United States, such as the Civil War and World War II (Bronson et al., 2018). Authors claim that TBI is one of the oldest and most common health afflictions to affect humans (Diaz-Arrastia & Kenney, 2014). Interestingly, they also point out that the effects of a TBI may continue to manifest in an individual for years after the accident in which it occurred. Many Americans suffer and die from this condition annually. TBI's typically occur after events such as a car accident in which an individual may receive blunt force trauma to the head; the recovery depends on the severity of the injury which may range anywhere from minor symptoms for a period of time to lifelong loss and disability. TBI causes impairment in sensory, motor, language, and emotional processing, as well as other cognitive functions (Hedge, 2014). Specifically, a TBI may impair emotional regulation and processing, verbal production and processing, memory, executive functioning, motor skills, and more depending on the location and severity of the injury (Wheeler, 2015). To children and teens specifically who sustain a TBI, this kind of injury may be a catastrophic event to their

development because it involves the tearing apart of crucial brain structures and consequently tearing apart important functions in the brain (Mossler et al., n.d.).

Music Therapy and TBI

The use of music as a clinical tool for TBI became more prominent after WWII due to the overwhelming evidence that music had restored quality of life and instigated dramatic progress in the soldiers with a TBI. The existing research on this topic lists many ways in which music therapy may aid an individual recovering from a TBI. The brain naturally responds to music in many ways which may be utilized for therapeutic benefit in recovery from a TBI. A link exists in the brain between the neural processing of auditory stimuli, arousal, and timing functions of the motor system (Thaut, 2008). Because of this, a music therapist may utilize music to assist a client in recovering motor skills impaired by a TBI. Music also aids in memory formation, another brain function often impaired by a TBI (Thaut, 2008). Music drives memory formation with its strong pattern and phrasing structure, which brings organization to the brain's temporal lobe. A music therapist may assist a client in memory retrieval through music from their past that they would know, as this would activate their brain and trigger memories. Movements and activities may be triggered through memory recall with music. Singing may be used as a tool to help a therapist better understand a patient's current level of communication, and it may also be used as a tool for the patient to communicate even if their verbal skills have been affected by the TBI (Azios & Archer, 2018).

Records show that the benefits that come after using music therapy to treat TBI lasted over long periods of time (Bronson et al., 2018). Researchers indicate that clinically relevant changes may be linked to musical changes during an improvisation between a client with a TBI and a music therapist; this musical interaction opens a window in which to view early

neurological intervention with TBI (Bronson et al., 2018). Music also restores healthy emotional and cognitive processes after a TBI and provides positive change in four domains: reward, motivation, and pleasure; stress and arousal; immunity; and social affiliation (Hedge, 2014). Lastly and most importantly, music helps an individual to regain their sense of self after a TBI. Addressing a person's disrupted sense of identity is a crucial part of neurological rehabilitation in the early stages (Thaut, 2008). The person recovering from TBI may wonder who they are after the injury, why they are different, why they can no longer do things as they did before the injury, what will happen to them, if they will regain their abilities, and why people treat them differently. Music provides a safe exploration for the client to create and express their feelings, to rediscover and regain lost functions, and to reorganize their brain after the injury. These elements make an enormous impact for a client recovering from TBI.

Voice and TBI

One common area affected by a TBI is communication. Some individuals may lose or experience differences in the ability to verbally communicate after a TBI. Existing evidence shows the benefits to using singing with TBI patients to restore communication skills that have been impaired by the TBI. Language and music are processed in different areas of the brain (Patel, 2003). Language is processed in the left hemisphere of the brain in Broca's area and Wernicke's area (Blank et al., 2002). Music is processed in the right hemisphere of the brain (Joseph, 1988). Researchers hypothesize that music and language share certain processes which overlap in the frontal lobe in the brain (Patel, 2003). This hypothesis serves as a possible explanation for how music seems to aid an impaired brain after an event such as a TBI to be able to verbally communicate again once this function has been damaged. For an individual with a TBI who suffered damage in the left hemisphere and experiences difficulty in language

production or comprehension, music therapy can benefit the brain in these areas due to the shared processes in the brain of language and music.

Researchers have observed where TBI patients used singing in a conversational way the same that neurotypical speakers would (Azios & Archer, 2018). Singing has allowed for TBI patients who struggled in verbal dialogue after the injury to be able to navigate conversing with others, nominate a new conversation topic, demonstrate misalignment, or close the topic. Because of this struggle, music therapists can use singing with TBI patients to reopen avenues of communication that were otherwise closed off due to the injury. For example, over a time a music therapist may lead a client in singing syllables that progress to words in a conversational style, all mimicking the properties of speech and verbal dialogue. The idea is that these qualities will eventually transfer outside of the music therapy session into the client's everyday life. Because of this transfer, singing may prove to be an effective tool in restoring communication to TBI patients and allowing for emotional expression along the way.

Music Therapy Outcomes for Patients with TBI

Music therapy may provide many favorable outcomes for patients with TBI. In addition to restoring verbal and nonverbal communication and providing emotional expression, music therapy may address gross and fine motor skills that were impaired by the TBI. For example, a music therapist may help a client whose ability to walk has been impaired by providing client-preferred music that they then guide the client to move and walk to. The music activates structures in the brain that control walking, timing, and coordination, and this helps the client to walk even after a TBI which impairs their ability to do so. The music therapist usually cotreats with a physical therapist to do this. Music therapy also provides a safe way to interact with and assess a patient who is still in a coma from a TBI. The music therapist can adjust the level of

stimulus being presented to the client based on their responses, and the music activates the client's brain in this state which helps to bring them back to awareness. Music therapy also aids in strengthening problem solving and memory. Depending on the client's level of functioning, a music therapist may lead a client in a songwriting activity which gives the client the opportunity to create something new, manipulating words and phrases. The music creates new pathways in the client's brain which may strengthen memory and cognitive functions impaired by the injury. Overall, because of the neuroplasticity of the brain and the ability of music to activate it, music greatly helps the brain to regenerate and regain function after a TBI.

