

A Comparative Study of Students Performance in Music Class When Taught Using Content Songs and  
Without Content Songs in 3rd Grade Class at a Selected Elementary School in Tennessee.

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### **Abstract**

The purpose of this study was to compare students' performance in a music class when they were taught using content songs and without content songs at a select elementary class. A sample of twenty-eight third graders learned two lessons, a lesson on the woodwind family through the use of a content song and on the brass family, without the use of a content song, gaining knowledge on four specific instruments from that family, based on the content of characteristics, parts, and pitch. After both lessons, an assessment of 12-items made up of three categories: characteristics, parts, and pitch, was administered to examine students' performance. A significant difference was found between the mean scores of both tests when students were taught using content songs and when taught without content songs. A significant difference was found between the test categories of characteristics, parts, and pitch when using subscores when taught with a content song and when taught without a content song. These results imply that musical mnemonic devices can be an effective teaching tool but maybe more coherent in an elementary music classroom where this strategy is in constant use-and music advocacy is active.

*Keywords:* content songs, mnemonics, elementary school students

## Chapter 1

### Introduction and Background

In the fifth century B.C., Simonides of Ceo began the historical development in creating mnemonics and mnemonic devices, reciting an ode of a noble man's banquet. After, others started to acquaint themselves with the Ancient Art of Memory like Cicero, Saint Thomas Aquinas, and Saint Ignatius Loyola. Today the common uses of mnemonic devices consist of acronyms, acrostics, and number-sound mnemonics. Students in both public and private schools have been taught mnemonic devices to recall historical facts: "In 1492 Columbus sailed the ocean blue", geography, HOMES (Huron, Ontario, Michigan, Erie, Superior), math, Please Excuse My Dear Aunt Sally, art, Roy G. Biv.

Mnemonic devices describe a device as an aid or a design to aid memory; common types of these devices include patterns of letters, an acronym or ideas, a song, or rhyme. Bellezza defined these devices as "strateg[ies] for organizing and/or encoding information with the sole purpose of making it more memorable" (Bellezza, 1981). With these in place for students, they can better decipher the information given to recall substantially easier. Mnemonic devices prevail for all students; English-language learners, students with learning differences, and their non-disabled classmates. These instructional devices serve access towards imagery, verbal, rhymes, chunking, and organizing while retrieving the information given. The studies in this proposal demonstrate the usage of songs or chants with rhyming for instructional purposes used as a mnemonic device to lend retentional aid in recalling facts in general education classes. According to Bellezza, one problem within the research of these devices is the focus on certain aspects of their purpose. However, the modern attitude towards these devices continues to be at large through educational purposes, using cognitive cueing structures (Bellezza, 1981).

The emphasis on such structures centralizes the learner recalling a verbal set of factual information, enabling the retainment of memory. One of these methods is rote learning, establishing an oral report, a common procedure teaching elementary music. However, musical mnemonic devices evoke rhythmic and/or melodic structure, combining musical elements such as tempo, mood, and tonality to implement a creative approach to educational instruction. While Crowther states most lack the purpose

criteria, these songs, paired up with meter or rhythm, imply engagement and movement with students, evoke strong emotions, and form as encoding devices such as pairing hard-to-remember words with easier words (Crowther, 2012). More and more students learn information through sensory modality-visual, read-write, auditory, kinesthetic, or mixed-modality, having the capabilities to reach students with sensory mixed-modalities; giving the music a chance to meet the needs of students' modality.

Many studies have proven music allows the brain to recall memorization fast. When the music reaches the frontal lobe, used initially for thinking and decision-making, it enhances its functions. The temporal lobe, the part of the brain that processes what is heard, allowing the listener to appreciate the music-the left hemisphere aligns with the words and language while the right aligns with music and sound. In addition, parts like the putamen, which process body movements and coordination, increase our responses rhythm (Sugaya and Yonetani, 2006). It's said information set to music allows the brain to recall memorization faster. Two areas of the brain, the hippocampus, and frontal cortex, are two structures that play significant roles in memory and learning process information constantly; while obtaining the information is relatively easy, getting the information out is difficult. Music helps resolve this problem. According to researchers, music provides rhythm, rhyme, or alliteration, unlocking the information stored in those two structures. As teachers, we use this information to help students learn challenging (learning the 50 states or anatomy) or multiple-step (PEMDAS and The Water Cycle) content enjoyably.

Students tend to learn and retain subject matter more when set to a chant or song. And while most people assume you have to be musically gifted to benefit from this type of mnemonic device, this is not true. Everyone listens to music throughout some point of their day; the joy that it creates stimulates throughout our bodies, instills in an elementary classroom. When rehearsed, the textual information in the form of lyrics and partnered with a melody act as an effective prompt in recalling lyrics (Gfeller, 1982).

Yee Pinn Tsin (2015) understands that studying science for many students can amount to a rigorous, straining, and ultimately frustrating mindset. She also knows that end due time, teaching 21st-century students cannot solely rely on visual and kinesthetic methods, but innovation must quickly



increase. Students in STEM classes have an escalation of stress and anxiety. However, music helps reduce anxiety, stress, and blood pressure in students, notably at the university level. The study focuses on creating songs from a subtopic in the students' syllabus in a challenging content area like chemistry, involving utilizing formulas, equations, and facts to enhance retention. In obtaining feedback, she designed a questionnaire containing six closed questions relating to composing songs as a method of teaching content for students of different academic proficiencies to answer. One example of this method in action used the tune "Colors of the Wind" from Disney's Pocahontas to teach a Chemistry subtopic titled: Equilibrium. As her subjects, she chose ninety-five Monash University Foundation Year (Science) students in Sunway College. After the study was complete, she gathered that students from the University needed this methodology as a teaching aid. The majority of students viewed the content songs as enjoyable, a helpful tool, and agreed the content presented assisted in their learning while lowering stress and boredom. An increase in motivation and engagement in the classroom grew exceedingly.

