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Music's Impact: A Review and Curriculum Proposal

Susanna M. Lindberg
Southeastern University - Lakeland

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by

Susanna Lindberg

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Abstract

The following thesis is a review of literature, covered in three chapters, and a proposal for a researched-based education curriculum. The goal of this research is to find how music affects the brain, how it influences education, whether it affects emotions, and if it has an impact on special populations in regards to education. In the final section of this thesis, there is a theoretical proposal for a yearlong music-based literacy curriculum for third grade students who struggle with reading and comprehension.

Introduction

Picture a single educational tool similar to a Swiss army knife that could be used in an almost unlimited number of ways to ensure improvement in both student literacy and in student social interaction. What if the tool was extremely accessible to the school system? What if the tool, when used properly, could be used with students who have various disabilities? What if the tool could be integrated into current school curriculum and standards? The following review proposes that music is that tool. Through past and present studies, music has been examined, in multiple facets, to see how it has a positive impact on the brain, on literacy skills, and on student behavior. The goal of this research review is to relay how leading researchers have studied music, and its effects on people, and to propose that these effects should be a factor in the creation of a music integrated literacy curriculum for elementary students who are enrolled in kindergarten through second grade Exceptional Student Education (ESE) programs in the United States, specifically in Florida.

The first chapter of this review examines current and past research that questioned the effect music has on the brain. If the conclusions affirm that music affects brain functionality, then music may perhaps be a viable a tool in the rehabilitation of brain functionality, as well as in the establishment of new information introduced to the brain (Sacks, 2006; Zatorre, Chen, Penhune, 2007; Balzani, 2014). The reality that the brain can be physically observed through imaging and observation, means that researchers can now accurately test the changes, if any, that music has on the brain (Habibi & Damasio, 2014; Strait & Kraus, 2011; Forinash, 2014). If the brain is not physically affected by music, then this research review is irrelevant; however, I hypothesize that something neurologically happens to people when they hear music. Studies that verify my hypothesis enhance the argument that music might be used to improve the literacy

skills of elementary ESE students, because music may reach parts of the brain that traditional instruction may not. This is the foundation in the integration of ESE literacy instruction and music education practices. Music may physically affect the mind.

The second chapter of this review will focus on music by itself. To help build my argument, I want to review the studies that test the benefits of singing and playing music on the literacy skills of reading and writing, as well as on neurological disorders, which goes hand in hand with ESE. Music is an educational subject that teaches students non-observable skills. These skills may help students make the necessary transfers from subject to subject, connecting information that can parallel each other (Peterson & Madsen, 2010). Music also seems to be fairly accessible for students to use as a tool when learning about other subjects. Some of the greatest stories of student success come from students with disabilities who are affected by music (Darrow, 2011; Heaton, 2009). For instance, there are hundreds of YouTube videos about students with disabilities who are also music prodigies or who are positively impacted by music. The studies in this chapter will validate why music might be used to promote student success for students with exceptionalities. This research will demonstrate how the affects music has on the brain, in connection with language arts studies and social behaviors, is why music might be one of the main tools through which teachers could teach students with exceptionalities (Tamas, Markovic, & Milankov, 2013; Paquette & Rieg, 2008; Butzlaff, 2000). As the research narrows, this thesis will attempt to validate musical training and its benefits for exceptional students who are struggling with language arts and in social or psychological responses.

Chapter three will focus on research that has specifically studied the effects of music on students in ESE programs, especially in the subjects of writing, reading, and speech. Studies on music in the ESE classroom have recently gained more popularity because of the new brain

imaging techniques, as will be reflected in chapter one (Abrams et al., 2013). It is important to understand as this research continues, music and ESE will continue to expand and evolve. Through the research of this chapter, the benefits of music-based literacy instruction might become increasingly evident and necessary for specific ESE populations (Caltabiano, 2010; Kirschner & Tomasello, 2010; Moreno et al, 2009; Dilci, Arseven, & Yildirim, 2013). This culmination of studies is acceptable; however, because they are only single studies that focus on specific literacy areas instead of looking at literacy holistically, I propose that the most effective way to help student success is through the creation of a music-based literacy curriculum.

In the last chapter, chapter four, I will propose a call for further research on the subject of a music-based literacy curriculum that could increase the test scores of students enrolled in lower elementary ESE programs. According to the reviewed research, music does seem to be a viable option for the Florida education system to use in its ESE programs. I will include a few visions of how the curriculum could be structured, as well as how it could be implemented. This research review cannot complete a research study of the proposed curriculum because there is insufficient funds, time, and accessibility for the execution of a worthy study. This writing is a call for someone to pick up where this research pauses and continue it to its end.

Chapter 1

To make something relevant to culture, it must first reach the mind and heart of the culture. It must connect in order to have a profound effect on the culture. Music historically is something that has been relevant for centuries, verified by the passing on of music from generation to generation from every culture known to man. Historians report music in every major civilization from Jewish culture to the Greeks and Romans, from the Renaissance to the early United States of America, and from the Xing Dynasty to Mesopotamia. No matter the location in the world or the form that it comes in, music appears to be in every culture, almost as though it is a part of us (Sacks, 2006; Levinowits, 1999). This chapter will look at how society has increasingly studied music, and its effects on society and culture. It has also become a more prominent subject as technology advances, allowing researchers the ability to delve into the minds of listeners, players, and singers to see how music directly affects the brain. Countless studies and reviews have been conducted, stating how music is perceived, felt, and experienced. These studies have shown that playing, listening to, and singing music effectively may help with fine motor problems, mild traumatic brain injuries, patients with dementia, and many other physical issues (Forgeard, Winner, Norton, Schlaug, 2008; Hurkmans, de Bruijn, Boonstra, Jonkers, Bastiaanse, Arendzen, and Reinders-Messelink, 2012; Sacks, 2006; Lloyd, 2013).

The brain contains over 10 billion neurons (nerve cells) and above 10 trillion synapses (connectors); these neurons select what people perceive in an environmental scene (Strait & Kraus, 2011). Strait reported that this study was one of the first that presented "biological evidence for musical training's impact on neural mechanisms of selective auditory attention within a language context" (Strait & Kraus, 2011, p. 8). Strait and Kraus explored how musicians and nonmusicians decipher sound through noise, meaning they explored the

differences between how musicians and nonmusicians were able to hear a specific sound while there were other distractions in the way. They suggested that there is more research occurring "to determine the neural mechanisms that underlie attention, their behavior outcomes, and how we might strengthen them with training and life experience" (Strait & Kraus, 2011, p. 1). It was inferred that musicians have better attention skills because of their musical training, often occurring during the most important developmental stage, childhood. It was hypothesized that the brains of musicians offer insight into how people can build their attention skills, and that the brain patterns of a musician are the best visual for study. Through this review of the evidence, it was found that previous researchers "imply that musicians' nervous systems are fine-tuned for the extraction of meaning from a complex soundscape, being shaped through their extensive and consistent interactions with organized sound to better exclude noise and more accurately encode signals of interest" (Strait & Kraus, 2011, p. 2). Essentially, musicians are continuously building their attention skills through their practice regimens, as well as through their study of music. These attention skills, learned through musical training during childhood, may have an impact on how students with various disabilities could be taught during their elementary years.

The study used twenty-three adults, eleven musicians and twelve non-musicians, between the ages of eighteen and thirty-five, as participants for the study. The musicians in the study "demonstrated decreased cortical response variability with auditory attention over the prefrontal cortex" (Strait & Kraus, 2011, p. 4). The prefrontal cortex is the area of the brain that controls sustained attention spans. The more the musicians had practiced throughout their time learning and playing the instrument, the more control they had in their selective auditory attention spans. The data suggested that the prefrontal cortical response of musicians showed a decrease in their responses from the ignore condition to the attend condition, which was the opposite of the data

collected on the non-musicians. The musicians were able to stop their responses to the distraction and focus on the auditory tasks they were given. The musicians were better able to sustain auditory attention to auditory tasks (Strait & Kraus 2011). Strait and Kraus (2011) concluded that musicians' training helps them control their selective attention. Music could possibly then be used as a method for the teaching of selective attention to students who have Attention-Deficit Disorder (ADD) and Attention-Deficit/Hyperactivity Disorder (ADHD).