Need for Study

The idea of music therapy being used to treat TBI is gaining interest as neuroimaging improves and the neurological benefits of using music may be more easily seen; these tools show more and more clearly how music enhances the neuroplasticity of the brain to create new pathways and restore function (Wheeler, 2015). However, many existing sources on this topic claim that this area is still very under-researched, especially considering the many potential benefits of this method of therapy for a TBI. A study has also never been done from the perspective of an individual who suffered a TBI; therefore, the world has only heard the voices of researchers describing the effects of this injury with no understanding of how it feels. This study will fill the gap in this area of research, as well as providing the first study to be done from the perspective of the individual who suffered the TBI and used music as their own tool to recover and communicate to the world what they experienced.

CHAPTER III

METHOD

Study Procedures

This study was an arts-based first-person retrospective case study. Arts-based research consists of using art to process information and to depict data at the end of a research study using art as the final data, or product (Ledger & McCaffrey, 2015). This format of study works well with topics which are difficult to describe or to imagine and leaves a powerful impact on its audience, which is why I chose it as my study design. This was also first-person research. First-person research offers invaluable perspective to many fields because of the validity and the uniqueness of a lived experience told by the one who lived it (Cotter, 2017). This study adapted the format used by Deborah Seabrook in her arts-based study called "Performing Wellness" (Seabrook, 2017). Seabrook designed this research study to musically explore interdisciplinarity between improvisation in music therapy and music performance. She created and performed a wellness improvisation recital to do this, and she also wrote an accompanying paper further articulating concepts and questions that arose as she researched. Similarly, I created a performance to musically present what I found in my research process, and I wrote this accompanying paper to explain topics further.

Data Collection

I, as the researcher, journaled to the following questions: What was your relationship to music like before the accident? Can you describe what you experienced in the aftermath of the injury? When did you start to think about music again after the TBI? What was making music like for you when you were in the hospital? Describe the process of making your music your

own in the months and years following the TBI. How do you feel that music changed the course of your recovery?

After journaling, I contacted the hospital where I was a patient after the accident to obtain copies of my medical records from this time, specifically the scans of my brain injury. I consulted a doctor who is a trauma-specialist about the records, and she interpreted them for me and defined the medical terminology being used. She also told me the probable outcome doctors would infer from my records. I continued journaling through this whole process to write out thoughts, new discoveries, and to carefully document the whole data collection process. After reviewing my medical records, I journaled to the following questions as a guide: What does this medical information mean to the researcher? What was surprising? How does this information relate to the researcher's relationship to music? I then used these reflections from journaling to create a recital. Throughout this process, I continually met with my committee chair for accountability and feedback. I also had a support plan in place in case I became triggered or overwhelmed by revisiting this traumatic time so closely. I found support from my family and my faith to keep my emotions in check as I examined this time in my life.

The Recital

My recital was held at the University of Memphis after I had completed my data collection. I advertised the recital to my family and friends, my coworkers, my clients and students that I teach, and other music therapists or medical professionals in my community. See Appendix A for the flyer I created to advertise the recital.

I created a recital program based on my data collection. The recital consisted of three sections: my relationship to music before the accident, during my recovery and how it changed, and after the accident. I began this process by writing out a list of important musical pieces to me

during this time. These pieces were songs that I learned to play and sing during these different times in my life, and the songs and order in which I performed them showed the change in my relationship to music in these three stages of life. Throughout the research process I reevaluated and made changes or cuts when needed, both for time purposes and to demonstrate new findings I gained as I researched. I also involved my committee chair, Dr. Lauren DiMaio, and the head of the new music therapy program at the University of Memphis, Professor Jim Pierce, in designing my recital. Both professors offered guidance for recital content and elements to include with my story to ensure that the recital was as descriptive, informative, and educational on music therapy as possible. I also invited one of my best friends, Sarah Grace Ketler, to sing with me for a special song we performed together shortly after my TBI when I began to sing for the first time. I included her in my recital because she is a special friend in my life who greatly encouraged me to sing after my accident. I also used my good friend as an accompanist, Mr. Scott Sturtevant, whom I have known for years and who has accompanied me in many performances throughout my life. See Appendix B for the recital program.

Once the recital program was finalized, I practiced my music, recruited my friend to assist in one piece of music, and wrote out what I was going to say. I timed my recital while I practiced, and I recorded the recital and sent the video to my committee chair for feedback. I rehearsed at the performance hall and kept my host, Professor Pierce, informed on the recital content.

The day of the recital, I arrived early and practiced some more. I spent time with family and time in prayer to calm my nerves leading up to the performance. It helped my nerves to think about the amazing opportunity I had to use what happened to me for good to help others. This thought was my motivation that day.

CHAPTER IV

RESULTS

Journaling

Pre-Medical Records

I journaled as I went through this entire research process. I am thankful for this opportunity to reflect on what I experienced, to analyze how music helped me at the time, and to make the connection today between my miraculous recovery and the music I was able to create. I felt a little apprehensive initially about examining this traumatic experience so closely, as I had not taken this close of a look before into what I had gone through.

