June 2023

A Novel Jazz Music Curriculum for Young Children: Results of A Pilot Study

Jazmin D. Ghent
University of South Florida

A Novel Jazz Music Curriculum for Young Children: Results of A Pilot Study

by

Jazmin D. Ghent

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
Department of Music Education
College of the Arts
University of South Florida

Major Professor: Jennifer A Bugos, Ph.D.
Victor Fung, Ph.D.
David A. Williams, Ph.D.
Darlene DeMarie, Ph.D.
Jack Wilkins, MA

Date of Approval:
March 24, 2023

Keywords: Creativity, Improvisation, Music Training, Elementary Music

DEDICATION

To God, I can do all things through Christ who strengthens me Philippians 4:13. To my Father and Mother, who made me who I am and invested so much love into my siblings and me.

ACKNOWLEDGMENTS

Be strong and courageous. Do not be afraid or terrified because of them, for the LORD your God goes with you; he will never leave you nor forsake you." Deuteronomy 31:6

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Jazz improvisation is known as the highest-known art form concerning improvisation due to its frequency and development of creative ideas (Feldman 1964). Research shows that the art of spontaneous creation can contribute to children's ability to problem-solve, social and emotional well-being, and academic success into adulthood (Biasutti, 2017; Heble & Laver, 2016; Kiehn, 2003; Kuzmich, 1980; Solis, 2009). Improvisation is crucial for developmentally comprehensive music programs; however, improvisation is scarce in elementary music classrooms and curricula. For this pilot study, a group of 31 children aged 5-8 and considered at-risk participated in a study where they were randomly assigned to either an experimental group (n=15) receiving a six-week multimodal jazz training or a control group (n=16) receiving a six-week unimodal singing training. The students completed pre and post-test measures specializing in music achievement (pitch & improvisation), cognition (inhibition & shifting), and emotions (Noldus FaceReader 9.0). The multimodal jazz curriculum was designed to incorporate movement, playing, singing, and listening into every lesson. Results showed that children were engaged via a novel jazz program for elementary students. Results for music achievement showed a significant time effect on pitch accuracy scores between the unimodal (singing) and multimodal (jazz) groups. Conversely, no significant effects were observed in the improvisation scores with respect to time, group x time, and group. The Noldus FaceReader indexes seven student emotions (neutral, happy, sad, disgusted, scared, surprised, and angry) during the AIRSS- Subtest measures: improvisation, imitation and favorite song. There were significant time effects (decrease) in the emotion "neutral" during the improvisation task and time effects (decrease) in the emotion

"scared" during the favorite song task. Results of a preliminary analysis on the cognitive measures (Flanker Task, Dimensional Card Sort, and Day and Night Stroop) showed no significant effects on inhibition or shifting. An exploratory analysis that entailed coding the participant's verbal responses showed a significant increase in how much the participants "liked" vocally improvising before and after music training. These results may show that students are more comfortable with singing improvising and may like vocal improvisation after music training; however, they do not show a significant difference from the multimodal jazz group compared to the unimodal group potentially due to overlapping program similarities and small sample size. This study contributes multimodal jazz music training to education and to research to be used as a stand-alone or supplementary resource for elementary music education in improvisation and jazz.

CHAPTER ONE: INTRODUCTION

Opportunities to engage with creativity and creative processes in the classroom may contribute to developing many cognitive and learning domains (Plucker & Dow, 2010; Russ & Fiorelli, 2010). Creativity may be defined as making something unique, novel, or unusual and is a vital part of human cognition (Runco & Jaeger, 2012). Research suggests that creativity can contribute to problem-solving, social and emotional well-being, academic success, and success in adulthood (Khalil et al., 2019). Creativity is found in all areas of the performing arts; however, jazz is the highest-known art form concerning improvisation and the spontaneous development of creative ideas (Feldman, 1964). Results of studies have shown that composition and improvisation are crucial components of a developmentally comprehensive music program (Biasutti, 2017; Heble & Laver, 2016; Kiehn, 2003; Kuzmich, 1980; Solis, 2009). Despite its importance, improvisation is less prevalent within elementary music classrooms.

Statement of the Problem

Jazz music is becoming more prevalent in the music education curricula; however, few jazz programs are designed for elementary students (Porter, 1989). For many students, elementary music class is their first exposure to music within an educational setting (Ferguson, 2004). Elementary music education places a significant emphasis on Western European classical music, whereas jazz is given relatively limited attention in the curriculum, often limited to just one lesson during the academic school year. An essential aspect of education is to appreciate the rich cultural heritage of our country, in which jazz uniquely is one of the few art forms that originated in America (Napier, 2011).

Introducing jazz and creativity should start at an early age to develop jazz appreciation. Without opportunities to listen to jazz in elementary school, students are more susceptible to conform to the belief that jazz is only for rich, wealthy, and privileged people; students may also believe that jazz is too complex to understand and an overly serious art form (Weiner, 2020). Previous jazz programs, some still active and some discontinued, provide demonstrations, performances, and workshops for elementary-aged students. The following is a sample of many jazz programs designed to introduce jazz music to children.

The Jazzmobile (1964) is a non-profit organization created by jazz great Billy Taylor, designed to bring jazz concerts, clinics, and workshops to the community of New York and San Francisco (JazzMobile, n.d.; Bay Area Jazz Mobile, n.d.). Jazz Interactions (1966) is a non-profit organization that intends to foster an appreciation for jazz music in New Jersey (Palmer, 1976). The Jazz Institute of Chicago (1987) plays a vital role in promoting and fostering jazz music and musicians and building a thriving jazz community in the city of Chicago (The Jazz Institute of Chicago, n.d.). The aforementioned jazz programs expose young children to jazz music; however, these programs are not for early childhood students (3 to 6 years-old).

Like many elementary school jazz programs, these programs are offered within large cities. According to Porter (1989), the music education program lacks tangible resources for teachers, offers fewer than two lessons yearly, and fails to furnish students with chances to engage in instrumental improvisation and performance. There is a need to examine other music programs to include consistent opportunities for improvisation, bimanual coordination, and vocal development. Students with these opportunities may show higher musical achievement levels than those only exposed to a traditional singing program.

Many elementary jazz programs provide an (initial) introduction to jazz music; however, they do not remedy the absence of jazz improvisation within elementary music curricula and classrooms. In addition, minority, at-risk students rarely receive the same academic learning opportunities in arts education as students of higher socioeconomic status (Costa-Giomi, 2008). Previous studies found that minority at-risk students need music training programs that teach and facilitate music creativity (Beverage, 2022).

It is hard to enforce adequate needs in creative music training with diminishing resources, budget restrictions, and inadequate means (Clark, 2022). Required by the National Association for Music Education (NAfME), improvisation aids in students' musical skills and is a fundamental component of the National Standards for Elementary Music Education (Coulson & Burke, 2013). Besides creativity's role within the National Music Standards (NMSs), prominent music pedagogies, such as Orff Schulwerk and Dalcroze's Eurhythmics, are heavily based on child exploration, creativity, and improvisation (Turpin, 1986).

The present study examined the effect of a multimodal jazz music curriculum on at-risk children. The participants in this study completed pre and post-test measures to see if the music training affected their executive functions (e.g., working memory and inhibition), emotions, and musical achievement (pitch and improvisation).

Executive Functions and Musical Improvisation

There has been a piqued interest in the effect of music education on executive functions and cognitive abilities (Jaschke et al., 2018). Executive functions refer to a set of cognitive control processes that the brain requires during tasks involving concentration, cognitive flexibility, and inhibition of prepotent responses. These actions are neural circuits in the brain's prefrontal cortex (Anderson & Anderson 2008; Bialystok & Craik 2005). Many studies relate

music training and executive functions to intelligence (Ardila et al., 2000; Bialystok & DePape,2009; Zelazo et al., 2008). Examples of executive functions are set shifting, selective attention, planning, inhibition, and fluency. The present study tested inhibition and shifting. Inhibition is the ability to restrain one's impulses or behavior consciously or unconsciously while shifting is the ability to adjust behavior and thoughts to a new, changing, or unexpected event (Van der Sluis et al., 2004). Music training that involves creativity and improvisation can enhance multiple learning and memory domains like divergent thinking (Gibson et al., 2009). Improvisation demands a conscious decision within a temporal context. Improvisation also forces children to inhibit a response by forming their creative rhythms, melodies, and harmonies. The need for inhibitory control is imperative during improvisational tasks and builds students' aural skills and determination. According to research, Limb and Braun (2008) found that improvisation activates areas in the brain responsible for decision-making and planning performance. Research indicates that when it comes to the nine subject areas in music, elementary music teachers allocate a comparatively smaller amount of time to the standards that necessitate the utilization of creative or artistic decision-making skills (Orman, 2002). This multimodal jazz training provides opportunities for improvisation where students can activate these critical brain areas.

Exclusion of Jazz in Music Education Standards

From the 1930s to the 1950s, many educators opposed including jazz in the music education curriculum. Music education journals, texts, and magazines saw jazz as inappropriate and degenerative for music education students (Prouty, 2005, 2008). Some education systems banned jazz from being played in their schools. The perception of jazz education turned in the 1960s through the 1970s; however, many music educators upheld a negative mindset toward jazz

music (Jazz in America, 2022). The National Association for Arts Education acknowledged the significance of improvisation during the early 1990s, while long-established musical concepts like composing, reading, and listening to music had been part of the NMSs for a considerably longer period. Improvisation was the most recent addition to these standards.

The National Standards for Art Education (NSAE) first recommended the incorporation of improvisation in 1994. The NSAE added improvisation as the ninth music content area, suggesting that all school system children develop and demonstrate proficiency (Ward-Steinman, 2007). Despite the NSAE requiring improvisation, jazz misconceptions led to its delay in inclusion within the music classroom and curricula.

Jazz Misconceptions

Some misconceptions regarding jazz include the viewpoint that jazz is too serious, that jazz is for seniors and is an old genre, that one needs to be an expert in the genre to improvise, and that jazz musicians are on drugs (Stutuler, 2019; Weiner, 2020). Societal misconceptions about jazz affect teacher perception and student perceptions. These misunderstandings continue to plague jazz's forward momentum within education and the survival of the tradition.

A common misconception about jazz and improvisation is that it is often taught outside the classroom in an informal setting. The belief that improvisation is taught informally contradicts the true nature and structure jazz requires (Murphy, 2009). Wright and Kanellopoulos (2010) conducted a narrative study (N=91) where student teachers were administered free improvisation courses. The participants journaled their experiences and perceptions of students, themselves as musicians, and jazz music as a school subject.

The findings suggest that improvisation may offer a direction for creating a powerful and intimate evolving dialogue among students' identities as learners, their attitudes toward other

children, and their creative potential. Teaching improvisation and jazz provides expressive techniques in a culturally communicative context (Kanellopoulos, 2010). Accessibility to musical improvisation through jazz music is imperative for students' development.

Improvisation

Improvisation is the real-time creation of music and musical performance in instrumental or vocal domains. Previous research defines improvisation as spontaneous creativity with constraints (Beaty, 2015; Berkowitz, 2010). In contrast, other studies refer to improvisation as the art of thinking and performing music simultaneously (Azzara, 1999). A unique trait of jazz improvisation is that once music sounds are made, they cannot be revised or changed, unlike many other forms of composition (Furstenberg & Hughes, 1995). Improvisation may have various definitions. However, it exists in all areas of the performing arts.

Jazz is known as the most common art form concerning improvisation because of its frequency in the spontaneous development of musical ideas. Jazz's significant emphasis on improvisation as its focal point justifies the rationale for basing multimodal music training on jazz music (John et al., 2006). Though improvisation is used in many genres of music, jazz requires arguably the greatest amount of improvisational competency and skill (Torrance & Schumman, 2019).

Improvisation in Early Childhood

Previous studies have shown evidence that multimodal music training taught for 45 minutes twice each week for 6 or 10 weeks optimized young children's learning engagement and increased their executive functions (Bugos, 2019; Bugos et al., 2021). Comparable to Bugos and DeMarie (2017), the present current study also measured executive functions, particularly inhibition among preschool students using a similar battery of test measures but included a

musical control task, group singing. Unlike previous studies, this study was designed as a pilot study to explore the effects of a novel jazz music training program designed by the principal investigator. The curriculum was designed to be a resource for other music educators to incorporate jazz into the elementary music classroom.

An example of improvisation during an early childhood multimodal jazz music program may be a simple call and response of the melodic material between teacher and students or between student to student. The teacher can chant a rhythmic pattern, for example, "What is for dinner?" then the children respond with a four-beat pattern (improvised on a hand drum). There are also ways to make improvisation more complex. Students can play harmonic accompaniments with two guitar chords using an age-appropriate application on an iPad to well-known jazz songs like "Oh When the Saints." These activities use a form of mental processes known as executive functions.

Examples of executive functions used in improvisation and creativity are task switching, working memory, and attention span (Loui & Guetta, 2019). According to Marsh and Young (2016), children in preschool (3- 6 years) express improvisation through two types of singing: communicative chant-like or repetitive singing of short verbal and musical ideas. Preschool students also express improvisation through instruments by exploring anything that makes sound and through movement by responding to music played.

Purpose

Though improvisation is an essential facet of elementary music education, previous studies have shown a lack of training, resources, and confidence in teaching improvisation in the elementary music classroom (Hickey & Schmidt, 2019). In the present study, it was anticipated that an engaging six-week multimodal music curriculum would be ideal for developing creativity and creative improvisation within the elementary music classroom.

The present study examined the effect of using an engaging novel multimodal jazz music curriculum (rooted in creative improvisation) on behaviors in at-risk children as well as their executive functions (e.g., working memory and inhibition) and the emotional well-being of at-risk children (5-8 years) while engaging in improvisation and imitation activities. A secondary aim of this study was to collect student and teacher perceptions regarding the effectiveness of the multimodal jazz program for at-risk children and the effect the program may have on their behavior, engagement, and interactions with other students.

Numerous studies have investigated the effect of jazz and jazz improvisation on musicians; however, few studies have examined the cognitive effects of a multimodal jazz program for elementary music students. Music training is a complex activity that enhances multiple learning and memory domains. Research reveals that short-term music activity engages the brain's attentional system and enhances cognitive performance (Posner et al., 2008). In addition, formal music training can improve young children's executive functions and academic performance (Bugos & DeMarie, 2017; Rauscher & Zupan, 2000). This study's Multimodal Jazz Music Program is centered around playing, listening, moving, and singing music. A multimodal music program according to prior research, multimodal music training consists of vocal development, improvisation, movement, and playing (Bugos et al., 2021). According to Marsh and Young (2016), multimodal refers to blending movement with singing, making sound with objects and instruments, and visual, kinesthetic, and aural activities.

Key Research Questions and Hypotheses

i. What effect does an engaging multimodal jazz curriculum have on early-age at-risk children and their behavior?

ii. What are the effects of a novel multimodal jazz curriculum on music achievement in pitch (Brother John Pitch Accuracy) and improvisation skills (ending of phrase)?

iii. What are the effects of a novel multimodal jazz curriculum on emotional affect in young at-risk children?

iv. . What are the effects of the novel jazz program on cognitive performance in a small sample of young children (pilot data)?

Hypothesis A: Children who complete the multimodal jazz curriculum will show a positive effect on classroom behavior and participation.

Hypothesis B: Children who complete the multimodal jazz curriculum will demonstrate enhanced pitch accuracy and improvisation skills in music achievement compared to the unimodal singing program.

Hypothesis C: Children who complete the multimodal jazz curriculum will demonstrate reduced errors in inhibition, decreased reaction time, and enhanced working memory compared to those enrolled in a unimodal singing program.

Hypothesis D: Children who complete the multimodal jazz curriculum will demonstrate an increase in positive emotions and a decrease in negative emotion FaceReader scores.

Jazz Music Program

The present study examined the effect of using an engaging novel jazz music curriculum on inhibition and facial affect in at-risk children (5-8 years old). It was hypothesized that children who completed the novel jazz curriculum would show enhanced pitch accuracy, inhibition, and improvisation skills compared to those who completed the standard singing program.

Delimitations

i. This study does not include children younger than the age of 5.

ii. Students with special needs were not part of the protocol for this study.

iii. No other forms of creativity other than improvisation were assessed.

Definition of Terms

Below is a compilation of frequently employed phrases used throughout this study.

i. **Improvisation:** Grove's Dictionary of Music and Musicians defines improvisation as the art of thinking and performing music simultaneously' and, therefore, 'the primitive act of music-making (Blom, 1973, p. 991). Other sources use the term 'improvisation' to mean composing on the spot.

ii. **Multimodal Music Program:** According to Prior Research, multimodal music training consists of vocal development, improvisation, movement, and playing (Bugos et al., 2021). According to Marsh and Young (2016), Multimodal is blending movement with singing, making sound with objects and instruments, and visual, kinesthetic, and aural activities.

iii. **Unimodal Music Program:** A Unimodal Music program comprises one development area, such as vocal or improvisational development.

iv. **Executive Functions:** Executive functions are the group of complex mental processes and cognitive abilities (such as working memory, impulse inhibition, and reasoning) that control the skills (such as organizing tasks, remembering details, managing time, and solving problems) required for goal-directed behavior (Anderson &. Anderson 2008; Bialystok & Craik 2005).

v. **Emotional Processing:** according to Science Direct, emotional processing is modifying memory structures that underlie emotions.

vi. **Facial Affect:** According to prior research by Elliott and Jacobs (2013), facial affects are used by humans to convey various types of meaning within various contexts through facial expressions and emotions.

vii. **Facial Action Units:** Facial action units, also known as facial action coding systems (FACSs), are comprehensive, psychometrically rigorous, and widely used systems to describe facial activity in terms of visually observable traits and changes (Clark, 2022).

CHAPTER TWO: LITERATURE REVIEW

The concept of creativity is a vital part of human cognition. Creativity influences problem-solving, social and emotional well-being, academic success, and the development of adult success. All areas of the performing arts, whether theater, music, or dance, involve creativity and the creative process. Many studies define creativity as imagining original ideas while producing artistic work (Barrett et al., 2020). In Barrett's case study, they found Gabriela Montero, a classical musician, improviser, and pianist, experienced full activation of their auditory, frontal/cognitive, motor, parietal, occipital, and limbic areas through creative improvisation.

This artistic production process applies to music improvisation research and spans many research areas, such as philosophy, psychology, art history, cognitive science, and musicology (Lopez-Gonzalez & Limb, 2012). In addition, creative literature shows growth and development from partaking in creative processes, which enhances the quality of life and health (Tan et al., 2019). Musical creation is a prime contributor to evolutionary biology, known as one of the oldest and most fundamental elements in socio-cognitive development. Although creativity has played a significant role in human evolution, it is yet to receive as much scholarly attention as related fields such as intelligence (Batey & Furnham, 2006).

For decades, one of the most well-known factors in creative literature is creativity's connection to human intelligence, a foundational element of information processing (Boden, 2014). These two constructs (creativity and intelligence) share cognitive fundamentals and

executive functions, emphasizing a positive correlation between intelligence and creativity (Benedek et al., 2014). The art of the creative process is complex because of researchers' differing perspectives on assessing creativity.

Historically, these perspectives have caused a great deal of confusion on how to measure creativity. While the findings seem to align with previous studies, discrepancies emerge when attempting to establish a standardized approach for assessing creativity. A closer look into creative literature reveals research that quantifies creativity by the quality of one artwork, while other studies weigh creativity by producing creative ideas. In addition, creative research references creativity as a personality trait rather than a creative work (s) (Runco & Jaeger, 2012).

Webster attributes creativity's placement, evaluation, and definition to a misunderstanding within research (Webster,1990). The various definitions and beliefs on creativity cause a lack of focus in the subject area and a mystification of the topic. A shift in creative research now concentrates on the mental process in creative production, pinpointing creativity to a more centralized focal point (Webster, 1990). Despite the conceptualization of creativity differing across research and its measurement forms, all creative studies agree on creative research's importance (Benedek et al., 2014).

Creativity in Children

Studies from prominent researchers and psychologists have long supported the importance of creativity in the classroom (Guilford, 1962; Vygotsky, 2004). Though research emphasizes these values, more research is needed on children's musical play and creativity. Existing research commonly focuses on observations of younger children and their musical behaviors or educational settings designed by adults (Marsh & Young, 2016). Adult-designed studies may skew child accuracy when pinpointing creative thinkers. According to neuroscience research, factors that contribute to a creative thinker are not having the highest intelligence quota

but a high level of activity in the cortices section of the brain. The cortices section of the brain handles higher-level processing, such as language learning, memory, emotion, and decision-making (Andreasen, 2005). When measuring creativity, researchers often compare divergent thinking to convergent thinking. Participants who lean more toward divergent thinking are seen to be more creative.

Divergent thinking is when someone develops multiple ways to do one task rather than one set way to solve a problem (Sarrazin, 2016). A multimodal jazz program would allow students to experience playing, singing, dancing, and moving, all activities that encourage divergent thinking. Torrance conducted multiple studies where first, and second-grade participants were subjected to teachers discouraging students from using their imagination, and it took great efforts for students to eliminate fantasy from their thinking—following a sequence of longitudinal studies. Torrance (2011) coined the term "fourth-grade slump," where almost half of the students who participated in the studies declined in their divergent thinking. The best way to change this teaching method is for teachers to reflect on their practices and avoid convergent teaching practices. Berger and Cooper (2003) discovered the importance of free and structured musical play among preschool students.

The researchers concluded that it is crucial for children to engage in prolonged, uninterrupted periods of play and for teachers to adopt a teaching approach that is less rigid and more adaptable. Many teachers value creativity; however, some do not value creative expression within their classrooms (Runco, 2003). Creative expression within a music classroom involves initiation by children, intrinsic motivation, control by the child, freedom from external rules, and involvement in daily musical activities (Marsh & Young, 2016). An example of child-initiated creativity is when children create and compose songs on the playground. Child-initiated

creativity is a natural part of child and human development. Naturally, children incorporate different forms of expression into their playtime. For instance, kids at a playground engage in various activities, such as moving around (dancing), singing, and playing freely, without any specific rules or instructions. Teachers attempt to mimic this multimodality in other education areas, for example, drama, art, and music classes (Sarrazin, 2016).

Improvisation

Improvisation is the real-time creation of music and musical performance in instrumental or vocal domains. Improvisation is a critical element of jazz music; however, spontaneous creativity is in all areas of the arts and ages (Biasutti & Frezza, 2009). Children must inhibit immediate entrances in child-centered improvisation activities to respond with their own creative rhythm, melody, or harmony. Inhibitory control is essential for success during creative improvisational tasks. An example of inhibitory control within children is that children must select a chord (from a limited array of choices) that sounds appropriate based on aural skills, then determine the timing of the performance within the chord.

Neurological data collected while musicians improvise confirmed activations in areas responsible for decision-making and planning performance happen during creative improvisation (Limb & Braun, 2008). Implementing improvisational tasks in early childhood development is essential for establishing cognitive abilities and behaviors that last a lifetime. Cognitive activity within the child's brain requires complex conscious decisions within a temporal context (Gilmore, 2020).

The National Standards for Music Education (NAfME, 2014) supports including improvisational activities in early childhood. With guidance, children explore and experience music concepts (e.g., beat and melodic contour). Since the revision and addition of the create strand, many music educators need to provide these opportunities. They cite a need for

pedagogical training on effectively implementing musical improvisation in the classroom (Whitcomb, 2007). Music education pedagogies (e.g., Orff Schulwerk's approach) emphasize improvisation. The new multimodal music program will infuse creative improvisation tasks into the curriculum using the Orff Schulwerk approach as a guide for allowing young children to experiment with musical sounds, sequences, and patterns. There are essential developments in young children's executive functions during early childhood.

Jazz Improvisation

Spontaneous improvisation is often associated with jazz music, arguably the most developed and advanced form of musical creativity (Lopez-Gonzalez & Limb, 2012). Jazz improvisation is also considered an ideal starting point for scientific studies in creativity. Jazz musicians typically produce music that is spontaneously created and immediately received with high flexibility and time frames that are relatively short. This process of spontaneous creation applies to young students, making multimodal jazz music training an excellent catalyst for jazz research among elementary students.

Jazz and improvisation can be displayed through using jazz songs, for example, Charlie Parker's "Now's the Time," and applying lyrics to the music or allowing students to create lyrics. This lyric creation process applies to all elementary grades, whether first or fifth. Improvisation is a critical element in many prominent approaches and methodologies, such as the Dalcroze and Orff methods. Limited research (de Vries, 2005; Guilbault, 2004; Reynolds, 2006; Scott, 2007) includes child perceptions of imitated verses improvised melodic content; however, both improvisation and imitation are essential in the creative process.

Improvisation vs. Imitation

According to Engel and Keller (2011), spontaneity is held in high regard among many regions of the world in music and within the arts by performing various forms of intensity (dynamics), melody, and timing. The recognition of improvised music, instead of imitated music, relies on objective auditory clues, individual experience, and personal listening skill level (Engel & Keller, 2011).

A unique trait of improvisation is that it takes a certain level of preparation when practicing. During practice, jazz improvisers develop a vocabulary of musical ideas by imitating other artists and musicians. Combining and reproducing different musical patterns is the reinterpretation of previously composed music. These elements are the foundation of jazz improvisation (Nettl & Russell, 2001). Improvisation and imitation share many similarities; however, both possess distinct traits that separate them. According to Waszak (2005) and Haggard (2008), improvisation is spontaneous and freely chosen actions, while imitation is externally controlled and is a preexisting thread of sounds that constrain the performer.

In short, improvisation is freely selected, and imitation is externally cued (Waszak et al., 2005; Haggard, 2008). Imitation is an essential aspect of music development, and studies show that imitation is imperative among all aspects of musical achievement.

Madura (1996) conducted a study involving 101 vocal jazz students to assess various factors that contribute to jazz improvisation achievement. Among the predictor variables examined, imitative ability emerged as the most prevalent predictor across categories such as jazz theory knowledge, jazz experience, gender, vocal lessons, general creativity, and instrumental lessons.

Engel and Keller (2011) conducted a study where participants were asked to determine whether 22 jazz musicians were improvising or imitating melodic lines. Participants underwent functional magnetic resonance imaging while adjudicating the jazz passages. Results showed that the pre-supplementary motor area, frontal operculum, and anterior insula were strongly activated for improvised passages. Though participant judgment accuracy was low, researchers saw a correlation between performance timing and intensity (loudness) in the melodies associated with imitation; however, where the amygdala detected behavioral uncertainty in the improvised passages (Engel & Keller, 2011).

Imitation is a vital part of aural learning and a crucial part of jazz. Because of societal stigmas associated with jazz imitation and aural imitation, there is a need for more research and pedagogical techniques in music education. Ferrin suggests that a great way to overcome pedagogical challenges in imitation is through audition (Ferrin, 2023). Audiation is the deep understanding of music where there is an internal realization of music by an individual with no physical sound (Oxford English Dictionary, 2022).