Habibi and Damasio (2014), from the University of Southern California, explained how music connects feelings and the human brain in their article, *Music, Feelings, and the Human Brain*. This literacy research connected the neurobiological framework (nervous system) to musical experiences while also connecting felt emotions to music. The hypothesis of their research was as follows: "We hypothesize that music can engage innate physiological action programs and, by doing so help restore the physiological state to a range of relative homeostatic balance" (Habibi & Damasio, 2014, p. 93). This study was conducted to find out if music affected the way the body functions, helping to restore equilibrium internally. Additionally, feelings are a part of humans' lives as a neurobiological phenomenon and should also be studied from both the neurobiological perspective and from the psychological and sociocultural perspectives (Habibi & Damasio, 2014). Feelings play a central part to how people act and react to everything around them. Music appears to be a facilitator of emotion observed though dance, the evoked responses of the listeners, or the players themselves. The argument in question for Habibi and Damasio (2014) was whether music induced perceived or felt emotions. If it induced felt emotion, could music help restore balance to people based on how the music engaged? It should be explained that perceived emotions and felt emotions are different; perceived emotions are recognized yet remain unfelt by the listener while felt emotions are physically felt by the

listener (Habibi & Damasio, 2014). If the observations proved true, and if music physically affected the listener, then music could be a facilitator in the rehabilitation of people with motor disabilities and those with emotional or psychological handicaps.

"It has been argued that music cannot induce basic 'everyday' emotions related to survival, and that music-evoked emotions should be categorized separately, as 'aesthetic,' and contrasted to 'utilitarian' emotions" (Habibi & Damasio, 2014, p. 93). According to the observations, this statement seemed to be incorrect because music "engages innate physiological action" and physical changes were visible via fMRI findings where dopamine was released through the body as music was played (Habibi & Damasio, 2014, p. 93, 96). Habibi and Damasio's findings, following previous research, indicated that there are physical changes within the brain that proved that music has influence over the body, causing physical change within the brain. Their study recorded two conclusions: there was undisputable confirmation that perceived emotions are followed by feelings, thus engaging the homeostasis neural systems in the brain. Simply stated, music will either evoke pleasurable or unpleasant emotions that can be identified through the monitoring of brain waves as music is being listened to (Habibi & Damasio, 2014).

In a beautifully written narrative from an event she experienced while working, Forinash (2014), a music therapist and Adjunct Director of Music Therapy at New York University, explores how the music therapy helped a distressed patient. Forinash's (2014) methodology was based on a seven step process created by a previous research study in 1984. The seven steps were: client background, session, syntax, sound as such, semantic, ontology, and metacritical evaluation. Forinash's (2014) patient was a terminally ill forty-two year old woman with breast cancer and metastasis to the brain. The patient was married and had two children. When the mother was admitted into hospice, her illness grew in strength, she was prescribed music therapy

(Forinash, 2014). All of this information was step one of the process, *client background*. Forinash and a co-worker went into the patient's room to start step two, the session. By the end of the session, the patient had passed. Both Forinash (2014) and her co-worker knew that they were going to assist the patient in order to help support the patient as she passed. As Forinash (2014) reflected on the *session*, she noted that the guitar chord progressions they were using helped the patient's breathing steady. In the *syntax* section, Forinash (2014) notes the actual musical analysis of the music that was played along with how the rhythm changed based on the patient's breathing. Step four, *sound as such*, was the patients breathing, oxygen machine's hum, and vocalizes of Forinash and her co-worker; step five, *semantic*, focused on the imagery of the music. Forinash (2014) thought of the ocean, an airplane, and the feeling of the patient reaching out her hand to leave this life as she passed on. She did note that she could not adequately assess step six, *ontology*, because she was unable to communicate with the patient. Lastly, step seven, *metacritical evaluation*, Forinash (2014) splits the experience into the aural and physical experience. She notes that she has only taken a small step in the explanation of what a music therapist does.

The reason Forinash's research is important is because it was a brief, but detailed analysis of how a patient was impacted by music and how music helped ease the patient. During the session section of the article, Forinash goes through the minute by minute detail of how the patient reacted to the music, as well as the patient's state at the beginning of the session before music was played. The patient's breathing went from sharp, hard, and uneven to calm and relaxed, decreasing as time passed (Forinash, 2014). It is important to see that even a music experience that seems so simple may have a huge, lasting impact on someone. In a supplementary work, using his own experiences as a neurologist, Sacks (2006) wrote his own

commentary, exploring the changes of his various patients and contemporaries once they were exposed to music.

One of Sacks' (2006) patients, a woman with parkinsonian post-encephalitic disease, a ticking, jerking problem, would become calm and peaceful while listening to legato music. Counterintuitively, if she was exposed to percussive or staccato music, her tick would jerk along with the beat. Legato is a description in music that is tells the player or singer to perform the notes smoothly, allowing both notes and phrases to transition seamlessly together. Opposite to legato, a staccato work is jerky, the notes' values are shortened, feeling agitated and sometimes choppy. This observation suggests that music was a tool for Sack to use as a way of balancing, or creating an equilibrium for the brain so that his patient could have a moment of freedom from her parkinsonian post-encephalitic disease.

Another of Sack's patients, composer Lukas Foss (who now has Parkinson's), could not control his movement; however, Lukas was in complete control of himself once he made it to a piano and started playing (Sacks, 2006). Sacks concluded that "patients with parkinsonism, in whom movements tend to be incontinently fast or slow or sometimes frozen, may overcome these disorders of timing when they are exposed to the regular tempo and rhythm of music" (Sacks, 2006, p. 2528). Sacks' experience was that music helped motor disorders as long as the music contradicted the problem, operating as the opposite extreme to balance the issue.

Music is something that changes the way people move. As the philosopher Fredrich Nietzsche said, "We listen to music with our muscles…" (Sacks, 2006, p. 2528) as can be seen when people keep time while listening to music with their hands and feet or by dancing, without noticing that they are reacting to the music. Sacks' experiences seem to suggest that there is also a physical connection between people and music. In addition, it is important to point out that

Sacks (2006) also observed that music affects the body internally:

> Most of the music I hear is from my past—many of the songs are hymns, some are folk music, some pop up from the forties and fifties, some classical and some show tunes. All the selections are sung by a chorus—there is never a solo performance or any orchestration. This first started last November when I was visiting my sister and brother in law in Cape Hatteras, NC, one night. After turning off the TV and preparing to retire, I started hearing "Amazing Grace." It was being sung by a choir, over and over again. I checked with my sister to see if they had some church service on TV, but they had Monday night football, or some such. So I went onto the deck overlooking Pamlico Sound. The music followed me. I looked down on the quiet coastline and the few houses with lights and realized that the music couldn't possibly be coming from anywhere in that area. It had to be in my head (p. 2530).

The above story is from June M. who was 70 years old when she wrote to Sacks concerning the music in her head. She experienced what is called a *musical hallucination*. These hallucinations can occur in anyone's mind, young, old, deaf, or hearing. Sacks later explained that people who have *musical hallucinations*, when given a positron emission tomography (PET) scan, or an imaging test, the cortical and subcortical networks would be activated, just as they are when people are actually listening to music (Sacks, 2006).

