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The Effect of Percussion and Rhythm-Based Interventions on Children with Social, Emotional and Behavioral Goals

Lesli Woods
Illinois State University, Lesliwoods123@gmail.com

THE EFFECT OF PERCUSSION AND RHYTHM-BASED INTERVENTIONS ON CHILDREN WITH SOCIAL, EMOTIONAL AND BEHAVIORAL GOALS

LESLI K. WOODS

97 Pages

This study explored the effect of percussion and rhythm-based interventions on children with emotional and behavioral goals. Five students from an after-school/summer program were analyzed in a case-study format. The five skills analyzed within this study included those of cooperation with others, remaining on task, refraining from interrupting others, demonstrating pro-social interactions, and remaining with the group. An additional interview was conducted with the children to understand their perception of the interventions and how it affected their social, emotional, and behavioral skills. The students themselves suggested that the music had a positive impact on their behavior and social skills, specifically within the group. In the interview, the researcher learned that the students enjoyed making music together. They were introspective, valued community amongst one another, and advocated for themselves when expressing their emotions. The results of data suggested percussion and rhythm-based strategies may be effective in improving the skills of children with emotional and behavioral goals.

KEYWORDS: Emotional behavioral; percussion; rhythm; entrainment; iso principle; music therapy; exceptionality; children

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LESLI K. WOODS

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COMMITTEE MEMBERS:

Andrea Crimmins, Chair

Cindy Ropp

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Thank you to my village. You mean more than you know. To my committee members, thank you for your encouragement, patience, and for sharing your love for music therapy.

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CHAPTER I: INTRODUCTION

According to the Centers for Disease Control and Prevention (2013) common mental health disorders among children are Attention Deficit/Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD), anxiety, depression, and behavior and conduct problems. In fact, 9.4% of children are diagnosed with ADHD (Danielson et al., 2018), 7.1 % of children have been diagnosed with anxiety, 3.2 % with depression, and 1.85% with ASD (Maenner MJ et al., 2020), and 7.4 % with a behavioral disorder (Ghandour et al., 2019). Another word for these sorts of disorders is "exceptionality." An exceptionality, as defined by the IRIS Center (2023) references "both disabilities and giftedness." Exceptionalities include "emotional disturbance[s]" (IRIS Center, 2023). The Better Health Channel (2012) identified some exceptionalities, or behavioral disorders, as Oppositional Defiant Disorder (ODD), and Conduct Disorder (CD), and ADHD. Characteristics of ADHD include inattention, impulsivity, and overactivity. A child diagnosed with ODD may refuse to obey rules, be angered easily, have low self-esteem, and throw temper tantrums. A child diagnosed with CD may lack empathy, refuse to obey parents, lie, and be aggressive to others (Better Health Channel, 2012). Research has shown students with these disorders have lower perceptions of their school climate (La Salle et al., 2018). They also experience victimization from their peers, and they may struggle with interpersonal relationships with their peers (La Salle et al., 2018). One researcher analyzed the relationship between behaviors such as these and life satisfaction amongst middle school students. Interestingly, there was a connection. Valois et al. (2006) found that nearly 20-26% of middle school students who demonstrated violent behaviors are dissatisfied with their lives. Impulsivity, stress, attentivity are goals commonly addressed with children that demonstrate behavioral needs (Baker et al., 2011; Jackson, 2003; Litchke & Finley, 2019).

Researchers have demonstrated that students' relationship with their instructors, their interpersonal relationships with their peers as well as their ability to learn in the classroom is affected by their impulse control skills, levels of stress, and attention (Berry, 2012; Rimm-Kaufman et al., 2009; Ponitz et al., 2009). Berry (2012) found that children with a lower inhibitory control skill eventually demonstrated teacher-child conflicts in the future. Children with lower levels of inhibitory control skills also demonstrated higher levels of inattention problems. Rimm-Kaufman et al. (2009) reported similar findings. They observed that the better children's behavioral and cognitive control and the more time children spent on task, the better the classroom quality (Rimm-Kaufman et al., 2009). Ponitz et al. (2009) yielded similar results with a group of kindergartners. Research has demonstrated that the presence of self-regulatory skills accompanies academic achievement (Ponitz et al., 2009).

Evidence related to self-control predict its effects from early childhood to future stages of life including adulthood health, wealth and crime (Berry, 2012; Kaufman et al., 2009; Moffit et al., 2011). Moffit et al. followed 1,000 children, interviewing parents and teachers about their children's' self-regulatory method from birth until the age of 32. The researchers found that children who demonstrated self-control skills were more wealthy, less likely to have health issues, and less likely to engage in criminal activity in adulthood (Moffitt et al., 2011).

It is evident that many children are plagued with emotional and behavioral disorders (CDC, 2013). Researchers have proven that childhood behavioral problems and diagnosed behavioral disorders are prevalent issues and can affect children later in life. Some researchers have sought to understand how to help these children. Interestingly, one-way researchers and professionals have addressed children with emotional and behavioral disorders' needs is through the use of music. They have demonstrated that music, percussion, and rhythm-based strategies have proven

to be effective methods in addressing those with emotional and behavioral needs (Currie, 2012; Litchke & Finley, 2019; Lowry et al., 2018; Matney, 2004; Rensburg et al., 2016; Santos, 2019; Shaffer et al., 2001).

Music, Percussion, and Rhythm-Based Strategies

Researchers have demonstrated that music can relieve symptoms of emotional and behavioral exceptionalities. (Baker et al., 2011; De Mers et al., 2009; Jackson, 2003; Litchke & Finley, 2019). In their 2009 case study, De Mers et al. used music therapy to reduce behaviors including hitting, and screaming, and increasing question-asking with three students. De Mers et al., (2009) obtained baseline data by observing the students' behavior during the 10-minute period before their lunch and recess, which was the time of day the behavior was most observed by staff members. After implementation of music therapy sessions, two of the three children's hitting and screaming behaviors were reduced, and their use of question-asking increased. The improved behaviors lasted as long as three weeks after the music therapy sessions concluded (De Mers et al., 2009).

Litchke and Finley (2019) conducted a case study with a 10-year-old male who was diagnosed with an intellectual exceptionality and ADHD. He struggled with behavioral problems, impulsivity, and maintaining concentration. After participating in therapeutic drum sessions with a partner, the child demonstrated improvement in various areas including taking turns, taking on leadership roles, listening to others, accepting responsibility, following directions, and having respect for self (Litchke & Finley, 2019). Another researcher followed a 12-year-old girl who, after a traumatic brain injury (TBI), demonstrated physical aggression and experienced agitation that exacerbated other sensory side effects related to her TBI. (Baker, et al., 2011). Over a period of 8 treatment sessions, she participated in relaxation interventions

using music with regular pulses, “moderate tempo and volume levels, predictive diatonic harmonic progressions, descending melodic lines, regular phrases, and repetitive structures” (Baker et al., 2011, p. 10). After participating in these relaxing interventions, her breathing rate decreased, she had less repetitive movements, and she stopped attempting to remove her feeding tube. Each were measures assessed to determine her level of calmness. These are some examples of the use of music to address emotional and behavioral needs within individuals. Specific elements of music have been studied to further analyze how music may help people.

Percussion, or the “act of percussing” is defined as “the beating or striking of a musical instrument” (Merriam-Webster, n.d.a). Matney (2004) conducted a study wherein he sought to analyze why and how percussion is used in music therapy. He analyzed 106 studies that were published between 1980 and 2003. In his results, he found 45 percussion instruments had been utilized within music therapy practice. The top five instruments he found utilized within music therapy included hand drums, unspecified rhythm instruments, unspecified types of drums, tambourines, and cymbals. In answering his first research question, “Why is percussion used in music therapy?” Matney (2004) observed 19 therapeutic functions of percussion in music therapy. The most commonly utilized interventions were facilitated to address goals related to social skills, self-expression/awareness, communication, emotional skills, and motor/body awareness. Other functions included “attention, meaningful activity, miscellaneous, cognitive, rapport, relaxation, evaluation, sensory integration, behavior management, vocational awareness, spiritual, auditory perception, coping skills, [and] neuroendocrine increase” (p. 57). Another common term that frequented the literature surrounding percussion was rhythm.

Rhythm is part of the musical experience and has been a factor when treating individuals with social, emotional, and behavioral goals (Berger, 2012; Matney, 2004; Trapp et al., 2020).