Another pedagogical technique, like an audition, is the I3 technique suggested and created by Zanfanly (2015). This technique has components where students embody spontaneous creativity. The parts of Zanfaly's model are imitation, iteration, and improvisation. Iteration is like variations in music; musicians still make copies of a work or song yet add slight changes. Often, improvisation uses a form of iteration in the creative process. Like multimodal jazz training, this model encourages students to engage with materials, tools, and objects (instruments), allowing them to develop a personal sensory experience. Once the experience is created, students can create and improvise independently (Zanfanly, 2015). A similar model was used among autistic children in music therapy (Carpente et al., 2021). This process was entitled

improvisational music therapy, where students could improve their social skills. The IMT's three-prong process includes exact imitation, imitation with elaboration, and contingent response.

Pitch Accuracy

According to previous research, music training and music training programs have improved elementary children's pitch, pitch perception, and vocal ability (Apfelstadt, 1983, 1983; Kim, 2000; Rutkowski, 2015). These results are elevated among students with autism, who have a raised perception of pitch compared to typically developed children (Stanutz et al., 2014). Chen et al. (2010) found that the longer musical training students receive, the higher scores students have for their performance of pitch perception. Studies also show that children with more nurturing musical environments at home are more likely to sing well and are less likely to produce non-singers and a high chance of singers and partial singers (Barnes et al., 2016; Brand, 1986; Dell et al., 2014; Kirkpatrick, 1962; Politimou et al., 2018; Willis, 2011).

Persellin (2006) conducted a study that measured the effect of teaching models, musical aptitude, and home environment on vocal pitch accuracy in kindergarten *(N*=134). The music classes were taught twice a week for eight months under three conditions: Condition 1: the teacher always sang, but not with the children; Condition 2: the teacher always sang but never with the children; and Condition 3, the teacher always sang for and with the children. All treatments showed improvement in vocal pitch accuracy. Persellin's study suggested that pitch accuracy may contribute less to singing accuracy than tonal aptitude.

Therefore, hearing pitches may be fine, but the relationship between them and how they are processed musically may be more challenging (Rutkowski, 2015). Compared to individual singing, group singing matters in students' pitch accuracy and teachers' perception of pitch

accuracy. Teachers may believe some students are weak singers, untuneful, and with slight pitch variation; however, they may not hear themselves in a group setting (Goetze, 1989). Goetze's study confirms that children are heavily influenced by their social setting, which influences their engagement and social responses.

Kirschner and Tomasello (2010) discovered (*N*= 96) that four-year-old children displayed more cooperative and helpful behavior during joint music-making rather than the same social and linguistic interaction level with no music. When examining the effects of unison singing as opposed to individual singing, Green (2016) found that children (*N*=241) enrolled in all grade levels (1, 2, 3, and 5) scored higher in pitch accuracy while singing in unison with their peers than singing individually.

Rhythm Accuracy

Prior research suggests students' rhythmic ability improved when music classes and training were administered two to three times a week (Grieshaber, 1987; Levinowitz & Scheetz, 1998; Rainbow, 1979). Preschool students (*N*=52) were asked to perform rhythmic activities within three categories, body percussion, instrument, and vocal performance. Many students had no difficulty with vocally performing rhythms by speech. Other tasks, such as clapping with speaking rhythms and playing a repeated pattern while marching, were difficult for preschool students and unsuccessful (Reifinger, 2006). These results suggested that rhythmic tasks involving large muscle movements may be too challenging for 3- and 4-year-olds (Rainbow, 1977).

Large muscle movements may also present a challenge for children up to as 5-year-old. Frega (1979) discovered that students struggled to do multiple tasks, such as simultaneously walking with the beat, singing, and clapping. These results show the importance of procedural

and productive order when presenting rhythmic tasks and assessments to preschool students. Rhythmic movement accuracy increases as a child's age increases; however, Kirschner and Tomasello (2009) examined that students (N=36) as young as 2.5 years could synchronize their drumming with high accuracy if granted a social condition and social partner. This joint rhythmic activity task motivated the students in the study.

Results of Sim's study (1985) found that 3-year-olds were rhythmically accurate 22% of the time. By the time participants reached 4-years, 61.97% of their rhythmical movements were accurate. The percentage of rhythmic accuracy increased to 73.86% by the time the participants were 5-years of age. Many studies that proceeded with Sims' research (1985) reaffirmed these findings and had comparable results (Aschersleben & Prinz, 1995; Drake et al., 2000).

In measuring rhythmic accuracy and rhythmic maintenance, Mastrokalou and Hatziharistos (2007) examined children (*N*=170) ages ranging from 6 to 9 years. Results showed differences among age groups when performing slow tempos; however, there were no differences in fast tempos. Though slower tempos were better among older students, Mastrokalou and Hatziharistos observed that all ages could play accurate rhythms but could have performed better in maintaining rhythmic accuracy (Mastrokalou & Hatziharistos, 2007).

Many studies show that through consistent music training, students may improve their phonological awareness, which aids in rhythm and sound manipulation and musical performance precision. These studies correlate directly to benefits in reading comprehension, verbal ability, language achievement, and phonological skills.

Executive Functions and Music

Working memory and inhibition are two primary factors within executive functions and early childhood (Willoughby et al., 2012). Wiebe et al. (2011) supported the unity, one-factor model. They showed that the three-factor model with distinct executive functions (i.e., inhibition,

shifting, and updating) did not contain additional information about the latent structure. However, by the time children reach age 7, the research showed working memory measures as more robust predictors of EF, with some independent effects of attention shifting and inhibitory control (Bull & Scerif, 2001). Bull et al. (2008) claimed that children with poor visual-spatial short-term memory were particularly disadvantaged.

In numerous studies, music training was associated with higher levels of cognitive performance in areas such as spatial-temporal skills (Rauscher & Zupan, 2000), intelligence (Moreno et al., 2011; Schellenberg et al., 2008), phonological awareness (Degé & Schwarzer, 2011) and verbal memory (Bugos & Mazuc, 2013; Ho et al., 2003; Rickard et al., 2012). Playing a musical instrument in childhood includes complex levels of sensorimotor integration, which causes high levels of attention and concentration (Wantabe, 1960). For example, to play the xylophone, the performer relies upon eye-hand coordination, auditory feedback, auditory cues, and their integration of them. Musical performance demands attention, enhancing executive functions with critical thinking skills in creative tasks (Posner et al., 2008).

Theoretical Framework

The following section describes the theories used to create this study and multimodal music training. These key concepts within this research were based upon the concepts described within the literature review and helped shape the focus of the music training and this research.

Suzanne Langer Form and Feeling

Langer viewed art as a symbolic activity. Langer (1966) believed art was the epitome of life and the truest record of insight into one's feelings. This view emphasizes why it was important for the participants to answer questions on emotion and to understand their emotions. In this study, the music training was designed to catalyze students to express their emotions through music. Langer believed that truly successful societies were ones that embraced art and

knew that art is an important component of human development in social and individual contexts (Langer, 1966). Langer's theory inspired the social and emotional components of multimodal jazz music training. Music is an interactive activity that can be played individually or in a group setting. Improvisation is also an activity that fosters students to create individually and collectively (in groups). Developing these skills among the three areas of this study (emotion, music achievement, cognition) may contribute to academic success for the participants and students within the multimodal jazz training.

The host school for this study did not have a music program or a music teacher. This may impact the participants' social, individual, and emotional development in comparison to students in a school with a music program.

Common terms in Langer's works are "form, feeling, and expression," all viewed by Langer as aesthetics. According to Langer, works of art are expressive forms created by our imagination through our perception in hopes of conveying human feeling (Reese, 1977). As defined by Langer, the term feeling comprises physical sensation, pain, excitement, and complex emotions such as intellectual tensions. Emotions can mislead and be ambiguous, making them difficult to examine. This challenge applies to teachers, causing a misunderstanding among music teachers regarding the nature and function of art and contributing to directionless and ineffective teaching practices.

A performer's interpretation of music can affect the quality of the musical performance, thus, equally influencing the performer's perception (Bugos et al., 2021). According to Langer, the performer's facial expression may show their emotions while creating an artistic work (1953).

The primary state of consciousness is the child's ability to feel (Browning, 2016). The two essential terms regarding human evolution and the human mind are consciousness and aesthetics. Langer accounts for consciousness forms as the expression of conscious mental life, for example, feeling. Langer expresses feeling as an innately biological concept through evolutionary biology. The biology of consciousness is reflected in the form of expressions of conscious mental life (i.e., "feeling"). (Langer,1953).

Guilford's Theory of Divergent - Convergent Thinking (1968)

Psychologist, J.P. Guilford (1968) first proposed the distinction between divergent and convergent thinking. He was president of the American Psychological Association and devoted his 1949 Presidential Address to creativity (Guilford, 1962). Guilford believed creativity is a resource of nature and argued that if creativity were encouraged, it would benefit society. Guilford argued that creativity could be studied objectively and dedicated his research to proving this belief system. (Runco, 2014). Divergent thinking is the generation of various ideas and alternative solutions to problems (Guilford, 1967). Divergent thinking is also viewed as problem-solving. On the contrary, convergent thinking gives one correct conventional response; however, divergent thinking leads to many responses.

Divergent and convergent thinking is essential in approaching problem-solving, specifically, its influence on creativity. Guilford described creativity and innovation as the ability to solve a situation or problem differently. Divergent thinking sought four key concepts, fluency, flexibility, originality, and elaboration (Guilford, 1967). According to Runco (2014), divergent thinking can be evaluated through three key elements: fluency (the quantity of ideas generated), originality (novel and unconventional ideas), and flexibility (creation of ideas across diverse categories).

Convergent Thinking

Convergent thinking involves selecting and developing ideas that work toward the best possible solution to a problem (Brophy, 2001). Convergent thinking also focuses on finding the best answer to a clearly defined question. Speed, accuracy, and logic are significant components of convergent thinking, recognizing the familiar, gathering information, and reapplying set techniques. Convergent thinking applies primarily to situations where ready-made answers live, and there needs to be an act of recall retrieved from stored information. There are no ambiguous answers in convergent thinking, and it uses a method of standard procedures in the hope of increased knowledge (Cropley, 2006).

Divergent Thinking

By contrast, divergent thinking incorporated the production of multiple alternative answers using available information. This process involves making unexpected combinations, recognizing links among remote associates, and transforming information into unexpected forms. Traditionally, Guilford described divergent thinking as generating creative ideas by combining diverse information in novel ways (1962, 1967). Divergent thinking, as defined by Thakral et al. (2021), refers to the capacity to produce innovative concepts by integrating various forms of information. There can be multiple answers to the same question, which may vary from person to person; however, the answers are of equal importance and value. These answers may have never existed and can be novel, unusual, and surprising (Cropley, 2006).

Peter Webster's Model of Creative Thinking Music (1990)

Webster (1990) constructed a conceptual model representing the creative thinking process. Webster's Model for Creative Music Thinking coincides with child creativity and is commonly used for music aptitude assessment in children and to dissect the music-creating

process, especially within concepts such as improvisation. Improvisation within early-age childhood and elementary creative music programs is taught differently throughout music education curricula.

Webster's model applies to adults and children, with slight variations between groups depending on their stage of development. At the top of Webster's model are "product intentions." Product intentions have three elements composition, performance, and analysis. All elements are considered the creators' intentions. School-aged programs are typically limited to performance, improvisation, and listening within the educational system. Webster recommended that the school systems incorporate more composition analysis into the curriculum. Webster emphasizes that creative thinking should be part of the music curriculum, not solely a classroom activity. Though the product intentions are different, the creative processes are very similar. Once the product intention is determined, the creator starts the creative thinking process.

The creator may use two skills that allow the thinking process to occur: enabling skills and enabling conditions. These skills comprise a group of musical aptitudes commonly influenced by human development into early adulthood. Examples of enabling skills are knowledge of facts which is the substance of music understanding, and conceptual understanding, which is one's technique and aesthetic sensitivity. Differing from enabling skills, enabling conditions are variables that are not musical.

The enabling conditions process differs from person to person and intertwines with the enabling skills. Examples of enabling conditions are motivation, subconscious imagery, environment, and one's personality. Motivation determines what internally and or externally keeps the creator on task, while personality is the level of risk-taking, spontaneity, openness, and

perspicacity. These traits vary depending on the person and influence, enabling the creative environment.

While these musical aptitude skills are being used, all enablers (skills and conditions) will fall under two different modes of thinking: divergent and convergent. Creative production does not solely come from one mode of thinking alone but from a combination of divergent and convergent thinking (Brophy, 1998; Malik & Butt, 2017).

According to Webster (1990, 1994), examples of divergent thinking skills within Webster's model are imaginative skills and critical thinking skills like music extensiveness (how long it takes to invest in creative imaging), flexibility (the extent to your musical expressions like dynamics, tempo, and pitch), and one's originality (uniqueness and one's expression). Examples of convergent thinking skills within Webster's model are the recognition of rhythm, tonal patterns, and musical syntax.

The final products of the Creative Thinking model are composition performance analysis or theory and listening. Webster's model (2002) is viewed as a multifaceted built process representing multiple aspects of music. These aspects provide a framework for the comprehension of individual music information-seeking behavior. There is an interplay between divergent and convergent thinking that starts with creative intention and concludes with a final musical product (Kostagiolas et al., 2015).

Elementary Creative Music Programs

Several music programs cater to the fostering of creativity in early education. The following creative music programs are a fragment of some of the many programs that focus on redesigning and advancing early music curricula. In 2008, Ginsberg founded a program entitled "Creative Music Programs" (CMP). CMP works closely with schools and organizations within

the New York Area to build music and arts programs suited for children and the cultural inclusivity of specific school communities. Ginsberg's (2008) programs include music for brains, hands, and feet, West African Drumming, American history through music, visual arts, recorder playing, drumming, and African dance.

MusiQuest is an interactive online music program encouraging children's creativity and composition (MusiQuest, 2023). With 616 music lessons, MusiQuest has many resources that provide a general overview of interactive and interdisciplinary sessions incorporating other subjects like math, science, and socioemotional skills. A unique aspect of MusiQuest is that subscribers can create and listen to songs that help them express their emotions, build songs, connect with different genres, and play interactive games. Subscribers are charged an annual fee of 100 dollars, and music instructors are charged an annual fee of $369.90 (MusiQuest, n.d.).

In 2001, Licitra developed a music program, "South Bay Arts Pharmacy," for children based on brain research in child development. Licitra focuses on performance, creative music-making, and building confidence in children. Licitra also focuses on the creative process of music making, coining the term "proficiency through participation," which encourages further child development in attention skills, emotional maturity, and growth as a musician. South Bay Arts Pharmacy's various arts programs include Kids for Kids, music lessons, music camps, and soul lessons. All of Licitra's lessons spark a journey of musical exploration through healing (2021).

Many creative music programs may need more funding, location, and other vital resources that can stifle the progression of music development and research. Although many music programs emphasize creativity in early music education, the accessibility, research, and curriculum reform remain limited, specifically in improvisation.

Improvisation in Elementary School Music Programs

Though improvisation is a vital part of elementary music education, many music teachers fear it may interfere with their instructional time; they have no experience with jazz music and lack training to teach jazz improvisation (Whitcomb, 2013). In 2007, Whitcomb administered a survey asking music educators to run ten activities in their classroom and how much instructional time was devoted to each. Number one in the survey was to show the activity given the most time, and number 10 was the activity allotted the least amount of time. The average ranking of improvisation activities ranked number nine among all survey participants (Whitcomb, 2007).

Orman (2002) conducted a study to see which music education content standards were being addressed during classroom instruction. Orman found that the students' standards that require creative or artistic skills received less instructional time.

Based on these findings, teachers support improvisation within the classroom but must implement improvisation more in their lessons. According to Koutsoupidou's survey of elementary music teachers in England, the most common way improvisation is used in elementary music classrooms is in response to a visual audio or a verbal stimulus to convey emotion, themes, moods, and ideas (2005). Ways teachers gain improvisation resources is through professional development opportunities; for example, Orff-Schulwerk, Dalcroze, and Kodaly are prominent methodologies.

Teachers can also attend workshops, education courses, Gordon Institute for Music Learning (GIML), teacher certification courses, International Piano Teaching Foundation, gospel music workshops, summer jazz camps, and local school district classroom visits of teachers in service (Gruenhagen & Whitcomb, 2014). Improvisation can be implemented within the classroom through many forms, such as movement, playing, performing, and singing. Research

often combines improvisation with other techniques and concepts within the music classroom so it is not seen as taking the focus or too much time within music lessons.

Improvisation Through Singing Elementary Music

A way to incorporate singing improvisation into the classrooms is through spontaneous melodic development using solfege. Teachers or instructors can facilitate good singing habits while students try new improvisational skills. This form of improvisational singing also allows students to listen to one another, analyze, and evaluate other improvisation occurrences happening in the classroom. This technique coincides with numbers six and seven in the National Standards for Music Education (Whitcomb, 2013). Once parameters are set, students can perform many singing improvisation activities knowing the set framework.

An example of improvisation parameters would be teaching first or second-grade students the song "Here comes a Blue Bird." Once the song is learned, students can improvise quarter, eighth, and half notes. The class can sing "Here comes the Bluebird through my window," and the student leader can compose their own rhythm and response to the class song in place of "diddle dum a day, day, day." Any replacement or composition the student leader sings is acceptable if it meets the rhythm requirements: quarter, eight, and half notes (Boler, 2019).

Preexisting music methodologies and programs incorporate improvisation within their curriculums, adaptable to any music lesson and creative-based activity. Gruenhagen and Whitcomb administered a survey asking music educators (N=145) how many improvisational activities were used in their classroom, what was the nature of these improvisational activities, and what was students' perception of the quality of their improvisation (Gruenhagen & Whitcomb, 2014).

Among the survey responses, teachers described different improvisation activities they use within their classrooms. Some of the activities were as follows; teachers can sing a rhythm or a melodic pattern and then ask the students to respond in an answer form while changing one of the rhythms or pitches in their response. A way to incorporate literacy and improvisation is to have a list of words for students to choose from. Students will choose a word from the list that goes with a rhythmic value, then compose and perform the rhythm and an original pattern for the class. Scat singing is also an essential part of jazz music. Scat singing is known as the vocalization of melodic jazz lines through syllables. Often, a jazz vocalist mimics an instrument and imitates the sounds and nuances not commonly heard on those instruments through their voice. Once students are more comfortable listening to jazz music, students can then learn and imitate scat singers.

Improvisation Through Instruments in Elementary Music

Instrument playing can be incorporated among all grade levels and vary in difficulty levels. Students have the opportunity to employ a drum circle method where they engage in conversational rhythms with both their classmates and their instructor. This enables them to quickly and effortlessly engage in improvisation. A more complex method would be to use recorders and play a blues progression and a simple jazz progression (using a support track) and allow the students to have set notes and chords to use. Once students know the parameters, they can practice different improvising ideas over the chord changes. For middle elementary grades, a mid-tier form of improvisation would be for students to improvise using the pentatonic scale over an I and V chord progression. Many jazz chord progressions have background music resources online.

Boler (2019) provides an excellent lesson for improvisational instrument playing using the song “Rocky Mountain.” In this song, students are asked to use both hands-on Orff instruments that only display the pentatonic scale. Once students are familiar with the structure of the piece and the melodic lines of the song, students will then be able to clap a rhythm over the “Do, do, do, do, do remember me,” and other students can play rhythms and melodies over the same portion of the song. These improvisation moments can happen simultaneously or at different times throughout the song (Boler, 2019).

Instrument playing is in all grades, and middle to high elementary grades (3rd-5th grade) can progress to instrument playing activities such as drumming circles, recorders, guitar, and piano. These activities allow students to develop their music-listening skills, which is essential in their maturation as musicians.

Improvise Through Movement in Elementary Music

Examples of movement using improvisation in the classroom are the teacher improvising on their instrument and allowing students to dance creatively to the music. This activity allows students to show self-expression and follow the music and how it leads them to move. The teacher may add additional rules to the activity by asking students to dance like an animal, a fairy, or an older man or woman. Call and response, otherwise known as question-and-answer form, allow students to interact with one another in a conversational form. This method can be done through body percussion and movement using pitched and unpitched instruments.

When students are in early elementary grades, the instructor must emphasize the importance of a steady beat. This critical concept can be taught through improvisation by allowing students to clap their hands, stomp their feet, or shake their hips to a steady beat. Once students have guidelines to maintain a steady beat, they can create their movements to any song,

whether jazz or any other genre (Sing Play Create, n.d.). A Common thread among all improvisation activities is enforcing the foundation and structure to improvise inside the classroom. Previously established music methodologies and programs are the best catalysts for a framework within the present-day classroom. Reputable programs and methodologies include but are not limited to the Dalcroze approach, Orff Schulwerk approach, and the Kodály method.

Pedagogical Contributions to Creativity

The creation of the multimodal jazz music program was centered around the following prominent music education programs, which contribute to the inclusion of creativity and improvisation in elementary music classrooms. The creators of these methods and approaches discovered needs in music education and music education curricula and found innovative ways to help these problems. These approaches and programs provided a foundation to develop inclusive, diverse, and creative multimodal jazz training to enhance music education similarly.

Dalcroze Approach

The Dalcroze method was established by Swiss composer Dalcroze (1865-1950) in response to his worries about the lack of emotional connection, sensory awareness, and personal encounters in music education. Music seemed mechanical to Dalcroze and was missing expression, understanding, and creativity (Dalcroze Society of America, n.d.). In efforts to reform music education, Dalcroze desired to develop hearing abilities and musical perception and for students to sensationalize music. Dalcroze's method believed that rhythmic music requires a whole-body response and experience. His method has three components: eurhythmics, rhythmic solfege, and improvisation (Jones, 2018). Dalcroze assumed harmonizing the human body, and the mind could strengthen one's rhythm (Juntunen, 2016). He first published his method in 1906, entitled "Methode Jacques-Dalcroze." The approach went by different titles

such as “gymnatique rythmique” and “plastique rythmique” overtime the term “eurhythmics” was coined by John Harvey from the University of Birmingham (Rogers, 1966).

Many of the activities within eurhythmics occur in group exercises with students moving in spaces surrounded by improvisation, recorded music, vocalized music, and sometimes without music. Movement is emphasized through the whole body of music that is felt, experienced, and expressed (Habron & van der Merwe, 2017, 2020). This movement works as a means of discovery for the students and grows their personal and social skills. They are harnessing the reflection of their personality and individualities. Dalcroze’s method applies to all genres, including early music, classical, ethnic, folk, pop, rock, rap, heavy, soul, and jazz (Juntunen, 2016).

Kodály Method

The premise of Zoltan Kodaly’s Method was that music should be for everyone. Kodaly’s belief system was that music has the power to develop personality, intellect, and emotion, deeming music to be viewed as a way of life (Neumann, 2006). This method is centered on music; however, Kodaly’s Method is unique because it includes folk songs, games centered on students’ culture and other cultures, music written by high-level composers in all generations, and pedagogical exercises created by top-quality composers (Howard, 1996). Kodaly viewed the human voice as an instrument everyone develops, like language learning. Students can learn to match pitches and grow their musicianship through listening and hearing role model voices often sing (Szonyi, 1971). Ear development is the most crucial goal of the Kodaly Method. Kodaly uses acapella singing to strengthen vocal development as the vocal foundation for sharpening the inner ear (Dobszay, 1972).

Orff Schulwerk Approach

Creator Carl Orff believed everyone possesses musical imagination and creativity. Orff first coined the term “Schulwerk” to represent his other compositions; however, when using the term in the present day, it refers to the Orff approach to music pedagogy (Beegle, 2016). The Orff approach states that imagination and creativity can be further developed through singing, saying, moving, and playing. Many aspects of the Orff Schulwerk approach make it unique; some call it the “Orff approach” (Orff, 1963). One example is when the teacher integrates necessary musical skills and knowledge while providing an engaging lesson involving creative thinking and imagination. It is important for students to receive feedback; however, there is no judgment when receiving this feedback (Shamrock, 1997).

The Orff approach’s central concept bases its pedagogy on the unity of music, movement, and speech. Teachers are the primary facilitators of the students’ artistic expression, commonly expressed through exploration and improvisation through speech, song, movement, and instruments. The Orff approach is widely known for including barred instruments called Orff instruments. These barred, primarily diatonic xylophones, metallophones, and glockenspiel provide a kinesthetic instrument experience for students whose skills are not developed enough to play the piano (Pine, 2020). There is no set method for teaching music, and there are similarities and differences between the Orff approach, the Kodaly method, and the Dalcroze method. Despite minor criticisms and discrepancies among these pedagogical techniques, they provide a strong foundation for a multimodal jazz training program rooted in improvisation. These pedagogical techniques emphasize the importance of leaving space for child expression, emotion, and interaction.

Children's Emotional Response to Music

There are different ways to determine how a child feels about music and how they perceive music. The mere expression of music conveys emotion, and emotion in children differs vastly from how emotion is expressed in adults. Maturity, socialization, and musical knowledge influence children's emotional responses to music (Adachi & Trehub, 1998). Infants can decode happy and sad facial expressions by 20 months, and children can decipher how they and others feel by two years of age (Bretherton et al., 1987). Once children are in preschool, emotion becomes part of their everyday activities; for example, they may express emotions through storytelling or caregiver interactions.

Preschool-age children can respond positively by smiling at negative thoughts with a sad expression (Masters et al., 1979). Though a child's emotional development goes through a fast maturation process, children can exhibit expressions of happiness and sadness even if that is not their genuine emotion or feeling (Borke, 1973). These experiences all contribute to establishing the foundation for social competence (Bretherton et al., 1986).

Emotion Through Music

Research involving child interpretation of music commonly varies between studies; however, the literature has many similarities. Numerous studies confirm that children as young as three can decipher happy or sad emotions in music and facial expressions (Balkwill & Thompson, 1999; Dolgin & Adelson, 1990; Gabrielsson, 2001; Gagnon & Peretz, 2003; Gregory et al., 1996; Kastner & Crowder, 1990; Schellenberg et al., 2008). For example, three-year-olds could determine happy, sad, minor, and major with musical excerpts using schematic faces (Kastner & Crowder, 1990). In Zentner et al. (2008) study, participants of a similar age group (3 to 7 years) could determine the same content using emotionally neutral music manipulated by happiness, sadness, anger, and fear.

Discrepancies are found when child perception and composer intent are unclear. The subjective nature of music can make measuring child emotions and range of emotions difficult. Numerous studies have used various emotions, such as fear and anger, confusing child participants (Gregory et al., 1996; Robazza et al., 1994; Terwogt & Van Grinsven, 1991). For instance, 4 to 6-year-old children can understand and control their emotional expressions; however, facial expressions in children are not the most accurate measure of their emotional response (Gosselin et al., 2002).

One reason for inconsistencies in the literature is that children easily confuse the emotion of fear and anger when describing music. Gregory's (1996, *N*=40) study measured the interpretation of 3 and 4-year-old children. The children interpreted a composed song as fearful, while the composer intended to convey the emotion of anger. This may be due to young children's inability to describe complex emotions in their words (Bugos et al., 2022). The mixture of inconsistent methodologies and varying responses from child participants may explain the reasons for inconsistencies in the literature (Nawrot, 2003). There is also more research on the child's interpretation of emotion than the child's perceived emotion.