I journaled about my relationship to music and how much it changed over the course of my life, specifically before and after this accident. Looking back, my relationship to music was quite impersonal and mostly functioned to please my parents. Year after year, I learned increasingly complicated pieces as I grew up. As I journaled, and after reading many articles on music's ability to enhance the organization and the neuroplasticity of the brain, I realized how much my musical training must have helped my brain to bounce back after a devasting injury like the TBI I had.

In the initial days after the TBI, I did not have full awareness of what happened until much later. I struggled with short-term memory and needed things people told me to be repeated many times. I also realized over time that the things I said did not make sense to people, even though I tried as hard as I could to communicate and knew what I wanted to say. While journaling I realized how truly encouraging, uplifting, and energizing playing music felt to me during this recovery from TBI. Music helped me to feel truly alive in a whole new way, even during a cognitively devastating time.

When I journaled about the initial days and onward after the TBI, I remembered the feeling of disconnect from myself that I felt at that time. In the weeks after the TBI, once I became more aware of what had happened, I remembered how life had felt in the past like completing my schoolwork easily, sleeping through the night, having adequate emotional regulation, and being able to play sports without feeling overwhelmed by the lights and the noise of the buzzer. I struggled with the difficulty the injury created, especially as I went back to school after the accident. I said things and acted in ways that just did not feel like me at all, and I had to really adjust to my 'new brain'; whether I wanted to or not didn't matter, it was a fact of life that I learned to cope with over time. My heart connection for music that grew right before the accident occurred proved to be a source of hope and renewed life for me when I was recovering and figuring out my 'new' brain after my accident. My life felt incredibly disrupted, but music was a beautiful constant that I couldn't wait to get back to each day.

Post-Medical Records

Initially, viewing my medical records and seeing the full extent of what happened to me was very difficult. My desire to help others with this information and to share the incredible things that happened after the accident inspired me to keep going when it was hard.

I learned from meeting with a trauma specialist on my medical records that my TBI was a diffuse axonal injury (DAI). A DAI occurs when the brain shifts as it is injured, and the axon fibers may be sheared as a result (*Traumatic Brain Injury,* n.d.). My GCS rating, as determined by eye movement, motor responses, and communication ability, was rated initially as a 7. At least 25% of individuals with a DAI and GCS rating of 8 or lower will die from the injury as it is classified as a severe TBI, and a very small percentage regain consciousness from a vegetative state within the first year after the injury (Mesfin et al., 2023). For those who live through it and

reintegrate into society, recovery goals could include social reintegration, return to productivity, and return to quality of life with the patient's family and friends. Looking back on this time in my life as I journaled, I realized how much music aided me in accomplishing these things in my recovery. I would like to point out here that these are all goals a music therapist is trained to meet through music therapy; there are several opportunities with these goals for a music therapist to assist a client with a severe TBI.

Another important aspect I wanted to examine with my TBI was that of development, specifically that my frontal lobe was in a critical developmental period when the injury occurred. I wondered how the injury might have impacted my ongoing brain development. The injury happened in my frontal lobe when I was 17, and the frontal lobe does not finish developing until age 25 (Arain et al., 2013). This injury had the potential to impact my long-term functioning since brain development was ongoing. Previous research indicates the fact that the prefrontal cortex develops at a later rate than the rest of the brain (Downing, 2015). Elements such as impulse control, working memory, inhibition, and set shifting are developed and refined during this last critical period of brain development before adulthood is reached (Downing, 2015). A brain injury to the frontal lobe during this period of development may result in more severe loss of function because the skills in that area of the brain were not yet fully developed and may never reach full function after the injury (Downing, 2015).

As the timing of this injury was crucial, so was the timing of music being reintegrated into my life during my recovery. As music greatly enhances the neuroplasticity of the brain, I believe that the time I spent creating music in the early days of my recovery allowed my brain to repair the damage far better from this injury and to rebound sufficiently in order to finish developing the damaged frontal lobe over the next several years. While I will never know what

my brain executive functioning may have been like if the injury had not occurred, I do believe I achieved adequate frontal lobe function to be able to achieve a variety of notable accomplishments in my life after this injury occurred. It wasn't easy, but it was possible.

Recital

In the first section of my recital, I introduced myself, my project, and briefly described the field of music therapy since many individuals in my audience were not familiar with the field. I showed a graphic illustrating the many ways music activates the brain which may be utilized for therapeutic benefit by a music therapist. I discussed what a music therapist's process might look like and the various methods they use to musically engage with a client. I then began to share my story, starting with my early childhood. I talked about the role music played in my life at this time, which was impersonal and only existed because my parents wanted me to do music. I played a Mozart piece that I learned as a child.

https://youtu.be/7L6nwSnRLUA?si=FK5BFL40UxUHioUy

Next, I talked about my adolescent years and the exciting possibilities that came leading up to my college years. I described the shift I began to feel in my relationship to music, specifically after listening to and playing beautiful music that I enjoyed immensely. I played a Debussy piece that I learned in 9th grade when I really began to fall in love with Romantic era compositions.