According to Merriam-Webster (n.d.b), rhythm is the "aspect of music comprising all the elements (such as accent, meter, and tempo) that relate to forward movement." It can be considered an element of percussion. Rhythm was a factor mentioned in five out of twelve techniques, further discussed within the literature review, that Matney (2004) observed when analyzing how percussion was utilized within music therapy. In her review of rhythm-based strategies, Ross (2016) stated that rhythm-based strategies are an "accessible medium for almost everyone," and that "through "participation in interactive rhythm games, a child can receive information that might otherwise be seen as a threat" (p. 100).

Considering the prevalence of emotional and behavioral needs in children, and the effectivity of music and percussion-centered strategies, there is one question this study will address. This question is:

1. What are the effects of the use of percussion and rhythm-based interventions on the social, emotional, and behavioral skills of children with social, emotional, and behavioral goals?

CHAPTER II: LITERATURE REVIEW

Music Therapy and Social, Emotional, And Behavioral Skills

As previously stated, researchers have proven that music can relieve symptoms of emotional and behavioral exceptionalities (Baker et al., 2011; Jackson, 2003; Litchke & Finley, 2019). Behavior, as it relates to attention span, has been addressed through music therapy. Findings indicate that music therapy has the potential to improve sustained attention (Guzic et al., n.d.; LaGasse et al., 2019). Guzic et al. had participants learn percussion interventions directly aimed to increase attention to task for children with ASD. The children demonstrated an increase of 189.1% in their attention to tasks after the percussion interventions were implemented (Guzic et al., n.d.). Similarly, LaGasse et al. (2019) addressed attention skills in part of their study. They found that after five weeks of 35-minute music therapy interventions, including rhythm-specific and percussion-based interventions, children with ASD demonstrated significant and insignificant improvements in selective and sustained attention skills. More specifically, children with ASD demonstrated significant improvement in selective attention after music therapy interventions ($p = .025$). While there were improvements in sustained attention ($p = .27$), and switch/control attention ($p = .14$) they were insignificant.

A survey was conducted, and 268 board-certified music therapists responded with the ways in which they treat children with ADHD (Jackson, 2003). The top five methods included music and movement (74%), instrumental improvisation (67%), musical play (63%), group singing (55%), and instrumental instruction (47%). Music therapists also identified the goals that they address with children with ADHD. These goals included those of behavioral goals (94%), psychosocial goals (89%), and cognitive goals (69%), many of which are addressed simultaneously in treatment. Lastly, it was reported that their treatments were effective based on

their perceived treatment outcomes (100%), other professionals (95%), teachers (84%), responses from their client's parents (83%), and the children themselves (96%) (Jackson, 2003).

In another multiple case study, the researcher followed ten children diagnosed with ASD and analyzed the impact of music therapy on the children's' social behavior (Pater et al., 2021). They found that at least half of the children made "moderate improvement" (Nonoverlap of Pairs (NAP) = $\geq$ .8) in various areas related to social skills including focus, making eye contact, and empathy (Pater et al., 2021, p. 4). Within this study, the researcher utilized the Nonoverlap of All Pairs technique (Parker, Vannest, Davis & Sauber, 2011). The most notable outcome in another study was the significant effect on communication and interaction skills in children ages 13 and over ($p = .007$), and social skills as compared to the control group by end of the music therapy treatment ($p = .04$) (Porter et al., 2016). This study consisted of 181 eight to sixteen-year olds who were members of Child and Adolescent Mental Health facilities and their parents (Porter et al., 2016). One hundred and five children were part of the control group, while seventy-six were part of the treatment group. The children were diagnosed with anxiety, depression, and ASD. Over a 12-week treatment period, the children participated in music therapy, with the specific technique of improvisation applied to each session. There was, however, no significant effect on communication and interaction skills in children under age 13 within their study. Additionally, self-esteem significantly improved ($p = .002$), and their depression rates significantly lowered ($p = .004$) by week 13 of the study for those over the age of 13. The researchers noted that these scores included one outlier, and the results were not sustained through week 26 of the study. At the conclusion of the study, participants over the age of 13 years old self-reported an improvement in communication and interaction skills a week following treatment. The

researchers suggested that there is potential for the use of music therapy for "troubled adolescents" (Porter et al., 2016, p. 590).

In their 2018 study, Moore and Hanson-Abromeit (2018) utilized a musical program with preschoolers that incorporated a music therapy intervention entitled the Musical Contour Regulation Facilitation to address emotional regulation. Throughout the four weeks of sessions, the children's teachers observed calmer behaviors after sessions and throughout the month in which the interventions were applied. It was also reported that the children exhibited an increase in the expression of their emotions, decreased arousal after the music therapy sessions, and "steady change" during the four weeks on intervention (Moore & Hanson-Abromeit, 2018, p. 429). Two measures constituted a large effect size, those being internalizing aggregate subscale (0.832), and total problems scale (0.889). Additionally, six other measures constituted medium effect sizes (with a range of 0.516 to 0.754). This means the children improved their emotional regulation skills within this study. Notably, a conclusion of the study was that teachers believed music was essential and could foster general development and social, emotional, and cognitive skills (Moore & Hanson-Abromeit, 2018). Based on these findings, the researchers suggested that music therapy may be beneficial in helped students regulate their emotions.

Santos' (2019) teenage participants were involved in group drumming, improvisation, imagery, story creation, songwriting, poem creation and journaling, all with music. For adolescents who experienced aggression and struggled with empathy, music therapy provided an outlet and gave the adolescents the opportunity to be empathetic (Santos, 2019). Youth with anxiety and phobias have also found music therapy to be valuable. After participating in group improvisation, lyric analysis, singing songs, and "instrumental role playing," the participants

considered the music therapy "quite valuable" (Preyde et al., 2015, p. 61). Success in communication and interactions, an improved mood, and reduced anxiety were reported.

Percussion

As previously stated, percussion is defined as "the beating or striking of a musical instrument" (Merriam-Webster, n.d.). According to Matney (2004), examples of interventions within the social interactions domain included sharing instruments with others, demonstrating "Group awareness and relatedness through group activities," and "through verbal processing of [the] activity" (pg. 58). Upon reviewing the literature related to percussion in music therapy, Matney (2004) stated that "interpersonal relatedness . . . pro-social behavior, and cohesion" among others, were concepts addressed by music therapists (p. 58). The researcher also found that emotional skills were addressed when clients were prompted to improvise or play their percussion instruments in ways that "represented their feelings" (Matney, 2004, p. 58). He classified the following results as emotional functions, "decreased agitation, change in mood and congruent memory, diversion from discomfort, decreased lethargy, decreased crying, and reduction in hostility," (p. 69). Additionally, Matney (2004) classified the exploration of factors such as self-esteem and confidence in the utilization of percussion instruments within the self-expression and self-awareness domain. Specific therapeutic techniques have also been identified within the literature. Matney (2004) Found 12 techniques, including those of "Improvisation, group drumming, role playing/metaphor, rhythmic imitation/matching, instruction/performance, accompaniment, structured rhythm activity, rhythm/speech, various rhythm tests, rhythmic grounding, miscellaneous, [and] integrity" (p. 63). Within his study, Matney (2004) concluded that the use of percussion instruments is effective in addressing various skills, including social and emotional skills, amongst diverse clientele.

Rhythm in Therapy

The concepts of the iso principle and entrainment were present in the literature. Matney (2004) highlighted that therapists have been known to facilitate an environment in which clients can "relate to each other" (p. 76). He suggested that understanding entrainment and the iso principle may aid in the understanding of clients relating to each other through rhythmic imitation and rhythmic matchmaking. Ideally, the therapist may meet the clients where they are rhythmically (entrainment) and therapeutically guide them from their current state (iso-principle) (Matney, 2004, p. 76). Within his instructional manual in his appendix, "Percussion Techniques in Music Therapy" the researcher stated, "The longer two people interact musically, the more musically 'in tune' they become with each other" (Matney, 2004, p. 173). Brainwave entrainment, as defined by Huang and Charyton (2008) is "the use of rhythmic stimuli with the intention of producing a frequency-following response of brainwaves to match the frequency of the stimuli" (p. 38). This is relative to musical entrainment, which is demonstrated when a music therapist uses music to match a person's current state of physical and/or emotional being. Once met, the notion of the iso principle is that the state can be gradually altered in effort to change and improve the person's state of being (Dimaio, 2010; Hense, Silverman, & McFerran, 2018). The iso principle is commonly utilized has been beneficial (Ghetti, 2011; Heiderscheit and Madson, 2015; Hense, Silverman, & McFerran, 2018). Some researchers have had clients create playlists of songs, listing the songs in a specific order to help induce a specific mood (Heiderscheit & Madson, 2015; Hense et al., 2018). The results of these studies proved the idea of the iso principle as beneficial in increasing social skills, managing bipolar disorder, psychotic disorders, and behavioral and emotional disorders including depression. Baker and Mackinlay (2006) offered new mothers minor training related to the idea of the iso principle in a study that

sought to analyze how singing lullabies to babies may help them sleep. The mothers were expected to sing lullabies in a manner that met their baby's current emotional states. The mothers were to observe their baby's responses and when they come to notice that the baby recognized the shared emotional response, they were to gradually alter the way the lullabies were sung in an effort to "encourage her baby to change with her and stay connected on an emotional level" (Baker & Mackinlay, 2006, p. 251). For example, if the baby was in distress, the mother was encouraged to begin singing the lullaby at a faster and louder pace, and gradually become slower, softer, and gentler, to induce a calmer emotional state. At the conclusion of the study, the mothers stated that their babies became calm, and relaxed. Essentially, meeting someone where they are, and then gradually altering their state of being has therapeutic implications.