Lesser, Pearl, Weber III, Dousa, Carey, and Haddad (2019) did extensive research on how music, specifically the uses of songwriting as musical mnemonics, with an increase of interaction, can increase retention and recall. The study's central purpose is to develop interactive songs, a continuous building of online activities that incorporate, including student contributions while integrating within the songs, or SMILES (Student-Made Interactive Learning with Educational Songs). Their goal was not only to improve retention of facts and knowledge in the field of Statistics but to increase motivation, participation, and engagement in the classroom since the majority of students in this content tend to have an increase of stress and anxiety and a decrease in stimulation. Before the study began, they found that several concepts impact the effectiveness of a content area song, such as rhyme, rhythm, melody, tempo, etc., making songwriting for mathematics and science concepts a challenge. Many components make up a song, but the primary consist of beat and melody; these two crucial elements attached with brain activity relating to our emotions help us decide ether the tune is familiar or unfamiliar (Pereira et al., 2011). The research was conducted in an introductory General Education statistics course at a two-year college and research university. Most students agreed, with some strongly agreeing that the interactive songs kept

them engaged, were relevant to learning, were high in quality, and relieving stress or anxiety. These researchers received feedback from students indicating the SMILES song collection should include faster tempos, more contemporary genres, shorter length, and familiar melodies to improve engagement and recall.

McLachlin (2009) used his classroom, an introductory second-year Biochemistry course, as his field of study. His framework and goal aligned with composing content-specific lyrics to popular songs to introduce and retain new information in an engaging way through surveys. The research was conducted in his classroom, hypothesizing that learning unfamiliar words or concepts comes easier when set to a familiar tune. In his class, students became engaged through singing and handclapping, magnifying the excitement in the classroom. The first results surround the education song used in the class; with the majority reporting they sing the song outside of the classroom. The tune used was the Flinstone theme song, a moderate, upbeat tempo, major chords, and quick rhymes, etc. These characteristics generally resign with happy music while a slower tempo, minor chords, expresses sadness. He also emphasizes the importance of moving away from less than familiar tunes, older songs, but implementing familiar songs, jingles, or theme songs due to the well-acquainted rhythms and melodies. Familiarity, in term of music, deepens the individuals understanding and increase the engagement while listening when joined with the components of music it increases the enjoyment to the listener (King and Prior, 2013).

Hayes (2009) did extensive research with elementary students in using melodic and rhythmic mnemonics. The goal was to see if elementary students have better retention and recall of subject matters can they independently recall them in a test and use them when put into rhythmic or musical mnemonic devices. Her subjects included first, third, and fifth-grade students studying science and mathematics. In the first setting, students were in groups and used hand motions to enhance engagement. In the second set, she used a CD, sung along, and then let the students sing along, then grouped them. In the final set, a chart became a visual representation of the topic and used hand motions. In all settings, the students responded positively, and an increase in test scores was physically evident. Even though this research

included multiple grade levels within elementary, she also contributed to more than one content area, showing melodic mnemonic can relate to other subjects, and more importantly, create an increasingly beneficial stance in academia. Few studies are complete on melodic and rhythmic mnemonics methods at the elementary level; most stem from STEM content areas in higher education or ESL programs; she discusses this growing problem at the beginning of her research.

### **Statement of the Problem**

Mnemonic devices are not a new idea in an elementary music room; one significant concept that connects to the foundation of music is the musical staff. In learning the line of the musical staff EGBDF, the acronym Every Good Boy Does Fine is a familiar western approach to helping students remember. For the spaces, FACE, the repeated method is the word face. The same procedure follows in learning the bass clef. Though many music teachers use these simplistic approaches to recall and retain fundamental notions, core curriculum teachers use musical mnemonic devices (song, rhyme, or chant) more than music teachers themselves.

Though many elementary teachers use musical or rhythmic mnemonic devices to enhance the instructional learning process, some retreat. Reasons for retreating from imparting these devices include the lack of musical ability or knowledge, rhythm, pitch, or simply confidence. The majority of research tailored to these mnemonic devices has been for ELL, students with learning disabilities, and curriculum courses that fall under the STEM program. In addition, there is extensive research on how the brain is positively effective when exposed to the concepts of music-rhythmic and melodic to enhance the recall of textual information. The lack of research on using musical mnemonic devices in a musical classroom and elementary settings increases the desire to further examine the disconnects between the two.

### **Purpose of Study**

The purpose of this quantitative study, then, is to determine the effects of using musical mnemonics devices; in the form of content songs on the retention and recall of factual information in an

elementary music classroom in upper east Tennessee. Specifically, the intent will focus on one primary objective: Determining the correlation between musical mnemonic devices in an elementary music classroom. The information retrieved from this research study will become a tool for future elementary music teachers; on how to implement an educational strategy in their field and in their classrooms.

### **Significance of the Study**

Elementary teachers recognize the importance of combining music with instruction; the lack of elementary music teachers incorporating this education strategy in their education practices is few. Many, if they have not had vocal training, are hesitant. Some do not see the need for reinforcing a technique when singing is already a constant procedure, and others view their elementary school as a population where students do not like to sing, however, they see the benefits this strategy produces in core curriculum courses as part of instruction. In reinforcing this teaching, elementary music educators would not only gain confidence but use it as a way to enhance and delight their open-minded students daily.

### **Limitations**

The study was completed on a small scale, where third-grade students from one public rural K-5 elementary school will be assessed; the results cannot be generalized to other elementary schools. This study solely focuses on mnemonics devices in the form of music, excluding other types of mnemonics such as pictorial and visual.

### **Definitions**

Mnemonic - Mnemonic is a term used to describe a device or technique to enhance the aid in memory, linking new information to familiar information, also called memory aid or mnemonic system (APA Dictionary of Psychology).

Musical Mnemonic Devices - A device or technique that uses a rhythmic-melodic structure to help aid in the recalling of spoken information. The product enhances engagement and motivation when taken on verbal memory learning tasks (Knott and Thaut, 2018).

### **Variables**

Performance in Music Class - The Performance in Music Class will what is measured, the result and/or finding when an assessment is given when students are taught a content song and without a content song.