https://youtu.be/szx99KSkpmM?si=Fh3AuDz0e-uCyX3G

In the next section, I described the car accident I was involved in which caused my TBI. I discussed the rating scale doctors use for a TBI and the initial bleak rating I received for my injury. I then talked about my miraculous recovery which began shortly after coming out of the coma I had been in for 3 days. I shared about my experience playing music in the hospital and

shared pictures as I described that time. I referred back to the music therapy process I had mentioned at the start of the presentation and described what it might look like if a patient in my circumstance were to receive music therapy. Lastly, I ended this section by sharing about one of the greatest parts of this time in my life for me: I began to sing! One of my best friends sang a special song with me to close this section.

https://youtu.be/nJs7KQ3uE9E?si=DRdElNrM1ZPgS4_N

The next section of the performance began the phase in my story in which I went to college and began to study music. I chose one of my favorite vocal pieces that I learned in college to encapsulate this time where I felt so blessed and privileged not only be alive, but to study beautiful music with wonderful people.

https://youtu.be/oQmXYq6JaV8?si=zeBFchgSxmuBf7HX

In the next section before sharing another beautiful piece I studied in college, I described the experience of making music in the hospital as a patient. I encouraged the audience that music makes a significant difference physically and emotionally to someone who lives in a hospital and is recovering from something like a TBI.

https://youtu.be/dbGoVrRFDx0?si=T30rXLBVrykf5B5t

Next, I described in detail the possible symptoms of a TBI and the potential for benefit from music after a TBI. I shared various music therapy interventions backed by research which aid in regaining lost or impaired function after a TBI. I defined how a music therapist would use musical improvisation with a client and gave an example of my own musical improvisation on the theme of gratitude, specifically my gratitude to the medical community of Memphis.

https://youtu.be/hXHSTBPunPQ?si=Bc-5oQGwvXulNQYJ

Here I included a section on my faith, spirituality, and how music connected me in an even deeper way to my faith after my accident. I felt that I was overflowing with hope and joy during this difficult time, and I know that music played a part in that. I discussed how a music therapist may facilitate music from a client's belief system or culture to help them find hope from what they believe in during difficult times, such as recovering from a TBI.

https://youtu.be/oFKeFtiNvyk?si=mhDfwXUrGQpgmSHF

Lastly I shared about the music therapy method of songwriting, and I shared a song that I wrote after my accident about my friends and how much their friendship meant to me during this time. I informed on how songwriting may be a powerful tool to facilitate communication and emotional expression for TBI patients.

https://youtu.be/tTnB1pWSVMA?si=j3Nlb8vL2rpmCyHm

I closed the recital with one last piece I studied in college which I felt really encapsulates how I feel about graduating and closing this chapter of my life. I shared my passion with the audience that I truly believe music may be used for good in many ways during hard times, and music therapy is a wonderful avenue in which to do so.

https://youtu.be/Vc-ERdfhU4A?si=hGt5yrm93FIuDwQN

The performance lasted 55 minutes. A transcript of the entire recital is found in Appendix C. All of the music for the recital was memorized. However, for the lecture part of the recital, I wrote out what I was going to say in case I became triggered from sharing such intimate details of my accident and recovery.

CHAPTER V

DISCUSSION

Audience Reactions

Many audience members expressed to me how moved they were after the performance. They expressed that they would not forget about this presentation and how impressed they were that music may be used in special ways to help TBI patients and other people as well. Audience members brought up to me different aspects of how music enhances brain function and neuroplasticity in the brain that caught their attention, and they asked clarifying questions about these aspects of music. Overall, I was pleased with the attendance of my recital, which was around 40 people, the support I received from the audience that day, and the true interest they had in music therapy after listening to my music and presentation.

After the Recital

Creating this performance challenged me as I have never shared my story in such a personal way. I wanted to find the perfect balance of sharing my story, incorporating the research I've conducted into the presentation, and educating on music therapy as I intentionally chose a location in which many do not yet know of the field and its benefits. I am incredibly pleased with what I put together for my performance, and the support of the audience that came to be a part of it encouraged me greatly. Ultimately, I believe I accomplished my goal in this project. Musically, I believe I offered my best in this performance and am pleased with my playing and singing that day. I practiced the music for months and felt passionate about this topic, which fueled me to prepare to give an excellent performance. Lecturing between the music provided a unique challenge. I had never performed in this format before, with moving back and forth between presenting and playing piano or singing. Since most of my songs were vocal, I was worried about

all of the talking I did in my presentation affecting my singing. Vocal fatigue was a concern of mine as I prepared for this day, but I am pleased with the result. I also somewhat regretted my decision to create and perform this performance for my thesis as I put it together. In the early stages of this project, I wondered how I would be able to connect my personal story, the music I shared, and all of the different aspects of research and music therapy education that needed to go into this presentation. This responsibility greatly intimidated me and made me wonder if my chosen research format was a mistake. Now that the recital is over and was successful, I am incredibly thankful that I chose this format and am excited about how the research came together.

Closing Comments

Strengths of Study

Looking back as I finish this research project, I feel that a definite strength to my project is in sharing my own personal account. Sharing stories and music is unique and powerful. My lived experience, shared through music, helped people understand what the literature hasn't captured yet. I believe this study will add valuable information to this area of study due to the lack of first-person accounts from severe TBI survivors. My ability to examine the benefit of music to me during this time will also aid in music therapy research with TBI and help to spread awareness of its benefits.

Limitations of Study

One limitation to my study is that I did this project about myself; therefore, it is a biased account. However, I believe I had adequate checks in place to promote objectivity, and the subjectivity I did include provided a means by which to move others. A moving story challenges people to act, and the vivid account remains in their memory. I hope this project accomplished

just that, and I hope to offer this study as a resource to further the use and availability of music therapy for TBI survivors.