Another study analyzed how tempo may affect arousal, mood, and spatial abilities (Husain, Schellenberg, &Thompson, 2002). Four different groups of participants listened to a Mozart piece in either a fast tempo and major mode, a slow tempo and major mode, a fast tempo and minor mode, or a slow tempo and minor mode. Researchers found that participants who listened to music with faster tempos demonstrated increased arousal and vice versa after listening to the piece in a slower tempo. Researchers also found the tempo of the piece did not have an effect on the participants' mood. Listening to the piece in major improved mood, while listening to the piece in minor either decreased mood, or mood remained constant. Lastly, after listening the piece, participants executed a spatial abilities test; the researchers observed that those who listened to the faster piece in a major key performed significantly better on the spatial abilities test than those who listened to the piece at a slower tempo ($p < .001$). Additionally, those who listened to the faster piece in a minor mode also performed better than those who listened to the piece at a slower tempo in the minor mode ($p < .001$). There were also statistically significant

results as it related to arousal. The participants who listened to the piece in the faster tempo demonstrated an increase in arousal ($p < .001$). Furthermore, the results illustrated significance between tempo and mode ($p < .01$). Although it was significant in both modes, the faster tempo was more effective in a major key, as compared to listening to the same piece in minor. Notably, the researchers found that tempo did not have an effect on mood, but the mode of the music did. In summary, listening to music affects arousal and mood, which mediates cognitive performance (Husain et al., 2002).

The concept of entrainment was also relevant in treatment strategies specifically involving rhythm. Various researchers have sought to understand why rhythmic entrainment works. Researchers have demonstrated that neural tracking occurs when a person hears rhythmic patterns (Tierney & Kraus, 2015). Tierney and Kraus found that neural tracking in the brain was present as students listened to music along with on-beat and off-beat stimuli. In their 2013 study, LaGasse and Hardy (2013) found that anticipatory rhythmic cues and other rhythmic strategies based on entrainment were effective in motor planning for children with ASD. Further, after their client's second 6-month treatment period, their motor goals became more complex, and the client demonstrated improved behavior in school. LaGasse and Hardy (2013) highlight that some motor planning, initiation, and inhibition difficulties may look like noncompliance behaviors, but appropriate cues may help organize the motor planning necessary to control these behaviors (LaGasse & Hardy, 2013). Lastly, LaGasse and Hardy (2013) concluded that applying rhythm therapeutically may help people with ASD, who have sensorimotor needs, gain control of their motor system. These results may be important in that, if neural tracking occurs in the brain when hearing rhythmic patterns, our brains may be able to prepare the body for motor planning and

carrying out motor abilities, thus controlling our bodily responses. This may bring control over impulsive behaviors, which may improve behavior in those with behavioral needs.

Rhythm Specific Strategies

Entrainment is related to synchronization, which was also a common term that highlighted in the literature (Matney, 2004; Park & Choi, 2017). Park and Choi (2017) utilized Interactive Metronome (IM) training with two children with ADHD. The children listened to a reference tone and performed hand and foot exercises synchronously to the tone. Results demonstrated that interactive metronome training was effective in improving the children's attention, timing, and processing speed. One child also demonstrated improvement in working memory, while the other did not. Following the intervention, the children's teachers also observed an increase in the children's participation and attention span in class. Similar results occurred with Shaffer et al., (2001) using Interactive Metronome training. The study began with 56 boys, ages 6-12.5 years old. One participant was removed from the study during treatment. The boys were divided into three groups, a control group, a group who received video gaming treatment, and the Interactive Metronome group. Statistically significant improvements occurred in reading, language processing, and attention in boys with ADHD who participated in Interactive Metronome training ($p \leq .0001$) and the video game group ($p \leq .0058$) (Shaffer et al., 2001). However, the boys in the Interactive Metronome training group surpassed the video game group in performance. This demonstrated that Interactive Metronome training was more effective than each other group. Likewise, Leisman et al. (2013) found Synchronized Metronome Training (SMT) effective in reducing ADD and ADHD behaviors in children with ADD and ADHD. After participating in SMT three times per week for 12 weeks, 81% percent of the 122 participants no longer demonstrated ADD/ADHD behaviors according to the Brown Attention

Deficit Disorder Scale (Leisman et al., 2013). Contraindicative to Park and Choi (2017), Shaffter (2001), and Leisman(2013), Roberds (2005) concluded that the use of Interactive Metronome training was not effective in reduction of ADHD symptoms.

In another study, the researcher sought to understand whether playing simply a steady beat at 66 bpm could reduce one's anxiety as compared to listening to nothing (Gadberry, 2011). The study safely induced anxiety in participants, and then had the participants rest either in silence or to a steady beat. The control group sat in silence while the experimental group listened to the steady beat. In the end, the experimental group reported a lower perceived level of anxiety than the control group. The results demonstrated that a steady beat can reduce anxiety and could potentially be used as a self-regulation method in times of stress. Relatively, Husain et al. (2002) stated that tempo affects arousal. Specifically, faster tempos increased arousal, and slower tempos decreased arousal. Husain et al. (2002) also noted that tempo did not specifically affect mood.

While exploring tempo-specific rhythmic interventions with children with Autism Spectrum Disorder, Berger (2012) found that pulse-centered interventions were the most effective in entrainment. These interventions included clapping and drumming. During hand clapping interventions, the children demonstrated "central visual focus, attention to task, and visual attention to therapist . . ." (Berger, 2012, p. 11). With drumming, the children demonstrated the same skills with the addition of "calm execution" and "relaxed" responses. One researcher sought to analyze the sustained effects of rhythmic entrainment. The researchers noted that it was unknown whether the effects of entrainment "persist for some time after the [rhythmic] input is removed" (Trapp et al., 2020, p. 82). Participants viewed images of faces and were instructed to categorize the facial expressions on the faces given three trials. During the

first and third trials, there were no rhythms provided to the participants. During the second trial, the control group was provided a rhythmic beat that was not in alignment to when the faces appeared on their screen, while the experimental group was provided a rhythmic beat that was synchronous to the faces. The researchers found that the experimental group took a shorter amount of time to categorize the faces and they were more accurate than the control group. This was specified by the mean, wherein the control group performed at 93.4% accuracy, while the experimental group performed at 96.4% accuracy. Additionally, the median performance of the control group was 95.3% accurate, while the median of the experimental group was 97% accurate. The researchers also found that while both groups demonstrated a reduction in reaction time between the first and second trials, the effect of the experimental group was sustained between the second and third trials, as opposed to the group with non-synchronous beats. As compared to baseline data, the experimental group performed significantly better during the third trial ($p < .001$), while the control group performed insignificantly better in the third trial ($p = .10$). However, the difference in performance between the groups was "inconclusive" between the trials ($p = .30$) (Trapp et al., 2020, p. 85). Nevertheless, the results proved "rhythms affect our performance beyond their physical presence" (Trapp et al., 2020, pg. 86).