Context plays an essential role in a child's speech and song response. Prior research shows inconsistencies between self-reporting and observable children's emotions (Castro et al., 2018).

Facial Affect Units and Child Facial Affect

It is imperative to have a true and accurate interpretation of a child's behavior, perception, and personality regarding music. Various programs commonly measure facial action units. Facial action units are face movements commonly associated with a displayed emotion (Frank et al., 2005). These units are organized in the FACS initially developed by Carl Hermann Hijortsjo, a Swedish anatomist (Hjortsjö,1970). There are different systems for describing and

analyzing facial expressions; however, the FACS is the most comprehensive, psychometrically rigorous, and widely used system (Cohn et al., 2007).

Facial recognition software Noldus (version 9) uses the FACS to gain accurate and reliable data and is the most robust automated system (Noldus, 2022). Though children in preschool can match facial expressions (e.g., happy, sad, surprised, and angry), they are least successful; in matching sad, afraid, or angry faces (Erickson & Schulkin, 2003). Children are more prone to reflect positive emotions due to positive emotion's association with peer acceptance (Fong et al., 2016; Grossard et al., 2018), which may explain why children may prefer expressing happy emotions more strongly than negative ones. There is a need for more research on children's emotional responses toward improvisation and vocal tasks. In music education research, "improvisation" and "creativity" are often used interchangeably. These terms have similar meanings; however, improvisation for some educators can have a negative connotation. This negative view can deter music educators from using improvisation in their classrooms and research due to a lack of familiarity. A resource that aids in instruction in music education may alter the stigma and mindset around the "term" improvisation. There is no fear in the concept of improvising; the fear is associated with the term "improvisation." This multimodal jazz curriculum may be a tool to increase improvisation within the classroom.

This research study examines the development of a novel jazz multimodal music curriculum and its effect on children's musical and classroom behaviors as well as secondary outcomes in inhibition and facial affect in at-risk children (5-8 years).

CHAPTER THREE: METHODOLOGY

This study aims to examine the effect of using an engaging novel multimodal jazz music curriculum (rooted in creative improvisation) on student behaviors. Secondary outcomes of the preliminary study include examining the effects of this curriculum on executive functions (e.g., shifting and inhibition), children's emotional affect during improvisation and imitation, and musical ability in pitch and improvisation in young at-risk children in music. The independent variable in the study was the music condition with two levels: the six-week multimodal jazz program or experimental group and the six-week unimodal or control group (singing). The dependent measures within the study were participants' classroom behaviors, performance on measures of student facial and emotional affect, pitch accuracy, improvisation, and cognition (inhibition and shifting).

First, to examine the effects of a novel curriculum on childrens' behaviors, interviews were conducted with educators who observed the implementation of the multimodal jazz program. Next, all control (n=16) and experimental (n=15) participants were administered a battery of measures pre and post-test. Baseline measures of receptive intelligence were administered using the Peabody Picture Vocabulary Test (PPVT).

Demographic Information

The total sample consisted of (N=31) participants who were between the ages of 5-8 years, and the mean age of all participants was (M=6.71). All participants were either in Kindergarten, First, or Second grade. The mean and standard deviation for the age of the multimodal group was (M=6.63, SD=.77). The mean and standard deviation for the unimodal

control group was (*M*=6.78, *SD*=.81). There were (*n=16)* females and (*n=15)* males in the study, with a mean and standard deviation of *(M*=, 1.60, *SD*= 0.50) for the control group and (*M*=1.44, *SD*= 0.51) for the experimental group. According to the demographic questionnaire (Appendix A), students identified as Black (*n*=29) and students identified as Hispanic or Latino (*n*=2). The unimodal control group had (*n*=16) participants, and the multimodal jazz group had (*n*=15) participants. All numbers on the demographic table below (Table 2) are reflected in number and percentage except for the mean age of participants in both the experimental (multimodal) and control (unimodal). The mean age of participants is reflected in how many years old and the standard deviation. All parent and caregiver information only applies to the individual who filled out the form. Parents and or caregivers completed questionnaires with participants' demographic information. The PPVT is not an intelligence quota test but rather a receptive vocabulary. PPVT scores can range from zero to 240. In the table below (Table 2), there was no significant difference between the unimodal group and the multimodal group, similar to prior research (Bugos et al.,2021; Bugos et al., 2022)

Dependent measures were categorized into three groups: music, cognition, and emotion. The Advanced Interdisciplinary Research in Singing-Test Battery of Singing Skills (AIRS-TBSS) sub-test, which assesses improvisation and pitch accuracy, falls under the category of measures related to music, as described by Cohen (2015). The Likert Scale and verbal responses in the AIRSS-TBSS subtest were test measures that involved emotion. Emotion was also measured through facial affect responses from the Noldus FaceReader Results. The third testing category was cognition, which involved the NIH Toolbox's Flanker Task (inhibition), Dimensional Card Sort (shifting), and the Day and Night Stroop (inhibition).

Table 1: *Demographic Information and Baseline Measure Scores (PPVT)*

(*N*=31)	Multimodal Jazz (*N*=15)	Unimodal (*N*=16)	Total
Age (in years)	6.63 (.77)	6.78 (.81)	6.71 (.79)
Gender			
Male	9(60%)	6 (37.5%)	15 (48.39%)
Female	6 (40%)	10 (62.5%)	16 (51.61%)
Race			
Caucasian	0 (0%)	0 (0%)	0 (0%)
Black	13 (86.66%)	16 (100%)	29 (95.54%)
Hispanic	2 (6.25%)	0 (0%)	2 (6.25%)
Asian	0 (0%)	0 (0%)	0 (0%)
Other	0 (0%)	0 (0%)	0 (0%)
Bilingual Children	0 (0%)	0 (0%)	0 (0%)
Parent Education (in years)	12.57 (1.65)	11.64 (1.08)	12.11(1.44)
PPVT Standard Score	98.33 (15.07)	95.27(14.72)	96.80 (14.72)

**PPVT: Peabody Picture Vocabulary Test*

Informed parental consent forms and child assent forms were obtained for all subjects (*N*=31) and were mandatory for participants involved in the study. All methods, procedures, and documents were approved by The University of South Florida's Institutional Review Board (IRB). All participants were divided into two randomized groups: the control group (unimodal) or the experimental group (multimodal). Participants were randomized to eliminate selection bias and ensure equality of treatments.

Participants

Thirty-one students (*n*=31*)* who attended East Tampa Academy (Tampa, Florida) were randomly assigned to either the experimental group (jazz multimodal music training) or the control group (unimodal music singing training). According to the US Department of Education

(2021), “at-risk” refers to students who may come from a single-parent household, show signs of emotional or behavioral problems, and lack the resources to navigate developmental tasks successfully. At-risk students may be disadvantaged because many are at higher risk of low self-esteem, increased juvenile crime, teenage pregnancy, and dropping out of high school (Furstenberg & Hughes, 1995; Keating et al., 2002; Thompson & Kelly-Vance, 2001).

These factors can cause long-term effects that may translate into adulthood. East Tampa Academy is a Title 1 charter school with 100% free and reduced lunch. Title 1 schools are from a section of the federal education law providing school systems with programs and services to help disadvantaged students (Office of the Education Ombudsman, 2012). Charter schools are independently operated public schools that can design classrooms and lesson objectives that cater to their students’ needs (National Charter School Resources Center & US Department of Education, 2022).

A Demographic Survey (Appendix A) was administered to retrieve further information about each student and the student’s family to ensure participants were within the age requirements and had no disqualifying factors that may have excluded them from the study.

Participants who fell within the age range of 5 to 8 years were eligible to be part of the research. They had to submit either a signed parent consent form or a child assent form and should not have missed multiple pretesting evaluations. Students who were not fluent in English, were absent for more than two consecutive music training sessions, faced behavioral difficulties, or changed schools during the program were excluded from the study.

Thirty-one students (N=31) enrolled in the music training classes and were randomly assigned to the multimodal jazz or unimodal singing training. There were n= 15 students randomly assigned to the experimental group and n =16 students randomly assigned to the

control group. 6.25% of the students were Hispanic (*n*=2), and 93.54% were Black (*n=29)*. All participants and parents received documents (Appendix B) that briefly described the music program and details about the starting date for the music training. The participating school's principal provided a letter of approval to begin the music training and agreed to conduct the training within the school classrooms. Parents of enrolled participants completed a demographic questionnaire that included parent education level, annual income, race, ethnicity, and other demographic information.

Curriculum Interview

The PI conducted a three-question interview to measure the effects of the jazz curriculum on student behavior. Due to attrition challenges, the instructors for this pilot were not available for follow-up interviews. However, the PI managed to interview a teacher whose class had received the same jazz curriculum in a separate pilot study. All interview responses were recorded and are exact quotes from the teacher.

Battery of Measures

The study involved administering baseline assessments of receptive vocabulary using the Peabody Picture Vocabulary Test IV (PPVT) and a series of dependent measures. The battery of dependent measures was categorized as follows (bolded titles denote each category):

Music Achievement

Advanced Interdisciplinary Research in Singing Test Battery of Singing Skills Music Achievement (AIRS-TBSS)—Improvisation and Pitch Accuracy

Cognition

Day and Night Stroop & NIH Toolbox-Cognition Battery for cognitive processing (Dimensional Card Sort & Flanker Task)—Inhibition and Shifting

Emotion

Noldus FaceReader – Facial affect responses (7 emotion scores), AIRS-TBSS—Verbal

Curriculum Interview

Responses

The following section briefly describes all test measures within the three testing categories, Music, Cognition, and Emotion.

Base Line Measure

Peabody Picture Vocabulary Test (PPVT IV) measured the participant's verbal ability and receptive vocabulary. In this short measure lasting 20-30 minutes, the presenter verbalized a word, and the participants were asked to point to one picture in a series of four colored pictures representing the word. Participants chose one of the colored pictures that corresponded with the word. This test measured the participants' verbal ability and receptive processing of the English Vocabulary. This test aids in determining appropriately leveled content for educational instruction. The PPVT's retest reliability presented a correlation between .92 and .96 (very high) (Dunn & Dunn, 2007; Edmonton, 2011).

Music

Advancing Interdisciplinary Research in Singing Skills, Test Battery of Singing Skills (AIRS-TBSS)- The AIRS-TBSS included scores for pitch accuracy, improvisation, and musical achievement and was chosen due to its inclusive and diverse singing tasks accessible to young children (age 3+). The AIRS-TBSS has been used in national and international samples (Adachi & Trehub, 2011; Bugos & DeMarie, 2017; Cohen, 2015). All participants completed three tasks: Favorite Song, Brother John (imitation in parts/whole), and Improvisation (complete a song

ending). The test measures began with a speaking task, a range task (singing from the highest and lowest notes), and a "sing your favorite song" task.

Due to time considerations, a modified version of the (AIRS-TBSS) was used for this study which began with "singing a favorite song" rather than the speaking and range tasks. Similar to prior research, we started with the favorite song task in order to ease students' apprehension when singing in a novel setting (Bugos et al., 2022).

The "Brother John" subtest evaluates imitation (pitch accuracy) skills. For the students to feel comfortable singing, the examiner used a giraffe puppet named "Gerald," who acted as a singing partner for the child. The assessment of pitch accuracy involved counting the correct pitches out of a total of 32 sung in the song "Brother John."

After each singing test component (favorite song, imitation, improvisation), students were asked how each task made them feel. Using pictures of faces to reflect a range of emotions, participants were asked to point to the face that aligned with their feelings. In addition, students were asked to describe why it made them feel the way they selected. Qualitative data were recorded. In addition to qualitative data, we recorded videos that were imported into FaceReader 9.0 (Noldus, 2022). FaceReader includes a three-step process for determining emotion in individuals. The active appearance model creates a three-dimensional facial model that locates over 500 critical points in facial structure.

Cognition

Day-Night Stroop (Inhibition/Shifting) task begins by instructing the child "read" 10 pictures using the proper labels (i.e., "day" for the sun and "night" for the moon). Data regarding the time to "read" the 10 stimuli and the number of errors are recorded. We then teach the child to say the opposite label (i.e., "night" for day) and ensure the child understands how to do the

task the silly way before proceeding. After two trials of 10 stimuli the silly way, we return to the original directions and labels (i.e., say "day" for the sun, and say "night" for the moon). We analyzed the correct proportion and the time comparisons for Trials 1 to 4. Data collected enables researchers to detect individual differences previously unreported in the literature. This task may be sensitive to pretest-to-posttest differences caused by a shorter music program. Guttman split-halves reliability for this task is (r=.93).

National Institutes of Health Toolbox Cognition Battery

This cognitive battery is a set of brief multidimensional measures that assess cognitive, emotional, motor, and sensory functions. These measures are used as a "common currency" among various studies and study designs (Troller-Renfree et al., 2015). The National Institutes of Health (NIH) Toolbox includes seven tasks in the Cognitive Battery to evaluate cognitive processing in six sub-domains of executive functions, episodic memory, language, processing speed, working memory, and attention. Tasks in the NIH Toolbox Cognition Battery have shown developmentally robust results with good test reliability (r = 0.92-0.96), showing strong correlations (Akshoomoff et al., 2014). The NIH Toolbox has been normed and validated among 4,589 participants ranging from 3 to 85 years, providing a reliable tool for cognitive processing among early elementary students. The measure used in this study is the Flanker and the Dimensional Card Sort (Bauer et al., 2013; Carlozzi et al., 2013).

Dimensional Card Sort (DCCS)

In this measure, participants sort a series of two bivalent cards. The initial card is one dimension color. Once the participant progresses to the next card, the other bivalent card is then shaped. The participants then switch from color to shape to exhibit a pattern of cognitive

flexibility. By age 5, most participants can exhibit these flexibility patterns (Distefano et al., 2021).

Flanker Task (Eriksen & Eriksen, 1974)

The Flanker Task is designed to test inhibitory control and attention. Participants see a target stimulus and a set of other stimuli which flank on either side. Participants must press a button associated with the target. Sometimes the flankers are the same as the target, which is congruent, and sometimes the flankers are incongruent and different from the target. If incongruent, the participant must override their attention to the flanker to respond correctly. There is also a neutral stimulus that is not the same or opposite of the stimuli.

Procedures

All pretest measures were completed within 4-weeks before starting the music training. No more than four students were tested simultaneously to avoid cross-contamination in the testing area. Each participant was assigned a research assistant to help with questions, testing fatigue, and participants' concerns. The baseline measure (PPVT) was the first test administered to the participants; however, the remaining measures were administered in pseudorandomized order. To ensure the completion of all test measures, each participant was assigned a checklist (Appendix C). Once a participant finished a test measure, the participant would receive an initial next to the measure on the checklist confirming completion. All post-test measures were administered once the 6-week training was complete. The participants took a total of four weeks to complete all post-test measures. In previous research, post-testing was completed two weeks post-training (Bugos et al., 2022); this differed from previous research due to the tester availability and school testing limitations.

Curriculum

Participants in both the multimodal and unimodal training programs met for two 45-minute group music lessons twice a week (90 minutes). The principal investigator and research assistants aided in administering the test measures (pre and post-test) and the 6-week jazz training. The following section describes the activities that took place in the unimodal control group and the multimodal experimental group. Following the group activity descriptions is a chart comparing the lessons in the unimodal group to the lesson in the multimodal group (Table 1).

Unimodal Singing Training (Control Group)

Vocal development, a component of the National Standards for Music Education (NAfME), may impact cognitive performance. Vocal training in the unimodal control group requires the processing of independent pitches and relationships. Since most preschool music programs focus primarily on singing, this was an appropriate control group from which to compare the novel jazz intervention. Within the 6-week program, participants relied upon their aural skills to process pitches and engage in decision-making skills such as raising and lowering pitches and matching angles within a temporal context. Evidence suggests that vocal training engages both sides of the auditory cortex (Belin & Zatorre, 2000). Many studies show the benefits of vocal training on auditory processing, language acquisition, and speech clarity in children (Anvari et al., 2002; Bidelman, 2013; Kraus et al., 2014).

Developing vocal skills requires children to audiate or hold melodic segments in their minds without musical stimuli. Audiation is necessary to reproduce melodic content accurately. For example, in a familiar song, “Bingo,” children must omit letters in the refrain and replace specific letters with rests or claps. Working memory is necessary to retain the song and inhibit singing specific notes in the refrain. Research showed that early childhood vocal music programs

enhanced math performance in numeracy ability, sustained attention, and emotional regulation (Williams et al., 2016). These benefits were sustained two years post-training.

Multimodal Jazz Training (Experimental Group)

The participants in the multimodal jazz training received engaging activities centered around singing, playing, creating, and moving. These components of elementary music education are standard practices; however, many classrooms do not incorporate jazz or musical improvisation. This program was designed to integrate jazz and creative improvisation as key components of the multimodal jazz program.

During this early childhood multimodal music program, students participated in the improvisation of melodic material. Participants' activities, such as a simple call and response to a rhythmic pattern, involved the children echoing the question and providing a four-beat improvised response on melodic instruments using parameters such as a pentatonic scale. The program incorporated improvisation history, playing and listening to prominent instrumental and vocal improvisation. Near the completion of the program, students' improvisation activities were more centered on independence when improvising and slowly increasing the free play level while still providing parameters.

"Movement" was an essential element of multimodal music training. All movements within the program are to reinforce musical terms and style elements. For example, if the participants are learning the musical term for soft, "piano," the lesson plan asks the students to tiptoe since "piano" means soft and tiptoeing is a quiet movement. If the students are learning what a trumpet looks and sounds like, the movement association would be for them to watch a video of various instruments and imitate playing the trumpet whenever they hear a trumpet sound. These motion activities are all used to reinforce musical concepts and are also forms of

active listening. Most movement activities are gross motor skills (running, jumping, marching) and fine motor skills (clapping, tapping shoulders, snapping).

Each lesson plan within the multimodal jazz curriculum incorporates a description of all activities and links used to provide context for the students. Students need to get a visualization of what these musical terms, artists, and concepts mean. There are additional activities provided for each lesson for teachers who may have additional time beyond 45 minutes or have activities that may better suit their students than others. The main focus in the multimodal jazz curriculum is that every category and activity has a purpose and is done with the intent of the participants to retain the information while having fun, whether the participant is singing, moving, listening, or playing.

If educators want access to the multimodal jazz program, they can email the principal investigator for access and additional information. Below is a chart comparing the Unimodal Group and the Multimodal Group. The first column, "Week," provides the weekly Lesson Objectives and coinciding with the National Music Education Standards. The second column, "Experimental- Multimodal," shows a breakdown of the weekly activities organized by playing, singing, or moving. The third column in the Comparison chart is entitled "Control- Unimodal," this column has one category, singing, and has a brief description of the weekly unimodal lesson.

Students engaged in activities that will be harmonically complex and involve accompaniments using Orff instruments age appropriate for smaller hands and children when ostinato-like jazz songs with extensive repetition (e.g., "Oh When Saints" and "The Blues"). Improvisational tasks require conscious decisions in a temporal context. Children must inhibit immediate entrances to respond with their own creative rhythm, melody, or harmony. Inhibitory control is essential for success during improvisational tasks. Children must select a chord from

a limited array of choices that sounds appropriate based on aural skills, and they determine the timing of the performance of the chord.

Through teacher guidance, children will explore and experience music concepts (e.g., beat and melodic contour using the Orff Schulwerk approach as a guide for allowing young children to experiment with musical sounds, sequences, and patterns. The standards-based multimodal

Table 2: *Unimodal & Multimodal Comparison Chart*

Week	Experimental- Multimodal	Control – Unimodal
1 Objectives/National Standards Students will be able to demonstrate the ability to move to a steady beat at varying tempi MU.1.S.2.1 MU.1C1.1 MU.1.C.1.4	**Play**: Hand Drum 2 and 4 count **Sing**: Spaghetti Blues **Movement:** 2nd Line Big 8 March Beginning Origins of Jazz – Blues, Ragtime New Orleans, Louis Armstrong, Singing the Blues- The Big Four	Procedures- Welcome Song Beat and Steady Beat – Singing Together, Different Voices (Whisper, Talk, Shout, Sing) Strong and Weak Beat
2 Students will be able to discover the singing voice. Recognize and perform high and low sounds including the minor 3rd (sol - mi). MU.K.O.1.2, MU.1.H.2.1 MU.2.C.1.1	**Play:** Rhythm Stick (Pop Goes the Weasel) **Sing**: Welcome to Music **Movement**: Hurricane Season Swing Big Era and Jazz Instruments – body percussion on jazz funk – Parade March New Orleans	High Low Sounds Pitches Solfege Singing Patterns Note and Rest Duration, Partner Songs
3 Students will be able to physically move to music based on the mood of the music Students will be able to identify by string instruments by sight & sound within the context of the families of instruments MU.2.C.1.2, MU.2.C.1.4, MU.2.S.1.1	**Play**: Boom whacker Blues **Sing**: Happy and You know it Instruments **Movement**: Sing Sing Sing Improvisation- Jazz -Fine Motor Snap, Clap on 2 and 4, intro to music notation hand drums from swing style	Instrument Families – Woodwind Brass Percussion, Strings
4 Students will be able to move to music based on the musical elements such as tempo, phrasing, dynamics, & structure MU.2.O.1.1; MU.2.H.2.1, MU.1.S.3.1, MU.1.O.1.2	**Play:** Story Orff with Trombone Shorty Book **Sing:** Bobby McFerrin **Movement:** It's all right (Soul) Improvise Cont. on Instruments Jazz Dance playing and improvising on Orff Instruments (Pentatonic Scale) Instrument Families	Long and Short Sounds- Moving Playing long short sounds, Accents

Table 2: *Continued*

5 Students will be able to move to music based on the musical elements such as tempo, phrasing, dynamics, & structure MU.1.S.3.5 MU.1.O.3.1	**Play:** Work With It 2 and 4 **Sing**: Scat Cat **Movement**: Take 5 Bean Bags Scat Singing- Jazz Vocalists Scat Echo- call and response-	Inner Voices, Singing Solo, Up and Down Singing and recognizing voices (Man, Women, boy, girl)
6 Students will be able to differentiate and perform loud and soft sounds. MU.1.H.1.2 MU.1.S.3.2 MU.1.S.3.5	**Play**: Up the Ladder Here we Go Orff **Sing**: Oh When The Saints **Movement**: Dynamics Soft and Loud "There is No Greater Love) Bebop Jazz -Cool Jazz Fusion, Jazz Quartets and Small Ensembles Quintet	Dynamics Sing Loud Soft Timbre active listening, Issimo,
7Students will be able to recognize and perform quarter notes, eighth notes represented by the syllables = ta, = ti - ti MU.1.O.1.1	**Play**: Percussion instruments watch Maracas/ Musication **Sing**: Mas Que Nada **Movement**: Mas Que Nada Slow versions Latin Jazz Contemporary Modern Jazz	Recognizing patterns meter 2 3 and 4, Tempo,
8Students will be able to perform a repertoire of songs using limited singing range. MU.2.C.1.1	**Play:** Overview of all of the songs from the program **Sing**: Singing all songs from the program **Movement**: A review of two songs from the program Overview of All Songs and Review of Program	Fast and Slow, Form, Composing Melody =, Lyrics, Rhythm, AB Form, ABA Form, ABACA Form

jazz music curriculum is designed to enhance executive functions and examine pitch accuracy and creative improvisation. Essential developments in young children's executive functions occur during early childhood. This study hypothesizes that individual components of executive functioning can be enhanced through multimodal, active music participation.

Scoring Procedures

Music achievement data were analyzed by calculating all the pitches (32) in the AIRSS "Brother John" subtest and rating how much student improvisation deviated from the given melody. The principal investigator trained a panel of independent raters on how to use the pitch and improvisation rubrics (Appendix D. Pitch and Appendix E. Improvisation). All raters

reviewed both pitch hand improvisation videos to rate and score all the participant's data. Each rubric provided a section for the raters to explain why the participant received their rating.

All raters were tested for interrater reliability on pre and post-test music achievement scores. Pitch accuracy scores were generated based on the number of accurate pitches sung and compared between the experimental and the controlled groups at pre and post-testing. Improvisation scores used a scale from 0-3.

The music analysis for pitch and improvisation used three raters to score each participant. The raters were tested for interrater reliability within pre and post-test measures. The pitch task from the AIRSS "Brother John" subtest produced a pretest Cronbach's alpha score of a=.89 and a pitch post-test Cronbach's alpha score *of* a=.95. The improvisation task subtest produced a pretest, Cronbach's alpha score of a=.91, and the improvisation posttest, Cronbach's alpha score was a=.97. The participants who did not complete the pre and post-test for pitch and improvisation were excluded from the music analysis data (n=5) equating to a total of *(*n=26) students who completed both pre and post-tests in all AIRSS subtest measures.

The improvisation task consisted of four level rating rubric scoring (Appendix E) ranging from a score of zero (did not sing) to three (four or more notes different notes with a clear expansion of a given melody).

Noldus FaceReader – Emotion

The Noldus FaceReader 9.0 software uses automated facial action units and generates a score for the video samples collected. Within this study, the video samples were divided by the three musical tasks (imitation, improvisation, and favorite song) pre and post-test. Each facial action unit coincides with a specific emotion. According to research, the accuracy of the Noldus

Facial reader is far more precise than the process of human coders recording facial affect units (Barrett et al., 2019), with high reliability and accuracy of 89% (Lewinski, 2015).

Through Facial AUs, Noldus Facial Reader computed what percent of occurrences connect with the selected data provided. Every Action Unit had a specific associated facial muscle (s) that aligned with a particular emotion. Each task was scored among seven emotions: happy, sad, neutral, disgusted, scared, surprised, and fear. Pre and post-test scores were compared among all seven emotions for the three music tasks. Results of the FaceReader data were used to determine if there were any changes between groups after the 6-week music trainings.

Qualitative Data

In the AIRS-TBSS subtests, imitation, improvisation, and favorite song, participants were asked questions as to why they chose their Likert-Scale responses after each task. Research assistants read each emotion on a pictorial representation of a 7-point Likert-type scale ranging from very happy to very sad to ensure the participants understood the pictures and their meanings. Studies show that ratings on levels of happiness are developmentally easy to discern by young children (Erickson & Schulkin, 2003).

Student responses were recorded and coded for reemerging themes. Bugos et al. (2022) found that song familiarity, object association, and song preference were common themes within their study. Similar to prior research, the reemerging themes found for this study were: feelings, no response, not liking the song, liking singing, liking the song, entertainment, and family association.

CHAPTER FOUR

The purpose of this research is to examine the effects of an engaging novel multimodal jazz music curriculum (rooted in creative improvisation) on children's behaviors and secondary outcomes of executive functions (e.g., inhibition and shifting) and children's emotional effect during improvisation and imitation in at-risk children (5-8 years). The results of the data address the following research questions:

i. What effect does an engaging multimodal jazz curriculum have on early-age at-risk children and their behavior?
ii. What are the effects of a novel multimodal jazz curriculum on music achievement in pitch (measured using the "AIRSS Brother John subtest") and improvisation skills (measured by the AIRSS Brother John subtest)?
iii. What are the effects of a novel multimodal jazz curriculum on emotional affect in young at-risk children?
iv. What are the effects of the novel jazz program on cognitive performance in a small sample of young children?