Content Songs - The independent variable in this research study is the content song issued and taught to the group of students before their first assessment.

No Content Songs - The dependent variable in this research study is No Content Songs issued and taught to the students before the students second, and final, assessment.

### **Theoretical Framework**

Gfeller (1982) based her study on the effectiveness of music as a memory aid on 60 students, 30 who were learning disabled and 30 students without learning disabilities. He used a repetitive structure of musical mnemonics and cueing, placing the model of teacher-directiveness on these educational strategies increased the aid for both groups. All boys ranged from ages 9-to 11. Gfeller sought out the importance of using musical mnemonics, and more so, the strategy of cueing. Using rhythmic patterns such as 6/8, 4.4, and syncopation within the meter of 4/4, Gfeller found it less effective with the focus groups. In conclusion, her theory of heightened attention in a musical stimulus contributed to the improvement of recalling textual information.

Bellezza (1996) theorized that successful mnemonic devices include four specific criteria: constructability, associability, discriminability, and bidirectionality of associations. Constructability is the ability to access and retrieve the mnemonic device when recalling. Associability refers to the connection between recall information and the mnemonic device. Discriminability is the idea if multiple lists are to

be recalled-each list should have its specific mnemonic device. Bidirectionality ensures the useability and aid of the mnemonic device.

Schmidt and Bjork (1992) considerably argue that learning and retention should be together instead of separate. In continuing, Anderson (1995), stated that information residing in Short Term Memory (STM) is stored for 18 seconds, while anything longer than that timeframe is retrieved to Long Term Memory and repeated. If the text or words are replaced with a musical melody to store information the retrieval of information will increase in the LTM.

Ritter, Baxter, Kim, and Srinivasmurthy (2011) conducted studies with a central focus on learning and retention. They have presented that process of retention occurs in three stages, declarative, associative, and procedural. Declarative refers to the lack of memory to have the ability to perform a task.

Associative is the mixture of both declarative and procedural. Procedural is the drive of the performance itself; this contributed to the theoretical foundation in forgetting and retaining in the stages of learning.

Mastropieri and Scruggs (2000) directed many research studies spanning over 1,000 studies focusing on musical mnemonic devices. Their data has presented that the retrieval of information through these devices produces a more efficient and effective educational strategy which contributed to improved grades, positive classroom motivation, and engagement between teacher-student relationships and student-student relationships. Primarily, this method benefited students with learning differences, where memorizing and recalling came about as difficult.

### **Overview of The Study Summary**

Chapter 1 provides the introduction and background-including the statement and purpose of the problem, the limitations, definitions, the organization, and an overview of the study. Chapter 2 covers the critical review of research and literature relevant to the study, and chapter 3 will deal with the research questions and hypotheses, the specific questions to the answers in seeing, giving focus, direction, and the framework within organizing findings of the study. Chapter 4 will cover the analysis of the data received

and the findings of the study. Chapter 5 will contain recommendations and conclusions of the research study.

## Chapter 2

### Review of Literature

#### Research from the Musical Training Perspective

Roden, Grube, Bongard, and Kreutz (2013) studied the neurological link between instrumental music training and memory in the brain of primary school-aged children. Out of their participants, half of them received music training from an extended music education program for about 45 minutes. Roden, Grube, Bongard, and Kreutz found through subtests that children who had musical training indicated a superior development in both cognitive and auditory information processing.

Spelke (2019) did extensive research on how the school children with musical training showed an increase in advantage when it came to mathematic performances. She chose as subjects for her research three populations: students in an elementary, middle, and high school in all levels of music training; weak, moderate, and intense. The study focused on problems where geometrical properties and relationships were shown and varied across each problem. As a result, children who received moderate to intense musical training showed higher performance on mathematical tasks. Students in a high school are associated better with geometric sensitivity performance. Students with moderate music training showed a small but still significant effect in map-reading-relating to geometric skills.

Rickard, Vasquez, Murphy, Gill, and Toukhsati (2010) research the phenomenon in instrumental music programs increasing its achievement on verbal memory within primary school children. Throughout several studies, musicians have expressed enhanced cognitive and psychosocial functioning, with the primary concept being verbal memory “acquisition (or learning), immediate recall and delayed recall of verbal or auditory information (para. 1).” Their chosen participants were recruited from nine regional state primary schools where the majority allocated to intensive music programs, and the rest participated in standard music classes that did not. The researchers initiated three sources of measure, two subtests from The Children’s Memory Scale and Benton’s Visual Retention Test. Across three years, the students who received intense musical training showed great. In conclusion, “music training may have



significant benefits for children in terms of enhancing non-musical cognitive functions, such as verbal memory (Rickard, Nikki S., et al., 2010, p. 36+).”

#### Research from Medical Perspective

Zalanowski (1990) studied the neurological link between music appreciation and hemisphere orientation along with visual and verbal involvement. Seventy-two nonmusical majors enrolled in introductory music (right-hemisphere) and psychology class (left-hemisphere). Each subject listened to a musical selection assigned randomly to a condition: visual representation, verbal description, or control. As a result, right-hemisphere subjects had a greater appreciation for the music selection in terms of attention, understanding, and enjoyment than left-hemisphere subjects. Results following the verbal condition included left-hemisphere subjects scoring higher in visual conditions-right-hemisphere subjects scoring higher. Zalanowski’s (1990) research confirms that people who correlate with being right-hemisphere show greater appreciation towards music than left; the left-hemisphere still accepts some concepts in music-such as language.

Sjolun (1977) reports on how cerebral dominance under music-particularly affects the right hemisphere. His goal was to incorporate art-related tasks to increase development in first and second graders who’ve been identified as right-hemisphere-dominated while experiencing low academic skills, poor self-image, and problematic behavioral traits. All students responded positively when stimulated by visual imagery, such as diagrams, pictures, movies, plays, creative movement, field trips, and operettas. Additional findings included in the area of language, students’ memory increased when learning through flashcards, increasing memory in terms of vocabulary when creative movements became allowed with words, stories, and poetry.