One other challenge to this study was finding the balance among my own ideas and personal story I wanted to share, the recommendations and ideas from my committee chair, and the requirements for content as the performance was held at a university with a new music therapy program. Because of the time limit of the recital, I was not able to include all of the content that I originally had planned. There was also a limited number of people who could attend as the recital was only available for viewing to the people in my community who could attend in person. Instead of livestreaming the recital, I decided to make the video recording available for all to watch once my project was completed.

Recommendations for Further Research

Many times, as I gathered sources for this project, I saw researchers noting the fact that much more research is needed in this area. More research examples are needed examining the benefits and the impact of music therapy for TBI survivors. Additionally, further research is needed in first-person accounts of TBI research. As far as I am aware, this is the only existing first-person arts-based account which has been done so far in this manner. I believe much valuable insight may be offered to this area of research from those who have experienced it first-hand.

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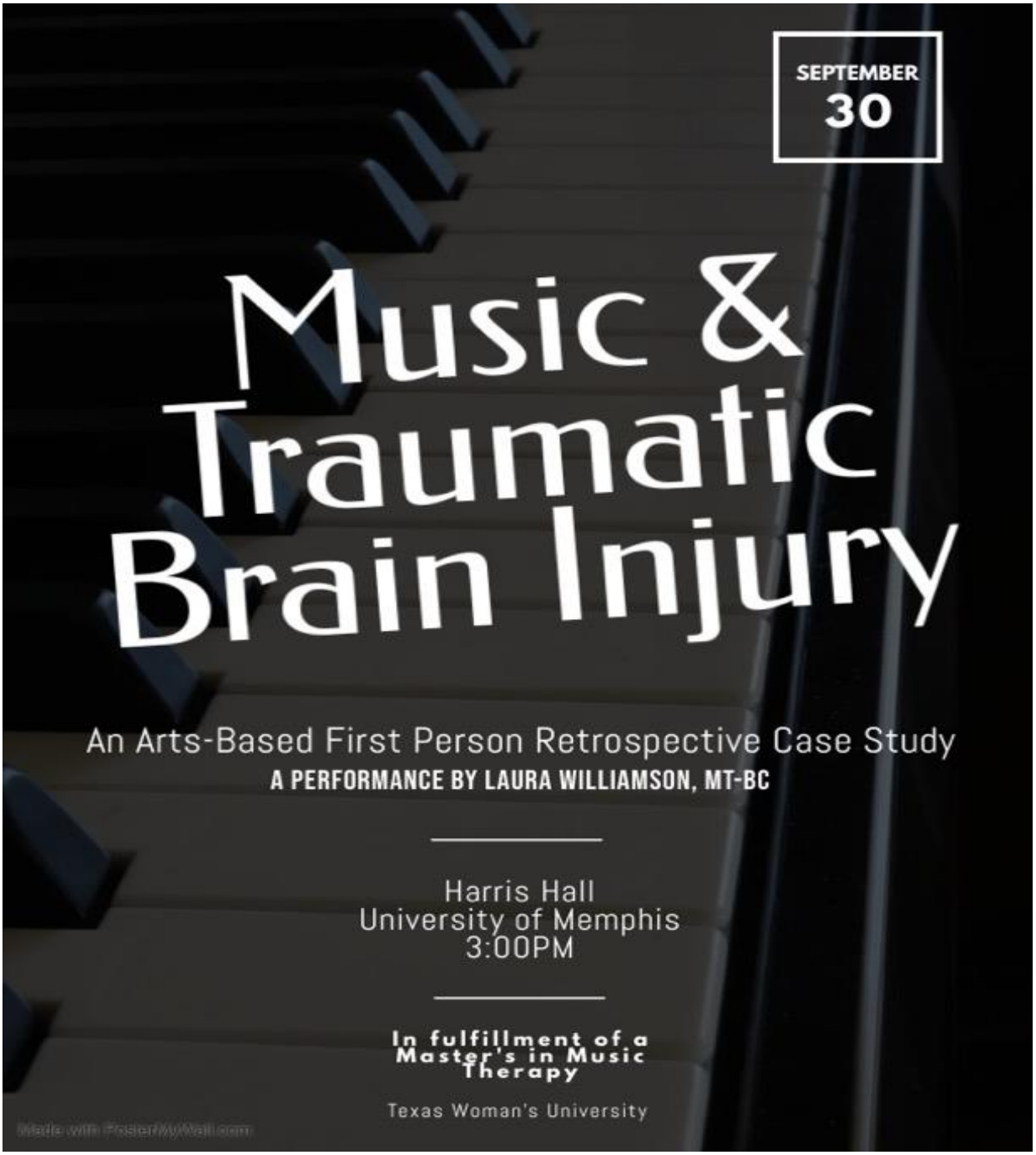
APPENDIX A

RECITAL FLYER



APPENDIX B

RECITAL PROGRAM

Texas Woman's University
School of the Arts and Design
Division of Music Therapy
Presents

Laura Williamson, MT-BC, piano/soprano
with collaborative pianist, Scott Sturtevant

Music and Traumatic Brain Injury: An Arts-based First-person Retrospective Case Study

Saturday, September 30, 2023
3:00 pm
Harris Hall

Program

Sonata III Wolfgang Amadeus Mozart (1756-1791)

Allegro

Deux Arabesques Claude Debussy (1862-1918)