Another way music makes us move is through auditory-motor interactions. Zatorre from the Montreal Neurological Institute and two of his colleagues reviewed literature on how music performances require complex cognitive and motor skills. They started by discussing two separate demands music has on a player: rhythm and pitch (Zatorre, Chen, Penhune, 2007). These two skills require fine motor skills, such as tonal perception, or how well someone can

determine musical pitches. The fine motor skills required are timing, sequencing, and spatial recognition. Just as Balzani's (2014) research, which will be covered in following section, Zatorre and his colleagues (2007) recognize that patients with brain injuries have issues with perceptual and timing skills. These motor skills seem to be controlled by multiple areas of the brain (Zatorre, Chen, Penhune, 2007). The following excerpt from their review maintains my hypothesis that music could be a viable source through which teachers teach reading to young children with comprehension problems:

> Indeed, musicians have been shown to have specific anatomical adaptations that correlate with their training. Several neuroimaging studies have observed that musicians show lower levels of activity in motor regions than non-musicians during the performance of simple motor tasks, suggesting a more efficient pattern of neural recruitment…the neural regions engaged during the listen and play conditions overlapped (Zatorre, Chen, Penhune, p. 551-552, 2007).

Musicians not only use multiple regions of their brains when performing, they also may have more efficient ways of doing simple motor tasks. I hypothesis that when teaching reading to struggling students, music, which is naturally multimodal, would naturally be both engaging and efficient in instruction. One of the last questions that Zatorre et al. (2007) calls to attention is how these musical interactions, combined with motor skills, could affect development. They only mention that their findings on music and motor interactions in advanced musicians is because those musicians have been susceptible to music for long periods of time, so their brains are trained to work more efficiently. I would suggest that if you start simple music training in young students early on, as suggested by Darrow (2011), which will be discussed in Chapter 4, students will be able to succeed more efficiently than without music training.

In a similar manner, there was a study conducted that sought to find the changes in music listening in people who suffered from Post-Concussion Syndrome (PCS). Balzani (2014) and her peers noticed a change in the music listening tendencies of U.S soldiers who suffered from PCS; however, the soldiers were not able to explain why their musical taste had changed (Balzani, Mariaud, Schon, Cermolancce, & Vion-Dury, 2014). Their subsequent study included a neuropsychological evaluation, an MRI, a second brain scan, and a neurophysiological assessment. The researchers used a detailed rubric to assess the musical capabilities of the patients. The rubric included perceptual discrimination, or sound pairs, implicit memory, reproduction of sound and rhythm, and production of sound and rhythm. The results of the study showed that overall, the patients had decreases, impairments, or difficulty with each music test, as well as trouble listening to certain types of music (Balzani et al., 2014). These findings followed the author's research. It was inferred that because "musical experience is a high-level and multimodal activity (Petitmegin et al., 2009) that entails holistic mode of brain functioning… the complexity of the processing required for music listening" (Balzani et al., 2014, p. 122) was too much for the patients; consequently, their music listening habits changed. This study, though seemingly opposite Sacks's research, aligns with the hypothesis that serious brain injuries impairs how the brain can process music. The research follows the hypothesis that music listening is a complex multimodal process that requires healthy brain function, and if there are traumatic injuries to the brain, music listening will be affected in some way.

Opera director Jonathan Miller summarizes music's role as something that takes "one inside oneself" (Sacks, 2006, p. 2529), referring to the physical response that music evokes out of listeners. This is explained through Sacks' (2006) term *release hallucination*, which he introduces in his writing. *Release hallucinations* occur when the deaf or blind hear music, also

called *musical hallucinations*, though they were never exposed to an instrument or voice (Sacks, 2006). These hallucinations imply that the auditory system is "tuned for music" (Sacks, 2006, p. 2532). A study on the effects playing a musical instrument has on children, further explains how music affects the auditory system. Lloyd (2013), from Trinity College, took Sacks observations a step further by researching if, and how, music brought harmony to the phenomenology and to the brain.

Lloyd (2013) started his study by stating that music cannot produce language-like semantics. He said that instrumental music will not read like a book. "No orchestra can ever communicate 'The cat is on the mat'" (p. 327). Instead, he suggested that because language is embedded into biology, music is also in our biology. Sacks (2006) would agree with Lloyd, as Sacks concluded that humans are musical in the same manner as they are linguistic, as Lloyd said, "A musical dynamical system thus has the ability to represent temporal properties that are essential to full-blown human consciousness" (Lloyd, 2013, p.329). Lloyd followed the trend of Sacks' research because he, too, inferred that music has a direct effect on the listener. Lloyd's research suggested that music, not only its own language, is also capable of helping, complimenting, and explaining complex systems, such as the brain.

Lloyd (2013) completed a study by comparing the brain functionality between fifteen patients with schizophrenia against eighteen healthy control patients. Each subject listened to dissonant tones and pressed a button as soon as they heard the pre-established target sound. Anything that is dissonant will not sound pleasing to the ear. When fire trucks, ambulances, and police cars have their sirens on, the sounds heard are dissonant. The study's conclusions revealed that the brains of patients with schizophrenia could not reestablish mental "harmony" after being exposed to dissonance, suggesting that schizophrenia itself is a disorder of literal

harmony (Lloyd, 2013). This contrasted from the results of the heathy brains which reestablished themselves and returned to baseline, equalized levels after being exposed to sporadic dissonance (Lloyd, 2013). Lloyd's study essentially showed that simply exposing the brain to dissonance will affect how the brain reacts as it tries to make sense of the sound. The results also suggest that music may be the key to assisting patients with schizophrenia; it may also help students with Autism disorders.

In another study, the effects of listening to natural music was examined. In this paid study, seventeen right-handed people, nine males and eight females, from nineteen to twenty-seven years of age, and who were all non-musicians, listened to music during a brain scan using functional brain imaging. The results were to see their response to natural music (Abrams et al., 2013). The examiners checked for synchronized brain activity during nine and a half minute listening sessions using late-Baroque symphonic music (natural music) and Spectrally-Rotates and Phase-Scrambled sounds. Basically, the study was conducted to check how the brain reacted to purposeful, organized sound compared to random noise. The results showed a distinctive/distributed set of brain regions were synchronized on multiple levels of the information processing regions of the brain (Abrams et al., 2013). The study proposed that auditory and supra-auditory brain structures track musical structures over long time periods, and "music listening elicits consistent and reliable patterns of time-locked brain activity in response to naturalistic stimuli that extends well beyond primary sensory cortices" (Abrams et al., 2013, p. 1468). The brain not only identifies musical structure as sound, it also tracks the patterns, trying to organize and make sense of what it hears.

Schon, Magne, and Besson (2004) sought to find out if extensive music training affected recognition in being able to find correlation between pitch contour processing in music and in

language. Their study used eighteen people, nine of whom were experienced musicians, who were all French, right-handed, normal hearing participants, to ensure that their study would be consistent. To test how well musicians versus non-musicians could identify pitch errors, the researchers used 120 French declarative sentences and 120 melodies split up evenly into three sets of forty conditions: final word/note being correct, weak, or strong (Schon, Magne, & Besson, 2004). The participants were given a practice round to become familiarized with the process, and then were told to press one of two buttons as quickly as possible, deciding whether the last pitch of the melody or sentence was correct or incorrect (Schon, Magne, & Besson, 2004). In laymen's terms, the experiment's goal was to find out if there was a difference between what musicians and non-musicians could decipher. The results of the study concluded that the musician participants did in fact detect pitch better than the non-musician participants (Shon, Magne, & Besson, 2004). The researchers also used topographic maps to see how the brain detected incorrect and correct pitch. It was decided that musical training does in fact affect how well people differentiate correct pitch in both music and in language. They went on to suggest, "…that specific musical training may improve some aspects of language rehabilitation" (Shon, Magne, & Besson, p. 347, 2004) and could possibly help language processing problems.