Colleagues of the Stanford University School of Medicine (2007), results show that brain activity peaks during movement transitions-process of music slowing down, followed by a brief silence and then the beginning of the next movement. The chosen participants were ten men and eight women. The colleague's goal was to mimic the everyday activity in listening to music passively. The

brain sorts out different events allowing the brain to organize information, a process called segmentation, where the division of brain tissue between white and grey matter with cerebrospinal fluid. Each participant included a brain scan, and all scans reported that in a 10-second window of silence, two locations in the brain increased in movement activity, significantly, the right side.

Sacks (2007) details how the brain, with its sensitivity to music, creates “automatic or compulsive internal repetition musical phrases” as a universal effect (p. 44). The brain treats and syncs imagery and memory in a music format so that there is no equivalent as it unfolds in the visual mind. Tempo, rhythm, and pitch “then to preserve with remarkable accuracy (p.47)” while scenes in a visual aspect are not recalled as accurately. As a finding, Sacks (2007) concurs that musical imagery and memory occur even in the minds of those who are non-musical; this occurs in a neurological process such as irresistible and unforgettable catchy tunes or earworms.

In an experiment to understand the medial temporal lobe Samson (2006) tested musical preference and recognition. He chose as the subject for his research with both left (LTL) or right (RTL) temporal lobe and normal control (NC) lesions. The goal was to observe melody repetition connecting with memory to where exposure assists implicit and explicit memory. The results indicated that melodies studied were preferred over nonstudied melodies and thereby establishing impairment in both LTL and RTL patients, supporting priming and memory recognition.

D’Acierno (2015) chronicles how music and physical exercises abided by the Greeks, Romans, and Arabs-spreading tremendously to the western and eastern worlds. Advocating that both Plato, Aristotle, and Socratis stated music inhabits and embodies everything that encompasses a human being, the body, the mind, and the soul. D’Acierno researched how both music and language, yet independent, inextricably link within different regions of the brain that are responsible for music, movements, and language learning. D’Acierno states the music and languages are governed by the same brain processes, the temporal lobe, the memorizing of information, and the frontal lobe, the learning of syntax, rules of harmony, and music perception. In addition, the researcher identifies the uses between the left and right

hemispheres, stating that both hemispheres collaboratively influence the use of language and music ability.

#### Research from the Classroom and Learning Environment

Bintz (2010) did extensive research on his new curriculum, including reading, writing, and singing that stretches across core curriculum classes. He chose his students, graduate students, for his research. The study focused on incorporating core content area concepts into familiar and popular songs where his graduate students create content-area songs for science. After the trial, students emerged concepts of reading and writing in the form of a song, which seemed effortless, especially in more challenging content areas such as science or math.

Cooper (2010) experimented with the incorporation of songs and stories and how they boost brain development. Two concepts: reading and singing, create advances in language skills, increase in memory, and emerging literacy with early childhood students in the classroom and create foundational structures of advancing. Through research, Cooper identified that linking stories to songs helps create strong relationships intertwining with classmates, culture, family, increasing the social environment between individuals. "Songs, stories, and storytelling-especially for young children-are social learning environments, and it is the social interaction that promotes bonding between individuals while supporting and extending learning" (Cooper, 2010, p.24). She encourages exposing students to song stories such a nursery rhymes and chants to increase engagement in the music environment. Musical classrooms can help nurture and inspire musical conversations amongst children.

Haynes and Canadayi (1974) experimented with memorizing 16 nouns with over 120 elementary students in the selected grades of 2nd, 4th, and 6th. The memorizing process of mnemonic devices comes in terms of encoding. Haynes and Canadayi evaluated unit transformation and order transformations. In conclusion, students who used mnemonic devices improved significantly and showed tremendous recall to core content area subjects such as language arts, math, science, and history through the process of imagery. As a result, both total recall and degree of organization in the uses of imagery increased significantly.

Stuft (2015) chose her middle school classroom to research integrating music into literacy instruction. Her goal was to improve the fluency of reading comprehension and facilitate writing through the importance of music, knowing that music correlates positively to overall cognitive abilities. Not only did Stuft provide how each, when separate, are independent concepts, but together, they are viewed as parallel skills by sharing in similar features such as listening, reading, speaking, writing, oral, aural, and print communication. The students participated in two musical activities, enhancing the learning of two books-Tuck Everlasting and The Watsons Go to Birmingham. In the first study, students play the musical activity called The Circle Game. Stuft realized students determining the relationship between both, the lyrics of The Circle Game and the Tuck Everlasting, explained in musical aids helping students interact and interpreting the text. In the second study, Stuft played two musical sections, Taps and Yakey Yak, both mentioned in the book, along with jazz selections. As a result, students were able to experience a deep connection between the music and the characters by visualizing the various settings in the book. After both studies, the students express understanding and connect better to the concepts that make up a story, the character, the plot, the setting, and literary themes.

#### Research from the Cognitive Psychology and Neuroscience Perspective

Halpern and Mullensiefen (2007) researched the influential impact on timbre and tempo within the implicit and explicit memorization of tune; they described implicitly as the “pleasantness of old and new melodies” and explicit as “confidence in recognition.” Researchers believe that music is encoded through a perceptual memory system () but as () says, “musical information could be associated with emotional and semantic information (associative memory)-either indirectly or directly, as was shown [3], even if it is not directly related to semantic information (). After the initial trial, they saw an impairment with the implicit memory from participants but worsening explicit memorization. The changes in timbre and tempo affected both concepts of memory and initially concluded that two musical memory systems exist.

Dege, Kubickey, and Schwarzer (2011) research the correlation between music and memory in children, having 55 preschoolers from Germany. A total of eight measurements were assessed:

- intelligence,
- precursors of reading,
- phonological awareness with the following subtest: rhymes, word segmentation, phoneme synthesis, and phoneme recognition
- working memory,
- rapid retrieval of long-term memory,
- musical abilities with the following subtest: melody, pitch, rhythm, tone length, and meter perception
- musical performance abilities with the following subtest: singing a song, rhythm production, and meter execution.