For Good Stephen Schwartz (b. 1948)

from *Wicked*

feat. Sarah Grace Ketler

Heimliches Lieben Franz Schubert (1797-1828)

Clair de Lune Claude Debussy (1862-1918)

Improvisation of "Gratitude" Laura Williamson (b. 1996)

He's Always Been Faithful Sarah Groves (b. 1972)

Original song "Carry Me Home" Laura Williamson (b. 1996)

Laurie's Song Aaron Copland (1900-1990)

APPENDIX C

RECITAL TRANSCRIPT

Thank you all for coming here today to be a part of my thesis for my master's in music therapy. Today I am presenting to you my thesis titled "Music and traumatic brain injury: an arts-based first-person retrospective case study." This is a research project I have worked on for the past 2 years, and I am so excited to share the outcome of that research with you all. I will describe what music therapy is, and then I will musically tell the story of a time in my life where I suffered a severe traumatic brain injury that put me in a coma for three days. Doctors said because of the severity of my injury I would either never come out of that coma or that I would never walk or talk again. I made a miraculous recovery, and I truly believe the role of music in my life played a big part in this recovery and what happened after the accident. My research process included surveying existing literature on this topic, obtaining my medical records from this time, consulting a doctor about them, journaling before, during, and after seeing my medical records, and developing this recital to artistically communicate what I found. To my knowledge, I am the first and only person to have done a study about severe TBI from the perspective of the survivor. I am going to share a bit about my life before the accident, my experience in the hospital and my recovery that followed, the role music played in these different times in my life, and how I believe music may be used to help others with a traumatic brain injury through music therapy. Throughout this performance, the music you hear will reflect my relationship to music and how it changed during these events in my life.

Music therapy is an evidence and research-based practice in which a credentialed professional uses music as a therapeutic tool to achieve goals. These goals could include speech, physical, cognitive, social, emotional, or more personal goals like specific musical goals. This

therapy works because of the music's ability to activate the brain in many ways and because of the emotional, cultural, and rewarding nature of music. You'll see on the projector a graphic illustrating all of the different areas in the brain which may be stimulated by both music making and listening. There are four methods a music therapist may use to musically engage with a client: receptive, recreative, improvisation, and songwriting. I will demonstrate all four methods in this performance. Many of the songs you hear will be the recreation method, in which one recreates music written by someone else. You as the audience are also practicing the receptive method, in which you receive and listen to the music being played. Many individuals can engage in music in some way, no matter what ability they have or whether or not they are trained in music. Music may even be therapeutic to a listening audience at a performance because of how it stirs the soul and emotions. It can truly provoke a life changing impact. For example, hearing a certain song may trigger a vivid memory of a time in one's life when that song was heard, and the music is forever associated with that time because of the multifaceted response in the brain. Music can be powerful in many ways.

A music therapist would conduct treatment in this order: referral, assessment, treatment, evaluation, and termination. I would like to distinguish here the fact that the personal account I am about to share is not the same as music therapy. I am going to share with you the therapeutic benefit I received from music as I was able to utilize it in my own way. My purpose in sharing this is to spread awareness of how others may benefit by seeing a music therapist when they are going through something like a TBI.

I will start by talking about my life before the traumatic brain injury. I lived with my parents and two brothers in Memphis, TN, and was involved in school, competitive basketball, and music. My parents allowed me to take piano and violin lessons since age 5, sing in choirs,

and regularly perform in recitals and competitions. Interestingly, I had no idea how formative those years of piano and violin lessons were to my young brain. Years of studying music theory, learning to read, visually process, memorize, and artistically interpret music were doing far much more for my brain than I could even fathom at the time. The music was strengthening my reading and language skills, focused attention, and triggering the neuroplasticity of my brain, which helps the brain to create new pathways and learn new things. I had no idea how those hours of practicing piano and violin would pay off incredibly later in my life.

As I grew up, I continued to play piano and violin and taught myself to play guitar. However, music was not a passion of mine. I honestly really did it because my parents wanted me to. I eventually quit violin by 11th grade and was determined to quit piano as well once I went to college, although I had received encouragement from some college music professors that I could receive a piano scholarship and get a music degree if I wanted to. I just didn't care, music was not my thing. I wanted to play college basketball and be a science major when I left for college. I did, however, love to sing. I was very shy and terrified to let anyone hear my voice, so I only sang in choir with others or when I was by myself. I dreamed of being a singer but didn't think it would be possible. I was content to keep playing piano and participating in music only as much as I had to until I could leave for school and do my own thing.

Towards the end of high school, my life plans really seemed like they were taking off. I began to be noticed by college basketball recruiters, and I began to think of the many possibilities for college coming soon. I still did music at my parent's wishes. When I was 17, I saw *Les Miserables* for the first time and was blown away by the music! It was so moving and beautiful, I couldn't believe it. I thought about that music all the time, listened to it constantly and sang the songs when no one was around. I also began playing piano compositions by the

romantic composer Claude Debussy. I began to find true enjoyment in this beautiful music that I had the ability to play, which I was thankful for for the first time! I began to grow a new love for music that I had not had before. I realized I had the training and the skills to create beautiful music to move and affect other people just the same as this music had moved me. I began to really put my heart into my music. This next song I am going to play by Debussy is one of my favorite piano pieces I have learned. I had no idea what jarring changes, disruptions, and tragedies were about to occur in my brain, as this music would remain in my memory untouched by the damage to come.