Other studies have yielded similar results from the use of percussion and tempo-based interventions in therapy (Currie, 2012; Lowry et al, 2018; Rensburg et al., 2016; Shaffer et al., 2001). For example, aggressive behaviors may be reduced after group drumming interventions in girls with conduct disorder. Currie (2012) found the "Doing Anger Differently" percussion-based program yielded statistically significant results that demonstrated a decrease in aggressive behavior six months after treatment in children with a history of aggression. Similarly, Koyama et al. (2009) found that recreational music-making through group drumming enhanced mood in

older adults from Japan. The participants performed various drumming exercises, including "entrainment building," that led to improvements in mood. Lowry et al. (2018) also observed that students with emotional difficulties benefitted from group drumming. After participating in two, weekly thirty-minute drum lessons for five weeks, teachers of children with emotional and behavioral disorders observed less hyperactivity, and improvements in prosocial behaviors, communication skills, confidence, delayed gratification, and attention skills (Lowry et al., 2018). Ross (2016) conducted 30-minute sessions once a week with children with emotional and behavioral disorders including bipolar disorder, pervasive developmental disorder oppositional defiant disorder, anxiety disorder and attention deficit disorder. Ross (2016) utilized the therapeutic arc idea, wherein the sessions began with a warm-up, an activity wherein students practiced "communication and social skills," and a cool down (p. 102). One of her rhythm-specific activity examples included having the students perform movements to the pulse of a drum. In the beginning of her cool down, she had students imitate body percussion movements. Ross (2016) explained that the cool down was intended to have a calming effect on the students. For example, during part of the cool down, the students counted to 10 at a slow tempo. The students' teacher and classroom paraprofessionals noted that the children did not require as much redirection during the transition time following the sessions, inappropriate behaviors occurred less frequently during the sessions, and that the students demonstrated positive engagement in their educational settings. Some of these behaviors included reduction in inappropriate verbiage use, interruptions, impulsivity, aggression, and inattention. Ross (2016) further suggested that if these positive behaviors were observed directly following the session, then they may become more prevalent for longer periods of time following participation rhythm-based strategies.

CHAPTER III: METHOD

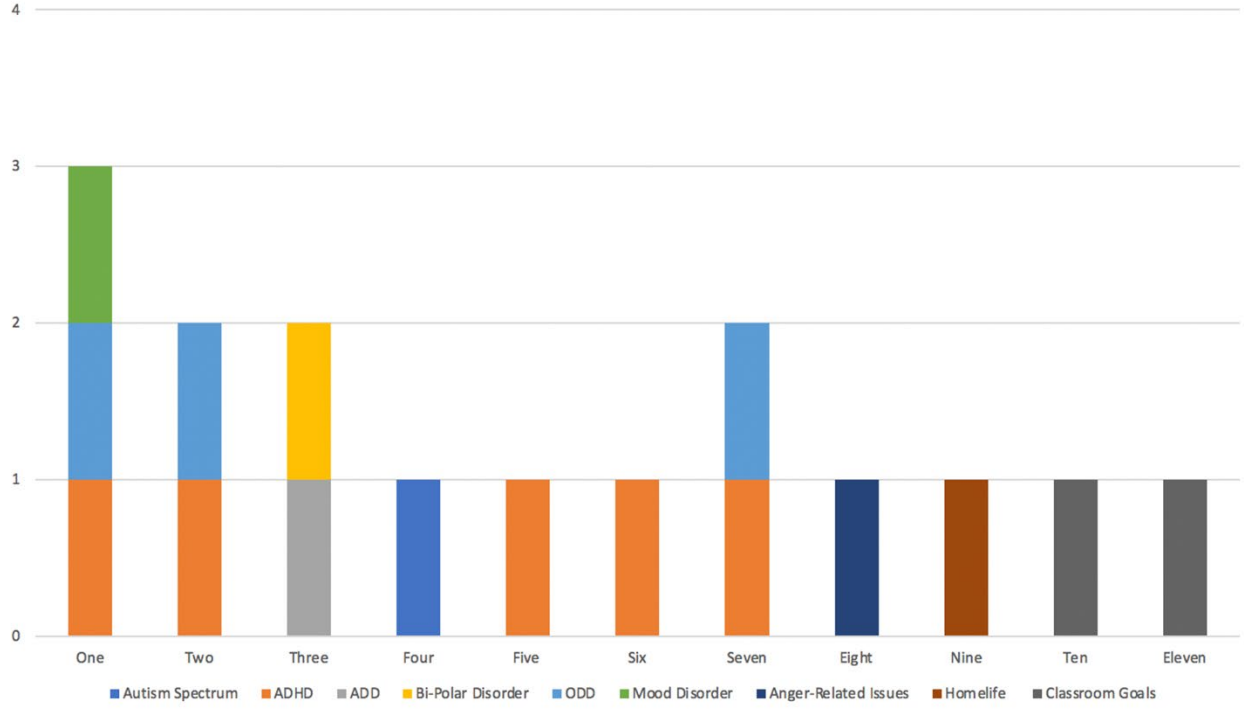
Setting and Participants

Participants were recruited at an after-school and summer program located in the midwest United States. The program was associated with a local housing authority. At the time, the researcher was working as a staff member for the program. Some students who were enrolled in the program had economical disadvantages. These students were not explicitly sought after. To reduce risk and undue influence, all parents and students who were approached were informed that their participation in the study was voluntary and that they may cease participation within the study at any time. The researcher coordinated with the director of the program times wherein she would meet with guardians of students eligible for participation in the study. Participants were required to be eight years of age or older, and demonstrate emotional or behavioral needs, be working towards emotional or behavioral goals, or diagnosed with an emotional or behavioral exceptionality. These students were referred to the researcher by the director of the program, resulting in the participants being a sample of convenience. The researcher informed the guardians of the nature of the study before they were asked to sign informed consent forms approved by the Institutional Review Board (IRB) of a midwestern university. Students also completed an assent form, approved by the same IRB, if they were interested in participating. Within this sample of convenience, 13 consent forms were signed and returned to the researcher. Upon obtaining further details regarding students' dates of birth, two of the twelve students were disqualified from participation within the study, as they were younger than eight years old. The researcher never gave these students an assent form, and neither began participation within the study. This resulted in 11 student participants at the beginning of the study.

Of these 11 student participants, four were boys, and seven were girls. Five of them were African American, three were bi-racial, and three were Caucasian. The participants ages ranged from 8-11. At the time of the study, seven of the student participants had been diagnosed with at least one or more emotional or behavioral exceptionalities. These included an unspecified mood disorder (n = 1), Attention-Deficit/Hyper-Activity Disorder (*n* = 5), Oppositional Defiant Disorder (n = 3), Bi-Polar Disorder (n = 1), Attention Deficit Disorder (n = 1), and one was reported to be to on the Autism Spectrum but had not specifically been diagnosed according to the director of the program (n = 1). The four other student participants demonstrated emotional and behavioral needs, including having issues related to anger (n = 1), homelife/familial issues that resulted in emotional and/or behavioral needs (n = 1), and working towards emotional and behavioral goals within their classroom (n = 2). Data regarding these students may be found in Figure 1.

Figure 1

Prevalence of Exceptionalities Among Participants



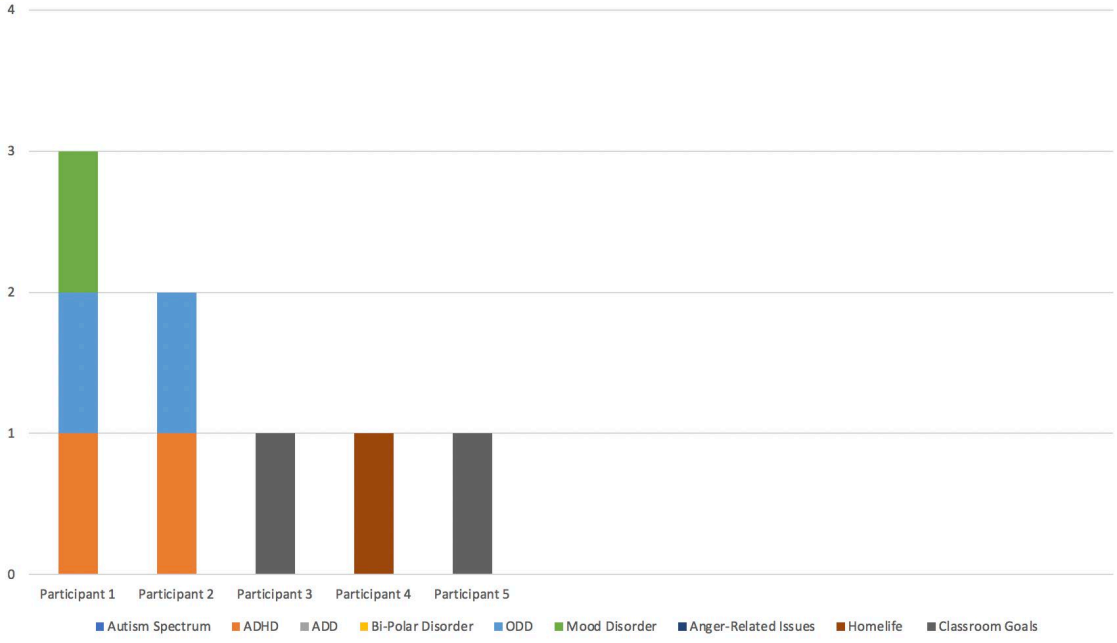
Additionally, staff members who disclosed information regarding students were also considered participants. They were informed of the general and voluntary nature of the study and completed consent forms approved by the midwestern university's IRB. Six consent forms were returned from program staff participants. Including the staff members, the total number of participants was seventeen, with some being staff members (n = 6), and others being student participants (n = 11).