Out of these measurements, the researchers found that a significant correlation associated between IQ and music production, music perception, such as pitch perception, rhythm perception, and tone length perception were significant. In addition, they found that musical production and perception are associated with phonological awareness and precursors of reading, like singing a song, encompassing rhythm production.

Perret (1994-97) knew what literature reflected neuroscientists investigating the influence of music on learning within children, with playing an instrument being a positive correlation. The goal was to improve the learning of young children through exposure and attentive listening to live music. Perret created his research on seven main focal points:

- The infusion of live music will enhance basic curriculum formats.
- Teaching by example, a musician's creative work process of practice, revision, refinement, and presentation will stimulate a young child's mind to do the same.
- The improvement of a child's ability will result in abstract reasoning.
- Making learning an emotional experience will lead to intellectual experiences.

- Developing a student's capacity for intellectual and aesthetic discernment
- Making classical alive for students greatly tops making it accessible.
- Continuing the contribution of research on music's impact on cognitive, creativity, and motor skills, as well as high learning skills.

The study focused on a woodwind quarter playing for a selected group of first-grade students for one-half hour. As a result, teachers saw better attendance, behavior, academic performance, and longer attention spans.

Krumhansl (2002) research the dynamic ratings of basic emotions and tensions. The goal was to see if instrumental excerpts continue to describe essential emotions. Eerola and Vuoskoski's (2013) research positively correlates music and emotions. As a result, Eerola and Vuoskoski (2013) identified two sets of emotions; perceived (external) and felt (internal). For their primary finding, the researchers found that emotions such as happiness, anger, sadness, and tenderness are perceived accurately in music. For Krumhansl (2002), participants correlated sadness by slow tempos and minor harmonies. The emotion of fear moves towards rapid tempos and a large range of dynamics and pitch. Happiness correlates among quick tempos and dance-like rhythms. The researchers formed an overview approach including inclusion criteria, research approach, emotion model, locus of emotion, and stimulus details, such as musical stimuli. In addition, Krumhansl found that tensions correlate with both fear, happiness, and sadness, stating, "Tension appears to be a multivalent quality, influenced to some degree by all three of the basic emotions represented by these excerpts (Krumhansl, 2002, p. 45-50)."

Bugter and Carden (2012) studied the effects of the music genre on memory tasks. As participants, four groups. Their chosen participants were 60 college undergrad students from psychology, sociology, and biology classes. Bugter and Carden found a difference between three groups classical, rap, and silence; the group exposed to classical music produced the best performance and grades. Because of this research study, Bugter and Carden (2012) uphold that students' cognitive, and memory are positively effective when listening to calming music rather than aggressive music.

Kenney (2010) reports on brain-compatible music teaching through songs in two traditional ways: piece-by-piece or whole-song approach. The brain learns, “fragmented content may be the biggest mistake” in which teaching content in “bits and pieces” may be cutting off the meaningful connections” (Caine and Caine, 1991). Because of this, two primary assumptions are indicated. It is known, after repetition learning, memory performance can be enhanced and maintained for a long time (i.e., learning effect; Ebbinghaus, 1964). Kenney found that learning songs by listening to them multiple times creates a message from the voice to sing in the brain. Kenney also notes that repetition as meaningless decreases motivation and engagement, creating ways to enhance memorization using vehicles such as games, solidifies the memory process to increase speed.

Aydın, Salehi, Semerci, and Yalçın (2012) selected 12 20-25-year-olds with no musical experience for their research project. The goal was to improve both students’ serial and free recall when a text is listened to without any melody. Not only did Aydın, et al. (2012) hope to improve performance with these experiments, but they also wanted to see if melodies present, in terms of distraction, memorizing content, a distraction. The research, conducted in three experiment setups, used the same list of 19 words. The students were able to recall words more easily when in the form of a song that they knew.

Serafine, Crowder, and Repp's (1984) goal were to integrate melody and text in song form to enhance recognition and improve memory. The researcher's findings presented students scored higher in recognizing the exact melody and text in songs than in mismatched songs. Researchers define mismatched songs as old tunes with old words that had been sung to a different tune in the original presentation (Serafine, Crowder, Repp, 1984). In addition, Serafine, Crowder, Repp (1984) concluded that melody recognition was a near chance probability unless the original words were with the original melody.

## Research from the Linguists Perspective

Koelsch and his colleagues (2014), report on how short musical selections with specific characteristics; increasing the semantic language memory system, yielding to faster recognition of certain words. Semantic memory correlates with the use of language-its meanings, symbols, a mental thesaurus. Koelsch found out through two experimentations when musical pieces are played, with a targeted word, responses from the brain were reduced and vice versa when a piece was unrelated to a targeted word. Because of these experiments, Koelsch and his colleagues uphold the associations between linguistic memory systems and melody.

Guasti (1999) studied the developmental aspects of prediction to comprehension, can coordination in both language and music. Their chosen participants were typically developing children at nine years old. Cross found that two principles lie within the rhythmic organization of handwriting and how developmental disorders can compromise them. The first is utilizing handwriting to keep the duration of motor actions consistent across various letter sizes and speeds, isochrony (movement duration in writing a word), and homothety (relative duration in writing individual letters).

Broca (1861) researched expressive aphasia. Broca observed a man who could only pronounce the word "tan," but able to pronounce intelligent words only through the action of singing. As a finding, there are two routes to word articulation: the left hemisphere, which brings about a normal-language-based route, and a singing route placed in the right hemisphere (Cadalbert, Landis, Regard, & Graves, 1994). Through this research study, recent accounts, such as Samson and Zatorre, found that the language route stored words represented in isolation, while the singing route stored the embedded melodies.

Peretz, Gagnon, Hebert, Macoir (2004) decided to reproduce a study similar to Broca. Peretz, et al. (2004) chose a 74-year-old named G.D, a native speaker of French, who started having language problems ten years before the research project. Their goal was to see if note and syllable recognition, presented with both combination or isolation singing, correlated better with text or a melody. As a result, the song component had a significant effect, indicating that performance through a melody, indicates a higher correlation than sole text.