One day as I was driving to school in January of my junior year of high school, a tragic accident occurred. I was rushed to Regional One hospital, the main trauma hospital in Memphis, in a coma. Doctors initially did not know if I would come out of the coma and told my parents to prepare for the worst. My injuries included traumatic brain injury, skull fractures, broken eye socket and facial bones, vision damage, torn carotid artery, shattered glass embedded into my skin, knocked out teeth, broken jaw, lacerated spleen, bruised lungs, dislocated elbow, and a deep cut in my ankle that severed the tendons and cut into the bone. I lay in a coma for 3 days.

Doctors rate the severity of a traumatic brain injury using a scale called the Glasgow Coma Scale. This scale rates a patient's current abilities regarding eye movement, talking, and motor skills from numbers 3-15, 3 being the worst. 8 or lower is considered severe. My initial rating was a 7. For this rating, a doctor would tell a patient's family that a recovery would take a long time, with a full recovery not being probable. I also had a diffuse axonal injury, meaning the brain had shifted and axons potentially were sheared as a result. According to the National Institute of Health, at least 25% of individuals with this kind of TBI will die, and only a very small percentage come out of a vegetative state within the first year after the injury. Doctors told

my parents I may die, and that if I lived, I may never walk or talk again. Everyone waited to see if this would be true.

Three days later, I came out of the coma, and I spoke. I had episodes of confusion and agitation periodically after I came out of the coma, but I was alive and speaking. I also relearned how to walk after some major surgery and began to be mobile again. After many surgeries over a few weeks, I moved to the rehab unit of the hospital and began progressing in different therapies as they assessed what my life may be like after this accident and how much assistance I would need. My recovery really began taking off; to everyone's shock, I was already doing things doctors said I may never do again. The chaplain at the hospital told my parents after all of this, doctors were coming to him and saying, "I want to know how that girl walked again." It seemed to be a true miracle.

While I was on the rehab floor, a doctor who knew I was a musician told me that playing music while I was there would be the best thing for my brain as it recovered. This is because of music's ability to enhance the neuroplasticity of the brain. Neuroplasticity is the brain's way of creating new pathways to learn new things or to repair damages. Music naturally triggers this process in the brain, making it beneficial in a unique way after a TBI. I began to play a piano they had on that floor. The first day I played, covered with braces, casts, and an eye patch, barely able to move, I played that Debussy piece that I had just learned before the accident. Somehow the memory of the music remained perfectly in my brain, even though I had significant memory loss that occurred from the brain injury. My muscle memory took over, and I played the music once again. I turned around after playing the piece to see my nurses all sitting behind me, crying, and seemingly amazed. It made me joyful beyond words to be able to create something beautiful

at a time when I felt so dependent on others and even thinking felt hard, and it encouraged those who were helping me.

If I were to have had a music therapist conducting the process I mentioned during this time, they would have received a referral from my treatment team to see me based on my needs from the TBI and the potential for benefit from music. The therapist would then conduct an assessment with me evaluating the needs expressed by the doctor, identifying any other goals which may be addressed by music, and finding out my own musical interests and abilities. The music therapist would assess these needs by conducting an interview with me or my family about personal interests or providing opportunities for singing or playing instruments to assess things like motor skills, reaction time, communication skills, orientation to surroundings, and more. The therapist may also play music to observe how the patient responds to different auditory stimuli. This assessment tool is particularly important if the TBI patient is in a coma. Current studies record accounts where a music therapist was able to elicit the first initial responses for a patient who was in a coma by playing their preferred music and then witnessing small movements in response, such as their toes moving. Amazingly, patients have expressed awareness of this music after coming out of the coma.

Based on this assessment and the findings from it, a music therapist would design the patient's treatment plan based on their preferences, cultural background, abilities, and the identified goals needing to be addressed. The therapist would choose measurable outcomes to track and document a client's progress. The therapist would continually evaluate treatment progress, making adjustments where needed, tracking progress towards goals, and terminating the treatment in this case based on when the patient is discharged from the facility or doctor's care.

After the accident, I began to make music like never before. I played the piano all the time and felt a profound difference in my cognitive ability when I was playing versus when I was not. As I integrated back into high school, competitive sports, and life as a high schooler, although I did it much faster than anyone anticipated that I would be able to, it still felt incredibly difficult at times. In the weeks after the TBI, once I became more aware of what had happened, I remembered how life had felt in the past like completing my schoolwork easily, sleeping through the night, being able to communicate what I thought and felt to others, having adequate emotional regulation, and being able to play sports without feeling overwhelmed by the lights and the noise of the buzzer. Thinking had never felt hard before, and sometimes it felt like my brain was stuck no matter what I did. When I played music, however, thinking felt so easy! Music was one of the only things I felt that I could do competently during this time of physical and mental limitations. My brain seemed perfectly capable of making music even better than it had before, and this time, my heart was in what I was playing. I truly felt the benefit and made music every day.

One thing I loved about music during this time was its ability to bring people together, both my family and friends. When I got home from the hospital, I would play songs on the piano while my dad would sing, and my mom would listen. I felt my soul begin to heal from this traumatic time with the music and the community with my family. Speaking and explaining how I felt was difficult due to the TBI, but communicating through music was the opposite. It brought us together all on one page.

So as you can see, music can be a way that those who have suffered a TBI may be connected in a meaningful way to those they love. That was certainly the case for me during the early stages of recovery from my TBI. The injury felt isolating at times; due to the various

symptoms and impairments I mentioned, I felt disconnected from others and disconnected from myself. But music helped me bring more clarity to my thoughts and to strengthen my cognitive skills during this time of recovery.