Demographic Information

The total sample consisted of (N=31) participants who were between the ages of 5-8 years, and the mean age of all participants was (M=6.71). All participants were either in Kindergarten, First, or Second grade. The mean and standard deviation for the age of the multimodal group was (M=6.63, SD=.77). The mean and standard deviation for the unimodal control group was (M=6.78, SD=.81). There were ($n=16$) females and ($n=15$) males in the study, with a mean and

standard deviation of *(M*=, 1.60, *SD*= 0.50) for the control group and (*M*=1.44, *SD*= 0.51) for the experimental group. According to the demographic questionnaire (Appendix A), students identified as Black (*n*=29) and students identified as Hispanic or Latino (*n*=2). The unimodal control group had (*n*=16) participants, and the multimodal jazz group had (*n*=15) participants. All numbers on the demographic table below (Table 2) are reflected in number and percentage except for the mean age of participants in both the experimental (multimodal) and control (unimodal). The mean age of participants is reflected in how many years old and the standard deviation. All parent and caregiver information only applies to the individual who filled out the form. Parents and or caregivers completed questionnaires with participants' demographic information. The PPVT is not an intelligence quota test but rather a receptive vocabulary. PPVT scores can range from zero to 240. In the table below (Table 2), there was no significant difference between the unimodal group and the multimodal group, similar to prior research (Bugos et al.,2021; Bugos et al., 2022)

Pretesting Differences

Participants were randomly assigned to either the control or experimental group. The random assignments contributed to both groups' differences in the male-to-female ratio. Nine females and seven males were in the control group (unimodal), and six females and nine males were in the experimental group (multimodal). If a participant missed more than three music classes, they were excluded from the study. The experiment was designed to follow an equal number of 16 students in each group; however, one participant exceeded the three allotted absences. Some (*n*=28) participants' parents completed the parent education portion of the Demographic Survey. Missing data from the demographic survey was due to parents not fully

completing the form. Notably, many parents chose to omit information regarding certain factors such as average parent income and education level.

Table 3: *Demographic Information and Baseline Measure Scores (PPVT)*

(*N*=31)	Multimodal Jazz (*N*=15)	Unimodal (*N*=16)	Total
Age (in years)	6.63 (.77)	6.78 (.81)	6.71 (.79)
Gender			
Male	9(60%)	6 (37.5%)	15 (48.39%)
Female	6 (40%)	10 (62.5%)	16 (51.61%)
Race			
Caucasian	0 (0%)	0 (0%)	0 (0%)
Black	13 (86.66%)	16 (100%)	29 (95.54%)
Hispanic	2 (6.25%)	0 (0%)	2 (6.25%)
Asian	0 (0%)	0 (0%)	0 (0%)
Other	0 (0%)	0 (0%)	0 (0%)
Bilingual Children	0 (0%)	0 (0%)	0 (0%)
Parent Education (in years)	12.57 (1.65)	11.64 (1.08)	12.11(1.44)
PPVT Standard Score	98.33 (15.07)	95.27(14.72)	96.80 (14.72)

**PPVT: Peabody Picture Vocabulary Test*

The Dependent Variables Table (Table 3) lists the study's dependent variables and measures: music achievement, cognition, and emotion. The first column displays the three test categories of variables. The table's second column contains the names of the measures and their subtests. The third column in the dependent variables table is entitled Description, which details what each measure entails.

Table 4: Dependent Variables Table

Variables	Measures	Description of Measure
Music		
Pitch Accuracy-(Imitation)	AIRSS subtest – Brother John Imitation	32 pitches "Brother John"
Improvisation		Rubric used based on deviation from the given melody
Cognition		
Inhibition	Day and Night Stroop	Measures -Inhibition by mean reaction time and the number of errors per trial
Shifting (Redirecting)-Cognitive Flexibility	Dimensional Card Sort Task NIH-Toolbox	Students are given a score based on ability to sort items by color and shape
Attention & Inhibitory Control	Flanker Task NIH- Toolbox	Students are scored on their ability to focus on a stimulus while inhibiting attention to stimuli (a fish)
Emotion		
Seven emotions (happiness, sadness, anger, surprise, fear, disgust, neutral)	Noldus Face reader	Students are given an average score on all seven emotions during -imitation, improvisation, and favorite song tests.
Likert Scale Responses	AIRSS subtest-Faces	Students point to a scale of faces representing emotions ranging from extremely happy to extremely sad after each singing task
Qualitative Responses	AIRSS subtest	After each singing task, students express why they feel which emotion they choose

Research Question 1

What effect does an engaging multimodal jazz curriculum have on early-age at-risk children and their behavior?

Student Engagement

The PI administered three interview questions about the effects of the Multimodal Jazz Curriculum. The teacher's responses are presented below.

Interview Question 1: How do you believe the Multimodal Music Training helped the students?

Teacher Response: I think it helped in having the children more interested in the classroom environment, and it increased their interest in the music center. It truly increased their knowledge of selecting music centers. In the past, I did not have as many students going to the music centers. I contribute that interest to them having the music enrichment with you.

Interview Question 2: What aspect do you believe was the student's favorite aspect of the music training?

Teacher Response: They enjoyed all of the activities; however, when you did the movement with the students, they really enjoyed that.

Interview Question 3: Were there any differences in classroom behaviors?

Teacher Response: Our behavior management went hand in hand with what you were doing. So the music training strengthened the behavior system we had with the children. It really increased them going into their centers and working cooperatively with their team members and with the other students.

Curriculum

This multi-modal jazz curriculum was designed to provide a simplified guide for early-age music teachers to integrate creativity, improvisation, and jazz into their music lessons.

Scenario 1: If an early-age music teacher has no curriculum for their classroom, this curriculum can serve as an independent guide without the need for additional resources.

Scenario 2: This curriculum can also serve as a supplement for early-age music teachers who are bound to a specific curriculum - assisting with jazz, creativity, and improvisation lessons.

Each weekly lesson incorporated singing, movement, playing, and listening. Some categories happened simultaneously, for example, clapping while singing or jumping while listening to specific musical elements. Detailed procedures were provided in each lesson, and additional activities were listed in each lesson in the case of extra time. Below (Figure 1; Appendix F) is an example of one of the lesson plans from Week 1.

Music Analysis

Research Question 2

2. What are the effects of a novel multimodal jazz curriculum on music achievement in pitch (Brother John Pitch Accuracy) and improvisation skills (ending of phrase)?

All participants were tested in improvisation and pitch accuracy to analyze music achievement on the AIRSS "Brother Jobn" subtest. A rubric designed by Ilari et al. (2018) was chosen because it has been commonly used to measure improvisation endings in early childhood. The pitch rubric (Appendix D) consisted of 32 pitches in the "Brother John" subtest of the AIRSS measure. Three raters were selected to score both the improvisation and music achievement portion of the AIRSS subtest.

The three raters were required to have at least 10 years of music experience playing, performing, and teaching music. The three raters comprised one music educator and two musicians with at least 10 years of experience. Each rater listened to the participant's verbal and singing responses to the AIRSS pitch accuracy (imitation) and improvisation subtest. Each rater was provided 31 grading sheets (Appendix D) for pitch accuracy and was asked to determine

which notes were correct. The research assistants extracted sound files from the overall recordings of the AIRSS subtest. Once the raters completed their grading, the number of correct pitches were added together for the total score.

Categories	Activity	Description	Resources
Singing	Welcome Song	-Have them sing the songs straight then sing with 2 and 4 then listen to the Wynton Marsalis version	Wynton Marsalis Jazz Versions with Jazz at Lincoln Center orchestra: Pop goes the weasel: https://www.youtube.com/watch?v=MhMDLObgFg8 Students sing: Pop Goes The Weasel
Playing	-Review of Rhythm Cards -Scat Singing - Rhythm Sticks -Bells Echo	Students review Quarter notes and eight notes. Now students learn rests Students Paly rhythms on Drums Students can	Example of the routine: for rhythm sticks : https://www.youtube.com/watch?v=rtS5IHAMg4o https://www.youtube.com/watch?v=rtS5IHAMg4o
Listening	-Trumpet -Dizzy Gillespie (cheeks) - Jimmy Blanton Bass with Duke Ellington) -Duke Ellington and Count - Lester Young - Billie Holiday - Al Grey (trombone) -Fletcher Henderson -Benny Good Man using his music	-Talk about how black musicians and white musicians used to play together - Black bands influence the white swing bands and kids -Music brought people together talk about jazz clubs and how they were separated	Play John Patatuchi Esparanza Spalding https://www.youtube.com/watch?v=xkdzo9dYLcA Jerry Lewis And Buddy Rich https://www.youtube.com/watch?v=MCpAJk-CILA
Movement	-Fly Swat Game -Guess the Name Put them in corners and have the picture of the people -Take Five with Bean Bags -Conductor Says Like Simon says Instrument to Chair Act out Instrument Ride Cymbal Password of the day	Separate the students and show them how they were separated in the past Have instrument families Show instrument family video for Jazz	Take Five Movement: https://www.youtube.com/watch?v=cWRGafkyvqk Guess The Instrument: https://www.youtube.com/watch?v=PvZdrT6FFJ4

Figure 1: *Week 2 Jazz Training Swing Band Duke Ellington Count Basie*

Pitch Analysis

The analysis started by examining the pretest and posttest scores for the pitch measures separately for the experimental and control groups. There were no serious departures from normality except for the posttest pitch score for the experimental group (skewness = -1.30, kurtosis = 2.12) (See chart).

Table 5: *Music Analysis Skewness and Kurtosis*

		Experimental				Control			
Variable		*M*	*SD*	*Sk*	*Kur.*	*M*	*SD*	*Sk*	*Kur.*
Pitch	Pre	13.17	7.46	.1	-.93	21.20	8.82	-1.14	.79
	Post	22.19	8.37	-1.30	**2.12**	26.47	3.98	-0.99	.52
Improvisation	Pre	1.31	.78	.51	.89	1.36	.48	-.048	.95
	Post	1.49	1.01	.11	-.84	1.10	.67	-.481	-51

**The table shows the distribution of cognition scores for the experimental and the control group M=mean, SD= standard deviation, Kur=kurtosis. Bold numbers are numbers that are outside of normal distribution. * Numbers are outside normality cutoffs of -2,2 for skewness and -3,3 for kurtosis*

To evaluate the effect of the music intervention, a 2 (Group) x 2 (Time) mixed design ANOVA was used. The Group x Time interaction was not statistically significant, F (1, 24) = 0.06, p = .46. The main effects for Time, F (1, 24) = 13.11, p = .001, and Group, F (1, 24) = 7.98, p = .009 were each statistically significant. These results indicate that both groups significantly improved in pitch, and the amount of change was not different for the experimental as opposed to the control group (Figure 1; Table 5).

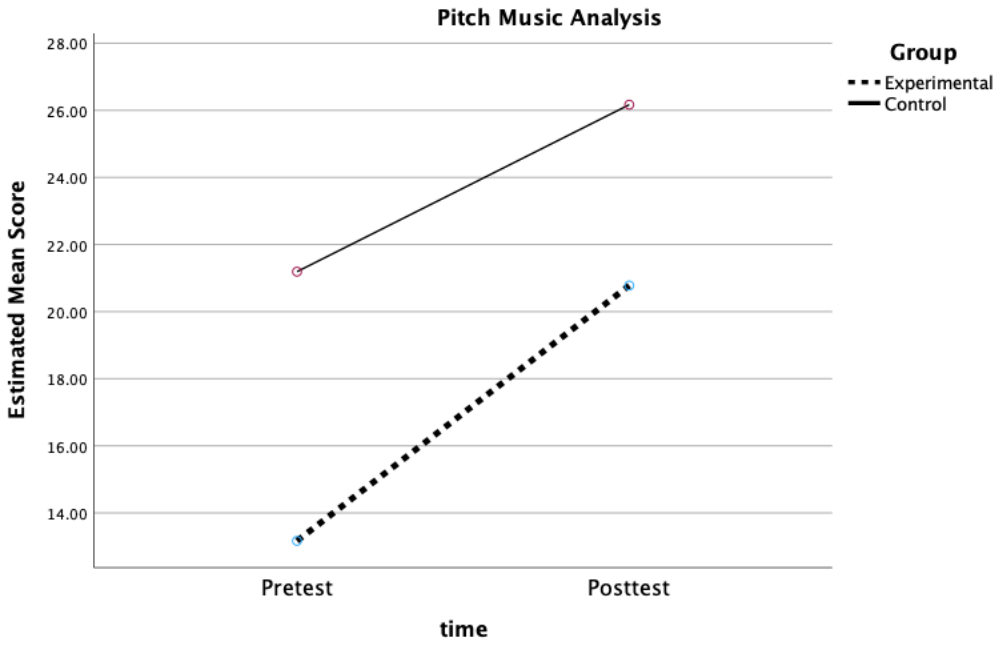


Figure 2: *Pitch Music Achievement Results*

To account for the differences in pretest pitch accuracy scores, the delta scores were used in determining if there was a significant group X time effect. Results of a MANOVA comparing delta scores of pitch accuracy revealed no significant group differences in scores $F(1,28)=1.44$, $p=.24$.

Improvisation Analysis

The analyses examined the pretest and posttest scores for the pitch measures separately for the experimental and control groups. There were no serious departures from normality (Table 6).

To evaluate the effect of the music intervention, a 2 (Group) x 2 (Time) mixed ANOVA was used. The Group x Time interaction was not statistically significant, $F(1, 28) = 1.23$, $p = 0.28$. The main effects for Time, $F(1, 28) = 2.84$, $p = 0.103$ was not statistically significant, and Group, $F(1, 28) = .60$, $p = 0.45$ was not statistically significant. These results indicate that both

groups did not significantly improve in improvisation scores, and the amount of change was not statistically significant for the experimental group as opposed to the control group.

Emotion Analysis

Research Question 2

2. What are the effects of a novel multimodal jazz curriculum on emotional affect in young at-risk children?

Face Reader Results

Though there were (*N*=31) participants within the study, due to extraneous movement, poor video quality, or a student absence, only participants (N=27) data were able to read by FaceReader and were included in the analysis of the results. The following FaceReader results section is organized by the music task in the AIRSS subtest, Favorite Song, Imitation, and Improvisation. Each subtest is preceded by the seven emotion categories, neutral, happy, sad, scared, disgusted, surprised, and angry. All subtest emotions were tested for normality of data favorite song (Table 6), Imitation (Table 7), and Improvisation (Table 8). Emotion scores that did not meet normal distribution were analyzed through a non-parametric test (Table 9).

Favorite Songs Face Reader Results

Neutral

The favorite song task had (*n*=12) students for the experimental group and (*n*=15) students for the control group. Though there was a small decrease in the time effect for the emotion "neutral" from the pretest to the post-test, it was not a significant decrease. The main effects for Time, $F(1,25) = .44$, $p = .52$, and Group, $F(1, 25) = .60$, $p = .45$ were each not statistically significant, and the group X time interaction was not statistically significant $F(1,25) = .03$, $p = .86$.

Table 6: *Favorite Song Test of Normality*

		Experimental				Control			
Variable		*M*	*SD*	*Sk*	*Kur.*	*M*	*SD*	*Sk*	*Kur.*
Neutral	Pre	.35	.18	-.11	.66	.39	.14	-.36	.13
	Post	.33	.18	.33	.-.40	.38	.16	-.09	-1.09
Happy	Pre	.36	.21	.10	.10	.25	.21	1.78	**3.79**
	Post	.39	.23	.80	-.84	.32	.23	.99	-.85
Sad	Pre	.05	.05	1.2	.50	.06	.08	**2.35**	**6.65**
	Post	.05	.08	**2.91**	**9.14**	.04	.03	1.21	.70
Angry	Pre	.04	.03	1.19	7.01	.02	.03	2.47	-.13
	Post	.04	.08	**3.35**	**9.76**	.02	.09	**2.95**	**11.43**
Surprised	Pre	.10	.09	1.07	-.34	.16	.19	2.42	**6.88**
	Post	.16	.14	.89	-.22	.13	.13	2.55	**7.77**
Scared	Pre	.02	.02	2.11	**4.49**	.02	.01	.77	.15
	Post	.004	.00	1.49	**3.35**	.01	.01	1.42	2.07
Disgusted	Pre	.02	.03	1.44	2.19	.01	.02	**2.66**	**7.98**
	Post	.01	.01	.606	-1.28	.01	.02	**2.62**	6.51

** Bold numbers are outside the normality cutoffs of -2,2 for skewness and -3,3 for kurtosis.*

Happy

There were (*n*=12) students in the experimental group and (*n*=14) students in the control group on the emotion "happy" for the favorite song measure. Due to the abnormality of the pretest Kurtosis score for the control group (kurtosis =3.76) in the emotion happy, a non-parametric test of the Mann Whitney U determined if there was a statistically significant difference between the multimodal group and the control group.

The results from an Independent Samples Mann Whitney U test indicated that there was no significant difference (p=.72) between the happy scores during the favorite song task of the

experimental group (*Mdn*=.25) and the scores of the control (unimodal) group (*Mdn*=.25) [*U*=82, *p*=.72]. Therefore, we retain the null hypothesis (Table 9).

Sad

There were (*n*=12) students in the experimental group and (*n*=15) in the control group for the emotion "sad" on the favorite song measure. Due to the abnormality of the Posttest experimental group (Skewness=2.91, Kurtosis=9.14) and the pretest of the control group (skewness=2.35, kurtosis=6.65) in the emotion sad, a non-parametric test of the Mann Whitney U determined if there was a statistically significant time, group, or group x time interaction.

The results from an Independent Samples Mann Whitney U test indicated that there was no statistically significant difference (*p*=.49) between the favorite song sad emotion scores of the experimental group (*Mdn*=.03) and the scores of the control (*Mdn*=.04) (unimodal) group [*U*=105, *p*=.49] (Table 9).

Angry

There were (*n*=12) students in the experimental group and (*n*=15) students in the control group for the emotion "angry" during the favorite song task. Due to the abnormality of the post-test experimental group (Skewness=3.36, Kurtosis=11.43) and pretest (Skewness=2.46, kurtosis=7.01) and post-test of the control group (skewness=2.94, kurtosis=9.76), a non-parametric test of the Mann Whitney U was used to determine if there was a statistically significant time, group, or group x time interaction.

The results from an Independent Samples Mann Whitney U test indicated that there was no significant difference (*p*=.46) for the angry emotion during the favorite song task between the experimental group (*Mdn*=.02) and the scores of the control (*Mdn*=.01) (unimodal) group. [*U*=74, *p*=.46] (Table 9).

Surprised

There were (n=12) students in the experimental group and (n=15) in the control group who produced results for the emotion "surprised" within the favorite song measure. Due to the abnormality of the pretest (Skewness=2.42, kurtosis=6.88) and post-test (Skewness=2.55, Kurtosis=7.77) for the control group, a non-parametric test of the Mann Whitney U determined if there was a statistically significant time, group, or group x time interactions.

The results from an Independent Samples Mann Whitney U test indicated that there were no significant differences (p=.55) between the experimental group (Mdn=.11) and the scores of the control (Mdn=.14) (unimodal) group [U=77, p=.55] for the favorite song surprised emotion (Table 9).

Scared

There were (n=12) students in the experimental group and (n=15) students in the control group for the emotion "scared" in the favorite song measure. The analyses began by examining the pretest and posttest scores separately for the experimental and control groups. There were no serious departures from normality except for the experimental group's pretest score (kurtosis=4.49).

To evaluate the effect of the music intervention, a 2 (Group) x 2 (Time) mixed design ANOVA for the emotion scared was used. The Group x Time interaction was not statistically significant, F (1, 24) = .25, p = .63. The main effect for Time, F (1, 25) = 7.42, p = .012, was statistically significant. These results indicate that both groups significantly decreased the fear level from pre-test to post-test, and the amount of change was not different for the experimental as opposed to control groups (Figure 2).

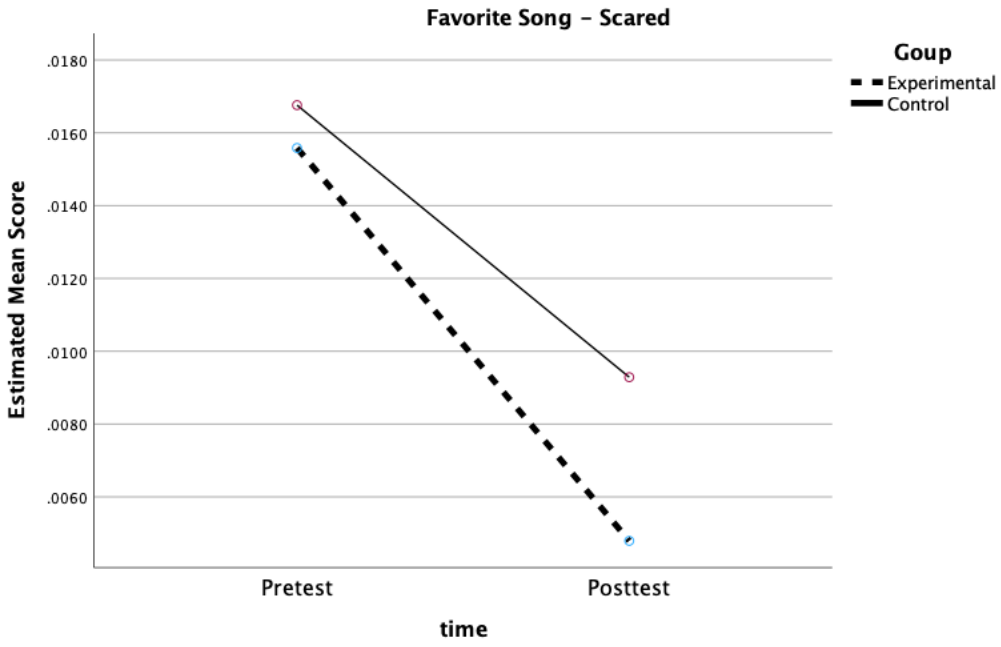


Figure 3: *Scared Emotion Favorite Song*

Disgusted

There were (*n*=12) students in the experimental group and (*n*=15) in the control group for the emotion "disgusted" in the favorite song measure. Due to the abnormality of the skewness and kurtosis pretest (skewness=2.66, kurtosis=7.98) and posttest (skewness=2.62, kurtosis=6.51) control group in the emotion disgusted, a non-parametric test of the Mann Whitney U test was used to determine if there was a statistically significant time, group, or group x time interaction.

The results from an Independent Samples Mann Whitney U test indicated that there were no statistically significant differences (*p*=.55) between the experimental group (*Mdn*=.01) and the scores of the control group (*Mdn*=.003) [*U*=82.50, *p*=.72] for the favorite song emotion disgusted.

Table 7: *Imitation Test of Normality*

		Experimental				Control			
Variable		*M*	*SD*	*Sk*	*Kur.*	*M*	*SD*	*Sk*	*Kur.*
Neutral	Pre	.33	.20	-.16	-.65	.38	.20	.48	1.38
	Post	.31	.16	.29	-1.10	.41	.16	.43	.29
Happy	Pre	.35	.33	.57	-.87	.35	.27	.86	-.40
	Post	.28	.39	.28	-1.60	.28	.22	.99	-.10
Sad	Pre	.04	.05	.96	-.722	.04	.05	1.96	**3.7**
	Post	.06	.05	1.18	.81	.06	.03	.36	-.90
Angry	Pre	.03	.28	1.64	**2.69**	.02	.02	1.85	**4.28**
	Post	.05	.04	1.36	1.43	.02	.02	1.11	1.04
Surprised	Pre	.12	.15	1.66	1.73	.09	.07	.90	.59
	Post	.12	.12	1.57	1.99	.09	.08	1.10	**5.14**
Scared	Pre	.01	.01	**3.57**	**13.05**	.02	.03	1.90	2.83
	Post	.01	.01	.60	1.10	.01	,01	2.26	**6.01**
Disgusted	Pre	.01	.03	3.2	**11.02**	.01	.02	1.59	1.36
	Post	.02	.02	2.1	5.29	.01	.01	-.58	-1.27

** Bold Numbers are outside the normality cutoffs of -2,2 for skewness and -3,3 for kurtosis*

Imitation Face Reader Results

Neutral

There were (n=13) student scores in the experimental group and (n=15) in the control group for the emotion "neutral" within the imitation song measure. To evaluate the effect of the music intervention, 2 (Group) x 2 (Time) mixed design ANOVA was used. The Group x Time interaction was not statistically significant, $F(1, 26) = .13$, $p = .72$ The main effect for Time, $F(1, 26) = .19$, $p = .66$, and Group $F(1,26)=2.17$, $p=.15$ were not statistically significant. These results indicate no significance in Group x Time, time, and group interaction. The amount of change was not different for the experimental and control group.

Happy

There were (n=13) students in the experimental group and (n=15) in the control group for the emotion "happy" in the imitation song measure. To evaluate the effect of the music intervention, a 2 (Group) x 2 (Time) mixed design ANOVA was used. The Group x Time interaction was not statistically significant, F (1, 26) =.10, p =.75. The main effect for Time, F (1, 26) = .86, p = .36, and Group F (1,26) =.97, p=.33 were not statistically significant. These results indicate no significance in Group x Time, time, and group interaction. The amount of change was not different for the experimental and control group.

Sad

The analyses began by examining the pretest and posttest scores for the emotion "sad" during the imitation measure separately from the experimental and control groups. There were no serious departures from normality aside from pretest kurtosis for the control group (kurtosis=3.7).

To evaluate the effect of the music intervention, a 2 (Group) x 2 (Time) mixed design ANOVA was used. The Group x Time interaction for the emotion sad was not statistically significant, F (1, 26) =.10, p = .76. The main effects for Time, F (1, 26) = 4.26, p = .05 significant with scores increasing. Group F (1, 26) =.09, p = .77 was not statistically significant. These results indicate that both groups significantly increased the emotion sad from pre to post-test in the measure of imitation. However, the amount of change was not different for the experimental as opposed to the control groups.