Attrition

By the end of the study, six student participants had stopped coming to the music therapy sessions. One participant's reasoning was that he did not like the loud noise happening within the sessions. Other students had been absent from the program for multiple days and did not return to the sessions following their absences, and others stopped attending for reasons undisclosed. This resulted in the researcher having five consistent students with behaviors to track. Data regarding these students may be found in Figure 2.

Figure 2

Prevalence of Exceptionalities Among Remaining Participants



All data was collected at the site of the program. Three of the music therapy sessions were held in site's "Zen Room," which was a room wherein students could go to take a break, calm down, meet with the program assistant, or read independently. This room was filled with pillows, books, special chairs, and more, to meet the needs of the students. The fourth session was held in the center's Kindergarten classroom, when the Zen Room could not be accessed by the researcher. Lastly, the interview portion was held in a secluded room within the site's Teen Center.

Measures

Originally, this study adopted an unpublished instrument in order to conduct the study. A "Point Sheet Record" (PSR) was obtained from a high school educator who led a student support inclusion program. The educator's pupils were students diagnosed with emotional and behavioral exceptionalities. The researcher made the educator an anonymous source to protect the identity of their students. Permission was obtained from the educator to utilize their formatting and some original goals, and to meet the needs of the participants in the current study (Anonymous, 2022). An example of the PSR can be found in Appendix A. The researcher adapted the PSR to meet the needs of the students in this study, by incorporating specific goals deemed relevant to the student participants, removing "periods," as the students did not have eight, but rather three trials, and transferring the comments section under specific days (Appendix B). The trials were divided upon completing each day by three columns by the staff member participants. Specifically, the researcher utilized social and behavioral goals in which staff member participants and the director of the program felt were relevant in data collection based on their students' needs. These social and behavioral goals, and their definitions, included:

1. Cooperation with others: Students will cooperate with others by working towards a common goal with others.
2. Remains on task: Students will remain on task by participating in tasks as instructed through the duration of the task.
3. Refrains from interrupting others: Students will refrain from interrupting others during tasks, and class discussions.
4. Pro-social interactions: Students will demonstrate pro-social interactions with others by displaying behaviors that benefit one or more other people (American Psychological Association, n.d.).
5. Remains with the group: Students will remain with the group for the duration of the session, without needing to be redirected to another location, classroom, director's office, or "think seat."

The goals including *remains on task, refrains from interrupting,* and *remains with the group* were goals utilized by the anonymous educator (2022). These were still goals that the students in the current study were expected to exhibit. The researcher created and implemented the other two goals. The researcher later adapted the phrasing of the educator's "refrains from interrupting" goal, as is explained within the next section of the text.

Research Design and Data Procedure

The study lasted for a period of six days. There were two settings in which behavioral data was collected utilizing the PSR. The first setting included within the student participants' classrooms, by the staff member participants or the researcher, if the researcher was present in the class at time of data collection. Secondly, the researcher also collected behavioral data utilizing the PSR within the music therapy sessions.

The study lasted for a period of six, consecutive weekdays. There were two days in which baseline data could be collected within the classroom, by the staff member participants. This data was collected during 30-minute trials in which academics, or activities in which the target behaviors were expected of the students, took place within their respective classrooms. The staff members notated whether or not the students performed the target behaviors in the PSR per 30-minute trial, within their three columns. The number of trials given differed per classroom, based on how academics were facilitated within the classroom. For example, academics were held for a period of three 30-minute trials in the 3rd-4th grade classroom, resulting in three trials of data collected for students in that room. Academics were held for a period of two 30-minute trials in the 5th-6th grade classroom, resulting in two trials of data collected for the student in that room.

The music therapy treatment sessions, utilizing percussion and rhythm-based interventions, was implemented over the next four consecutive days. The music therapy sessions lasted for about 30-minutes per day and were not held during designated academic times. There was only one 30-minute trial in which student behavior was collected during the music therapy sessions. Following treatment, the researcher transferred data from the PSR to Microsoft Excel for analysis. Lastly, there was a 30-minute interview with the student participants on the sixth day of the study. Staff member participants were also invited to partake in the interview to discuss their observations of the students. However, the staff were not available during the interview due to lunch breaks and their involvement with the other students in their classrooms. Questions that were to be asked during the interview can be found in Appendix D.

Within the original methodology, the researcher sought to analyze how students met the five target behaviors in their classrooms as compared to how they met the target behaviors within the music therapy sessions over the four consecutive treatment period days. However, there were

many limitations within the original method. These limitations may have affected the validity and reliability of the results, therefore, drawing insignificant conclusions. As a result, the researcher adopted a qualitative design in analyzing the data through case studies (Cresswell, 2014). The researcher created separate case studies per participant. However, some quantitative data is listed to support the qualitative data. The qualitative data, or the case studies, provide a thorough descriptive analysis of each student throughout their time within the music therapy sessions, while still offering numeric data to support the analysis. In developing the case studies for each individual participant, the researcher observed student behavior, and analyzed each individual student in the video and audio recordings of each music therapy session. The researcher counted the number of times specific behaviors occurred in order to inform the qualitative data. Additionally, the researcher held a group interview with each student. However, their responses to each question were listed within their individual case studies. The researcher created a case study for each participant, noting their interactions with each other, affect, engagement with the researcher, and behaviors throughout the session. The same five social and behavioral goals were considered in the analysis. However, some changes in phrasing were made for more specific data analysis by the researcher (Appendix E).

Music Therapy Sessions

Session 1

1. Call and Response – Participants were prompted to repeat call and response phrases after the researcher on their djembes. They also took turns leading call and response phrases.
2. Concentration – A game category was chosen. The group maintained a steady beat by patting their legs twice and clapping their hands twice. Each student was given the opportunity to name a noun that was part of the original chosen category.

3. Group combo – Participants were given various miscellaneous instruments, including a tone chime, tone block, drumsticks, a guiro, and a den-den daiko. The researcher prompted the participants to begin and stop playing their instruments while adhering to dynamics as she raised and lowered her hands, which signaled the students to play louder or softer, respectively.

Session 2

1. Introduction – The researcher began a metronome at about 90 BPM. The researcher prompted students to entrain to the metronome. The researcher then stated the chant, "1 2 3 4, we're all going to drum some more." The students began tapping their hand drums and practiced stopping as the researcher counted down.
2. Pass the rhythm – After repeating the chant in the introduction, the researcher stated a participant's name and said, "Show us how to tap our drum." The participants then performed call and response phrases while tapping their hand drums.
3. Rhythmic phrases – Using rhythm sticks, the researcher taught a rhythmic phrase by rote, accompanied with syllables. The phrase involved tapping the floor with their rhythm sticks in a specific rhythmic pattern. A metronome was utilized to maintain a steady beat at about 70 BPM.
4. Closing – The students created a "rainstorm" by first rubbing the head of their hand drums, tapping gently with their fingers, and then striking the drum at an increasing speed before being instructed to stop. Then, they were instructed to close their eyes, listen and follow the researcher as they tapped their hand drums at a decreasing speed until they stopped tapping.

Session 3

1. Introduction – The researcher prompted the participants to play a steady beat as led by one of their peers. They then practiced call and response phrases on their hand drums.