## **Chapter 3**

### **Methodology and Procedures**

Within many previous studies on music mnemonics, the brain, its benefits, and detriments, have been revealed. The purpose of this study was to compare students' performance in a music class when they are taught using content songs and without content songs. This chapter covers the population, participants, data collection instruments procedures, and the research questions that guided analysis of the data.

#### **Population**

The elementary school selected for this study was a rural, Title I elementary school in Upper East Tennessee, enrolling 448 students in grades PreK-5, 18.4% of which were considered economically disadvantaged. The state report card for 2021-22 summarizes that 92% of students are Caucasian, leaving 8% as the minority ethnicities represented in this percentage are Black, Hispanic, and Asian.

#### **Sample**

The sample consisted of a third-grade class with twenty-eight student's total: ages eight through nine years old. Within the class, sixteen were males, and twelve were females. Two lessons were selected for this study: the woodwind family and the brass family. The first was implemented over three days during the second nine-week period, after Thanksgiving break, and the content song was issued out to students and taught. The second lesson was taught a week later. Students learned about both instrument families, gaining knowledge of the characteristics of both families, including the structure and four specific instruments that make up each family.

#### **Data Collection Instruments**

The collection of data was through the use of two summative assessments. Two similar lessons were taught using two different methods. For the first lesson, the students learned about the woodwind

family through a content song, split up into three sections: Characteristics of the woodwind family and four specific instruments in the family (flute, clarinet, oboe, and bassoon). After the end of the first lesson, the students were administered a 12-item assessment-each question was worth 3 points. The essay was graded using a grade-point scale. For the second lesson, the students learned about the brass family without a content song, but through direct instruction through the use of a content song, split up into three sections: Characteristics of the brass family and four specific instruments in the family (trumpet, French horn, trombone, and tuba). Similarly, after the end of the second lesson, the students were again administered an assessment with 12 items, each worth 3 points. The assessment was graded using the same grade-point scale and performed by the researcher.

### **Procedures**

Before this study was conducted permission was sought from the principal of the selected elementary school and Milligan University IRB. In addition, notification of intent and request for consent letters were sent home to parents. Students were informed that the participation was voluntary, that an assessment would be given based on the content they were learning about and would not count towards their final grade in music for the semester. Two lessons were selected for the study: the first lesson used the content song about the woodwind family. Methods in teaching the song included students hearing and following along with the song lyrics on the screen, letting the Principal Investigator sing sections alone, the Principal Investigator and the student singing together, and then the students singing it by themselves. When instruction was over, the experimental group was administered an assessment to complete-12 items total. The assessment was graded using a grading scale.

For the second lesson, the students were taught another instrument family through direct instruction-no content song was handed. When instruction was over, the administration of an assessment, similar to the first, was given to students to complete. The assessment was then graded using a grading scale. When all data were collected, it was transferred to SPSS for analysis.

### **Research Questions and Related Hypothesis**

Four research questions were used to guide the analysis of data.

Research Question 1: Is there a significant difference between students' performance when they are taught using content songs and when taught without content songs?

Research Question 2: Is there a significant difference between students scoring on the content of instrument characteristics when taught a content song and when taught without a content song using subscores?

Research Question 3: Is there a significant difference between students scoring on the content of instrument pitch when taught a content song and when taught without content song using subscores?

Research Question 4: Is there a significant difference between students scoring on the content of instrument parts when taught a content song and when taught without a content song using subscores?

Research Hypothesis 1: There is a difference between students' performance when they are taught using content songs and when taught without content songs.

Null Hypothesis 1: There is no difference between students' performance when they are taught using content songs and when taught without content songs.

Research Hypothesis 2: There is a difference between students scoring on the content of instrument characteristics when taught a content song and when taught without a content song using subscores.

Null Hypothesis 2: There is no difference between students scoring on the content of instrument characteristics when taught a content song and when taught without a content song using subscores.

Research Hypothesis 3: There is a difference between students scoring on the content of instrument pitch when taught a content song and when taught without a content song using subscores.

Null Hypothesis 3: There is no difference between students scoring on the content of instrument pitch when taught a content song and when taught without a content song using subscores.

Research Hypothesis 4: There is a difference between students scoring on the content of instrument parts when taught a content song and when taught without a content song using subscores.

Null Hypothesis 4: There is no difference between students scoring on the content of instrument parts when taught a content song and when taught without a content song using subscores.

## **Chapter 4**

### **Results**

The purpose of this quantitative study was to determine the effects of using musical mnemonics devices; in the form of content songs on the retention and recall of factual information in an elementary music classroom in upper east Tennessee.

#### **Data Collection Instruments**

Data were collected through the use of two summative assessments. Two lessons that were similar were taught using two different methods. For the first lesson, the students were taught about the woodwind family through the use of a content song, split up into three sections: Characteristics of the woodwind family, and four specific instruments in the family (flute, clarinet, oboe, and bassoon). After the end of the first lesson, the students were administered a 12-item assessment, each question was worth 3 points. The assessment was graded using a grade-point scale. For the second lesson, the students were taught about the brass family through a lesson without a content song being issued and learned. In this lesson they learned about three sections: Characteristics of the brass family, and four specific instruments in the family (trumpet, french horn, trombone, and tuba). Similarly, after the end of the second lesson, the students were again administered an assessment with 12 items, each worth 3 points each. The assessment was graded using the same grade-point scale and performed by the researcher. After the data was collected, they were transferred over to an excel spreadsheet, divided into eight categories: Content/No Content Song, Test Score, and Subscores of Test Content (Characteristics, Pitch, and Parts) for both tests. When this was completed, the data from the excel spreadsheet were then transferred to SPSS. All data were analyzed using .05 level of significance.

### Research Questions and Related Hypotheses

Four research questions were used to guide the analysis of data. Each research question was associated with a research hypothesis and a null hypothesis. All data were analyzed using .05 level of significance. Research questions were analyzed using Dependent t-test.

Research Question 1: Is there a significant difference between students' performance when they are taught using content songs and when taught without content songs?