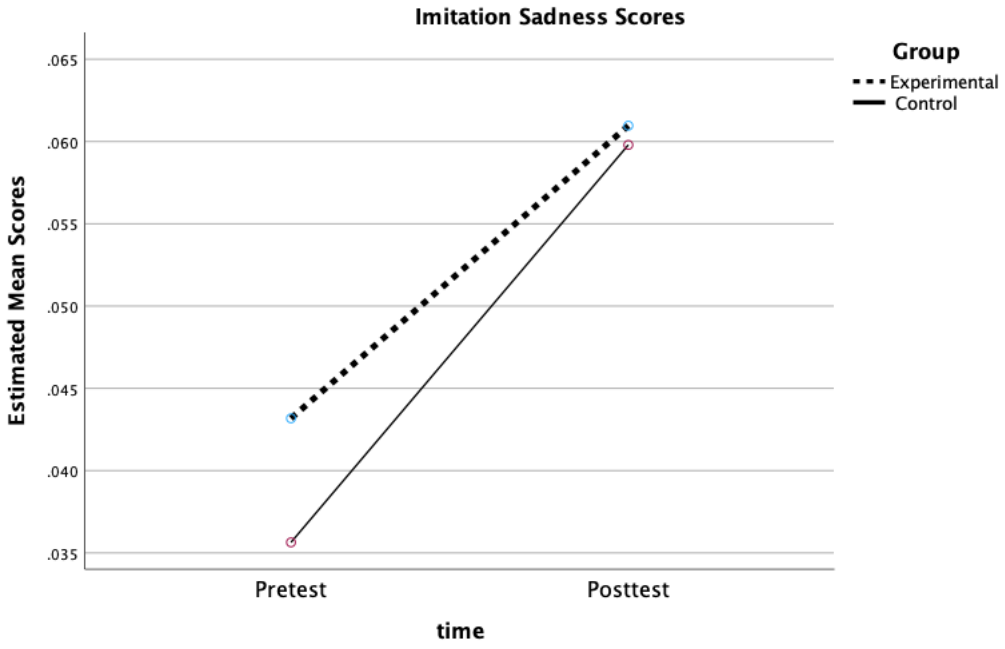


Figure 4: *Imitation Sad Face Reader Sad Scores*

Angry

There were (n=13) student scores in the experimental group and (n=15) student scores in the control group for the emotion angry within the imitation song measure. Due to the abnormality of the pretest experimental group (kurtosis=13.44) in the emotion angry, a non-parametric-test-of the Mann Whitney U test was used to determine if there was a statistically significant time, group, or group x time interaction. The results from an Independent Samples Mann Whitney U test indicated that there was no significant difference (p=.50) in the angry scores during the imitation task between the scores of the experimental group (Mdn=.03) and the scores of the control (Mdn=.04) (unimodal) group. [U=82.50, p=.50] (Table 9).

Surprised

There were (n=13) student scores in the experimental group and (n=15) in the control group for the emotion "surprise" in the imitation song measure. Due to the abnormality of the

pretest experimental group (kurtosis=13.44) in the emotion surprise, a non-parametric-test of Mann Whitney U test was used to determine if there was a statistically significant time, group, or group x time interaction. The results from an Independent Samples Mann Whitney U test indicated that there was no significant difference (p=.49) between the surprised emotion scores of the experimental group (Mdn=.07) and the scores of the control (Mdn=.07) (unimodal) group [U=90, p=.75].

Scared

There were (n=13) student scores in the experimental group and (n=15) in the control group for the emotion "scared" in the imitation song measure. Due to the abnormality of the pretest experimental group (kurtosis=13.05) in the emotion scared, a non-parametric-test of the Mann Whitney U test was used to determine if there was a statistically significant time, group, or group x time interaction. The results from an Independent Samples Mann Whitney U test indicated that there was no significant difference (p=.49) between the scared emotion scores of the experimental group (Mdn=.01) and the scores of the control (Mdn=.01) (unimodal) group during the imitation song task. [U=105, p=.49].

Disgust

There were (*n*=13) students in the experimental group and (n=15) students in the control group for the emotion "disgust" in the imitation song measure. Due to the abnormality of the pretest experimental group (kurtosis=11.01) in the emotion disgust, a non-parametric test of the Mann Whitney U test was used to determine if there was a statistically significant time, group, or group x time interaction. The results from an Independent Samples Mann Whitney U test indicated that there was no significant difference (p=.94) between the imitation song disgust

emotion scores of the experimental group (Mdn= .01) and the scores of the control (Mdn=.01) (unimodal) group. [U=92.50,p=.94].

Table 8: *Improvisation Test of Normality (Improvisation Face Reader Results)*

		Experimental				Control			
Variable		*M*	*SD*	*Sk*	*Kur.*	*M*	*SD*	*Sk*	*Kur.*
Neutral	Pre	.29	.18	1.19	1.11	.32	.20	.31	-.161
	Post	.10	.10	.87	-.84	.11	.09	1.13	1.10
Happy	Pre	.39	.32	-.03	-1.83	.41	.32	.49	-1.40
	Post	.30	.15	.15	.-.23	.40	.12	-.82	.25
Sad	Pre	.04	.06	1.66	2.04	.02	.02	1.13	2.04
	Post	.38	.24	.24	-1.35	.28	.21	1.12	-1.35
Angry	Pre	.02	.03	2.24	**5.04**	.04	.06	2.69	**7.20**
	Post	.07	.05	.64	.60	.07	.03	-.04	-.77
Surprised	Pre	.13	.15	1.81	5.51	.13	.17	1.81	3.67
	Post	.01	.01	1.14	**10.32**	.01	.03	1.14	.60
Scared	Pre	.02	.04	**3.63**	**13.44**	.01	.02	2.45	**5.77**
	Post	.01	.02	**3.19**	**10.77**	.02	.02	1.22	.77
Disgusted									
	Pre	.01	.01	**3.63**	**13.36**	.005	.01	**3.66**	**13.77**
	Post	.03	.02	.41	-.58	.03	.02	1.45	2.76

* *Bold Numbers are outside the normality cutoffs of -2,2 for skewness and -3,3 for kurtosis*

Improvisation Face Reader Results

Neutral

There were (n=13) students in the experimental group and (n=15) in the control group for the emotion "neutral" in the improvisation song measure. To evaluate the effect of the music intervention, 2 (Group) x 2 (Time) mixed design ANOVA was used. The Group x Time interaction was not statistically significant, F (1, 26) = .001, p = .97. The main effect for Time,

*F (*1, 26) = 32.99, *p* = .001, was statistically significant. These results indicate that both groups significantly decreased in the emotion neutral. The amount of change was not different for the experimental and control group.

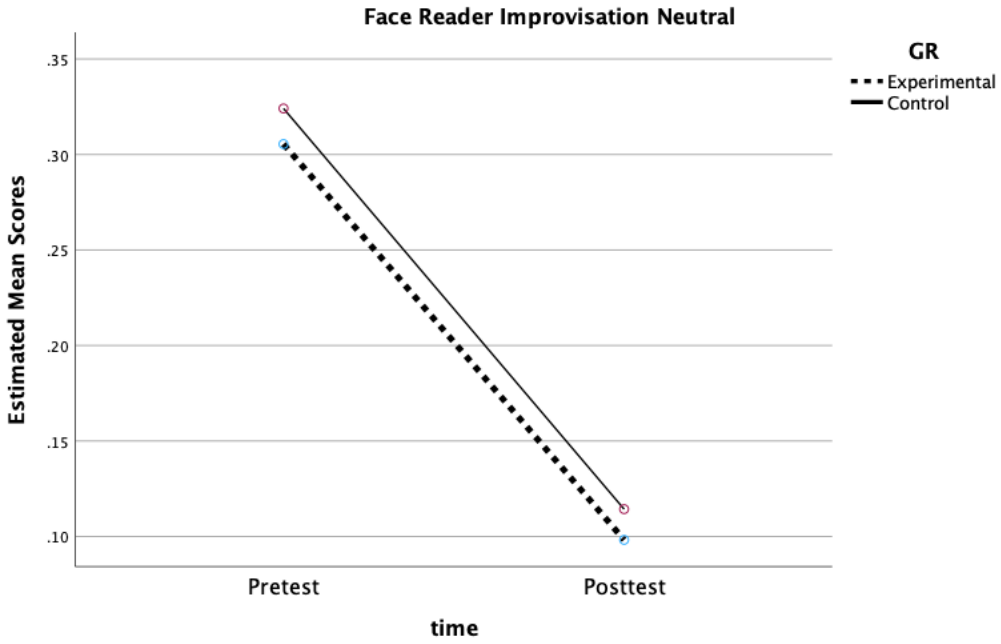


Figure 5: *Improvisation Face Reader Neutral Scores*

Happy

There were (n=13) student scores in the experimental group and (n=15) in the control group for the emotion "happy" improvisation song measure. To evaluate the effect of the music intervention, a 2 (Group) x 2 (Time) mixed design ANOVA was used. The Group x Time interaction was not statistically significant, *F (*1, 26) = .37, *p* = .55. The main effect for Time, *F (*1, 26) = .39, *p* = .54, was not statistically significant, and the main effect for group *F (*1, 26) = .46, *p* = .50 was not statistically significant. These results indicate that no groups significantly

decreased or increased on the emotion happy during improvisation. The amount of change was not different for the experimental and control group.

Sad

There were *(n*=13) student scores in the experimental group and (n=15) in the control group for the emotion "sad" in the improvisation song measure. A 2 (Group) x 2 (Time) mixed design ANOVA was used to evaluate the effect of the music intervention. The Group x Time interaction was not statistically significant, $F(1, 26) = 1.19$ $p = .28$. The main effect for Time, $F(1, 26) = 46.98$, $p = .001$ was significant with scores increasing, and Group, $F(1, 26) = 4.13$ $p = .052$ was not statistically significant. These results indicate that both groups significantly increased in sad scores, and the amount of change was not different for the experimental compared to the control group (Figure 5).

Angry

There were (n=13) student scores in the experimental group and (n=15) in the control group for the emotion "angry" in the improvisation song measure. Due to the abnormality of the skewness and kurtosis pretest for the experimental group (skewness=2.24, kurtosis=5.04) and pretest for the control group (skewness=2.69, kurtosis=7.20), a non-parametric-test-of the Mann Whitney U was used to determine if there was a statistically significant time, group, or group x time interaction. The results from an Independent Samples Mann Whitney U test indicated that there was no significant difference (*p*=.65) between the improvisation angry emotion scores of the experimental group (*Mdn*=.05) and the scores of the control (*Mdn*=.06) (unimodal) group. [*U*=116, p=.65].

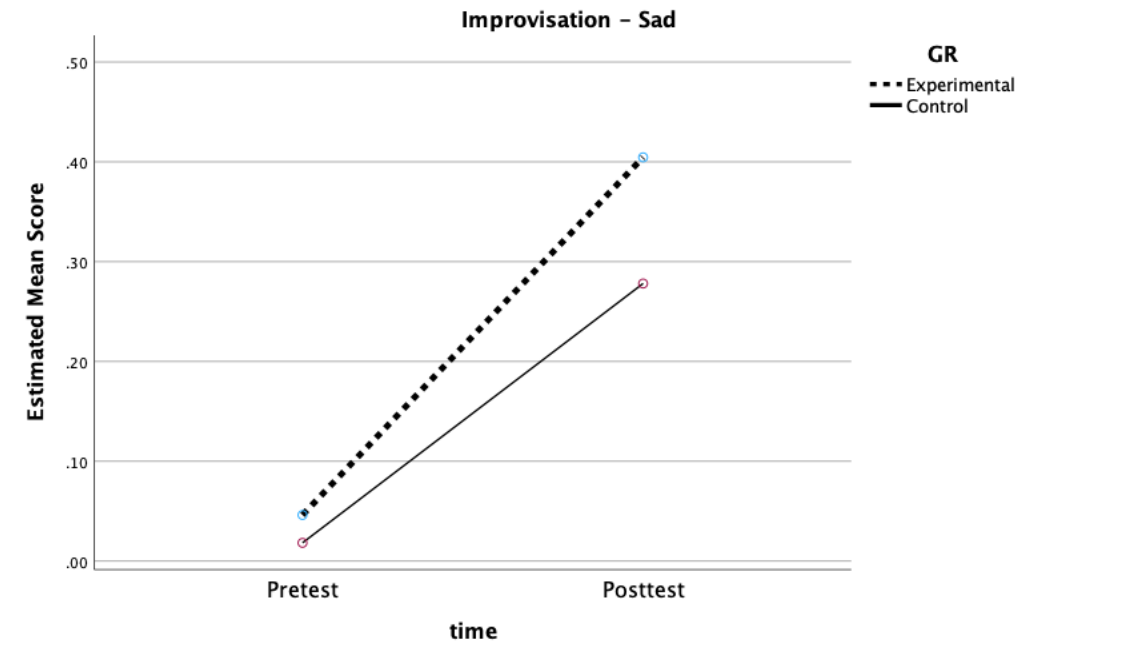


Figure 6: *Improvisation Face Reader Scores*

Surprised

There were (*n*=13) student scores in the experimental group and (n=15) in the control group for the emotion "surprise" in the imitation song measure. Due to the abnormality of the pretest experimental group (kurtosis=13.44) in the emotion surprise, a non-parametric test of the Mann Whitney U test was used to determine if there was a statistically significant time, group, or group x time interaction. The results from an Independent Samples Mann Whitney U test indicated that there was no significant difference (*p*=.49) between the surprised emotion scores of the experimental group (*Mdn*=.07) and the scores of the control (*Mdn*=.07) (unimodal) group [*U*=90, *p*=.75].

Scared

There were (*n*=13) student scores in the experimental group and (*n*=15) in the control group for the emotion "scared" in the imitation song measure. Due to the abnormality of the pretest experimental group (kurtosis=13.05) in the emotion scared, a non-parametric-test-of the Man Whitney U test was used to determine if there was a statistically significant time, group, or group x time interaction. The results from an Independent Samples Mann Whitney U test indicated that there was no significant difference (*p*=.49) between the imitation song scared emotion scores of the experimental group (Mdn=.01) and the scores of the control (*Mdn*=.01) (unimodal) group. [*U*=105, *p*=.49] (Table 9).

Table 9: *Non-Parametric Emotion Results*

Measures	***Emotion***	***U***	***p***
Favorite Song			
	Happy	82	.72
	Sad	105	.49
	Angry	74	.46
	Surprised	77	.55
	Disgusted	82.5	.72
Improvisation			
	Angry	116	.65
	Surprised	97.5	.75
	Scared	135	.20
	Disgusted	121	.50
Imitation			
	Angry	82.50	.50
	Scared	105	.49
	Disgust	92.5	.94
	Surprise	90	.75

Disgust

There were (*n*=13) students in the experimental group and (*n*=15) in the control group for the emotion "disgust" in the imitation song measure. Due to the abnormality of the pretest experimental group (kurtosis=11.01) in the emotion disgust, a non-parametric test of the Mann Whitney U test was used to determine if there was a statistically significant time, group, or group x time interaction. The results from an Independent Samples Mann Whitney U test indicated that there was no significant difference (*p*=.94) between the imitation song disgust emotion scores of the experimental group (*Mdn*= .01) and the scores of the control (*Mdn*=.01) (unimodal) group. [*U*=92.50, *p*=.94].

Cognitive Analysis

Research Question 3

3. What are the effects of the novel jazz program on cognitive performance in a small sample of young children (pilot data)?

Dimensional Card Sort (DCCS)

The analysis commenced by separately assessing the pretest and posttest scores for the DCCS measure in both the experimental group (using multiple modes) and the control group (using a single mode). There were no serious departures from normality except for the posttest DCCS score for the experimental group (skewness = -1.42, kurtosis = 2.68) (Table 10).

There were (*n*=12) students in the multimodal group and (*n*=10 students) in the unimodal group who completed the pre and post-test of the DCCS Task. To evaluate the effect of the music intervention, a 2 (Group) x 2 (Time) mixed design ANOVA was used. The Group x Time interaction was not statistically significant, $F(1, 21) = 0.05$, $p = .82$. The main effects for Time, $F(1, 21) = .009$, $p = .93$, and Group, $F(1, 21) = 1.5$, $p = .22$ were each not statistically

significant as well. These results indicate that neither group (experimental or control) significantly improved in DCCS Task, and the amount of change was not different for the experimental or the control group.

Flanker

The analyses by examining the pretest and posttest scores for the dimensional card sort measure separately for the experimental (multimodal) and control (unimodal) groups. There were no serious departures from normality in the Flanker Task.

Table 10: *Cognitive Measures Skewness and Kurtosis*

		Experimental				Control			
Variable		*M*	*SD*	*Sk*	*Kur.*	*M*	*SD*	*Sk*	*Kur.*
Flanker	*Pre*	93.80	14.56	.67	.84	92.71	12.60	-.69	-.52
	Post	91.00	8.21	-.56	.75	90.00	14.38	.13	-1.00
Dimensional	*Pre*	94.8	7.13	.09	-1.23	99.29	16.24	.70	.36
Card Sort	*Post*	92.40	16.54	-1.42	2.68	98.57	22.71	.25	.17
Day Night	*Pre*	1.19	2.07	2.08	**3.75**	1.21	2.29	2.37	**5.90**
Silly Errors	*Post*	2.44	3.18	1.82	2.76	.93	1.21	1.08	-.35
Day Night	*Pre*	10.80	6.36	.35	.85	9.61	4.83	-1.08	.48
Silly Time	*Post*	9.61	2.79	1.03	.26	9.56	2.79	1.44	**3.41**

**Bold Numbers are outside the normality cutoffs of -2,2 for skewness and -3,3 for kurtosis*

There were (n=12) students in the multimodal group and (n=10 students) in the unimodal group who completed the pre and post-test of the Flanker task. To evaluate the effect of the music intervention, a 2 (Group) x 2 (Time) mixed design ANOVA was used. The Group x Time interaction was not statistically significant, F (1, 20) = 0, p = .99. The main effects for Time, F (1, 20) = 2.85, p = .12, and Group, F (1, 20) = .04, p = .84 were each not statistically significant as well. These results indicate that neither group (experimental or control) significantly improved in Flanker Task, and the amount of change was not different for the experimental or the control group.

Day Night Stroop

Errors

The Day Night Stroop task was analyzed by examining the pretest and posttest errors separately for the experimental (multimodal) and control (unimodal) groups. Due to the abnormality of the Day Night Stroop errors (See Table 10), a non-parametric test of the Mann Whitney U was used. The Mann Whitney U test determined if there was a statistically significant difference between the multimodal (experimental) and unimodal (control) groups on a decrease in errors from the pretest to the posttest for the Day Night Stroop Task. There was a total of (n=16) participants in the experimental (multimodal) group who completed the Day Night Stroop Task and (n=14) participants in the control group who completed the Day Night Stroop Task. The results from an Independent Samples Mann Whitney U test indicated that there was no significant difference (p=.15) between the silly error total score of the experimental group (Mdn=1) and the scores of the control group (Mdn=.5). [U=77.50, p=.15].

Day Night Stroop Time Results

The analyses began by examining the Day Night Stroop reaction time pretest and posttest scores. The pre and post-test scores were examined separately for the experimental (multimodal) and control (unimodal) groups. There were no departures from normality, except for the posttest Day Night Stroop time score for the control group (skewness = 1.44, kurtosis = 3.41). To evaluate the effect of the music intervention, a 2 (Group) x 2 (Time) mixed design ANOVA was used. The Group x Time interaction was not statistically significant, $F(1, 28) = 0.33$, $p = .57$. The main effects for Time, $F(1, 28) = .40$, $p = .53$, and Group, $F(1, 28) = .20$, $p = .66$ were each not statistically significant. There was a decrease in time for the experimental group; however, the decrease was not of statistical significance. These results indicate that neither group (experimental or control) significantly decreased in time on the Day and Night Stroop mean reaction time. The amount of change was not different for the experimental compared to the control group for this small sample.

CHAPTER FIVE: DISCUSSION

The purpose of this pilot research was to examine the effect of using an engaging novel multimodal jazz curriculum on child behavior, engagement in the classroom, executive functions (e.g., inhibition and shifting), emotional affect, and music aptitude in at-risk children (5-8 years of age).

This chapter discusses the prominent findings concerning the literature on music training in young children (5-8 years), at-risk children and emotions, creativity, and improvisation. Also included is a discussion of the participants' verbal responses during the AIRSS subtests. The chapter concludes with a discussion of the limitations, implications, areas for future research and a summary.

All discussion and future research prospects in this chapter are to help answers the following research questions:

i. What effect does an engaging multimodal jazz curriculum have on early-age at-risk children and their behavior?

ii. What are the effects of a novel multimodal jazz curriculum on music achievement (Brother John Pitch Accuracy), Improvisation skills, and emotional affect in young at-risk children (5-8 years of age)?

iii. What are the effects of the novel jazz program on cognitive performance in young children (5-8) (Inhibition, shifting)?

iv. What is the effect of a novel multimodal jazz program on a child's (5-8 years of age) emotion through verbal response and facial affect?

Question 1: *What effect does an engaging multimodal jazz curriculum have on early-age at-risk children and their behavior? Student Engagement*

Curricular development is an iterative process. This study developed a novel multimodal jazz program for elementary children that was feasible for the students and produced on-task behaviors as reported by educators. Students were engaged in multiple music activities that increased their knowledge of jazz repertoire, composers, performers, and musical styles within the jazz vernacular. The interview with the teacher reflects the students growing interest in music, specifically jazz. The teacher expressed that students were individually choosing music centers, inquiring about music classes, and working better within their classroom groups. The interview reflects the positive impact the jazz training had on the class collectively and the students individually.

Music Analysis

The data indicated a significant impact of time on the music achievement measure, specifically regarding pitch accuracy. These results show that after a (6-week) unimodal or multimodal jazz music training, both groups can show a significant improvement in pitch accuracy. Two factors may have influenced the difference in pitch accuracy scores among the two groups, (a) pretest scores (b) and the multimodal group curriculum. Though students were divided into groups through a randomized process, the control (unimodal) group had a higher pretest score than the multimodal group on the pitch accuracy measure. Both music groups, control and experimental, contained activities that involved singing in every lesson. Albeit both groups' (unimodal and multimodal) curriculums involved singing, the multimodal group did not have as much singing as opposed to the control group. The curriculum for the multimodal jazz group consisted of four distinct elements of music, namely: (a) playing, (b) singing, (c) movement, (d) and listening. The unimodal group focused solely on singing for the entire 45-

minute lesson. This factor may contribute to the difference in post-test scores between the unimodal and multimodal jazz group, resulting in the unimodal singing group producing higher pitch accuracy scores.

These results shed new light on the impact of music training concerning time and early childhood age in at-risk children. While previous multimodal music training programs found benefits after six weeks of music training (Bugos & DeMarie, 2017), increased training duration may be necessary to see differences from this novel jazz music program., Early childhood is a formative period in which daily exposure to music may be necessary to shape musical and cognitive development.

Improvisation

Though there was a small increase in improvisation scores among the experimental and control groups, the results were not statistically significant. The multimodal jazz curriculum had activities that incorporated improvisation. Each student learned the meaning of improvisation and improvised through singing, playing, movement, and listening. There were multiple students during the AIRSS improvisation subtest who, when asked to improvise, sang a familiar song rather than improvising over the song "Brother John". Transferring the idea of improvisation during music training to the Improvisation test measure may have been challenging for these participants. Students who sang a familiar song rather than improvising over "Brother John" earned a score of 0.5. Despite the students singing, their performance did not slightly deviate from the required melody, as specified in the improvisation rubric.

Often music education is so "performance-focused" that people believe settings with children and music involves "a performance repertoire of children's songs under the leadership of an adult" (Young, 2006). Young describes this method as "music-as-performance," where music education can only be applied to performing rather than learning concepts like

improvisation. Young also describes this process as detracting attention from a child's self-initiated musical activity. The understanding is that the students were aware that improvisation involved singing something different from the imitation task. Nevertheless, their results emphasize the importance of understanding the boundaries, structure, and limitations associated with improvisation. This observation provides an area for improvement within the multimodal jazz curriculum as curriculum development is an iterative process. Students who received a perfect score of three applied their improvised lines to the original melody and slightly deviated from the original melody.

Cognitive Performance

Results of shifting measures (Dimensional Card Sort) and Inhibition (Day and Night Stroop &Flanker) showed no improvements contrary to prior research (Diamond, 2011; Ilari et al., 2018; Rodriguez-Gomez & Talero-Gutiérrez, 2022; Yu, 2018). Few music training studies showed significant results on cognitive measures in 6 weeks or less. Bugos & DeMarie (2017) found significant improvement in inhibition and visual discrimination on the Matching Familiar Figures Test (MFFT) after a six-week program, while Moreno (2021) found significant improvement in verbal intelligence on the "Go no Go" task in 4-weeks. Most of the music training studies with cognitive test measures range from 8 weeks (Bowmer et al., 2018) to 19 weeks (Bolduc et al., 2021) and more (Kosokabe et al., 2021; Bayanova et al., 2022). These findings suggest there may have been greater results if the novel jazz multimodal music training had been longer than six weeks. In addition, there was a limited sample size that reduced the likelihood of finding any differences between groups. Twenty participants per group (N=40) is necessary to see such differences using these measures. This data was meant to serve as pilot data.

Emotion-Face Reader

The Face Reader scores for "Sad, Neutral, and Scared" presented interesting findings. Results showed (a) an increase in improvisation (sad emotion), (b) an increase in the Sad emotion during imitation, (c) a decrease in Neutral for the improvisation task, (d) and a decrease in Scared for the Favorite song task.

The rise in sad emotions observed during the improvisation and imitation tasks led to an exploration of existing research concerning the expression and development of emotions in at-risk children, as well as the examination of the effects of COVID-19 on child emotions and emotional expression. Mondi &Reynolds (2021) emphasize that not all experiences of poverty are equal; even if it is a geographic area with low-income children, each student's experience varies. Due to the individuality of each student's experience, deciphering what may have led to the increase in the "sad" emotion during imitation and improvisation is challenging, and it would need further research (interviews, etc.) with the participants.

Van Zonneveld et al. (2018) conducted a study where at-risk children (n=219) aged 8 to 12 scored very low in recognizing the emotions fear and sadness. Similar studies further supported findings that children with severe family adversity and behavior problems had an impaired recognition of negative facial expressions (Wells et al., 2020; Burley et al.,2021; Hunnikin et al., 2021)

Through correlational analysis, Sanders et al. (2013) revealed that parents with unsupportive responses to their child's emotional expressivity led to greater child emotion dysregulation and poor emotional coping. Parents with high levels of unsupportive responses to their child's emotional expressivity led to more anger dysregulation, less anger coping, less sadness coping, and even higher depressive symptoms in their children (Sanders et al., 2013). These prior studies may explain why the participants reacted sadly to the improvisation and

imitation task during facial recognition. Given the likelihood of poor emotional regulation, participants may have had difficulty expressing their emotional reactions to the activity.

COVID-19

When schools were closed during COVID-19, many students had an abnormal school experience due to mandated distance learning (Yorke et al., 2021). This may have impacted the participants' social-emotional development and ability to express emotions. Children develop the ability to express emotions at six years of age and continue developing the recognition of real emotions compared to overtly displayed emotions. Children's understanding of privately experienced emotions develops at age 10 (Harris et al.,1986).

Egan et al. (2021) administered a survey (*N*=506) to parents with children ages 1-10. The parents were asked how the pandemic impacted their child's social and emotional development. Many parents expressed their children struggled with boredom, isolation, anxiety, under stimulation, and clinginess. According to Egan et al. (2021), these findings had a severe impact on their academic performance and a detrimental effect on their social-emotional development. Similar studies surveying COVID-19's impact on social-emotional development concluded with similar results and findings of loneliness, anxiety, parental stress, and the need for remediation (Rogers et al.,2021; Sun et al.,2022; Werner & Woessmann, 2023).