2. Drum About it – Researcher and students repeated the chant “It’s music time, so it’s time to play. Show us how you feel today.” Participants took turns demonstrating their feelings on a hand drum. Other participants then guessed their emotion and guessed why they felt that way.
3. Rhythmic phrases – Using rhythm sticks, the researcher reviewed the rhythmic phrase learned in the previous session, accompanied with syllables. A metronome was utilized to maintain a steady beat at about 70 BPM. A second phrase was also taught.
4. Body percussion – The participants improvised body percussion phrases while verbalizing the movement (i.e., pat, clap, stomp).
5. Stick Improvisations – The participants and the researcher took turns improvising and repeating call and response phrases using rhythm sticks while standing.
6. Closing – The researcher and participants sat down. The researcher repeated the chant, “Listen closely to me, dear. This is what I want to hear.” The researcher improvised rhythmic phrases, gradually slowing down to bring the session to a close. The phrases included clapping and patting the legs.

Session 4

1. Introduction - The students created a “rainstorm” by first rubbing the head of their hand drums, tapping gently with their fingers, and then striking the drum at an increasing speed before being instructed to stop by the researcher counting down.
2. Drum About it – Researcher and students repeated the chant “It’s music time, so it’s time to play. Show us how you feel today.” Participants took turns demonstrating their feelings on a hand drum. Other participants then guessed their emotion and guessed why they felt that way.
3. Build it in – This was a group combo intervention. Instruments utilized within this intervention included egg shakers, castanets, a guiro, rhythm sticks, and other small miscellaneous percussion instruments. The researcher stated the chant, “This one is called, build it in. Now play this rhythm, my friend.” The researcher then improvised a repetitive

rhythm, and the students played the rhythm with their respective instruments. A metronome was utilized to provide a consistent beat, at about 75 BPM.

4. Body Percussion – The researcher and the students took turns improvising body percussion phrases. Before improvising, they repeated the chant, “Listen closely to me, dear. This is what I want to hear.” Everyone stated the chant together. The word “I” was replaced with the participant’s name who would be performing the next improvisation.
5. Collaborative drumming – The researcher began the intervention by using rhythm sticks. A rhythmic phrase was improvised, coupled with syllables to describe the phrase. When sticks became challenging, the researcher adapted by using drums instead. They sat in a circle, with their drums in front of them. For example, they tapped their drum and the peer to their right and said, “Drum, drum, friend, friend.”
6. Closing – The researcher repeated the chant, “Listen closely to me, dear. This is what I want to hear.” The researcher improvised rhythmic phrases on the hand drum while slowing the tempo and playing softer until the end of the session.

CHAPTER IV: RESULTS

Data Analysis

Some students rescinded participation within the study throughout the study. Due to this attrition, data was analyzed for participants who were present in at least two music therapy sessions, as well as the final interview. This resulted in data, specifically the music therapy session videos, being analyzed for five participants in total. Each participant's behavioral data was individually analyzed into five respective case studies. In analyzing this data, the researcher sought to understand the essential question, "What is the effect of percussion-based interventions on the behavioral skills of children with emotional and behavioral goals?"

Participant 1

At the time of the study, Participant 1 was an eight-year-old bi-racial female in the 2nd-3rd grade classroom. She had been diagnosed with ADHD, ODD, and a mood disorder. Due to reasons unknown by the researcher, Participant 1 was absent from the first music therapy session. However, she was present during the second music therapy session.

Session Two

Participant 1 entered the second music therapy session quietly. She observed her peers and listened patiently for instructions from the researcher. Before the session officially began, she had been laying on the floor, but she sat up when prompted. She volunteered to locate another student within the building and pouted slightly when the researcher chose someone else. While sitting, she began tapping her drum with her fingers, as prompted by the researcher. She glanced around the room and continued to watch her peers as she tapped. When prompted, she played her hand drum quietly. She was seemingly uninfluenced by her peers who played their

drums out of turn. She observed them but continued tapping as prompted by the researcher. She made eye contact with the researcher as the researcher gave instructions.

Participant 1 was open to her name being called first to lead her peers in tapping to the metronome during the first application. She seemingly became more comfortable during the first intervention. She smiled while listening to the researcher's countdown, anticipating striking her drum perfectly on the final beat. She repeated the phrase immediately after the researcher gave an example of the call and response, "Show us how to tap our drum." There was a time when she teased a peer and made a silly face at them while she attempted to retrieve an extra hand drum that the peer had. After the researcher removed the hand drum, before she could obtain it, she refocused. Participant 1 tapped her hand drum with others and repeated her peers' improvisational phrases. During the transition into the next intervention, Participant 1 informed a peer that the researcher instructed them to place their drums behind their backs. After she provided this prompt, the peer followed the instruction.

During the second intervention, she watched the researcher provide instructions and give syllables that accompanied the rhythmic phrases. She was intentional about learning and checked for her own understanding by asking, "Like this?" She was smiling and rubbing her sticks together when she glanced at Participant 2. She became excited upon trying a trick that he demonstrated. The trick was flipping a rhythm stick in the air during a rest within the rhythmic phrase, with a goal of catching it just in time to tap the stick on the ground on the next beat. She looked in the peer's direction and while smiling, exclaimed, "I actually got it!" During this activity, she glanced at another peer who had been playing out of turn. She briefly attended to the researcher but struggled to remain on task throughout the rest of the intervention. She closed her eyes as everyone else tapped their sticks, and gently tapped her sticks on another peer's body. In

return, the peer said back to her, “I’m not a drum.” She was seemingly antsy, as she inquired regarding if it was time for departure. During the transition, she retrieved her hand drum from behind her back just before being instructed but began rubbing the drum when directions were given. When an adjacent peer chose to leave, she retrieved their hand drum and got off task briefly. She then returned to the task as directed on her own.

Throughout the closing application, she followed the researcher’s instructions while laying on her stomach and tapping her drum. She closed her eyes, listening to the researcher as she tapped faster and then slower. After a few seconds, she opened her eyes before being prompted, but remained quiet as the session was brought to an end. When the researcher mentioned that there were only two more sessions left, she seemed upset about this and said, “I want to stay.” Following the session, she made small talk with the researcher, discussing the new grade level she was entering into that fall.

Overall, Participant 1 cooperated with others in three of the four interventions. She remained on task in two of the four interventions. She was present without interrupting others in three of the four interventions. She only interrupted someone else once during the session. She demonstrated pro-social interactions in four of the four interventions, with a total of eight pro-social interactions during the session. Lastly, she remained with the group during the entire session. This information can be found in Table 1.

Session Three

Participant 1 was physically and verbally active at the start of Session 3. She spoke with her peers as she moved about the floor and waited for the session to begin. She began tapping her drum before everyone else while holding on to a stuffed animal she found within the room. The researcher utilized Participant 1 as an example, for everyone else to match to her steady beat. She

smiled, seemingly proud as others entrained to her. During the introduction, she smiled as she participated, even when the rhythms she played were not perfect repetitions. She intentionally followed her peers' lead. She sat the toy she had obtained to the side. At one point, she became slightly distracted. She had picked up her hand drum and dropped it back on the floor. However, she attended back to session shortly after. She smiled as her peers lead. By this point, she had obtained her toy again, which hindered her from accurately repeating her peers for the remainder of the introduction. During the transition, she patiently tapped her hand drum with her fingers.

When the researcher began a metronome for the next intervention, "Drum About it," she immediately began tapping her hand drum. The researcher gave an example of how the participants could express their emotions on their hand drums. After her example, she asked the students to guess which emotion she demonstrated. Participant 1 was one of the first to guess and emphatically state "Happy!" She went on to think critically and explain that it was because the researcher struck the drum hard. Shortly after this, Participant 1 became distracted by other stuffed animals in the room. She went on to encourage another peer to play with a stuffed animal, by placing one of her own in the arms of another peer. She would then go on to tap her drum with her feet. She had become distracted with the animal so much so, she tossed it in the air when her name was called to "Drum About it." Nevertheless, when given a second turn to demonstrate her feelings, she played a fast, loud, improvised pattern. When one of her peers attempted to interpret her demonstration, Participant 1 interrupted the peer by stating that she was not happy but "excited!" Later, as a different peer was explaining their own emotions, Participant 1 interrupted them, and went on to discuss a situation that had made her sad in class, and another situation which kept her from getting enough sleep the night before. She then stood up and continued to play with the stuffed animal, even vocalizing once. When the researcher

asked her to sit down, she did so. However, she continued to have some vocal outbursts as others attempted to describe their own emotions. This resulted in Participant 1 demonstrating four interruptions during this one intervention. During the transition, she sat near a bean bag chair, just outside of the group. She was still energetic and continued playing with her stuffed animal.