Research Hypothesis 1: There is a difference between students' performance when they are taught using content songs and when taught without content songs.

Null Hypothesis 1: There is no difference between students' performance when they are taught using content songs and when taught without content songs.

Dependent t-test comparing students' performances through the mean scores when taught using content song and without were conducted. A significant difference between the means of test scores ( $t(27) = 16.6, p < .05$ ) was found. The means for the tests taught without a content score was significantly higher ( $M = 60.68, SD = 19.56$ ) than the mean for the tests taught with a content song ( $M = 61.68, SD = 19.06$ ). The calculated effect size was 19.05. The null hypothesis was rejected. The results are displayed in Table 1 respectively.

**Table 1****Paired Sample T-test for Content and No Content Song Exam Scores**

<b>Test Score</b>	<b>M</b>	<b>SD</b>	<b>df</b>	<b>t</b>	<b>p</b>	<b>ES</b>
<b>N.C. Song</b>	61.68	19.06	27	16.60	0.001	1.95
<b>Content Song</b>	60.68	19.56				

**Note.  $P < .05$**

Research Question 2: Is there a significant difference between students scoring on the content of instrument characteristics when taught a content song and when taught without a content song using subscores?

Research Hypothesis 2: There is a difference between students scoring on the content of instrument characteristics when taught a content song and when taught without a content song using subscores.

Null Hypothesis 2: There is no difference between students scoring on the content of instrument characteristics when taught a content song and when taught without a content song using subscores.

Dependent t-test comparing the subscored of the test content of instrument characteristics when taught a content song and without were conducted. A significant difference between the test category ( $t(27) = 4.16$ ,  $p < .05$ ) was found. The mean subscores for the tests taught without a content score was significantly higher ( $M = 4.21$ ,  $SD = 1.70$ ) than the mean subscores for the tests

taught with a content song( $M=2.82$ ,  $SD=1.09$ ). The calculated effect size was 1.8. All null hypotheses were rejected. The results are displayed in Table 2 respectively.

**Table 2**

**Paired Sample T-test for Content Category of Characteristics**

Test Score	M	SD	df	t	p	ES
Content Song	4.21	1.70	27	4.16	.001	1.8
N.C. Song	2.82	1.09				

**Note.  $P < .05$**

Research Question 3: Is there a significant difference between students scoring on the content of instrument pitch when taught a content song and when taught without content song using subscores?

Research Hypothesis 3: There is a difference between students scoring on the content of instrument pitch when taught a content song and when taught without a content song using subscores.

Null Hypothesis 3: There is no difference between students scoring on the content of instrument pitch when taught a content song and when taught without a content song using subscores.

Dependent t-test comparing the subscores of the test content of instrument pitch when taught a content song and without were conducted. A significant difference between the test category ( $t(27) = -4.17$ ,  $p < .05$ ) was found. The mean subscores for the tests taught without a



content score was significantly higher ( $M = 1.04$ ,  $SD = 1.0$ ) than the mean subscores for the tests taught with a content song ( $M = 2.86$ ,  $SD = 1.93$ ). The calculated effect size was 2.31. All null hypotheses were rejected. The results are displayed in Table 3 respectively.

**Table 3**

**Paired Sample T-test for Content Category of Pitch**

Test Score	M	SD	df	t	p	ES
N.C. Song	2.86	1.93	27	-4.17	.001	2.31
Content Song	1.04	1.0				

**Note.  $P < .05$**

Research Question 4: Is there a significant difference between students scoring on the content of instrument parts when taught a content song and when taught without a content song using subscores?

Research Hypothesis 4: There is a difference between students scoring on the content of instrument parts when taught a content song and when taught without a content song using subscores.

Null Hypothesis 4: There is no difference between students scoring on the content of instrument parts when taught a content song and when taught without a content song using subscores.

Dependent t-test comparing the subscores of the test content of instrument parts when taught a content song and without were conducted. A significant difference between the test

category ( $t(27) = 2.06, p < .05$ ) was found. The mean subscores for the tests taught with a content score was significantly higher ( $M = 2.12, SD = .80$ ) than the mean subscores for the tests taught without a content song ( $M = 1.75, SD = 1.00$ ). The calculated effect size was 1.10. All null hypotheses were rejected. The results are displayed in Table 4 respectively.

**Table 4**

**Paired Sample T-test for Content Category of Parts**

<b>Test Score</b>	<b>M</b>	<b>SD</b>	<b>df</b>	<b>t</b>	<b>p</b>	<b>ES</b>
<b>Content Song</b>	2.18	.80	27	2.06	.001	1.10
<b>N.C. Song</b>	1.75	1.00				

**Note.  $P < .05$**

## **Chapter 5**

### **Summary of Findings**

The purpose of chapter 5 is to summarize findings from the conducted research study-comparing students' performance in a music class when they are taught using content songs and without content songs. In this study, four research questions and their hypotheses guided the research-Chapter 5 will contain a discussion of the findings, revealing how consistent they were in comparison to the critical review of research and literature; a narrative conclusion stemming from the drawing of primary information; and recommendations for future research, as it relates to this area of study.

### **Discussion of Findings**

The first research question, which focused on students' performance on an assessment when taught with and without a content song, indicated a significant difference between the mean scores. The mean test score when learning the content score was 60.68 while the score for without a content score was 61.68. Therefore, the null hypothesis was rejected. For this research study, the analysis of data reveals that students who did not learn a content song scored higher on the assessment than when taught one. The effect size of 19.05 reflects a high magnitude of difference between the test scores of the control and experimental learning tool used to achieve the performance of assessments. The time frame when students were taught the woodwind song to when they took the test expanded due to a holiday break. However, the time frame between students learning about the brass family and taking the test was shorter, allowing students to retain information faster and more accurately, which can explain the difference in mean scores and the contradiction with the literature review of this study. Students improve and advance in

recalling and retention of factual information when the information was in the form of a song that they knew (Aydın, Salehi, Semerci, and Yalçın, 2012).