The lack of correlation between the participants' verbal responses (Likert scale) and face reader scores indicates the need to emphasize social-emotional learning within the multimodal curriculum. Socio-emotional learning is the gaining of critical skills that contribute to student development (Duckworth & Yaeger, 2015).

Examples of socio-emotional skills are self-awareness, social awareness, relationship skills as well as responsible decision-making (Elias et al., 1997). The participant's verbal

responses during the AIRSS subtest fell within the category of self-awareness. During the Likert scale responses (e.g. very happy, neither happy nor sad, angry), some participants did not understand the meanings of the emotions or could not understand what they were feeling if not solely happy or sad. These responses emphasize the importance of teaching students what emotions are and emotion regulation. Teachers and parents can also teach students how to express their feelings. As educators, teaching these emotions may contribute to students' mental health and well-being, which can contribute to their academic success.

Harris (1985) states that people often think emotion is an involuntary reaction; however, children can be taught to hide or exaggerate emotions. Depending on one's culture and environment, a parent may teach their child what is acceptable and unacceptable or how to control certain emotions. It is challenging to infer the meaning behind the increase in the emotion "Neutral" due to its ambiguity. This score may be due to the students being more focused or familiar with the test measure upon post-testing.

There was no correlation found between the participants' Likert scale verbal responses during the music subtests and FaceReader scores. This is an important finding in understanding child emotions and perceived emotions. Though participants' facial affect in muscle movements was captured, emotional responses may have been overshadowed by events in students' living situations or personal lives. For instance, one participant felt extremely happy singing the "Brother John" Measure; however, the student said the song reminded them of their aunt's funeral and never having a chance to meet their father. The self-rated Likert scale score did not align with the student's verbal responses. Further research is necessary to understand emotions in at-risk children to better tailor learning experiences in all subject areas.

According to Denham (2012), teachers and parents are considered the most important socializers of emotions. Parents can provide experiences that encourage or deter children from having emotional competence. Funerals are not topics commonly associated with positive emotions; however, it is common for students of her age group (6 years) to express positive emotions. Within the early elementary age range, positive emotions are seen as inviting to their social classmates, which may be contrary to the child's feelings. Denham says it is safe for children to express all emotions, including negative emotions, in a "safe" way and for parents to encourage their children to be open in hopes of emotional competency.

Verbal Responses

The following section highlights qualitative responses from the AIRSS "Brother John" subtest. Students were asked to rate their emotions based on a range of 7 emotions from "Extremely Happy to Extremely Sad". Once participants pointed to an emotion represented by a face, the students answered why the task made them feel that emotion. Participants' answers were recorded through video recordings and then analyzed and transcribed to find emerging themes and similarities in participant responses. Participants were asked why they chose a specific feeling on the Likert scale three times, the improvisation task, imitation task, and favorite song task.

Student responses from the AIRS-TBSS subtests showed the value of family, how they experience music, and what they associate with their musical experiences. The participant responses were divided into family, entertainment sources (video games, television, toys), song preference, no response, and feelings. The same emerging themes were divided into a chart for post-testing as well. The following charts show the results of the most prominent emerging themes within these categories. The themes among the posttest and pretest were that the participants liked the song "Brother John" and enjoyed singing. "Family" was also an important

reoccurring theme; however not as significant as the participants' preference for singing and preference for the song "Brother John."

Some students did not respond when prompted for qualitative responses on the AIRS-TBSS test. This may be due to students not feeling comfortable singing, sharing their emotions, or being nervous. The principal investigator coded all common themes from participant responses. An emerging theme between pretesting responses was in relation to home and family. Certain songs reminded the students of their family and their siblings. Students who did not explain or respond were encouraged to express how they felt; however, 3 of the (N=31) students did not respond to any pre-test Brother John Measure.

Fortunately, all three students who did not participate and did not sing a song (pretest) participated during post-testing, which implies a change in student perception or students feeling more comfortable singing on their own during post-testing. Some students relayed their excitement for the song to their excitement for their toys and other positive associations. This category was organized into entertainment, encompassing television shows, games, movies, and other forms of entertainment. The improvisation and imitation tasks required students to sing for an extended amount of time on their own. Responses showed that students were most nervous with the imitation and improvisation tasks, which caused them to be more exposed despite encouragement from the research assistants and the use of a puppet, Gerald the Giraffe.

The subtest emphasizes the importance of teaching emotions and teaching students how to express emotions. Many students within the "Brother John" subtest did not know what the word "neither" meant. One student thought "neither" meant "shy," so there were explanations made by the research assistants on what the term "neither" meant during all participants' tests.

Some students responded by saying they didn't like the song; however, many enjoyed singing the song "Brother John."

Verbal responses on improvisation showed a significant difference from the pre-test to the post-test among both groups (Figures 6 & 7). The pretest improvisation category of "not like" was very high; however, the post-test improvisation score for liking the song was considerably higher than the pretest.

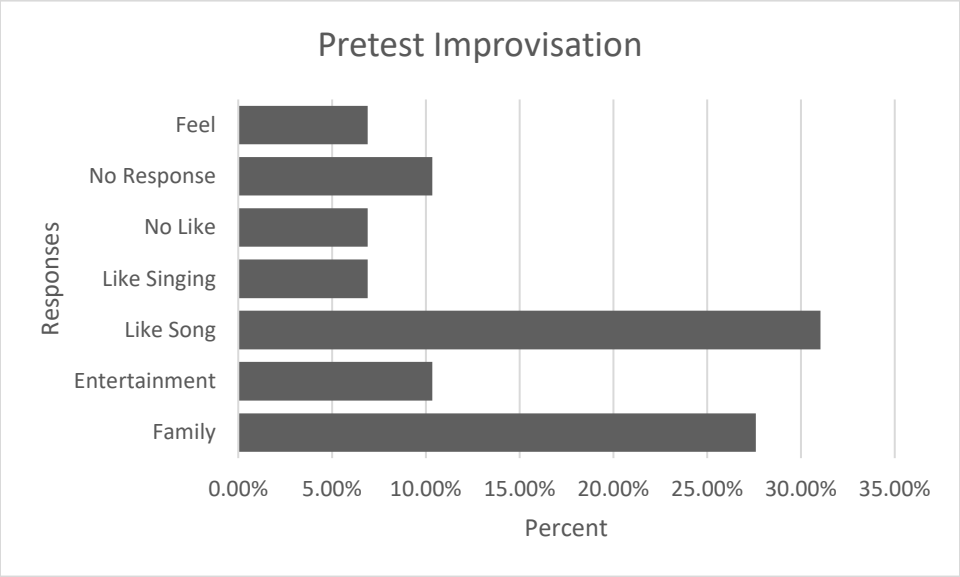


Figure 7: *Pre-test Improvisation Verbal Responses*

These results suggest that the students may have enjoyed singing during improvisation tasks more at post-test, potentially due to the participants improvising during the music training. Many students expressed how proud they were of themselves for completing the whole "Brother John" imitation or for not being shy. This may connect to student perception and self-efficacy. It is important for there to be a connection between the classroom and students' home lives. It is

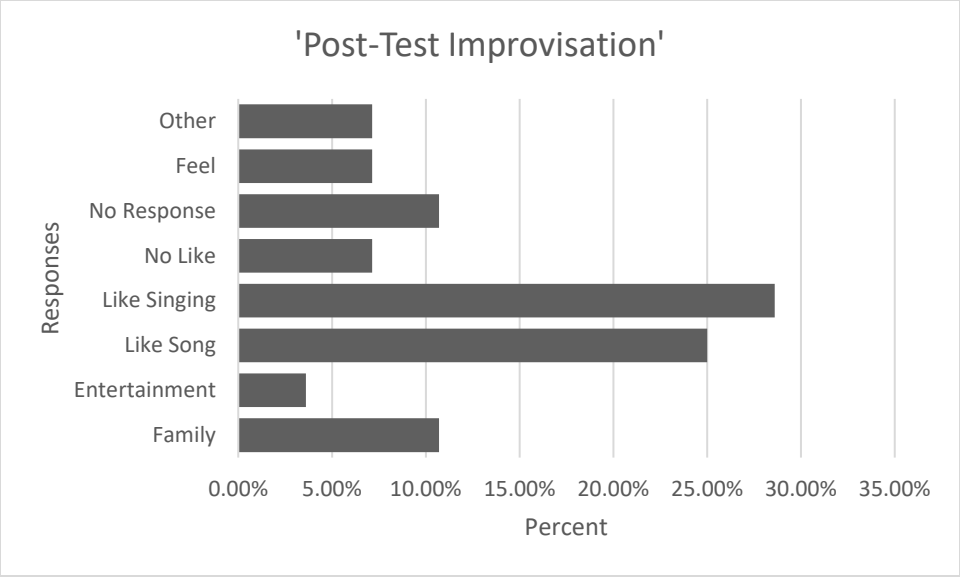


Figure 8: *Post-test Improvisation Verbal Responses*

also important for students to sing preferred songs to motivate practice inside and outside the classroom. . It is possible that the student's opportunity to sing their favorite song allowed participants to make a connection to preferred musical selections.

Future Research

The implications of these findings are discussed within this section, along with suggestions for future research. The participants in this study were from low-income households, possibly where students are faced with challenges that can affect their progress in school, which may have affected their performance on standardized measures. According to Moreno and Bidelman (2014), music training can affect students' motivation to learn, their parents, their teachers, the process of their social development, and the emotional experience brought by music.

This study was a pilot to a larger study. Our sample size was (n=31) participants, which is challenging in comparison to previous research, most studies contain a much larger sample. This data was collected as a pilot to the interative process of refining the multimodal jazz music

curriculum. This study was not powered to detect appropriate statistical differences in secondary variables. For future research, the principal investigator would like to run this same study with two schools with students of the same demographic and socio-economic level. These adjustments will give more robust results and findings. In addition, the inclusion of multiple music groups as well as non-musical training groups such as sports, art, drama, or no treatment group, would highlight important contributions of the multimodal music training program.

The FaceReader program may be unable to detect other emotions the at-risk students are feeling, for example, anxiety, or if the students may have other circumstances at home that may skew the physical view of their emotions instead of how they are truly feeling. Children (6-7 years) can consistently show awareness and knowledge of their thoughts connecting to their emotions (McCartney & Phillips, 2009, p.322). For future research, there is a need for more studies using similar programs to Face Reader and determining whether it aligns with the student emotions of a similar demographic and ethnicity of the students reflected within this study.

Limitations

Despite significant improvements within various measures of this study, many limitations may have affected the results. The participants in this study were tested in a community room where the testing environment was not optimal due to extraneous sounds, such as those overlapping between participants or school staff.

Additionally, the relatively short duration of the music training may have impacted the effectiveness of the curriculum. Future iterations of the curriculum could contain longer training durations which may be necessary to see generalizable results. Other studies showed positive results after a minimum of six weeks (Bugos & DeMarie, 2017; Moreno et al., 2011). However, the design of the multimodal jazz program would have best suited a minimum of eight weeks or may need to be more rigorous for the participants. Though the participants in this study are at an

ideal age to learn music and develop cognitive skills, it takes time to foster these abilities. While six weeks aligned with previous research (Bugos et al., 2022), a longer timeframe may be necessary for the novel jazz multimodal curriculum.

The measures used in this study may not have reflected the learning that took place with the curriculum. Some measures may more accurately portray the testing categories; for example, improvising can be done through movement and not solely singing. Exploring other measures (e.g. instrumental improvisation, movement improvisation) for the multimodal curriculum may provide avenues for future research.

The literature on emotions in young children and music does not reflect the demographic of the participants in this study. Children sometimes express their emotions as more positive than actually perceived (Fong et al., 2016; Grossard et al., 2018); however, this may allude to different results within at-risk children compared to students of higher socio-economic status. There were no previous studies to my knowledge that addressed the use of FaceReader among at-risk children or adults of low socioeconomic status. These findings might suggest that FaceReader is not sensitive to the facial effect of at-risk children, and the need for research in this area. Due to home life, real-life traumatic events, and household financial strains, students' emotional response to music tasks may differ among at-risk students (Garner & Spears, 2000; Ho et al., 2011).

Summary

Improvisation is something that is deemed important but is often overlooked and an intimidating concept for music teachers. Results of this 6-week multimodal music training among both experimental and control groups showed the significant impact the presence of music classes could have in a short amount of time.

A highlight of the multimodal jazz curriculum is its versatility and ability to engage young children in active musical activities. The multimodal curriculum is adaptable for different populations, for example, preschool students. The preschool age range is a group that is not traditionally exposed to jazz music. The multimodal jazz curriculum gives music educators who want to incorporate improvisation into their early childhood curriculum an opportunity and resource. This curriculum is designed to supplement pre-existing music curriculums and programs. This curriculum also aims to enhance ongoing music lessons beyond seminars, workshops, and presentations.

Prior to enrolling in this research, the participants in this study did not receive funding for instruments and materials and did not have access to a music teacher. Many schools face these challenges and cannot afford music materials, instruments, or programs that require funding (WeBop or Musiquest). For schools that do not have a music educator, components of this multimodal curriculum can also be used by other subject area teachers. The key component of this program is the accessibility of a multimodal music program centered around jazz music, improvisation, and creativity. Through the implementation of this curriculum, other areas of child development, such as cognition (inhibition and shifting), music (pitch improvisation), and emotion (facial affect and Likert scale), were tested to see if there were any improvements. Future research will examine these areas with a larger, more diverse, sample.

Though there were minimal improvements in comparing the multimodal to the unimodal group, both groups collectively improved within each are of child development, from pretesting to post-testing. Findings of this research reinforce the importance of music training classes within all areas of child development and imply the need for more research with diverse samples of students from under-represented demographic groups.

REFERENCES

Adachi, M., & Trehub, S. E. (1998). Children's expression of emotion in song. *Psychology of Music*, *26*(2), 133–153. https://doi.org/10.1177/0305735698262003

Adachi, M., & Trehub, S. E. (2000). Decoding the expressive intentions in children's songs. *Music Perception*, *18*(2), 213–224. https://doi.org/10.2307/40285909

Adachi, M., & Trehub, S. E. (2011). Canadian and Japanese preschoolers' creation of happy and sad songs. *Psychomusicology: Music, Mind and Brain*, *21*(1-2), 69–82. https://doi.org/10.1037/h0094005

Akshoomoff, N., Newman, E., Thompson, W. K., McCabe, C., Bloss, C. S., Chang, L., Amaral, D. G., Casey, B. J., Ernst, T. M., Frazier, J. A., Gruen, J. R., Kaufmann, W. E., Kenet, T., Kennedy, D. N., Libiger, O., Mostofsky, S., Murray, S. S., Sowell, E. R., Schork, N., … Jernigan, T. L. (2014). The NIH Toolbox Cognition Battery: Results from a large normative developmental sample (PING). *Neuropsychology*, *28*(1), 1–10. https://doi.org/10.1037/neu0000001

American Psychological Association. (n.d.). *Apa Dictionary of Psychology*. American Psychological Association. https://dictionary.apa.org/inhibition

Andreasen, N. C. (2005). *The creating brain: The neuroscience of genius*. Dana Press.

Anvari, S. H., Trainor, L. J., Woodside, J., & Levy, B. A. (2002). Relations among musical skills, phonological processing and early reading ability in preschool children. *Journal of Experimental Child Psychology*, *83*(2), 111–130. https://doi.org/10.1016/S0022-0965(02)00124-8

Apfelstadt, H. E. (1983). An investigation of the effects of melodic perception instruction on the pitch discrimination and vocal accuracy of kindergarten children. *Dissertation Abstracts International: Section A. Humanities and Social Sciences*, *44*(6-A), 1719.

Ardila, A., Pineda, D., & Rosselli, M. (2000). Correlation between intelligence test scores and executive function measures. Archives of Clinical Neuropsychology, 15(1), 31–36.

Aschersleben, G., & Prinz, W. (1995). Synchronizing actions with events: The role of sensory information. *Perception & Psychophysics*, *57*(3), 305–317. https://doi.org/10.3758/BF03213056

"Automated facial coding: Validation of basic emotions and FACS AUs in FaceReader": Correction to Lewinski, den Uyl, and Butler (2014). (2015). *Journal of Neuroscience, Psychology, and Economics*, *8*(1), 58–59. https://doi.org/10.1037/npe0000033

Azzara, C. (1999). An Aural Approach to Improvisation. *Music Educators Journal*, *86*(3), 21–25. https://doi.org/10.2307%2F3399555

Balkwill, L.-L., & Thompson, W. F. (1999). A cross-cultural investigation of the perception of emotion in music: psychophysical and cultural cues. *Music Perception*, *17*(1), 43–64. https://doi.org/10.2307/40285811

Barnes, G. V., DeFreitas, A., & Grego, J. (2016). Parental involvement and home environment in music: Current and former students from selected community music programs in Brazil and the United States. *International Journal of Music Education*, *34*(2), 208–218. https://doi.org/10.1177/0255761415619057

Barrett, K. C., Barrett, F. S., Jiradejvong, P., Rankin, S. K., Landau, A. T., & Limb, C. J. (2020). Classical creativity: A functional magnetic resonance imaging (fMRI) investigation of pianist and improviser Gabriela Montero. *NeuroImage*, *209*. https://doi.org/10.1016/j.neuroimage.2019.116496

Barrett, L. F. (2017). *How emotions are made: The secret life of the brain*. Houghton Mifflin Harcourt.

Barrett, L. F., Adolphs, R., Marsella, S., Martinez, A. M., & Pollak, S. D. (2019). Emotional expressions reconsidered: Challenges to inferring emotion from human facial movements. *Psychological Science in the Public Interest*, *20*(1), 1–68. https://doi.org/10.1177/1529100619832930

Batey, M., & Furnham, A. (2006). Creativity, intelligence, and personality: A critical review of the scattered literature. *Genetic, Social, and General Psychology Monographs*, *132*(4), 355–429. https://doi.org/10.3200/MONO.132.4.355-430

Bauer, P. J., Dikmen, S. S., Heaton, R. K., Mungas, D., Slotkin, J., & Beaumont, J. L. (2013). National Institutes of Health Toolbox Cognition Battery (NIH Toolbox CB): Validation for children between 3 and 15 years: III. NIH Toolbox Cognition Battery (CB): Measuring episodic memory. *Monographs of the Society for Research in Child Development*, *78*(4), 34–48. https://doi.org/10.1111/mono.12033

Bay Area Jazz Mobile. (n.d.). *Bay Area Jazz Mobile*. http://https://bayareajazzmobile.org/

Beegle, A. (2016). *Teaching General Music:Approaches Issues nad Viewpoints* (1st ed., Vol. 1). Oxford University Press.

Beghetto, R. A., & Kaufman, J. C. (2010). Broadening conceptions of creativity in the classroom. In R. A. Beghetto & J. C. Kaufman (Eds.), *Nurturing creativity in the classroom* (pp. 191–205). Cambridge University Press. https://doi.org/10.1017/CBO9780511781629.010

Belin, P., & Zatorre, R. J. (2000). "What,' "where' and "how' in auditory cortex. *Nature Neuroscience*, *3*(10), 965–966. https://doi.org/10.1038/79890

Benedek, M., Jauk, E., Sommer, M., Arendasy, M., & Neubauer, A. C. (2014). Intelligence, creativity, and cognitive control: The common and differential involvement of executive functions in intelligence and creativity. *Intelligence*, *46*, 73–83. https://doi.org/10.1016/j.intell.2014.05.007

Berger, A. A., & Cooper, S. (2003). Musical Play: A Case Study of Preschool Children and Parents. *Journal of Research in Music Education*, *51*(2), 151–165. https://doi.org/10.2307/3345848

Berkowitz, A. L. (2010). *The improvising mind: Cognition and creativity in the musical moment*. Oxford University Press.

Beverage, T. (2022). Does Music Education Have a Poverty Problem. *Applications of Research In Music Education*, *40*(2), 10–18. https://doi.org/10.1177/87551233211036069

Bialystok, E., & DePape, A. M. (2009). Musical expertise, bilingualism, and executive functioning. *Journal of Experimental Psychology-Human Perception and Performance*, 35(2), 565–574.

Biasutti, M. (2017). Teaching improvisation through processes. Applications in music education and implications for general education. *Frontiers in Psychology*, *8*. https://doi.org/10.3389/fpsyg.2017.00911

Biasutti, M., & Frezza, L. (2009). Dimensions of music improvisation. *Creativity Research Journal*, *21*(2-3), 232–242. https://doi.org/10.1080/10400410902861240

Bidelman, G. M. (2013). The role of auditory brainstem in processing musically relevant pitch. *Frontiers in Psychology*, *4*. https://doi.org/10.3389/fpsyg.2013.00264

Blurton Jones, N. G. (1971). Criteria for use in describing facial expressions of children. *Human Biology*, *43*(3), 365–413.

Boden, M. A. (2014). Creativity and artificial intelligence: A contradiction in terms? In E. S. Paul & S. B. Kaufman (Eds.), *The philosophy of creativity: New essays* (pp. 224–244). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199836963.003.0012

Boler, V. (2019, October 5). *Improvisation Sequences for Elementary Music*. https://victoriaboler.com/blog/improvisation-elementary-music

Borke, H. (1973). The development of empathy in Chinese and American children between three and six years of age: A cross-cultural study. *Developmental Psychology*, *9*(1), 102–108. https://doi.org/10.1037/h0035080

Brand, M. (1986). Relationship between home musical environment and selected musical attributes of second-grade children. *Journal of Research in Music Education*, *34*(2), 111–120. https://doi.org/10.2307/3344739

Bretherton, I., McNew, S., & Beeghly, M. (1986). Learning to Talk about Emotions: A functional perspective. *Developmental Psychology*, pp. *18*, 906–921.

Bretherton, I., NcNew, S., & Beeghley-Smith, M. (1987). Early person knowledge as expressed in gestural and verbal communication: When do infants acquire a “theory of mind”? (J. Oates & S. Sheldon, Eds.). *Cognitive development in infancy*, 219–246.

Brophy, D. R. (1998). Understanding, measuring, and enhancing individual creative problem-solving efforts. *Creativity Research Journal*, *11*(2), 123–150. https://doi.org/10.1207/s15326934crj1102_4

Brophy, D. R. (2001). Comparing the attributes, activities, and performance of divergent, convergent, and combination thinkers. *Creativity Research Journal*, *13*(3-4), 439–455. https://doi.org/10.1207/S15326934CRJ1334_20

Browning, M. M. (2016). The import of feeling in the organization of mind. *Psychoanalytic Psychology*, *33*(2), 284–298. https://doi.org/10.1037/a0037765

Bugos, J. (2019). The effects of bimanual coordination in music interventions on executive functions in aging adults. *Frontiers in Integrative Neuroscience*, *13*, 1. https://doi.org/10.3389/fnint.2019.00068

Bugos, J., DeMarie, D., Torres, M., & Fuller, N. (2022). Face the music: Children's facial affect in musical imitation and improvisation tasks. *Psychology of Music*, *50*(2), 460–474.

Bugos, J., DeMarie, D., Torres, M., Lamrani, D., & Gbadamosi, A. (2021). The Effects of a multimodal music program on young children's facial expressions during controlled singing tasks. *Musica Scientiae*, 1–16. https://doi.org/10.1177/10298649211021463

Bugos, J., & Mazuc, J. (2013). Semantic clustering and processing speed in Suzuki violinists. *Bulletin of the Council for Research in Music Education*, *198*, 7–22. https://doi.org/10.5406/bulcouresmusedu.198.0007

Bugos, J. A., & DeMarie, D. (2017). The effects of a short-term music program on preschool children's executive functions. *Psychology of Music*, *45*(6), 855–867. https://doi.org/10.1177/0305735617692666

Bull, R., & Scerif, G. (2001). Executive functioning as a predictor of children's mathematics ability: Inhibition, switching, and working memory. *Developmental Neuropsychology*, *19*(3), 273–293. https://doi.org/10.1207/S15326942DN1903_3

Burt, S. C. (1968). The Analysis of Cognitive Abilities [Review of the book *The Nature of Human Intelligence*, by J. P. Guilford, 1967]. *Contemporary Psychology*, *13*(11), 545–547. https://doi.org/10.1037/009351

Brown, E. D., & Sax, K. L. (2013). Arts enrichment and preschool emotions for low-income children at risk. *Early Childhood Research Quarterly*, *28*(2), 337–346. https://doi.org/10.1016/j.ecresq.2012.08.002

Cameron, S. (1998). Consciousness, symbols and aesthetics: A just-so story and its implications in Susanne Langer's Mind: An essay on human feeling. *Philosophical Psychology*, *11*(1), 45–66. https://doi.org/10.1080/09515089808573248

Carlozzi, N. E., Tulsky, D. S., Kail, R. V., & Beaumont, J. L. (2013). National Institutes of Health Toolbox Cognition Battery (NIH Toolbox CB): Validation for children between 3 and 15 years: VI. NIH Toolbox Cognition Battery (CB): Measuring processing speed. *Monographs of the Society for Research in Child Development*, *78*(4), 88–102. https://doi.org/10.1111/mono.12036

Carpente, J., Casenhiser, D. M., Kelliher, M., Mulholland, J., Sluder, H. L., Crean, A., & Cerruto, A. (2021). The impact of imitation on engagement in minimally verbal children with autism during improvisational music therapy. *Nordic Journal of Music Therapy*. Advance online publication. https://doi.org/10.1080/08098131.2021.1924843

Castro, V. L., Camras, L. A., Halberstadt, A. G., & Shuster, M. (2018). Children's prototypic facial expressions during emotion-eliciting conversations with their mothers. *Emotion*, *18*(2), 260–276. https://doi.org/10.1037/emo0000354

Chen, J. K.-C., Chuang, A. Y. C., McMahon, C., Hsieh, J.-C., Tung, T.-H., & Li, L. P.-H. (2010). Music training improves pitch perception in prelingually deafened children with cochlear implants. *Pediatrics*, *125*(4), e793–e800. https://doi.org/10.1542/peds.2008-3620

Clark, I. (2022). Supporting Music Education in Elementary Schools in a Low-Income Rural Area. *Education Research International*, *2022*, 1–8. https://doi.org/10.1155/2022/6532825

Cognifit. Shifting- Cognitive Ability. (2017, January 17). https://www.cognifit.com/science/shifting

Cohen, A. J. (2015). The AIRS Test Battery of Singing Skills: Rationale, item types, and lifespan scope. *Musicae Scientiae*, *19*(3), 238–264. https://doi.org/10.1177/1029864915599599

Cohn, J. F., Ambadar, Z., & Ekman, P. (2007). Observer-based measurement of facial expression with the Facial Action Coding System. In J. A. Coan & J. J. B. Allen (Eds.), *Series in affective science: Handbook of emotion elicitation and assessment* (pp. 203–221). Oxford University Press.