Nevertheless, during the third intervention, she recalled the rhythm stick phrases from the previous day and was adamant about demonstrating it for the class. She played the phrase almost exactly as it had been taught the previous day. However, following this, she became off task, rubbing her sticks togethers and interrupted others' learning with various verbalizations and vocalizations. She stood up again and began walking around the room. The researcher gestured for her to sit down, but she either did not see or disregarded the gesture. As she stood, she told the researcher that she needed to use the restroom. She re-entered energetically a little over four minutes later, she jumped around to her spot and then placed a hoodie over her face, which briefly became a distraction for her. However, she volunteered to lead and improvise a body percussion phrase. After which, she attended to one other student, then retrieved the stuffed animal she was initially using and became distracted once more, wandering around the room. At this point, the researcher suggested that she, along with another participant, leave the session and re-join tomorrow, but Participant 1 wanted to stay. Her behavior changed following this. When another participant that she had been interacting with was removed from the group, she inquired about the remaining duration of the session. Nevertheless, she obtained rhythm sticks during the fifth intervention and listened to her peers, repeating after them, and even leading in the call and response. She advocated for herself when her phrase was not played correctly, stating "and also I added this."

During the closing intervention, she repeated after the researcher, slowing her tempo and saying the chant quietly. As the session came to a close, she expressed disappointment by verbalizing an elongated "No," and laying on the floor calmly until all her other peers exited the room. She then asked, "Do I have to go?" She was willing to help the researcher clean up after the session but needed to leave for her lunch period.

Overall, she exhibited high energy during the session, which negatively impacted her ability to meet the target behaviors, especially when compared to the previous session. She cooperated with others in three of the six interventions. She did not work towards meeting the common goal during the interventions with others, as she was often off task and could not cooperate with others. She remained on task in three of the six interventions. She was present without interrupting others in four of the six interventions. She interrupted others six times during the session. She demonstrated pro-social interactions in each of the six interventions. She demonstrated 6 pro-social interactions total. This is reflective in that she led her peers often and listened to her peers during some of the interventions. However, there were many instances in which she could have worked more pro-social interactions had she been on-task more frequently during this session. She also caused others to get off task, which may have affected their ability to demonstrate pro-social interactions. Lastly, she remained with the group during the entire session, but was almost removed from the group due to behavior, which improved toward the end of the session. This was the final session Participant 1 attended, as she was absent from the center on Day 4 of the study. This information may be found in Table 1.

Interview

Participant 1 was present and active in the final interview. She sat in her chair, listening to others talk. The interview began with the students expressing how they felt that day by

participating in the “Drum About It” intervention. They performed their chant, “It’s music time, so it’s time to play, show us how you feel today!” During this opening intervention, Participant 1 explained that she felt sad after expressing it on her hand drum. Her reasoning was similar to other participants who expressed the same emotion. She explained that she was sad because it was the last day. Following the opening activity, the first question participants were asked, “How did it feel to participate in the music therapy sessions?” In response to this question, Participant 1 raised her hands up, signaling a “10/10.” She further explained that she got to know “new people and their names.” Next, the researcher asked, “How do you feel your connection with each other changed while we were doing music?” Participant 1 became antsy, she moved around in her chair, stood up, and whispered to one of her peers, but did not give an answer to the question. Following this, the next question posed was, “Do you feel your behavior changed at all while we made music together?” The researcher restated the question, and asked “How do you feel the music make you change how you acted?” When the researcher first asked the question, Participant 1 inquiring about how much time was left. She sat as her peers answered the question. She also stated, “No, I’m leaving.” However, she did not leave. After another participant discussed how music makes them feel more energetic, the researcher asked Participant 1 if she ever had an experience similar to that. Participant 1 insinuated that she had felt ashamed of a medical condition she was experiencing at the time and go into a fight with her sibling about it. The researcher asked, “And how do you feel like music helped you with that?” She answered by stating, “It made me feel much better.” At the end of the question, Participant 1 removed herself from the interview for an undisclosed reason.

Table 1

Participant 1's Target Behaviors

	Cooperated with others for entire intervention	On-task for entire intervention	Present without interrupting others for entire intervention	Demonstrated pro-social interactions within the intervention	Remained with the group for entire session
Session One (3 Interventions)					
Session Two (4 Interventions)	2	2	3	4	1
Session Three (6 Interventions)	3	3	4	6	1
Session Four (6 Interventions)					

Participant 2

At the time of the study, Participant 2 was an eight-year-old bi-racial male in the 4th-5th grade classroom. He had been diagnosed with ADHD and ODD. He attended all four music therapy sessions.

Session One

Just before the first session began, he entered the room seemingly in a good mood. He sat on the floor and focused on the different rhythms he could make by tapping the heads of two djembes that were nearby. The researcher asked for one of the larger drums he had, as she wanted to distribute the drum to an older student in the room. Participant 2 was adamant about keeping the larger drum, and he gave the researcher some resistance. Additionally, he stated, "Thanks for making fun of my size," talking to the researcher. He assumed the researcher removed the larger drum because he was shorter, and in-turn was making fun of his size. Nevertheless, when the researcher gave instructions to begin playing the drums, he sat down and began as prompted. There were numerous times when he continued to play his drum after the

researcher prompted the group to “freeze.” He required multiple prompts to remain on task as instructed.

He participated in the warmup while lying on his back, and holding his djembe on top of his body, often times being out of the view of the recording device. When he did participate, he had perfect rhythmic timing, as commented on by the researcher. Participant 2 struggled to refrain from playing his drum as instructions were given for the first intervention. However, as soon as he was called on to lead the group in call and response, and asked to sit upright, he did so. While he was eager to play and lead, he did not seem confident leading his first improvisation. He seemed unsure of when to stop playing his phrase, so others could repeat. He looked at the researcher bashfully, almost in disappointment and seemingly for approval or help. He sat back and watched the researcher explain that he had four counts to play the phrase. In anticipation, he tried again. As others repeated his phrase, he leaned back once more, out of the recording device’s view. Following this, he continued to play his drum out-of-turn while another one of his peer’s lead, resulting in his drum being confiscated by the researcher. While out of the view of the camera, he retrieved another instrument, continuing to play it to the point of his peer bringing it to the attention of the researcher. Shortly after this, the researcher returned his djembe to him, asking him to show her that he can use it appropriately. However, he continued to play out of turn. The researcher asked him if he needed to leave. He then became quiet and remained in the room.

During the second intervention, during the game of “concentration,” he gave the name of an animal during his turn, yet was distracted by the top of his djembe, which he had now turned into a hand drum. While he was generally quiet, he toyed with the two parts of his djembe-turned-hand drum throughout the intervention. In the completion of the second intervention, the

researcher asked for drum rolls from everyone. During the drum roll, he began yelling until the researcher asked everyone to freeze. He continued to play out of turn after the researcher asked him to stop. At this point, he was then asked to leave, kicking a pillow on his way out. During the final intervention, one student opened the door of the room, and Participant 2 was standing in the hall, outside of the door. Impulsively, when the researcher saw Participant 2, she asked if he wanted to rejoin the group. He rejoined, as he was interested in obtaining the rhythm sticks in last the couple of minutes during the final intervention. He followed instructions, playing his drum louder and softer, and stopping once the researcher prompted. He was enthralled by the drum sticks he had obtained by the researcher and went on to ask if he could keep them at the end of the session.

Overall, Participant 2 struggled to meet the target behaviors during the first session. He did not cooperate with others during either of the two interventions. He did not remain on task in either of the two interventions. He did not participate without interrupting others in either of the two interventions. He demonstrated a total of three interruptions during the two interventions. However, there were more instances in which he played out of turn but did not necessarily interrupt anyone. He demonstrated pro-social interactions in one of the two interventions. This resulted in a total of two pro-social interactions during his time within the session. However, he had the opportunity to demonstrate many more, specifically if he participated with others as opposed to participating as instructed solely when it was his turn. Lastly, he did not remain with the group for the duration of the intervention, as he was instructed to remove himself from the group once he became a significant distraction to his peers in the room and therefore missed the majority of the final intervention. This information may be found in Table 2.

Session Two

Participant 2 began the second music therapy session in an energetic mood. He verbalized and made silly faces at the recording device, which was visible in the room. He was seemingly antsy throughout the beginning of the session. He struggled to find an appropriate seat. At first, he sat too closely, and behind another peer. When asked to find another place to sit, he resisted, and then obtained a nearby bean bag chair and moved it to another place, albeit within the semi-circle with his peers. He resisted following instructions. For example, this happened when he was asked to remove his bean bag chair and give up the rhythm sticks that he had obtained at his own will.