In regard to the second research questions concerning the comparison made between the subscores of content within the tests, starting with instrument characteristics, a significant difference was found when taught a content song and when taught without a content song. The mean subscores for the tests taught without a content score was significantly higher at 4.21 than the mean subscores for the tests taught with a content song at 2.86. The results indicate a significant difference between the groups, and therefore the null hypothesis was rejected. The results suggest that students retain and recall information faster and more effectively, in regard to instrument characteristics through the use of a content song than without-the significant outcome demonstrated by these assessments is consistent with information present in the literature review of this study. Short musical selections with specific characteristics increase the semantic language memory system, yielding faster recognition of certain words, such as describing words or characteristics (Koelsch, 2014).

In regard to the third research question assessed, a comparison was made between the subscores of test content relating to instrument pitch and if a significant difference was found when taught a content song and when taught without a content song. The mean subscores for the tests taught without a content score was significantly higher at 2.12 than the mean subscores for the tests taught with a content song was 1.75. The results indicate a significant difference between the groups, and therefore the null hypothesis was rejected. The results suggest that students did not retain and recall information faster and more effectively, in regard to instrument pitch through the use of a content song. The significant outcome demonstrated by these assessments is inconsistent with information present in the literature review of this study. In

addition, being able to identify visually and auditorily instrument pitches is challenging for students who are not involved in musical training, such as playing an instrument. Children who had musical training indicated a superior development in cognitive and auditory information processing (Roden, Grube, Bongard, and Kreutz, 2013). The majority of students who completed the assessments have little to no musical training.

In regard to the fourth research question examined, a comparison was made between the subscores of test content relating to instrument parts and if a significant difference was found when taught a content song and when taught without a content song. The mean subscores for the tests taught with a content score was significantly higher at 2.12 than the mean subscores for the tests taught without a content song at 1.75. The results indicate a significant difference between the groups-therefore the null hypothesis was rejected. The results suggest that students retain and recall information faster and more effectively, in regard to instrument parts through the use of a content song than without-the significant outcome demonstrated by these assessments are consistent with information present in the literature review of this study. The memorizing process of mnemonic devices comes in terms of encoding, and with that both total recall and degree of organization in the uses of imagery increases. Hence, in interpreting and remembering instrument parts students are using imagery to display the instrument in their brain in order to recall factual information relating to the concept (Haynes and Canaday, 1974).

### **Conclusion**

In conclusion, this research was conducted to determine the effects of using musical mnemonics devices; in the form of content songs on the retention and recall of factual information in an elementary music classroom in upper east Tennessee. The primary finding was

a significant difference in student's performance when taught with and without a content song. However, the resulting difference is contrary to the prediction based on the literature review. One of the key findings is that most teachers' primary teaching methods are direct instruction or in the process of a lecture. However, as years continue to move, education must evolve alongside its students, a more student-centered method than a teacher-centered approach, which can occur through music mnemonics. According to the mean scores of both assessments, teaching occurring without a content song (direct instruction), produced higher scores. And in conclusion, correlates to the teaching technique that encompasses how students primarily learn. Another central finding is the culture or environment surrounding schools-If the culture does not realize the impact music can have on student academic learning, a negative mindset can increase to where enthusiasm in learning music can die out, only making it harder to revive in secondary learning. The study also reveals that students, at a younger age, have difficulty responding and remembering pitch and auditory information correctly. Out of three content areas within each test, students' accuracy was greater on instrument characteristics and parts with a content song. This incentive is due to the association between words to imagery, characteristics, and parts, which are repetitive in an elementary setting, to auditory (pitch), which requires a higher level of focus and training. Therefore, the study concluded that teaching through music mnemonics had a negative influence on academic performance.

### **Recommendations For Future Research**

First, in terms of the research study presented, I would recommend a spread-out timeframe in learning the content song. Choose one that your students know and can have fun with, allowing at least 2-4 days to learn it. Learn the chorus and first verse on day one, and over the following days, relearn the chorus, and add another verse-this way they know the chorus

well, allowing more time to focus on the verses since this is where your factual information will be. As far as the assessment, the test items should come from the song-nothing on the test should raise eyebrows or hands. Lastly, allow students to have the class period to complete the assessment.

Relating to procedures and methods, I would recommend combining both qualitative and quantitative methods. An assessment, for quantitative data, can only give so much-a qualitative side, such as interviewing elementary music and core subject teachers on their thoughts, knowledge, and application of music mnemonic drives can create a compelling research study for present and future music teachers and core subject teachers. In addition, core subject elementary teachers can tackle the process of music mnemonics within a lesson and do their research study between the use of one and without. Another recommendation is branching two subjects together-the music teacher and another subject teacher get together, look over lesson plans, and see where they can create a content song together and teach them in both classes.

Secondly, regarding the population, I would recommend the study be conducted in an elementary school where music is greatly appreciated and deemed vital to the school as it relates to every core subject. This outlook can only come from the highest position, the principal. A principal or administrator who greatly advocates for music is one who was influenced by them at a young age, like singing in the choir or playing an instrument in the band. In a school system with the previous statement used, students are more likely to participate in other extracurricular activities about music.

### **Recommendations for Practice**

I recommend teachers to incorporate music mnemonics in their lessons, looking to see where music can enhance them- use songs that your students know, allow the content to create the

verses, and add a catchy chorus to enrich your presentation. All students have different learning needs and styles, and some are musically gifted or like music. Reach out and offer them another way of learning that accommodates their needs. Plus, this is a way to advocate music in your school in a minor way, leading to a greater impact on your students. I also recommend asking your elementary music teacher for guidance—they generally have a greater insight into their students. For parents, allowing their children to become well-rounded in academic, athletic, and musical activities, such as participating in band, choir, or taking instrument lessons, will enhance their achievements. In regard to school districts, do not doubt or overlook that music can extend a helping hand in academic learning. If your mission statement is to produce well-rounded students, let your teaching strategies, such as music mnemonics become a more academic tool for the diverse learning needs in your schools. In addition, look for ways to increase musical experiences for your students. Lastly, to advance the school, allow your advocating for music to become more public than private, or in some cases, non-vocal.



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