Costa-Giomi, E. (2008). Characteristics of Elementary Music Programs in Urban Schools: What Money Can Buy. *Bulletin of the Council for Research in Music Education*, *177*, 19–28. http://www.jstor.org/stable/40319449

Coulson, A. N., & Burke, B. M. (2013). Creativity in the elementary music classroom: A study of students' perceptions. *International Journal of Music Education*, *31*(4), 428–441. https://doi.org/10.1177/0255761413495760

Cropley, A. (2006). In Praise of Convergent Thinking. *Creativity Research Journal*, *18*(3), 391–404. https://doi.org/10.1207/s15326934crj1803_13

Dalcroze Society of America. (n.d.). https://dalcrozeusa.org/about-dalcroze/what-is-dalcroze/emile-jaques-dalcroze/

Degé, F., & Schwarzer, G. (2011). The effect of a music program on phonological awareness in preschoolers. *Frontiers in Psychology*, *2*. https://doi.org/10.3389/fpsyg.2011.00124

Dell, C., Rinnert, N., Yap, C., Keith, T., Zdzinski, S., Gumm, A., & Russell, B. (2014). Musical Home Environment, Family Background, and Parenting Style on Success in School Music and in School. *Contributions to Music Education*, *40*, 71–89. https://doi.org/https://www.jstor.org/stable/24711072

Design4services. (2020). *Divergent and Convergent Thinking*. https://design4services.com/concepts/divergent-and-convergent-thinking/

de Vries, P. (2005). Lessons from Home: Scaffolding Vocal Improvisation and Song Acquisition with a 2-Year-Old. *Early Childhood Education Journal*, *32*(5), 307–312. https://doi.org/10.1007/s10643-004-0962-2

Distefano, R., Fiat, A. E., Merrick, J. S., Slotkin, J., Zelazo, P. D., Carlson, S. M., & Masten, A. S. (2021). NIH Toolbox executive function measures with developmental extensions: Reliability and validity with preschoolers in emergency housing. *Child Neuropsychology*, *27*(6), 709–717. https://doi.org/10.1080/09297049.2021.1888905

Dobszay, L. (1972). The Kodály method and its musical basis. *Studia Musicologica*, *1*(4), 15–33. https://doi.org/10.2307/901863

Dolgin, K. G., & Adelson, E. H. (1990). Age changes in the ability to interpret affect in sung and instrumentally-presented melodies. *Psychology of Music*, *18*(1), 87–98. https://doi.org/10.1177/0305735690181007

Drake, C., Jones, M. R., & Baruch, C. (2000). The development of rhythmic attending in auditory sequences: Attunement, referent period, focal attending. *Cognition*, *77*(3), 251–288. https://doi.org/10.1016/S0010-0277(00)00106-2

Duckworth, A. L. and Yeager, D. S. 2015. Measurement Matters: Assessing Personal Qualities Other Than Cognitive Ability for Educational Purposes. Educational Researcher, 44(4), 237-251.

Dunn, L., & Dunn, D. (2007). *Peabody Picture Vocabulary Test*. APA PsycTests. https://psycnet.apa.org/record/9999-15145-000?doi=1

Edmonton, A. (2011). *Early Childhood Measurement and Evaluation Tool Review*. https://www.ualberta.ca/community-university-partnership/media-library/community-university-partnership/resources/tools---assessment/ppvt-4may-2012.pdf

Egan, S. M., Pope, J., Moloney, M., Hoyne, C., & Beatty, C. (2021). Missing early education and care during the pandemic: The socio-emotional impact of the COVID-19 crisis on young children. *Early Childhood Education Journal*, *49*(5), 925-934.

Elliott, D. J. (1986). Jazz education as aesthetic education. *Journal of Aesthetic Education*, *20*(1), 41–53. https://doi.org/10.2307/3332311

Elliott, E. A., & Jacobs, A. M. (2013). Facial expressions, emotions, and sign language. *Frontiers in Psychology*, *4*. https://doi.org/10.3389/fpsyg.2013.00115

Elias, M.J., Zins, J.E., Weissberg, R.P., Frey, K.S., Greenberg, M.T., Haynes, N.M., Kessler, R., Schwab-Stone, M.E. and Shriver, T.P. 1997. Promoting Social and Emotional Learning: Guidelines for Educators. ASCD.

Engel, A., & Keller, P. E. (2011). The perception of musical spontaneity in improvised and imitated jazz performances. *Frontiers in Psychology*, *2*. https://doi.org/10.3389/fpsyg.2011.00083

Erickson, K., & Schulkin, J. (2003). Facial expressions of emotion: A cognitive neuroscience perspective. *Brain and Cognition*, *52*(1), 52–60. https://doi.org/10.1016/S0278-2626(03)00008-3

Feldman, H. (1964). Jazz: A Place in Music Education. *Music Educators Journal*, *50*(6), 60–64. https://doi.org/https://journals.sagepub.com/doi/pdf/10.2307/3390178?casa_token=6zkECaAj7jUAAAAA:WDntOejizvTZYTaGzMpm-Hajqs2cu8xqLz9AM4KoVdmKLRu9_knhl-MZ3BabIuaDSawrzAO7HsalWFI

Ferguson, L. (2004). Putting It Together: Integrating Jazz Education in the Elementary Music Classroom. *Music Educators Journal*, *90*(3), 28–34. https://doi.org/https://journals.sagepub.com/doi/pdf/10.2307/3399952?casa_token=pbWR

Ferrin, J. (2023). Regarding Musical Understanding and Aural Learning from the Introduction of Audiation to Novice Jazz Students. *Jazz Education in Research and Practice*, *4*(1), 112–131.https://www.proquest.com/iimp/docview/2755158819/26DA927573D44A6CPQ/1?accountid=14745

Fong, E. H., Catagnus, R. M., Brodhead, M. T., Quigley, S., & Field, S. (2016). Developing the cultural awareness skills of behavior analysts. *Behavior Analysis in Practice*, *9*(1), 84–94. https://doi.org/10.1007/s40617-016-0111-6

Franco, F., Chew, M., & Swaine, J. (2017). “Preschoolers’ attribution of affect to music: A comparison between vocal and instrumental performance. *Psychology of Music*, *45*(1), 131–149.

Frank, M. G., Ekman, P., & Friesen, W. V. (2005). Behavioral Markers and Recognizability of the Smile of Enjoyment. In P. Ekman & E. L. Rosenberg (Eds.), *Series in affective science: What the face reveals: Basic and applied studies of spontaneous expression using the facial action coding system (FACS)* (2nd ed., pp. 217–242). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780195179644.003.0011

Frega, A. (1979). Rhythmic tasks with 3-, 4-, and 5-year-old children: A study made in Argentine Republic. *Council for Research in Music Education*, 32–34.

Furstenberg, F. F., Jr., & Hughes, M. E. (1995). Social capital and successful development among at-risk youth. *Journal of Marriage and the Family*, *57*(3), 580–592. https://doi.org/10.2307/353914

Gabrielsson, A. (2001). Emotion perceived and emotion felt: Same or different? *Musicae Scientiae*, *Spec Issue, 2001-2002*, 123–147. https://doi.org/10.1177/10298649020050S105

Gagnon, L., & Peretz, I. (2003). Mode and tempo relative contributions to “happy-sad” judgements in equtione mequitone. *Cognition and Emotion*, *17*(1), 25–40. https://doi.org/10.1080/02699930302279

Garner, P. W., & Spears, F. M. (2000). Emotion regulation in low-income preschoolers. *Social Development*, *9*(2), 246–264. https://doi.org/10.1111/1467-9507.00122

Gibson, C., Folley, B. S., & Park, S. (2009). Enhanced divergent thinking and creativity in musicians: A behavioral and near-infrared spectroscopy study. *Brain and Cognition*, *69*(1), 162–169. https://doi.org/10.1016/j.bandc.2008.07.009

Gilmore, J. H. (2020). Early childhood brain development and schizophrenia: An imaging perspective. In M. Kubicki & M. E. Shenton (Eds.), *Neuroimaging in schizophrenia* (pp. 303–317). Springer Nature Switzerland AG. https://doi.org/10.1007/978-3-030-35206-6_15

Ginsberg, S. (2008). *Creative Music Programs*. http://www.creativemusicprograms.com/seth2

Goetze, M. (1989). A comparison of the pitch accuracy of young children. *Bulletin of the Council for Research in Music Education*, 57–73.

Langer, S. K. (1966). The cultural importance of the arts. *Journal of aesthetic education*, *1*(1), 5-12.

Lopez -Gonzalez, M., Limb,C. (2012). Musical creativity and the brain. National Library of Medicine.

Gibson, C., Folley, B. S., & Park, S. (2009). Enhanced divergent thinking and creativity in musicians: A behavioral and near-infrared spectroscopy study. *Brain and cognition*, *69*(1), 162-169.

Gosselin, P., Warren, M., & Diotte, M. (2002). Motivation to hide emotion and children's understanding of the distinction between real and apparent emotions. *The Journal of Genetic Psychology: Research and Theory on Human Development*, *163*(4), 479–495. https://doi.org/10.1080/00221320209598697

Green, G. (2016). Unison versus Individual Singing and Elementary Students' Vocal Pitch Accuracy. *Journal of Research in Music Education*, *42*(2), 105–114.

Green, G. A. (1994). Unison versus individual singing and elementary students' vocal pitch accuracy. *Journal of Research in Music Education*, *42*(2), 105–114. https://doi.org/10.2307/3345495

Gregory, A. H., Worrall, L., & Sarge, A. (1996). The development of emotional responses to music in young children. *Motivation and Emotion*, *20*(4), 341–348. https://doi.org/10.1007/BF02856522

Grieshaber, K. (1987). Children's rhythmic tapping: a critical review of research. *Bulletin of the Council for Research in Music Education*, 73–81.

Grossard, C., Chaby, L., Hun, S., Pellerin, H., Bourgeois, J., Dapogny, A., Ding, H., Serret, S., Foulon, P., Chetouani, M., Chen, L., Bailly, K., Grynszpan, O., & Cohen, D. (2018). Children facial expression production: Influence of age, gender, emotion subtype, elicitation condition, and culture. *Frontiers in Psychology*, *9*. https://doi.org/10.3389/fpsyg.2018.00446

Gruenhagen, L. M., & Whitcomb, R. (2014). Improvisational practices in elementary general music classrooms. *Journal of Research in Music Education*, *61*(4), 379–395. https://doi.org/10.1177/0022429413508586

Guilbault, D. M. (2004). The effect of harmonic accompaniment on the tonal achievement and tonal improvisations of children in kindergarten and first grade. *Journal of Research in Music Education*, *52*(1), 64–76. https://doi.org/10.2307/3345525

Guilford, J. P. (1962). Potentiality for creativity. *Gifted Child Quarterly*, *6*(3), 87–90.

Guilford, J. P. (1967). *The nature of human intelligence*. McGraw-Hill.

Habron, J., & van der Merwe, L. (2017). A conceptual study of spirituality in selected writings of Émile Jaques-Dalcroze. *International Journal of Music Education*, *35*(2), 175–188. https://doi.org/10.1177/0255761415620532

Habron, J., & van der Merwe, L. (2020). Stories students tell about their lived experiences of spirituality in the Dalcroze class. *British Journal of Music Education*, *37*(2), 125–139. https://doi.org/10.1017/S0265051720000091

Haggard, P. (2008). Human volition: Towards a neuroscience of will. *Nature Reviews Neuroscience*, *9*(12), 934–946. https://doi.org/10.1038/nrn2497

Harbon, J. (2014). Through music and into music' – through music and into wellbeing: Dalcroze Eurhythmics as Music Therapy. *The Journal for Transdisciplinary Research in Southern Africa*, *10*(2), 90–110. https://doi.org/10.4102/td.v10i2.101

Harris, P. L., Donnelly, K., Guz, G. R., & Pitt-Watson, R. (1986). Children's understanding of the distinction between real and apparent emotion. *Child development*, 895-909.

Heble, A., & Laver, M. (2016). *Improvisation and Music Education*. Routledge. http://file:///Users/jazminghent/Downloads/10.4324_9781315737393_previewpdf%20(1).pdf

Hickey, M., & Schmidt, C. (2019). The effect of professional development on music teachers' improvisation and composition activities. *Bulletin of the Council for Research in Music Complementary and Alternative Medicine*, *2011*, 1–14. https://doi.org/10.1093/ecam/neq072

Ho, Y.-C., Cheung, M.-C., & Chan, A. S. (2003). Music training improves verbal but not visual memory: Cross-sectional and longitudinal explorations in children. *Neuropsychology*, *17*(3), 439–450. https://doi.org/10.1037/0894-4105.17.3.439

Howard, P. (1996). Kodaly strategies for instrumental teachers. *Music Educator's Journal*, *82*(5), 27–33.

Ilari, B., Fesjian, C., Ficek, B., & Habibi, A. (2018). Improvised song endings in a developmental perspective: A mixed-methods study. *Psychology of Music*, *46*(4), 500-520.

Jaschke, A. C., Honing, H., & Scherder, E. J. (2018). Longitudinal analysis of music education on executive functions in primary school children. *Frontiers in neuroscience*, 103.

Jazz in America. (2022). *History of Jazz Education: A Brief Outline*. http://www.jazzinamerica.org/JazzResources/JazzEducation/Page

The Jazz Institute of Chicago. (n.d.). *Our Mission Our Story*. http://www.jazzinchicago.org/mission-story

JazzMobile. (n.d.). *Jazz Mobile We Keep the Music Playing*. Jazz Mobile. http://www.jazzmobile.org/#

Johnson, D. (2019). *The Oxford Handbook of Assessment Policy and Practice in Music Education* (1st ed., Vol. 1). Oxford Universeity.

Jones, J. (2018). Scaffolding the Dalcroze approach. *Journal of General Music Education*, *32*(1), 1–12. https://doi.org/10.1177/104837131877082

Juntunen, M. (2016). *Teaching General Music* (1st ed., Vol. 1). Approaches, Issues, and Viewpoints.

Kanellopoulos, P. (2010). Informal music learning, improvisation, and teacher education. *British Journal of Music Education*, *27*(1), 71–87. https://doi.org/https://www.academia.edu/27240171/

Kastner, M. P., & Crowder, R. G. (1990). Perception of the major/minor distinction: IV. Emotional connotations in young children. *Music Perception*, *8*(2), 189–201. https://doi.org/10.2307/40285496

Keating, L. M., Tomishima, M. A., Foster, S., & Alessandri, M. (2002). The effects of a mentoring program on at-risk youth. *Adolescence*, *37*(148), 717–734.

Khalil, R., Godde, B., & Karim, A. A. (2019). the link between creativity, cognition, and creative drives and underlying neural mechanisms. Frontiers in neural circuits, 13, 18. https://doi.org/10.3389/fncir.2019.00018

Kiehn, M. (2003). Development of music creativity among elementary school students. *Journal of Research in Music Education*, *51*(4), 278–288. https://doi.org/https://journals.sagepub.com/doi/pdf/10.2307/3345655

Kim, J. (2000). Children's pitch matching, vocal range, and developmentally appropriate practice. *Journal of Research in Childhood Education*, *14*(2), 152–160. https://doi.org/10.1080/02568540009594760

Kirkpatrick, W. (1962). *Relationships between the singing ability of prekindergarten children and their home musical environment.* [Unpublished doctoral dissertation]. University Chicago.

Kirschner, S., & Tomasello, M. (2009). Joint drumming: Social context facilitates synchronization in preschool children. *Journal of Experimental Child Psychology*, *102*(3), 299–314. https://doi.org/10.1016/j.jecp.2008.07.005

Kirschner, S., & Tomasello, M. (2010). Joint music making promotes prosocial behavior in 4-year-old children. *Evolution and Human Behavior*, *31*(5), 354–364. https://doi.org/10.1016/j.evolhumbehav.2010.04.004

Kostagiolas, P., Martzoukou, K., Lavranos, C., & Papadatos, J. (2015). *The impact of personality traits on music information seeking and musical creativity* [Conference session]. 2015 International Conference: 'Information: Interactions and Impact', Aberdeen. https://www.researchgate.net/publication/309636079_The_impact_of_personality_traits_on_music_information_seeking_and_musical_creativity

Koutsoupidou, T. (2005). Improvisation in the English primary music classroom: Teachers' perceptions and practices. *Music Education Research*, *7*(3), 368–381. https://doi.org/10.1080/14613800500324432

Kuzmich, J. (1980). Improvisation Teaching Materials. *Music Educators Journal*, *66*(5), 51–163.

Langer, S. (1966). The cultural importance of the arts. *journal of aesthetic education*, *1*(1), 5–12.

Langer, S. K. (1953). *Feeling and form*. Scribner's: New York.

Levinowitz, L., & Scheetz, J. (1998). The effects of group and individual echoing of rhythm patterns on third-grade students' rhythmic skills. *Research of Music Education*, *16*(2), 8–11.

Licitra, J. (2021). *South Bay Arts Pharmacy*. https://www.artspharmacy.com/

Limb, C. (2008). neural substrates of spontaneous musical performance: An fMRI study of jazz improvisation. *PLOS One*. https://doi.org/10.1371/journal.pone.0001679

Lopez-Gonzalez, M., & Limb, C. (2012). Musical creativity and the brain. *National Library of Medicine*. https://doi.org/https://www.ncbi.nlm.nih.gov/pubmed/23447788

Loui, P., & Guetta, R. E. (2019). Music and attention, executive function, and creativity. In M. H. Thaut & D. A. Hodges (Eds.), *The Oxford handbook of music and the brain* (pp. 263–284). Oxford University Press.

Madura, P. (1996). Relationships among vocal jazz improvisation achievement, jazz theory knowledge, imitative ability, musical experience, creativity, and gender. *Journal of Research in Music Education*, *44*(3), 252–267.

Malik, M. A. R., & Butt, A. N. (2017). Rewards and creativity: past, present, and future. *Applied Psychology: An International Review*, *66*(2), 290–325. https://doi.org/10.1111/apps.12080

Marsh, K., & Young, S. (2016). The benefits of music and movement in early mathematics. In In G. McPherson Ed (Ed.), *The Child as musician: A handbook of musical development* (2nd ed., pp. 462–484). Oxford University Press.

Masters, J., Barden, R., & Ford, M. (1979). Affective states, expressive behavior, and learning in children. Journal of Personality and Social Psychology. *Journal of Personality and Social Psychology*, *37*, 380–390.

Mastrokalou, N., & Hatziharistos, D. (2007). Rhythmic ability in children and the effects of age, sex, and tempo. *Perceptual and Motor Skills*, *104*(3, Pt 1), 901–912. https://doi.org/10.2466/PMS.104.3.901-912

McCartney, K., & Phillips, D. (2009). *Blackwell Handbook of Early Childhood Development*. Blackwell Publishing.

Miller, A. L., Gouley, K. K., Seifer, R., Zakriski, A., Eguia, M., & Vergnani, M. (2005). Emotion knowledge skills in low-income elementary school children: Associations with social status and peer experiences. *Social Development*, *14*(4), 637–651. https://doi.org/10.1111/j.1467-9507.2005.00321.x

Mondi, C. F., & Reynolds, A. J. (2021). Socio-emotional learning among low-income pre-kindergarteners: The roles of individual factors and early intervention. *Early education and development*, *32*(3), 360-384.

Moreno, S., Bialystok, E., Barac, R., Schellenberg, E. G., Cepeda, N. J., & Chau, T. (2011). Short-term music training enhances verbal intelligence and executive function. *Psychological Science*, *22*(11), 1425–1433. https://doi.org/10.1177/0956797611416999

Murphy, J. (2009). *Musical Improvisation: Art, Education, and Society* (1st ed., Vol. 1). University of Illinois Press. https://books.google.com/books/about/Musical_Improvisation.html?id=2B31AAAAMAAJ&source=kp_book_description

MusiQuest. (n.d.). *MusiQuest*. https://app.musiquest.com/about

Napier, C. (2011, November). Jazz: America's original art form. *The Collegian*, 1. https://collegian.csufresno.edu/2011/11/jazz-america%E2%80%99s-original-art-form/#:~:text=Unknown%20to%20some%2C%20jazz%20is,music%20traditions%20and%20African%20culture.

National Charter School Resources Center & Us Department Education. (2022). *What is a Charter School?* National Charter School Resources Center. https://charterschoolcenter.ed.gov/what-charter-school

Nawrot, E. (2003). The Perception of Emotional Expression in music: Evidence from infants, children, and adults. *Psychology of Music*, *31*(1), 75–92.

Nettl, B., & Russell, M. (2001). Psychological constraints on improvisational expertise and communication," in In the Course of Performance: Studies in the World of Musical Improvisation. *Ethnomusicology*, *56*(2), 1. https://doi.org/10.2307/852499

Neumann, C. (2006). The Kodaly method and learning theories. *The Canadian Music Educator*, *47*(4), 48–49.

Nieminen, S., Istók, E., Brattico, E., & Tervaniemi, M. (2012). The development of the aesthetic experience of music: Preference, emotions, and beauty. *Musicae Scientiae*, *16*(3), 372–391. https://doi.org/10.1177/1029864912450454

Noldus. (2022). *FaceReader Benefits and Features*. https://www.noldus.com/FaceReader/benefits

Office of the Education Ombudsman. (2012). *Title 1*. Washington State Office of Education. https://www.digitalarchives.wa.gov/GovernorGregoire/oeo/education/titleI.asp

Orman, E. (2002). Comparison of the national standards for music education and elementary music specialists' use of class time. *Journal of Research in Music Education*, *50*(2), 155–164.

Oxford English Dictionary. (2022). Oxford University Press.

Palmer, R. (1976, May 21). Around the Clock With Jazz Interactions. *The Washington Post*. http://www.nytimes.com/1976/05/21/archives/new-jersey-weekly-around-the-clock-with-jazz-interactions.html

Persellin, D. (2006). The effects of vocal modeling, musical aptitude, and home environment on pitch accuracy of young children. *Council for Research in Music Education*, *39*(50), 1. https://www.proquest.com/iimp/docview/1038284/7A983B7311654FE0PQ/3?accountid=14745

Pine, J. (2020, July 26). *What does Orff really mean*. https://content.westmusic.com/what-does-orff-really-mean/

Plucker, J. A., & Dow, G. T. (2010). Attitude change as the precursor to creativity enhancement. In R. A. Beghetto & J. C. Kaufman (Eds.), *Nurturing creativity in the classroom* (pp. 362–379). Cambridge University Press. https://doi.org/10.1017/CBO9780511781629.018

Politimou, N., Stewart, L., Müllensiefen, D., & Franco, F. (2018). Music@Home: A novel instrument to assess the home musical environment in the early years. *PLoS ONE*, *13*(4). https://doi.org/10.1371/journal.pone.0193819

Porter, L. (1989). jazz in American education today. *College Music Symposium*, *29*, 134–139. https://www.jstor.org/stable/40373955

Posner, M. (2008). how arts training influences cognition. *The Dana Consortium Report*, *1*, 1–10.

Prouty, K. (2005). The history of jazz education:A critical reassessment. *Journal of Historical Research in Music Education*, *26*(2), 161–162. https://journals-sagepub-com.ezproxy.lib.usf.edu/doi/pdf/10.1177/153660060502600202

Prouty, K. (2008). The "finite" art of improvisation: pedagogy and power in jazz education. *critical studies in improvisation*, *4*(1), 1–15. https://doi.org/10.21083/csieci.v4i1.346

Rainbow, E. (1977). A longitudinal investigation of the rhythmic abilities of pre-school aged children. *Bulletin of the Council for Research in Music Education*, *50*, 55–61.

Rainbow, E. (1979). A progress report on a three year investigation of the rhythmic ability of pre-school aged children. *Bulletin of the Council for Research in Music*, *1*, 84–86.

Rauscher, F. H., & Zupan, M. A. (2000). Classroom keyboard instruction improves kindergarten children's spatial-temporal performance: A field experiment. *Early Childhood Research Quarterly*, *15*(2), 215–228. https://doi.org/10.1016/S0885-2006(00)00050-8

Reese, S. (1977). Forms of feeling: The aesthetic theory of susanne K. langer. *Music Educator' Journal*, *63*(8), 44–49.

Reifinger, J. (2006). Skill development in rhythm perception and performance: A review of literature. *Update Applications of Research in Music Education*, *25*(1), 15–27.

Reynolds, A. (2006). vocal interactions during informal early childhood music classes. *Bulletin of the Council for Research in Music Education*, *168*, 35–49. https://doi.org/https://www.jstor.org/stable/40319459#metadata_info_tab_contents

Rickard, N. S., Bambrick, C. J., & Gill, A. (2012). Absence of widespread psychosocial and cognitive effects of school-based music instruction in 10–13-year-old students. *International Journal of Music Education*, *30*(1), 57–78. https://doi.org/10.1177/0255761411431399

Robazza, C., Macaluso, C., & D'Urso, V. (1994). Emotional reactions to music by gender, age, and expertise. *Perceptual and Motor Skills*, *79*(2), 939–944. https://doi.org/10.2466/pms.1994.79.2.939

Rogers, A. A., Ha, T., & Ockey, S. (2021). Adolescents' perceived socio-emotional impact of COVID-19 and implications for mental health: Results from a US-based mixed-methods study. *Journal of Adolescent Health*, *68*(1), 43-52.

Rogers, C. (1966). *The influence of dalcroze eurhythmics in the contemporary theatre* [Unpublished doctoral dissertation]. Louisiana State University.

Runco, M. (2014). *Structure of Intellect* (2nd ed., Vol. 1). Academic Press.

Runco, M. A. (2003). Idea evaluation, divergent thinking, and creativity. In M. A. Runco (Ed.), *Perspectives on creativity research: Critical, creative processes* (pp. 69–94). Hampton Press.

Runco, M. A., & Jaeger, G. J. (2012). The standard definition of creativity. *Creativity Research Journal*, *24*(1), 92–96. https://doi.org/10.1080/10400419.2012.650092

Runco, M. A., & Pritzker, S. R. (Eds.). (2011). *Encyclopedia of creativity* (2nd ed., Vols. 1–2). Elsevier Academic Press.

Russ, S. W., & Fiorelli, J. A. (2010). Developmental approaches to creativity. In J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge handbook of creativity* (pp. 233–249). Cambridge University Press. https://doi.org/10.1017/CBO9780511763205.015

Rutkowski, J. (2015). The relationship between children's use of singing voice and singing accuracy. *Music Perception*, *32*(3), 283–292. https://doi.org/10.1525/mp.2015.32.3.283

Sarrazin, N. (2016). *music and the child* (1st ed.). College at Brockport. https://open.umn.edu/opentextbooks/textbooks/283

Schellenberg, E. G., Peretz, I., & Vieillard, S. (2008). Liking for happy- and sad-sounding music: Effects of exposure. *Cognition and Emotion*, *22*(2), 218–237. https://doi.org/10.1080/02699930701350753

Scott, J. (2007). Me? Teach improvisation to children? *General Music Today*, *20*(2), 6–13.

Shamrock, M. (1997). Orff-Schulwerk: An integrated foundation: An integrated foundation. *Music Educators Journal*, *83*(6), 41–44.

Sims, L. (1985). Young children's creative movement to music: Categories of movement, rhythmic characteristics and reactions to changes. *Contributions to Music Education*, *12*, 42–50.