Hurkmans and his co-authors (2012) reviewed music therapy's ability to help people who have acquired various brain injuries from strokes. Music therapists' are given the task to help people who have physical, mental, emotional, and even social issues through the expression of music. Many music therapists help patients through the use of playing or listening to music. Hurkmans et al. completed a meta-analysis of research, as well as an experiment studying the effect music has on the treatment of neurological languages and different speech disorders. Melody and rhythm were the most applied forms of therapy studied to date; the two forms of

therapy had a measurable recovery rate in the treatment of neurological language and speech disorders (Hurkmans et al., 2012). Though some of their conclusions may be unreliable because of the low quality methodologies, Hurkmans does reiterate that the standards of the tests overcame the shortcomings of the reviewed studies. Methodologies based on music resulted in improved patient functionality (Hurkmans et al., 2012). Because music improves brain functionality, it can be assumed that music will also improve language skills.

The previously stated research is only a portion of the studies conducted to observe and study how music affects the mind. Many times, scientists want to study what music does to the body for the sake of medical study or science (Hurkmans et al., 2012; Abrams et al., 2013; Lloyd, 2013). They want to watch, usually through imaging methods, how the brain responds to music through changes in brain waves (Habibi & Damasio, 2014). These studies are very important for the advancement of medical research, in addition to the advancement of musical therapy; these studies are also important for the advocating of music education programs around the world. These research studies and commentaries promote the use of music as a facilitator for success.

There are also many studies on music being advantageous in its own right. In 2014, Miksza and Gault took the data from the *Early Childhood Longitudinal Study of the Kindergarten Class of 1998-1999* (ECLS-K) and described how music affected the students from kindergarten until their 8th grade year of middle school. The study used the records of 21,260 children from 1,200 public and private schools in the United States. Because there was a lack in funding, proper education, and, in some cases, of any music programs in certain school systems, the data was, in some cases, limited, and because of the study's limits, Miksza and Gault (2014) called for more research, such as the ECLS-K study, to be completed for the benefit of music

education. However, this study was one of the first full reports on how music affected student success over a long timeframe. This culmination of data helps support music in schools for the sake of the students' success because of music's positive influence in student development.

In a more specific study that also shares the benefits of music for the sake of music, children with three years or more of instrumental music training outdid the control group in both closely and distantly related music studies using auditory discrimination and fine motor skills, (Forgeard, Winner, Norton, Schlaug, 2008). The results suggested that instrumental music training has an effect on auditory discrimination, fine motor skills, vocabulary, and nonverbal reasoning. The study results also revealed that music influences, helps, and is directly related to spatial, verbal, math, and general intelligence quotient (IQ) skills. They discovered that instrumental training, in many cases, accelerated the development of spatial abilities. Forgeard and her counterparts recognized that their research was not fully exhaustive, and that there should be additional research conducted; however, every area of the study resulted in the music students surpassing their counterparts, except in phonemic awareness (Forgeard, Winner, Norton, Schlaug, 2008). Phonemic awareness refers to the ability recognize sounds and identify how those sounds translate into words.

Three theorists wanted to see how music therapy effected children, between ages 3.5 and 6, who suffered from delayed speech development (DSD) (Grob, Linden, & Ostermann, 2010). These eighteen were given twenty-five minute out-patient music therapy sessions at the Department of Music Therapy at Herdecke Community Hospital. The tests did not necessarily have an effect on the other isolated aspects of speech development (e.g. in the home learning, observations outside the classroom and home); however, it did help the children with speech fundamentals, which helped their DSD (Grob, Linden, Ostermann, 2010). Simply, outside of the

therapy sessions, these children may not have made any gains in their development of verbal expression, but their fundamentals of speech (i.e. vocabulary, comprehension, phonemic awareness) improved as they received music therapy. Because there were drastic improvements in phonological and sentence structure understanding, Grob (2010) concluded that music therapy is a basic and supportive way to help students with delayed speech.

The brain is a complex structure that scientists may still be working to understand, but through music, there have been significant gains in how the brain is understood. Chapter one sought to look at a few complementary studies that observed different ways music affects the brain and the human body. The brains of musicians offer insight into how the brain holds attention and how the brain patterns of musicians offer the best visuals to study. Musicians' nervous systems may more accurately encode specific sounds that are more important than others (Strait & Kraus, 2011). Music research also found that music may be a tool for doctors to use as a means of creating equilibrium in the brain, or offsetting extreme physical ticks (Sacks, 2006; Habibi & Damasio, 2014; Abrams et al., 2013).

It is fascinating how the brain automatically responds to music. It seems to have been a part of humanity since creation. With new technology, scientists can now actually see what happens to the brain when music is played, sung, or listened to, and the implications of this new era of technology are still not completely known or understood. Musicians and music teachers alike are encouraged to stay current with new research studies as they come out. Koelsch (2012), one of the leaders of music and neuroscience, says in his book *Brain & Music*,

> In my view, we do not need neuroscience to explain or understand music… However, I do believe that we need music to understand the brain, and that our understanding of human brain will remain incomplete unless we have a thorough knowledge about how the

brain processes music (p. xiii).

Knowing what music does to the brain is crucial in our understanding of the brain, and based on the research previously discussed, music may have unlimited uses for treating disorders and diseases. These implications have the potential to change how developmental education, that is, lower elementary education, is viewed, especially for students with various disabilities. If students received the attention that they need in school through music, for nonmusical subjects, for instance English, grammar, and writing, then they may have a better chance of graduating out of ESE programs. The implications of this hypothesis will be elaborated in a later chapter.

Chapter 2

The studies on the brain and music have demonstrated that music may have a positive effect on the brain. Because of the results of these studies, on top of countless others, music needs to be considered an important a part of the school curriculum. Music also has extra-musical effects on those who experience it. Extra-musical is simply the emotions, thoughts, and reactions that people experience when listening to music. Through the act of singing and playing music, students have the potential to learn valuable skills, such as eye-hand coordination, listening skills, and group cooperation. Music is also a tool for teaching students the value of taking the information they learn through music and transferring that information to different, sometimes seemingly unrelated, information (Peterson & Madsen, 2010). Music seems to be inherently accessible for students, especially as music teachers find creative ways to incorporate popular music into their classes. Home-made instruments are a fun way to engage students, the voice is an instrument that is free for every student, and there are many programs that help provide low-economic schools, such as Title I schools, with instruments for students to use. The goal of Chapter 2 is to provide evidence that music is beneficial for students in its own right, because it can be transferred.

There are those who feel that music is engrained in our DNA. Zoltan Kodaly, a Hungarian pedagogue who lived in the twentieth century, said music education starts nine months before the child is born (Levinowits, 1999). Levinowits (1999) suggested that music is something that everyone is born with, as can be seen when babies react to music by bouncing. Some say music may, in some of its most basic forms, predate spoken and written language, based on time gaps between musical instrument discoveries and when written language was first discovered (Levinowits, 1999). Arbib (2013) also suggests that "music and language are

universal features for all cultures…" (p. 163). Music educator and Vice President of Student and Academic Affairs at South Central College in Minnesota, Susan Tarnowski, argues that early music education needs to be creative and playful because it "begins in delight and ends in knowledge" (Levinowitz, 1999, p. 17). Music is a tool that helps young students connect information as they learn. The following two studies suggest that music positively effects the body and shows how music helps students who struggle with motor, verbal, and neurological disorders

Music may also have a profound impact on how students develop fine motor, vocabulary, auditory discrimination, and nonverbal skills. Children with three or more years of instrumental music training outdid their other study counterparts in both closely related and distantly related music studies (Forgeard, Winner, Norton, Schlaug, 2008). The outcome suggested that instrumental music training could possibly have an effect on auditory discrimination, fine motor skills, vocabulary, and nonverbal reasoning. The study that Forgeard et al. (2008) completed revealed that music and spatial/verbal/math/general Intelligence Quotient (I.Q.) skills were directly related and that music could both influence and help these skills. Every area of the study found that the instrumental students had better results than those without music. Two concrete findings arose from the study. Instrumental music was shown to help cognitive abilities and increase general I.Q (Forgeard, Winner, Norton, Schlaug, 2008).