Another big life change for me during this time was that I began to sing. I sang shortly after I came home from the hospital out of pure joy that I was alive. I felt I had so much to be thankful for, it made me want to sing! My voice was hoarse from being intubated, but I sang more and more every day. I decided my fear of singing from before was silly, because life is short and I wanted to sing to encourage and help others. I started taking voice lessons. I went on to college doing things doctors said I would never do, like playing NCAA Division II college basketball on scholarship, and graduating with honors with a music degree in voice. The brain injury that was thought to silence my voice forever seemed to do the opposite: I found it instead!

This song is one of the first ones I sang in front of others. It's special to me because I did it with one of my best friends, who really encouraged me to sing after my accident. Because of her and because of singing, my life has been changed for good.

I had the time of my life in college learning as much as I could about music, making music with friends, and learning beautiful pieces of music. Music began to feel like something I couldn't live without in this new chapter of life following my brain injury. As I wondered what I might do with music, I learned about the field of music therapy. It seemed perfect to use my life helping others with the gift that had been so beneficial and life-changing to me during a very difficult time.

Music therapy provides a unique opportunity, especially to those who are hospitalized. I remember thinking, once I was able to start making music on the rehab floor, I had the opportunity to create something beautiful in a place where there seemed to be no beauty. It made

a world of difference to me to break up the routine of surgeries, doctor visits, blood drawing every day, taking medicine, and sitting in my white room, to being able to create something so soul stirring as beautiful music. This is why music therapy is an amazing resource to be offered to patients in a hospital. The encouragement, emotional expression, and companionship of a music therapist has been shown to do things like regulating heart rate and respiration, calming anxiety, lowering blood pressure, and lowering pain levels due to distraction and the release of dopamine. Music is a wonderful gift.

Symptoms of a TBI may include short- or long-term memory loss, impairment of speech, social, or motor skills, impairment in various forms of cognition, personality changes, disruption of emotional regulation, and more. The image above depicts brain activity during exposure to music highlighting the auditory perception happening, the feeling of reward, and the high overlap between them. The brain naturally responds to music in many ways which may be utilized for therapeutic benefit in recovery from a TBI. A link exists in the brain between the neural processing of auditory stimuli, arousal, and timing functions of the motor system. Because of this, a music therapist may utilize music to assist a client in recovering motor skills impaired by a TBI. Music also aids in memory formation, another brain function often impaired by a TBI. Music drives memory formation with its strong pattern and phrasing structure, which brings organization to the brain's temporal lobe. A music therapist may assist a client in memory retrieval through music from their past that they would know, as this would activate their brain and trigger memories. Movements and activities may be triggered through memory recall with music. Singing may be used as a tool to help a therapist better understand a patient's current level of communication, and it may also be used as a tool for the patient to communicate even if their verbal skills have been affected by the TBI. Records show that the benefits that came after

using music therapy to treat TBI lasted over long periods of time. Songwriting and discussion allow a patient to emotionally express what they are feeling and talk about it with someone else. Musical improvisation also can be a great tool to use, as it allows the patient to take the lead while the therapist follows and offers supportive music. Music therapists often use improvisation to give autonomy to a client, which proves to be very beneficial if that client lives in a hospital or a facility where they don't get to make many decisions for themselves. I will show you an example of musical improvisation now. This improvisation is based on the theme of gratitude, specifically my gratitude to the medical community of Memphis. I truly would not be alive if it weren't for the incredible care I received, and I am so thankful to the men and women who dedicate their lives to studying and practicing medicine at a high level to help those who have been through traumatic accidents. They are real difference makers in our community, and I want to thank them in a special way.

After this tragic accident, I have ironically felt more alive than I ever have before, even though my life has changed to include many health problems from a young age. A crucial aspect for an individual during a recovery from something like a TBI is hope. A music therapist may help a patient get in touch with what brings them hope during a life crisis, especially when death may be near and recovery seems difficult. A music therapist can facilitate music from a patient's disclosed belief system or culture to help them hold on to hope and find courage from what they believe in during a difficult time. For me, my hope is in Jesus. I put my hope and trust in Him, and I believe if I had died in that accident, I would be in heaven with Him. Music connected me in an even deeper way with my faith after my accident. Music can be a powerful tool for fostering spirituality, especially in hard times. Following my accident, I received many opportunities to speak for churches, schools, athletic programs, at the Fed-Ex forum during a

Memphis Tigers game, and other places as well to talk about what I went through and my miraculous recovery. I was often asked to sing along with my story, and I chose to sing this song the most. It truly encapsulates where my hope came from during this time. I truly felt like I was overflowing with hope even in dark trials, and I wanted to share with others through music where my hope came from.

There is one last method I want to share, and that is songwriting! Songwriting gives a patient a way to express emotions and to communicate what they are going through in a unique way. Songwriting may benefit those with damage to their verbal and conversational skills after a TBI by providing more structure for them to communicate with. This is a song I wrote after my accident about my friends who stood by my side through everything.

I hope through this program you all have been encouraged by my story and seen clearly how much I believe music may be used for good in hard times. I hope this research project I have done may be a resource to spread awareness of the benefit of music for those with a TBI and allow for music therapy to become more available to those who could benefit from it. I will close with this piece I studied in college, which encapsulates how I feel about whatever lies ahead for me as I conclude this chapter of school. Thank you all for being here and listening to my story.