Sing Play Create. (n.d.). *Improvisation Ideas in the Music Classroom*. https://www.singplaycreate.com/2014/09/improvisation-happens-daily-inspiring.html

Solis, G. (2009). *In musical improvisation: art, education, and society*. University of Illinois Press.

Spinelli, M., Lionetti, F., Setti, A., & Fasolo, M. (2021). Parenting stress during the COVID-19 outbreak: Socioeconomic and environmental risk factors and implications for children emotion regulation. *Family process*, *60*(2), 639-653.

Sun, J., Singletary, B., Jiang, H., Justice, L. M., Lin, T. J., & Purtell, K. M. (2022). Child behavior problems during COVID-19: Associations with parent distress and child social-emotional skills. *Journal of Applied Developmental Psychology*, *78*, 101375.

Stanutz, S., Wapnick, J., & Burack, J. A. (2014). Pitch discrimination and melodic memory in children with autism spectrum disorders. *Autism*, *18*(2), 137–147. https://doi.org/10.1177/1362361312462905

Szonyi, E. (1971). A summary of the Kodaly Method. *Australian Journal of Music Education*, *9*, 23–29.

Tan, A., Tsubonou, Y., Oie, M., & Mito, H. (2019). Creativity and music education: A state of art reflection. In Y. Tsubonou (Ed.), *Creativity in Music Education* (1st ed., Vol. 1, pp. 3–17). Springer. http://doi.org/10.1007/978-981-13-2749-0

Terwogt, M., & Van Grinsven, F. (1991). Musical expression of mood states. *Psychology of Music*, *19*, 99–109.

Thakral, P. P., Yang, A. C., Addis, D. R., & Schacter, D. L. (2021). Divergent thinking and constructing future events: Dissociating old from new ideas. *Memory*. Advanced online publication. https://doi.org/10.1080/09658211.2021.1940205

Thompson, L. A., & Kelly-Vance, L. (2001). The impact of mentoring on academic achievement of at-risk youth. *Children and Youth Services Review*, *23*(3), 227–242. https://doi.org/10.1016/S0190-7409(01)00134-7

Torrance, E. P. (2011). Creativity and its educational implications for the gifted. In T. C. Grantham, D. Y. Ford, M. S. Henfield, M. T. Scott, D. A. Harmon, S. Porchèr, & C. Price (Eds.), *Gifted and advanced Black students in school: An anthology of critical works* (pp. 41–54). Prufrock Press Inc.

Torrance, S., & Schumman, F. (2019). The spur of the moment: What jazz improvisation tells cognitive science. *AI & Society*, *34*, 251–268. https://doi.org/https://link.springer.com/article/10.1007/s00146-018-0838-4

Troller-Renfree, S. V., Barker, T. V., Pine, D. S., & Fox, N. A. (2015). Cognitive functioning in socially anxious adults: Insights from the NIH Toolbox Cognition Battery. *Frontiers in Psychology*, *6*. https://doi.org/10.3389/fpsyg.2015.00764

Turpin, D. (1986). Kodály, Dalcroze, Orff, and Suzuki: Application in the secondary schools. *Music Education Journal*, *72*(6), 56–59. https://doi.org/10.2307/3401279

Van der Sluis, S., de Jong, P. F., & Leij, A. van. (2004). Inhibition and shifting in children with learning deficits in arithmetic and reading. *Journal of Experimental Child Psychology*, *87*(3), 239–266. https://doi.org/10.1016/j.jecp.2003.12.002

Van Zonneveld, L., de Sonneville, L., van Goozen, S., & Swaab, H. (2018). Recognition of facial emotion and affective prosody in children at high risk of criminal behavior. *Journal of the International Neuropsychological Society*, *25*(1), 57–64. https://doi.org/10.1017/s1355617718000796

Vygotsky, L. S. (2004). Imagination and creativity in childhood. *Journal of Russian & East European Psychology*, *42*(1), 7–97.

Wantabe, H. (1960). [Educational achievement of pupils in schools for the blind: III. Concerning mis-answers]. *Psychology of the Blind, Tokyo*, *4*, 51–60.

Ward-Steinman, P. (2007). Confidence in Teaching Improvisation According to the K-12 Achievement Standards: Surveys of Vocal Jazz Workshop Participants and Undergraduates. *Bulletin of the Council for Research in Music Education.*, *172*, 25–40. https://www.jstor.org/stable/40319363

Waszak, F., Wascher, E., & Aschersleben, G. (2005). Intention-based and stimulus-based mechanisms in action selection. *Express Brain Res*, *162*, 346–356.

Webster, P. (1990). Creativity as creative thinking. *Music Educators Journal*, *76*(9), 22–28. http://www.jstor.org/stable/3401073?origin=JSTOR-pdf

Webster, P. (1994). *Brief description of measure of creative thinking in music II*. Peter Webster. http://peterrwebster.com/pubs/Brief%20Description%20of%20MCTMII.pdf

Webster, P. (2002). Creative thinking in music: Advancing a model. *Canadian Music Educators' Association*, *3*(1), 21. https://doi.org/https://scirp.org/reference/ReferencesPapers.aspx?ReferenceID=445986

Weiner, N. (2020, January 24). Five myths about jazz. *The Washington Post*. http://https://www.washingtonpost.com/outlook/five-myths/five-myths-about-jazz/2020/01/23/72dba37e-3e0b-11ea-8872-5df698785a4e_story.html

Welch, G. F. (2006). The musical development and education of young children. In B. Spodek & O. N. Saracho (Eds.), *Handbook of research on the education of young children* (2nd ed., pp. 251–267). Lawrence Erlbaum Associates Publishers.

Wells, A. E., Hunnikin, L. M., Ash, D. P., & Van Goozen, S. H. (2021). Improving emotion recognition is associated with subsequent mental health and well-being in children with severe behavioural problems. *European child & adolescent psychiatry*, *30*, 1769-1777.

Werner, K., & Woessmann, L. (2023). The legacy of COVID-19 in education. *Economic Policy*, eiad016.

Whitcomb, R. (2007). Elementary improvisation in New York State: Survey results. *School Music News*, *71*(2), 31–33.

Whitcomb, R. (2013). Teaching improvisation in elementary general music: Facing fears and fostering creativity. *Music Educators Journal*, *99*(3), 43–51. https://doi.org/10.1177/0027432112467648

Wiebe, S. A., Sheffield, T., Nelson, J. M., Clark, C. A. C., Chevalier, N., & Espy, K. A. (2011). The structure of executive function in 3-year-olds. *Journal of Experimental Child Psychology*, *108*(3), 436–452. https://doi.org/10.1016/j.jecp.2010.08.008

Williams, K. E., White, S. L. J., & MacDonald, A. (2016). Early mathematics achievement of boys and girls: Do differences in early self-regulation pathways explain later achievement? *Learning and Individual Differences*, *51*, 199–209. https://doi.org/10.1016/j.lindif.2016.09.006

Willis, A. (2011). *Relationships among musical home environment, parental involvement, demographic characteristics, and early childhood music participation* [Master's thesis, University of Miami]. ProQuest Dissertations and Theses Global. https://doi.org/991031447883002976

Willoughby, M. T., Wirth, R. J., Blair, C. B., & Family Life Project Investigators. (2012). Executive function in early childhood: Longitudinal measurement invariance and developmental change. *Psychological Assessment*, *24*(2), 418–431. https://doi.org/10.1037/a0025779

Wright_R_and_Kanellopoulos_P_A_2010_Informal_music_learning_improvisation_and_teacher_education_British_Journal_of_Music_Education_27_1_71_87

Yorke, L., Rose, P., Bayley, S., Wole, D., & Ramchandani, P. (2021). The importance of students' socio-emotional learning, mental health and wellbeing in the time of COVID-19. *Rise Insights*, *25*, 1-11.

Zanfanly, D. (2015). Imitation, teration, and improvisation: embodied interaction in making and learning. *design studies*, *41*, 1. https://doi.org/10.1016/j.destud.2015.09.002

Zentner, M., Grandjean, D., & Scherer, K. R. (2008). Emotions evoked by the sound of music: Characterization, classification, and measurement. *Emotion*, *8*(4), 494–521. https://doi.org/10.1037/1528-3542.8.4.494

Zelazo, P. D., Carlson, S. M., & Kesek, A. (2008). The development of executive function in childhood. In C. A. Nelson & M. Luciana (Eds.), Handbook of developmental cognitive neuroscience (2nd ed., pp. 553–574). Cambridge, MA: MIT Press.

APPENDIX A: DEMOGRAPHIC SURVEY

Participant #:_____ **Date:**_____

Confidential Preliminary Questionnaire

Information Regarding Person Completing the Form

Relationship to Child (Circle One) Mother Father Legal Guardian

Other:_____

Gender (Circle One): Female or Male

Parent Education in Years (12 for completion of high school): _____

Occupation: _____

Information Regarding Your Child

Age: _____ **DOB**_____ **Gender** (Circle One): Male or Female

Handedness (circle one): Right or Left or Ambidextrous

What grade is your child? _____

Native Language: _____

Do you wear contacts/glasses/neither? _____

Race (please circle one-categories from NIH)

American Indian Asian African American Pacific Islander Caucasian

Ethnicity (circle one): Hispanic/Latino Non-Hispanic/Non-Latino

Does your child currently have a diagnosis of a learning disability? Yes or No

Does your child have any difficulty hearing? Yes or No

Is your child currently taking any medications? Yes or No

If yes, please list the name of the medication and dosage : _____

Participant #:_____ **Date:**_____

Is your child taking any vitamins, minerals, or supplements? Yes or No

If yes, please list name of product and dosage : _____

Has your child ever participated in private formal music lesson(s)? Yes or No

If yes which instrument(s):_____

How long (for each)?_____

Describe reasons for discontinuation_____

Does your child read musical notation? Yes or No

If yes, which is your child most comfortable reading? Treble Bass Alto

If your child plays a musical instrument, how long does he/she currently practice a week?

_____

Socioeconomic Information (Optional)
Since this research concerns education we appreciate your honesty. As a reminder your information is reported collectively and is anonymous.

Annual Household income:

Less than $10,000	$10,000-$20,000
$20,000-30,000	$30,000-$40,000
$40,000-50,000	$50,000-$60,000
$60,000-70,000	$70,000-$80,000
$80,000-90,000	$90,000-$100,000
$100,000-110,000	$110,000-$120,000
$120,000-130,000	$130,000-$140,000
$140,000-150,000	$150,000-$160,000
$170,000-180,000	$180,000-$190,000
$190,000-200,000	$200,000+

APPENDIX B: MUSIC PROGRAM INFORMATION SHEET FOR PARENTS

Study ID: STUDY003812 Date Effective: 3/10/2022

UNIVERSITY OF SOUTH FLORIDA

USF RESEARCH & INNOVATION

Consent to Participate in Research and Parental Permission for my Child to Participate in Research and Authorization to Collect, Use and Share Health Information

Information for parents to consider before agreeing to participate and allowing your child to participate in this research study

Title: The Effects of a Music Curriculum on Children's Executive Functions and Math Achievement

Study # STUDY003812

Overview: The following information is being presented to help you and your child decide whether you would like to be a part of a research study. The sections in this Overview provide the basic information about the study. More detailed information may be provided in the remainder of the document.

Study Staff: This study is being led by Jazmin Ghent who is a Doctoral Student at The University of South Florida. This person is called the Principal Investigator. She is being guided in this research by Dr. Jennifer Bugos. Other approved research staff may act on behalf of the Principal Investigator.

Study Details: : This study will be conducted at East Tampa Academy. The purpose of the study is to examine the effects of a novel music curriculum on executive functions and math performance in children (4-8 years).

Participants: You are being asked to take part because your child is a student between 4-8 years.

Voluntary Participation: You and your child's participation is voluntary. You and your child do not have to participate and may stop your participation at any time. There will be no penalties or loss of benefits or opportunities if you and your child do not participate or decide to stop once you start. Alternatives to participating in the study include: Your decision to participate or not to participate will not affect your job status, employment record, employee evaluations, or advancement opportunities. Your decision to participate or not to participate will not affect your student status, course grade, recommendations, or access to future courses or training opportunities.

Benefits, Compensation, and Risk: We do not know if you or your child will receive any benefit from participation There is no cost to participate. You and/or your child will not be compensated for your participation. This research is considered minimal risk. Minimal risk means that study risks are the same as the risks you face in daily life.

Confidentiality: Even if we publish the findings from this study, we will keep you and your child's study information private and confidential. Anyone with the authority to look at you and your child's records must keep them confidential.

Why are you & your child being asked to take part?

You are being asked to take part because your child is a student between 4-8 years. We believe these classes can enhance your child's development and allow them to discover an interest in music.

Study Procedures:

Your child will experience various engaging activities that include: singing, performance, creating, and movement. All children will be randomly assigned to a music program either a standard music program or a novel music program. Both programs include singing developmentally appropriate songs. The 8-week program will meet for two 45-minute group music lessons twice a week (90 minutes) during the school day. These activities are every day within many childhood music programs.

Your child will participate in test measures that will track and measure the student's development before the study and then their progress after the study. Students will be read the instruction for these pre and post-test measures before they begin.

If you and your child take part in this study, you (the parent) will be asked to fill out a demographic questionnaire which would take 15 minutes. Your child will be asked to participate in test measures that will track and measure the student's development before the study and then the progress after the study. Students will be read the instruction for these pre and post-test measures before they begin.

The Test Measures Include:

Measures Include:

PPVT IV: is used to assess and measure one's verbal ability, receptive processing in the English Vocabulary and review a child's scholastic aptitude PPVT lasts approximately 20 to 30 minutes. The presenter administers a series of pages that contain four colored pictures. The examiner will name a word, and the participants will identify the number to which the word corresponds.

Music Aptitude: (PMMA; Gordon, 1986) measures music aptitude with 40 paired rhythmic patterns and 40 paired melodies in which listeners must distinguish whether the two melodic phrases or rhythmic patterns are the same or different. PMMA was chosen for its reliability and validity in preschool children (r=.86). Music aptitude could affect music learning outcomes. At baseline, we will administer it to evaluate the potential relations among music aptitude and scores on the dependent measures.

Music Achievement, The Advanced Interdisciplinary Research in Singing Test Battery of Singing Skills (AIRS-TBSS, Cohen, 2011), will be used to assess pitch accuracy with "Brother John" subtest and creative improvisation with musical sentence completion exercises. These exercises are used extensively internationally with young children (Cohen, 2015). The test components consist of examining the ability to sing a familiar song (Brother John), learn a new song, perform short melodic fragments, sing low and high notes, improvise the ending of a song, and create a new song.

Day-Night Stroop (Inhibition/Shifting) The task begins by having the child "read" ten pictures using the proper labels (i.e., "day" for the sun and "night" for the moon). This enables us to get a baseline of each

child's performance, the time to "read" the ten stimuli, and the number of errors. We then teach the child to say the opposite label (i.e., "night" for day) and ensure the child understands how to do the task the silly way before proceeding. After two trials of ten stimuli the silly way, we return to the original directions and labels (i.e., say "day" for the sun, and say "night" for the moon). We analyze the proportion correct as well as the time comparisons for Trials 1 to 4. This detects individual differences previously unreported in the literature. In our pilot research, this task was sensitive to pretest to posttest differences caused by a shorter music program. Guttman split-halves reliability for the task is r=.93.

EF Touch- Working Memory Span. This task involves holding two or more types of pieces of information. The participant is presented with pictures of houses with animals and colors. The participant is then asked to remember the animal and the house and the color in the house. After a short delay, the house is presented again; however, the house is empty this time. The participant is then asked to remember pieces of information, either color or the animal in the house. The difficulty of the tasks increases as the number of homes increase.

Farmer – The farmer task measures visual and spatial working memory. Children are presented with a 4 x 4 grid of squares referred to as farmer's fields. Children see various animals "walk" in these fields. Children are asked to touch the fields in which the animal walked in them to help the farmer locate his missing animal. The items become increasingly difficult as the child is shown and asked to recall longer strings of fields.

KeyMath™-3 Diagnostic Assessment (Connolly, 2007) includes math concepts and skills reflecting the content processes and standards proposed by the National Council of Teachers of Mathematics (NCTM). It is administered individually and is a comprehensive, norm-referenced test. It is untimed and normed for kindergarten children (from ages four years, six months to grade 12). Ten subtests represent three different math content areas: Basic Concepts (conceptual knowledge), Operations (computational skills), and Applications (problem-solving). The test now has Growth Scale Values (GPV), which can help see a child's progress more accurately. With children who are 5-6-years-old, the test time is approximately 20 minutes.

The test has two different forms with high alternate form reliability among the content areas (r = .88 to .94) and total test scores (r = .96). We will be using the Numeration subtest (identifying, representing, comparing, and rounding numbers); the Measurement subtest (comparing objects with standard and nonstandard units of measure); and the Data Analysis and Probability subtest (the ability to collect, display and interpret data; e.g., tally charts, estimating quantities). Thus, we can assess transfer to math achievement.

Number Estimation- We will use a number estimation task similar to the one used by Ramani and Siegler (2012). Children are shown a number line with numbers 0 and 10 labeled at each end. Children indicate where particular numbers would be found on this number line (e.g., 7, 2, etc.). Smaller distances between the child's choices and actual number locations suggest more accurate number estimation skills.

Total Number of Participants

About 60 individuals will take part in this study at East Tampa Academy.

Alternatives / Voluntary Participation / Withdrawal

You and your child do not have to participate in this research study.

You and your child should only take part in this study if you want to volunteer. You or your child should not feel that there is any pressure to take part in the study. You and your child are free to participate in this research or withdraw at any time. There will be no penalty or loss of benefits you and your child are entitled to receive if you stop taking part in this study. Your decision to participate or not participate will not affect your student status and course grades.

Benefits

We are unsure if you or your child will receive any benefits by taking part in this research study.

Risks or Discomfort

This research is considered to be minimal risk. That means that the risks associated with this study are the same as what you face every day. There are no known additional risks to those who take part in this study.

Compensation

You and your child will receive no payment or other compensation for taking part in this study.

Cost

It will not cost to participate and to let your child take part in the study.

Privacy and Confidentiality

We will do our best to keep you and your child's records private and confidential. We cannot guarantee absolute confidentiality. You or your child's personal information may be disclosed if required by law. Certain people may need to see you or your child's study records. These individuals include:

- The research team, including the Principal Investigator, Jazmin Ghent, study coordinator, Dr.Bugos, and research staff.
- Certain government and university people who need to know more about the study. For example, individuals who provide oversight on this study may need to look at your records. This is done to make sure that we are doing the study in the right way. They also need to make sure that we are protecting your rights and your safety.

- Any agency of the federal, state, or local government that regulates this research. This includes the Department of Health and Human Services (DHHS) and the Office for Human Research Protection (OHRP).
- The USF Institutional Review Board (IRB) and its related staff who have oversight responsibilities for this study, and staff in USF Research Integrity and Compliance.

You or your child's information or samples collected as part of the research, even if identifiers are removed, will NOT be used or distributed for future research studies.

We may publish what we learn from this study. If we do, we will not include you or your child's name. We will not publish anything that would let people know who you are.

You can get the answers to your questions, concerns, or complaints.

If you have any questions, concerns or complaints about this study, call Jazmin Ghent at 256-617-0258. If you have questions about your rights, complaints, or issues as a person taking part in this study, call the USF IRB at (813) 974-5638 or contact by email at RSCH-IRB@usf.edu.
allowed by USF policies.

Consent to Participate and Parental Permission for My Child to Participate in this Research Study and Authorization to Collect, Use and Share Health Information for Research

I freely give my consent take part and to let my child take part in this study. I understand that by signing this form I am agreeing to take part and to let my child take part in the research. I have received a copy of this form to take with me.

_____ _____
Signature of Adult Participant/Parent of Child Taking Part in Study Date

_____
Printed Name of Adult Participant Taking Part in Study

_____
Printed Name of the Child Taking Part in Study

Statement of Person Obtaining Informed Consent

I have carefully explained to the person taking part in the study what he or she can expect from their

APPENDIX C: CHECKLIST FOR BATTERY OF TEST MEASURES

Pre or Post-Testing Date_____

Subject# _____

Time Began Testing _____ **Tester Initials** _____

Tester, please initial when completed or indicate "refused´´ or N/A. If not completed, indicate the reason why. Indicate all missing items in the Comments section.

_____ PPVT (Baseline Measure)

_____ Informed Consent Statement / Child Assent

_____ Preliminary Questionnaire

_____ Day / Night Stroop

_____ Singing Task (randomized order of AIRS TEST BATTERY, 3 tasks)

_____ NIH Toolbox (Flanker)

_____ NIH Toolbox (Dimensional Card Sort)

TESTER COMPLETE THE FOLLOWING:

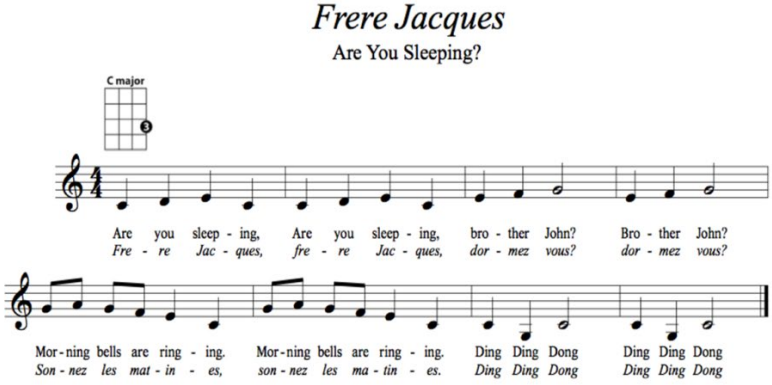
_____ Scheduled for post-test visit _____ Data restored

_____ Participants data entered into database _____ Participant data in database double-check.

COMMENTS (to be entered into the database 40 or fewer characters):

** Please initial the front of folder when the entire has been re-scored**

APPENDIX D: PITCH RUBRIC



Participant #: _____

Pre or Post

Rater # _____

Notes:

APPENDIX E: IMPROVISATION RUBRIC

singing voice (and not vocal accuracy). Copyright © Joanne Rutkowski. Published with the author's permission.

1	**Pre-singer**	Does not sing but chants the text.
1.5	**Inconsistent Speaking Range Singer**	Sometimes chants, sometimes sustains tones and exhibits some sensitivity to pitch but remains in the speaking voice range, lower register (usually A3 to C4).
2	**Speaking Range Singer**	Sustains tones and exhibits some sensitivity to pitch but remains in the speaking voice range, lower register (usually A3 to C4).
2.5	**Inconsistent Limited Range Singer**	Wavers between lower and middle registers and uses a limited range when in middle register (usually up to F4)
3	**Limited Range Singer**	Exhibits consistent use of limited range (usually D4 to F4).
3.5	**Inconsistent Initial Range Singer**	Sometimes only exhibits use of limited range, but other times exhibits use of initial range (usually D4 to A4).
4	**Initial Range Singer**	Exhibits consistent use of initial range (usually D4 to A4).
4.5	**Inconsistent Singer**	Sometimes only exhibits use of initial range, but other times exhibits use of extended singing range, upper register (sings beyond the lift to upper register: B4-flat and above)
5	**Singer**	Exhibits use of consistent extended range, upper register (sings beyond the lift to upper register: B4-flat and above).

Improvised song endings in a developmental perspective: A mixed-methods study

Supplementary Material

Appendix A: Improvisation scoring rubric

Score	Description
0	Did not sing
1	Exact replication of given melody or extremely similar
2	Melody and/or rhythm deviates slightly (1-3 notes different)
3	4 or more different notes with clear expansion of given melody

Expert raters provided scores between 0 and 3, with liberty to score in increments of 0.5 depending on tonal and/or rhythmic coherence.

APPENDIX F: WEEK TWO LESSON PROCEDURES

National Music Standards:
MU.1.S.1.1 – w2
Improvise a four-beat response to a musical question sung or played by someone else.
MU.K.O.1.2- w2
Identify similarities and differences in melodic phrases and/or rhythm patterns.
MU.1.H.2.1 w2
Identify and perform folk music used to remember and honor America and its cultural heritage.

MU.2.C.1.1w2
Identify appropriate listening skills for learning about musical examples selected by the teacher.

Lesson Objectives:
Students will be able to identify prominent Jazz Band Leaders from the Big band Era
Students will be able to Mimic all big band instruments using the movements with their body
Students will be able to learn what tap dancing and s2wing dancing is
Students will be able to perform a swing dance to the song Swing Swing Swing

Videos of Vocalists and Instrumentalists:
Bass: https://www.youtube.com/watch?v=ldY1wR3G8L0
https://www.youtube.com/watch?v=pyUZh_Cbw6Q
Duke Ellington:
https://www.youtube.com/watch?v=D6mFGy4g_n8
Count Basie:
https://www.youtube.com/watch?v=hHMYhajNtNg (start 2:52)
Lester Young:
https://www.youtube.com/watch?v=5rCSTY917sk (start :49)
Billie Holiday:
https://www.youtube.com/watch?v=ojn-uLG7Jgc

Procedures:

- Today We will continue to learn about _____ music.
- Have the students review the welcome song and sing the welcome song
- Review some of these questions
    - Big Four With the scarves and play a review game that asks where was jazz born?
    - What styles of music made Jazz what It Is (compare it to a soup) (ragtime-blues-spirituals- African music)
    - Ask what instrument Louis Armstrong Played
    - Review Nick Names for Jazz
    - Also Review the musical fruit notes. The students need to review Quarter notes and now add eight notes with quarter rests

    - Continue review depending on how much the students learned and remembered (this should take no more than 5 minutes)
- The band leader would conduct bands that were not little… they were _____ students say "big"….so do you think we called them little bands? Students say "No" we called them "Big Bands"
- Say the different sections for big bands and introduce the students to the different instruments**:** **First a video of a big band**
- Instruments Introductions: Make sure you say the instrumentalists' names and students say "Hi (Insert musicians name)" they probably will not remember these names however they will have the opportunity to know who they are
- Show trumpets (they should know this) Have students watch a video of trumpets playing now have students walk around and play the trumpet
- Show the Saxophone Video Students play air saxophone (Show students a video off a saxophone player in Big Band then myself playing saxophone)
- Show Students Video of Rhythm Section Instruments Have them play different rhythm sections instruments
- Show Students Video of Trombone player…have them play air trombone
- Now the students can play a game of Bandleader says to review the instruments standing up.
- If time permits the students will listen to a Jazz song and airplay the instruments they hear
- Talk about Swing music and dancing
- Learn the Swing Dance to "Sing Sing Sing"
- Extra Time:
    - Students Sit in a circle to sing the song and echo back responses on the syllable so and mi
    - Bean bag take five
    - Rhythm sticks and have them do a concentration game
    - Students can play a ride cymbal
    - On Hand Bells, students can improvise melodies with the instruments
    - B-A-G
- All of these activities will and can be continued during the following sessions.
- Students can go over to the instruments that they hear if they would like to find other chairs

Materials: Small Hand Bells (red with white and black notes), Rhythm Sticks