Neuroeducation and Music: Collaboration or Student Success (2014) is a brilliant article about current research on brain-based music education. Authors Curtis and Fallin compiled an in-depth look at why music instruction is a viable option for schools. They began their research report with a section on brain plasticity, or how well the brain is able to change as we age. Children's brain plasticity is especially responsive, because any information given to them is

new information for their brain (Curtis & Fallin, 2014). From there, Curtis and Fallin discuss the most important reasons school systems should include music programs. Through the research, Curtis and Fallin (2014) found that music instruction builds the auditory and motor systems, and "research has clearly shown that those trained in music have different brain activation patterns when engaged in listening activities than those that have not received such training" (p. 53). Interestingly enough, they also report a study that suggested there should not be a distinction between left or right hemisphere processing, but that the complex processes of music and language require both hemispheres are required for the brain to make sense of the information (Curtis & Fallin, 2014).

> A study conducted by researchers at Stanford University determined that when participants were involved in listening to music, both hemispheres of their brains worked in tandem, with the right hemisphere significantly more active, appearing to process the sound. The brain exhibited increased activation (attention) when changes occurred, even anticipated changes signaled by periods of silence, sending new information to areas specific to working memory (Curtis & Fallin, p. 53, 2014).

This could possibly mean that through music, education lessons would automatically make students use their whole brain to process information. I infer that because music uses both hemispheres of the brain, during music-based educational instruction, students should be fully engaged in the learning process because full brain function will be used. In fact, music seems to use many parts of the brain at one time. Curtis and Fallin (2014) found research that concluded the auditory, motor, cognitive, affective, and visual systems were being used while reading, playing or singing music at any given time.

Wan, Ruber, Hohmann, and Schlaug (2010) proposed that the active making of music

may help stimulate the nervous system, helping perception and action. Wan et al. argue that, because music is multimodal, it could be used to help speech problems. Physically singing helps people learn to extend breathing and strengthens the muscles around the core of the body (Wan, et al., 2010). Stuttering, Parkinson's disease, Aphasia, and Autism may be helped by singing. Wan et al. reasoned that "singing is particularly useful in ameliorating some of the associated speech-motor difficulties because of features such as continuous voicing, decreased production rate, and increased awareness of individual phonemes" (Wan et al., 2010, p. 7). This study also helped support the theory that music education may benefit ESE students both academically—specifically reading, writing, and speaking—and socially/emotionally with self-confidence and human interaction.

In 2014, Miksza and Gault used the data from the *Early Childhood Longitudinal Study of the Kindergarten Class of 1998-1999* (ECLS-K) and described how music effected the students from their kindergarten year through 8th grade. The problem they found was that most students in low socioeconomically living situations were not getting an adequate amount of music instruction because there was a lack in funding, proper education, and, in some cases, any music programs in certain school systems. As explained earlier, the data from the ECLS-K study contained the records of 21,260 children from 1,200 public and private schools in the United States, and the study showed an increase in duration of class time as the students progressed through each grade (Miksza & Gault, 2014). Miksza and Gault (2014) called for more studies like the ECLS-K study to be completed for the benefit of music education. The previously explained research that Forgeard et al. (2008) conducted was in fact a predecessor study that may support Miksza and Gault's study, though it was written before the review of *Early Childhood Longitudinal Study of the Kindergarten Class of 1998-1999.* Music instruction also may help

connect musical information and tools (e.g. self-discipline) to other aspects of life through the transferring of information.

Students will also realize the importance of music as they are shown that music applies to several different areas of life through the use of transfers. A *transfer* is defined as the learning and application of information to seemingly unrelated material. Peterson and Madsen (2010) better define transfers as the interrelation of information. The Power Chord Academy, a rock music summer camp in Georgia, teaches that music builds the foundation for the skills of self-discipline, dedication, and teamwork, as well as the value of knowledge, continuous improvement, self-confidence, humility, hard work, goal setting, and practice (Petress, 2005). Petress (2005) also stated that music helps with grace, coordination, timing, sense of aesthetics (beauty), history, culture, and countless other extra-musical aspects of life—extra-musical being the emotions one perceives and physical changes of those listening to music. Peterson and Madsen (2010) split transfer learning into two categories: high-road and low-road transfers.

> *Simple* transfer [low-road transfer] is almost automatic because it 'hugs' the original learning situation and takes little effort to apply to a novel situation. Complex [high-road transfer] transfer requires thought and effort because it is a transfer that is remote from the original learning and takes conscious awareness to find the connections or to 'bridge' ideas to novel situations that make relevant transfer (Peterson & Madsen, p. 26, 2010).

Transfers provide students with a highly comprehensive learning environment, which promotes the study of music in multifunctional outlets. Multifunctional transfers contribute to both scholastic learning and character building; therefore, it is important and should not be left out of education (Levinowitz, 1999). Curtis and Fallin (2014) also recorded transfers in their article. There are studies that confirm near-transfers, or simple transfer. For example, finger agility,

rhythm understanding, as well as an increase in attention skills, active listening, and sustained attention after students were exposed to music instruction (Curtis & Fallin, 2014).

Kraus and Chandrasekaran (2010) wrote a review about how musical training may help students learn auditory skills. In their review, they wrote about the practical implications and the educational implications their research had. Their research found that musicians can "incorporate sound patterns of a new language into words" (p. 603) and musically trained children often "show stronger neural activation to pitch patterns of their native language, have a better vocabulary, and a greater reading ability…" (p. 603). Overall, it was suggested that anyone who is musically trained will most likely have better language and speech skills. It was also proposed that musicians have better selective attention, working memory performance, and timing (Kraus & Chandrasekaran, 2010). The implications for education were equally as interesting. Kraus and Chandrasekaran (2010) inferred that the education system would be the best place to start early music training, even though some school system's music programs are lacking due to the misunderstanding of the benefits that music education will have on the school system. They argued that music improves learning skills as well as listening skills. They suggest that music programs will "reduce the negative influences of external noise and better prepare a child for everyday listening challenges beyond the challenges that directly relate to music "(p. 603) and children in ESE programs, who may especially be susceptible to challenges tuning out background noise, would benefit from music training (Kraus & Chandrasekaran, 2010).

In the Doctoral research conducted by Hearnsberger (2013), choral literature for high schoolers was studied to see if it improved literacy skills. Hearnsberger compared "8th grade literacy benchmark achievement test scores and 11th grade literacy end-of-course achievement

test scores" (p. 48) to see if there was a statistical difference between students who enrolled in choral programs versus those who did not. His findings did show that the longer students were enrolled in music choral programs, the better their literacy achievement, even though both choral and non-choral results increased. Hearnsberger's research is an emergent study in that there is not much specific research on how high school test scores are impacted by music. There is a need for more research like this to be completed. Music is such a unique subject, because it is so adaptive and complementary.

John Kratus (2007) said, "Not only have in-school music experiences become disassociated from out-of-school music experiences, but tried-and-true music education practices have become unmoored from educational practices in other disciplines" (p. 45). Because music is such a unique subject, music teachers may adapt their lessons to the skill level of their students (e.g., elementary, middle, and high school) (Peterson & Madsen, 2010). Kratus (2007) requested that music educators create sticky, engaging, or captivating, educational settings to engage today's students. Music is a valuable subject that must stay in today's education system. Music education is a necessity for successful mastery of simple and complex transfers. It helps students realize the importance of life-skills such as teamwork, dedication, and humility while teaching grace, timing, and coordination (Petress, 2005). Petress (2005) even argued that music keeps students away from illegal substances because it teaches responsibility. His argument will be further discussed in a later section. When taught well, music becomes *sticky*, or engaging, because it relates to students in today's society and is relevant to their world. Music effects both body and mind, and therefore, cannot be erased from public education today. Music's impact on education may be the key to helping the success of students with disabilities in today's public school system.

In the conclusion of the longitudinal study of Miksza and Gault (2014), there is value placed on a holistic educational experience where arts education is available to all students. Not only is it important for students to experience a truly holistic educational experience, it is also necessary for students to be given the opportunity to use music. It was suggested that when music teachers and classroom teachers collaborate in completing curriculum standards, they are modeling how to integrate music into elementary classrooms where students learn about music the most within school hours. There is also a call to continue music advocacy for all students in and out of classroom settings.

Today's public school music programs are being cut. According to Kratus (2007), the *No Child Left Behind Act*, in combination with changes in school funding are the main reasons for the cutting and de-funding of music programs. These cuts may be detrimental to the academic success of students. Petress (2005) argues that music helps increase students' success in the areas of society, school, intelligence, and life. The *Texas Commission on Drugs and Alcohol Abuse Report* supported Petress by saying, "Secondary students who participated in band or orchestra reported the lowest lifetime and current use of all substances (alcohol, tobacco, [and] illicit drugs)" (Petress, 2005, p. 113). Michael Greene, the former president of the National Academy of Recording Arts and Sciences and CEO of the 42nd Annual Grammy Awards, stated there is scientific evidence proving that music education supports success in other educational subjects, lessens teen violence, and helps the spatial intelligence of newborns (Petress, 2005). Today's youth need to see that music is a transfer subject that will help them achieve their academic, social, and emotional goals.

Music on its own has many positive effects on those who will use it. Everyone seems to have music built into their mind when they are born. It seems to also be a huge part of every

society in the world. Music can be used to teach many subjects, because music is transferable by nature; it should be noted, that music is also justified, by itself, as an art form. The research has agreed that music may also help with life skills, such as time management, responsibility, and respect. It is time to recognize the benefits music research, study its vast amounts of benefits, and understand how it is advantageous for ESE programs throughout the United States.

Chapter 3

Music education and ESE based research studies have blossomed over the last few decades. People are becoming more interested in finding different ways that music can help students with disabilities. Because music is transferable and naturally multi-modal, it may be one of the ideal ways to teach ESE students how to read, and it seems to also have profound effects on student behavior. I hypothesize that through this review of research, it will become more apparent that music has already been and will continue to be a successful tool in the aiding of comprehension skills, as well as in creating and sustaining positive student behavior. The following chapter is a review of the literature that researched how music has affected ESE students and programs in literature, and how music has impacted ESE student behavior.

Darrow (2011) wrote an article about the need for early childhood special music education. In the article, she listed all of the reasons that music should be used in teaching students who have disabilities and need special education, and music's importance in helping teach those who need ESE services. Within the cognitive domains, music can be used to help teach and reinforce educational standards across every subject. Darrow then includes a few different examples of how music can teach numbers to preschool students. The article also includes a list of how music promotes psychomotor skills. Motivating physical movements, synchronizing selected movements, structuring movements, promoting adherence to movements, facilitating relaxation during movements, distracting from pain experienced with physical movements, developing and maintaining muscle function, and increasing fine and gross motor coordination and control are just a few ways in which music helps students move (Darrow, 2011). Darrow (2011) also emphasizes that music in and of itself is engaging enough to keep a class's attention, can change the mood of the room, and teaches social skills.

Hourigan and Hourigan (2009) wrote an article to educate music educators, who may have to work with children with Autism but have no educational training, in how to teach those children. Autism, becoming a more diagnosed impairment today and beginning within the first three years of a child's life, is one of five disorders that fall under the pervasive development disorders, which include the following: Autism, Asperger's disorder, childhood disintegrative disorder, Rhett's disorder, and any disorder not otherwise specified (Hourigan & Hourigan, 2009). It is important to note that since 2009, the *Diagnostic and Statistical Manual-Fifth Edition (DSM-5)* removed and generalized the pervasive developmental disorder list into the general term Autism Spectrum Disorders (Association, 2013). Music teachers need to be aware that students with Autism may have difficulty relating to fellow classmates and display a range of both positive and negative emotional disturbances. The authors provide music teachers with strategies geared to help children with Autism succeed in music classroom settings. They also identify possible classroom behaviors, both disruptive and appropriate, that students with Autism may instigate in the classroom (Hourigan & Hourigan, 2009). Teachers need to be aware that music is the tool for ESE success and they could implement many musical experiences such as song, dance, and music playing into every class to help promote success.

In a literature review, Heaton (2009) wanted to see if it was in the predisposition of children with Autism to be naturally good at music, even if they were not savants, or extremely gifted musicians. Heaton (2009) started by discussing Kanner, who first described Autism in an experiment. From the research of Kanner, Heaton (2009) discovered that the students with autistic characteristics under Kanner most likely had a heightened sense of listening when it came to music, explaining those students' musical abilities. A study completed in 1979 concluded that children with Autism were better at reproducing atonal melodies than children

without Autism (Heaton, 2009). In addition, there was also research that suggests absolute pitch is not solely reserved for musical savants, but for Autism, concluding that perhaps students with Autism simply are better able to keep specific pitches in their long-term memory; however, all these suggestions are only theoretical (Heaton, 2009). Students with Autism are also more sensitive to musical timbre, being able to better discriminate between both similar and dissimilar instrumentations (Heaton, 2009). In the conclusions, Heaton (2009) noted that most students with Autism may not meet the criteria to be called savants, but nonetheless, they may have an unlimited amount of musical potential. Music instruction may help with spatial-temporal processing, math, reading, emotional understanding or intrapersonal understanding or interpersonal behaviors, such as sociality (Heaton, 2009). Heaton concluded by saying that children with Autism, who show musical skills, need to be taught in the same way that typical children are taught or potential may never be unlocked.

Hundreds of studies have been conducted to determine the extent of music's influence on the literacy skills of students. Because the research shows that there is a connection between music and language skills, music teachers could transfer that music may help ESE students succeed in all aspects of school. Even "singing is particularly useful in ameliorating some of the associated speech-motor difficulties because of features, such as continuous voicing, decreased production rate, and increased awareness of individual phonemes" (Wan, Ruber, Hohmann, & Schlaug, 2010, p. 7). Wan's study supports the theory that music education can benefit ESE students both academically—specifically reading, writing, and speaking—and psychologically, with self-confidence and human interaction.

Tamas and her two co-authors Markovic and Milankov (2013) researched the productivity of the systemic multimodal approach to speech therapy in conjunction with children

with different Autism disorders. Her study used thirty-four children between the ages of eight to sixteen, all diagnosed with Autism, to see how well the systemic multimodal approach to speech therapy could help treat the children's Autism (Tamas et al., 2013). Sze's (2005) summary on the benefits of music on speech agreed with Tamas's research. The summary explained that verbally identifying instruments, articulating words when singing, and articulating an instrument are a few areas showing how music incorporates language (Sze, 2005).

Traditionally, speech therapy for children with Autism heavily used repetitious exercise of speech, sign language, and slide show images. In the Tamas et al. (2013) study, the thirty-four children were split into two groups. One group was given classical speech treatment, while the other was given the systemic multimodal treatment (Tamas et al., 2013). The multimodal approach to therapy influenced the child's positive progress in communication, socialization, and self-worth skills. With time, the children with Autism were more open to receiving the new content offered to them in their immediate surroundings. The interactive and practical systemic multimodal approach to speech therapy was more effective than the traditional, classic methods of speech therapy, because it allowed the students to use multiple musical outlets as a means to help them function better in society (Tamas, Markovic, & Milankov, 2013). Music was shown as a tool to help ESE students' speech problems.

As much of the research already covered concluded, music is a multimodal subject that uses much of the brain and body. In the book, *Language, Music, and the Brain* by Arbib (2013), music is indeed multimodal, just as language is multimodal. Arbib discusses the emotional side of music and language before detailing brain research and the connection between music and linguistics. He also concluded that music causes two distinct types of emotional reactions: utilitarian and aesthetic. Utilitarian emotions are the basic emotions people recognize, such as

happy and sad. Aesthetic emotions are the emotions physically felt because of a force acting on something, such as goose bumps (Arbib, 2013). Arbib continues to the synthesizing music and language. He states that the link between music and language is "musical syntax and linguistic phonology" (p. 257). His treatise seems to suggest that music and language are very similar entities that could be combined.

When ESE students succeed academically, they are emotionally more self-confident, happier, and socially interactive. From the research reported in Chapters 1 and 2, it seems to be that music is a positive way to promote both academic and emotional success in ESE students. Sze (2005) put together a summary of facts to suggest that music used in the classroom benefits students with disabilities. She argued that music heals people and helps improve life, as a whole, for people with disabilities (Sze, 2005). Music has a positive impact on students' educational development because it gives students a reason to learn, a desire to learn, and a way to learn. Sze specifically suggested that music encourages development in "cognitive, learning, perceptual, motor, social, and emotional development" (Sze, 2005, p.113).

Music is also a tool to help struggling readers. Register, Darrow, and Standley (2007) listed completed studies that stated pitch, along with other musical abilities, affects a child's ability to read. In their study, six students with reading disabilities were put into a study alongside seventeen second grade students (treatment condition), while sixteen other second grade students were used as the control group. The control group was taught the traditional reading program, while the treatment group was taught the reading program and a subscribed music/reading program (Register et al., 2007). There were significant gains in the pre/posttest results of those who had reading disabilities. Because the study was conducted during a four week period at the end of the school year, a new study was suggested to last at least six weeks

with added emphasis on transferring word knowledge to reading comprehension (Register et al., 2007). Music's ability to engage students in the classroom can no longer be ignored. Connecting music and reading in the classroom may benefit students' reading comprehension.

A research study that tested whether music instruction could increase young students' phonemic awareness was conducted in 2005. Gromko (2005) used two kindergarten aged classes, a control and the test group, taught by collegiate music major students during a three month period. The kindergarten classes were the first in the schools in which they were taught. The English classes were taught through music via song, activities, and games to reinforce the English content. The results of the study concluded that, after months of music instruction, the children who received the music instruction had more improved scores than the control group (Gromko, 2005). After this finding, Gromko (2005) did note that the only substantial difference between the pre and posttest was in phoneme-segmentation fluency, probably because it is an aural skill.

Music can be integrated throughout the day within the classroom to develop vocabulary, comprehension, cultural awareness, creativity, and abstract thinking. Paquette and Rieg (2008) suggested that musical intelligences is the first thing to come from young learners, noting that most children are natural singers or hummers (Paquette et al., 2008). Paquette, et al. (2008) said that using music engages students' reading process, especially when taught using popular music (i.e. pop music). Butzlaff (2000) created a literature review in 2000 to determine if music actually helped teach reading skills. Butzlaff reviewed ninety-four empirical articles testing the connection between reading and music and the twenty-four studies that compared reading by students who had some music experience to reading by students with no music experience. In his explanation, Butzlaff asserted that the lyrics of vocal music engages the reading process, and

when students learned good music that they can connect with, they learned how to engage with the writing (Butzlaff, 2000). Music in the classroom will "generate interest, encourage creativity, and set the stage for a positive learning environment" (Paquette & Rieg, 2008, p. 231). Butzlaff's (2000) study found that there was a difference in the overall scores of students with music experience in comparison to students without musical experience.

In a study that sought to determine how music training affects the linguistic abilities in eight-year old children, the findings of Moreno, Marques, Santos, Santos, Castro, and Besson (2009) showed that music instruction improved reading skills, especially when it tested on phoneme-to-grapheme ability. Moreno, et al. (2009) discovered that music improves the phonological skills required for reading, builds concentration and attention skills, helps students discriminate pitch in speech as well as music, and increases second language learning skilled. Their research and review found that "…short periods of training [in music] have profound consequences on the anatomical and functional organization of the brain" (Moreno et al., p. 721, 2009). Moreno, et al. (2009) concluded that their research should be used to help develop further research education programs that use music education methods to teach children with disabilities. They hoped that special education music based research would begin because of their study.

Music is also a stand-alone subject, meaning that music by itself is able to help students' succeed and grow. To test how much music, by itself, affected student interaction, twenty-two fourth grade students from Ghazi Primary School in Zara, Turkey were divided into two groups (Dilci, Arseven, & Yildirim, 2013). During the four week period, the first group regularly listened to music while the control group was isolated from any musical sound. These researchers hypothesized that simply listening to music changes social behaviors, and their study

resulted in confirmation of their hypothesis (Dilci, Arseven, & Yildirim, 2013). They suggested that early childhood social development relies on music, and that merely listening to good quality music will benefit students in and out of the classroom.

Music is a valuable subject that must stay in today's education system. Music education is a necessity for successful mastery of simple and complex transfers (Peterson & Madsen, 2010). It helps students realize the importance of life-skills, such as teamwork, dedication, and humility while teaching grace, timing, and coordination. Music keeps students away from illegal substances because it teaches responsibility (Petress, 2005). When taught well, music becomes *sticky* because it relates to students in today's society and is relevant to their world (Kratus, 2007). Music effects both body and mind, and therefore, cannot be erased from public education today. Music's impact on education may be the key to helping the success of students with disabilities in today's public school system.

Kirschner and Tomasello (2010) conducted a study involving ninety-six four-year-old children of mixed socioeconomic backgrounds from sixteen different German daycare centers. They tested how music impacted spontaneous cooperative and behavior using musical vs. non-musical manipulation. The entire session lasted twenty minutes and was split into four phases: experimental manipulation phase, dependent measure one, manipulation phase repeated, and dependent measure two (Kirscher & Tomasello, 2010). The results revealed that in small-scale societies, joint music making helped the social behavior in 4-year-olds (Kirscher & Tomasello, 2010). People have musical experiences and then want to engage with others because of the music and how it affected them.

In a second test, Caltabiano (2010), during her undergraduate honors thesis, conducted a seven-week study on how music therapy both affected and helped the social behaviors of four

children with Autism. She used the Griffin Park Public School system alongside the Grace Music Therapy Centre in Australia to facilitate her study. She also used a mixed methodology (the combining of multiple observable teaching strategies) to collect and analyze data. The data indicated that an increase in music resulted in an increase of positive social behaviors and that a decrease in music resulted in the decrease of positive social behaviors (Caltabiano, 2010). Musical experiences resulted in "a greater tolerance of frustration and more openness to experience, laughter and enjoyment" (Caltabiano, 2010, p. 43). Music gives ESE students an outlet, allowing them the freedom to feel and express emotions that they could not do otherwise.

This review of specific ESE research studies is only the surface of total research that has been completed on ESE and music instruction benefits. Overall, it seems that music does have a positive effect on learning outcomes for ESE students. The focus on this chapter was to find out if language arts skills were strengthened through the use of musical instruction, and based on the research, it was determined that language arts skills can be positively influenced by music instruction. It seems as though music-based literacy and comprehension lessons may be the most engaging for this population of students, because it provides them with a different approach to learning. Because music is inherently engaging, it may be an alternative way to teach literacy to students in ESE populations. More research will continually need to be produced to continue confirming these ideas, but music does seem to have a lasting impact on cross-curriculum teaching.

Conclusion

This review sought to demonstrate that music is an effective tool that transfers subjects, affects the body and mind, and furthers education in ways that were once completely unknown. Research studies on music and education have long been popular, and they will continue to be created as technology advances. Along with the research that has already been completed, more music-based education research support is needed to conclude that music is an effective learning tool that engages students in ways that traditional teaching methods may not. I hypothesize that a music-based education study, using a full school year curriculum for third graders who are also struggling readers, could help improve struggling readers' comprehension assessments. Through the previous chapters, I am convinced that such a curriculum may have a lasting impact on overall English grades in students who would complete such a program. However, due to time constraints and resources, I cannot create and complete this study. Therefore, I will now discuss how this curriculum could be created and implemented.

Purpose

The purpose of the study would be to determine whether music instruction is an effective way through which third grade teachers could teach language skills, focusing on vocabulary, phonemes and graphemes, and decoding skills to struggling readers through a yearlong music-based curriculum.

Participants

To begin the study, an elementary school would need to be chosen. The school would need to have a variety of socioeconomic backgrounds and levels of comprehension, as well as a variety of gender. It would also be interesting to see if educational changes varied between male and female participants after the curriculum study was finished. The study would require all

third grade struggling readers. The best results will probably be brought about when the participants are in the least restrictive environment so they are able to react naturally to their experience. Therefore it would the study would be most effective if the struggling readers did not know that they were being used in the study, the parents however would have to know. Not allowing the participants to know may isolate any chance of the participants feeling superior or performing better automatically because they were aware of being part of a study.

One of the best ways to inform people about the effects of music is through advocating. To get a school's permission to complete the study, there could be a meeting for all the third grade parents, the administration, and the teachers who would be involved in the study. Based on some of the points from Curtis and Fallin (2014), the meeting would summarize new research findings that connect music to increased learning, dialogue about how the curriculum would still adhere to and follow all standards for the year, and answer any questions or concerns that parents might have. For this type of study to be effective, the teachers and parents who are affected by the study need to be amenable with the study.

For best results, the teacher in the study should either be a music teacher or an elementary teacher trained in the study curriculum. The teachers involved in the study should be trained in the curriculum, before the study began, using concepts from Collins (2014). Collins' article focused on educating pre-service elementary teachers on neuroscience and music education. Collins' approach used two groups of pre-service teachers. One group was given music education instruction while the other was not. The group that was given the music education were told about the neuroscience findings where musically trained people were better at processing information, and had better memory storage and retrieval. They were told how music training builds visual and verbal skills, as well as phonological awareness (Collins, 2014). The

pre-service teachers were given fifteen hours of music and dance over a span of ten weeks. For the curriculum training, the teachers should train for five days, training a total of ten hours over those five days. According to the results from Collins' (2014) study, the pre-service teachers who were given the extra music and dance instruction had increased the value that they placed on music instruction. If the teachers in the study are elementary teachers instead of music education teachers, then with this training, they should also have an increased value in music instruction, validating the study.

Study

The next step in this research proposal is the creation of a music-based literacy skill curriculum. For this specific study, one should create a schoolyear's worth of fifteen minute lesson plans for grammar, vocabulary, and decoding. The plans should be based in multimodal teaching techniques and also cover multiple learning styles. To simplify testing, vocabulary would be taught through singing, grammar through rhythm, and decoding processes through connecting story structure to the structure of songs. In this way, the study would test how singing, rhythm, and learning song structure influences literacy skills over the period of a single schoolyear. Since the focus is on struggling readers, the literacy skill lessons should be engaging, keeping the students moving and active. Because music is inherently engaging in its own right, the students should naturally engage with the lessons. Some lesson ideas could come from the studies completed by Register et al., Darrow, and Gromko. Such a variety, when used effectively, could have drastic positive effects on literacy skills. Assessments should be both formal and informal, but formal assessments should not be confined to only paper testing. A series of assessments should be created and implemented where the mediums through which they were taught would be varied to keep the students' attention. To check the base reading level and

the end reading level after the year curriculum, the testers should probably have two pre and post-test resources for grammar, vocabulary, and decoding. After the full curriculum was completed, advertising would have to begin to find an elementary school that would be willing to accept my education-based study.

While the study was being implemented, someone should play an active role in observing the flaws and the positives in the study. Along with the pre and post-tests, a teacher evaluation of the curriculum should also be created and given to the teachers who are implementing the curriculum during the study. It is one thing to create a theoretical curriculum, but it is another to implement that curriculum successfully, and through teacher observations. The best way to learn is to constantly evaluate. If the possibility were to arise, the researchers should also receive feedback from the parents of the participants to see if they too notice changes in the students reading levels as the year progresses because the teachers would only see a portion of their students' lives.

Predictions

The results of such a study may demonstrate that overall, music was indeed beneficial to the literacy skills in third grade students. Such a study would also affect the classroom in behavioral ways on top of its impact academically. Since music is already engaging itself, I predict that throughout the year, there would also be behavioral and social changes in the students. Music is a community event. Using music to aid educational instruction automatically involves most or the whole of the class body, including the teacher. The study may also help improve physical skills in the students as well, just as the research from chapter two conveyed.

If the results of the study end positively, the implications could change the face of American education today. I predict that the cognitive development of the participants would

increase, as Bolduc's (2008) research states. The act of singing, playing, creating, and responding to and understanding music will help the participants "build up their knowledge using their own and standard music vocabulary to discuss their musical experience" (Bolduc, p.2, 2008). The music-based curriculum may be another way through which students can improve their literary skills. Even though music in this study is complementary, the students may long remember the songs and experiences that they had through the research study, because music experiences stick to the mind, since people use both hemispheres to comprehend music experiences (Curtis & Fallin 2014; Kratus, 2007). The participants should learn that the music tools they use to remember literacy skills can transfer to their other subject areas, such as math and science. Overall, I predict that, even if it is a small amount, there will be an increase in the final post-test scores.

Limitations

As in most research, there will be some limitations to this study. These limitations may include participant diversity, the size of the study itself, parent participation, research bias, and unforeseen events emerging. If the groups used are too diverse, the ranges of the grades of the pretest and posttest may not be effective. It may be better for a smaller population in a low-performing school system to be the participants in this study. A yearlong full curriculum is a huge research project that will need to be funded and completed with excellence. The sheer size alone may be a detriment to the study, and it may have to turn into a semester long research study. An alternative could also be building to a yearlong curriculum. This would mean having to create smaller versions of the study, starting with a three month study, then a five month study, and then a full school years' worth curriculum. If the teachers or parents are not committed to the study, they will turn into variables that may become unusable. This is why it is

so important for the research to be presented to the parents and teachers before the study is finalized, making sure that everyone involved with the study is completely aware of the requirements, benefits, and proposed results of the study.

Concluding Statements

There needs to be continual research on the topic of music education in the classroom and how music affects the human body. There are still many things that researchers will discover about music's full impact on society. This literature review and proposal does not begin to cover all the research, but it is a small beginning. As teaching evolves, teachers need to look to music as a viable complimentary way through which subject matter is taught. Music will undoubtedly have an effect on the classroom and on the behaviors of the students. It naturally makes students move, pay attention, remember, and recall information. The research shows that it has a positive effect on grades when effectively used to teach or compliment teacher instruction. Music's effect on ESE populations is undeniable and music should be used to teach every ESE population at some point. As teaching evolves, and methods change, music being a part of the classroom should remain constant.

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