Once the session officially commenced, and the participants were instructed to play their hand drums, it still took him a few seconds to begin. When he started to play, he tapped his drum a couple of times, and then struck it, noticeably harder than his peers. Once the group was prompted to stop playing, he continued. Nevertheless, the researcher used his continued playing to prompt him to match her metronome. By this point, his demeanor had changed, and he tapped to the metronome calmly. He had perfect timing and added dynamics as instructed by the researcher. There were moments in which he would play his drum without being instructed for lengthy periods of time. He played calmly when others played energetically. He anticipated a count down and struck his drum perfectly on the final beat. At one point, he retrieved multiple hand drums and situated them in front of himself, similar to a drum set. He tapped quietly as the researcher gave instructions, though he was still attentive. He performed responses perfectly in time with all three of his drums and did not demonstrate any resistance when his extra drums were removed by the researcher. Once it was his turn to lead, he gave his own intricate call for

his peers to repeat. He insisted his phrase be heard. He loudly repeated the end of his phrase, which his peers had not heard, as the researcher gave the next instructions.

Shortly after, He quietly attempted to direct the researcher's attention to another student who had obtained the same bean bag chair he previously had. The researcher did not see him attempting to get her attention. He then became withdrawn; he held his hand drum close to his body and only repeated the researcher's calls. He tapped his drum to his own beat and did not repeat the calls of his peers. When the researcher gave him another turn to lead a call and response, he tapped his drum once with a straight face, refusing to lead, evidently upset. After this, he followed the researcher's transition, and placed his drum behind his back, preparing to retrieve rhythm sticks for the subsequent intervention. Although he needed some additional prompting, he was most attentive during this intervention and lead and supported others by maintaining a steady beat, as prompted by the researcher. He easily learned the rhythmic phrase as instructed by the researcher. Once learned, he implemented a trick by tossing a stick in the air and catching it with one hand during a pause in the phrase. He presented a challenge for others to learn the trick, by stating "They're not going to be able to do what I do" as he demonstrated the phrase along with his trick. After learning the phrase in full and practicing his trick, he tapped during instructions, tapped his sticks on one of his peers' sticks and drifted on and off task toward the end of the intervention.

During the final intervention, he demonstrated a pro-social interaction by retrieving the keys that another staff member left in the room. After this, he retrieved a second hand drum and stacked it atop his first drum. Nevertheless, he then began rubbing his drum as instructed by the researcher. He created the rainstorm and stopped when prompted. He closed his eyes and participated in the cool down, listening to the researcher's instructions, and stopping perfectly in

time. At the end of the session, he stated that he wanted the rhythm sticks. However, when the researcher said he couldn't take them home, he calmly said, "See ya," to the researcher twice, ensuring his farewell was heard. He then stated something else to a peer before exiting the room while dancing and vocalizing.

Overall, Participant 2 cooperated with others during three of the four interventions. He remained on task in two of the four interventions. There were times when he seemingly always needed to do one more thing, such as play after the group was instructed to stop or retrieve an additional instrument. He was present without interrupting others in three of the four interventions. He commonly interrupted the researcher by playing the instruments he had while instructions were given, as opposed to interrupting his peers. This happened twice notably during the session. He demonstrated pro-social interactions in three of the four interventions, with a total of five pro-social interactions. Pro-social interactions included tapping drums with the rest of the peers during the opening and closing interventions While the researcher began recording numbers for the behaviors after instructions were given to officially begin the session. There were moments before the session when Participant 2 seemingly agitated another peer before the session officially commenced. Lastly, he remained with the group during the entire session. This information may be found in Table 2.

Session 3

Participant 2 was also present in music therapy session 3. However, during the first two interventions, the researcher's view of Participant 2 was limited due to the placement of the recording device and the location in which Participant 2 sat. Participant 2 entered the session with a somewhat high level of energy. He playfully teased another student who was not part of the study. However, he was easily redirected. He flicked off shoes, making himself more

comfortable, and tossed a deck of Post-it notes across the room, just as the session began. When the researcher began passing out hand drums, he kindly asked for rhythm sticks. He also did not complain when he did not receive the sticks. However, he became distracted by various objects throughout the first intervention. Some of those items included pillows that were already in the room, a deflated balloon that he brought in, and a bean bag chair. When his turn arrived, he improvised an elaborate rhythmic phrase on his hand drum for others to repeat. He repeated it multiple times so his peers could attempt to imitate it. He even clarified the confusing portion of it verbally so others could understand by saying, "You had to drum after you clapped." Due to him being out of the camera, his full participation within this activity could not be counted numerically.

Although out of view, he was quiet during the transition into the second intervention, "Drum About It." When the researcher began playing a metronome, he matched it with perfect timing, as positively reinforced by the researcher. He followed directions given by the researcher to sit appropriately and upright, as he had been leaning backwards. Shortly after this, he interrupted the researcher and distracted his peers by saying "Watch how big my cheeks are." Although he could not be seen, he was seemingly referring to how big his cheeks would become as blew into his balloon. He repeated the "Drum About It" chant loudly, yelling above the volume of his peers. When it was his turn to demonstrate how he felt, he asked, "Which one is mad?" He was seemingly attempting the researcher to demonstrate how feeling "mad" would sound when demonstrated on a hand drum. The researcher encouraged him to improvise the emotion. He then struck his drum in a steady pattern. He explained that he was mad because someone threw his water bottle over the fence on the playground. He went on to interpret another

peer's demonstration. However, he was disruptive, as he yelled during the chant, and he stood up and walked through the group circle while one peer was speaking.

At the beginning of the next intervention, he compromised with the researcher to obtain blue and green sticks, as opposed to two blue sticks, without resistance. Once retrieved, he tapped his sticks on an object, making additional unsolicited noise. A few seconds later, the researcher gave him a warning that he may need to leave the session if he can't participate. He then sat up and re-engaged. At one point he repeated part of the phrase alone for his peers, demonstrating leadership. When the researcher asked him to demonstrate his trick, he did so confidently, tossing his stick in the air and catching it with one hand, for his peers to see. The researcher taught him part two of the phrase. Once he learned it, he became quiet for a period of time, practicing his trick occasionally. He asked to get a drink and left the room during the next transition. He returned during the third intervention.

He was engaged during the body percussion intervention and repeated the body percussion phrases as they were given by the researcher. When it was his turn, he led a phrase verbally but did not perform body percussion movements. He then had a verbal outburst as a peer prepared to give her improvisation. Seconds later, he became off-task again while interacting with a peer. He received a warning but said he would remain with the group once he remembered that the next day would be their last day to make music. However, he continued to be disengaged, and moved about the room at his own will, and tapping sticks on a white board and hand drum. At this time, he was prompted to leave. He left without incident, missing the final two interventions.

Participant 2 was present during four of six interventions during session 3. He cooperated with others in one of the four interventions. He did not remain on task thoroughly throughout

either of the four interventions. He was present and did not interrupt others in one of the four interventions. He interrupted others six times in total. He demonstrated at least two pro-social interactions during his four interventions. However, due to him being out of the camera's view, this number could have been higher. Additionally, there were may have been opportunities for him to demonstrate more pro-social interactions had he remained with group during the entire session. Lastly, he did not remain with the group for the entire session. This information may be found in Table 2.

Session 4

Participant 2 was the last to enter Session 4. He walked in quietly while holding onto a squishy stress ball. He did not speak to anyone as he entered, but he closed the door when requested by the researcher. His body was just outside of the view of the camera when he sat on the floor, only the top of his head was visible. As the session started, he began striking his drum to the beat of the metronome. The researcher complimented his playing by saying, "Perfect timing . . ." During the creation of the rainstorm, he seemingly began rubbing his drum with everyone else, as his head moved in a circular motion. As the researcher prompted the participants to tap their hand drums with their fingertips, he began striking his drum slowly. The researcher encouraged him to continue so he could create the "thunder" part of the storm. It was only during the transition into the second intervention, "Drum About It," that the researcher observed him speaking for the first time during this session. He was asking about a chart that was placed on the wall of the Kindergarten room they were in.

After the researcher provided the first chant, he created a loud drum roll on his drum. It is unclear if his drum roll was in response to the "Drum About It" chant, or if it was an impulsive action. However, his head remained fixated in the direction of the researcher. He was seemingly

still engaged. The researcher then prompted the participants to entrain to a metronome so they could maintain a steady beat for their chant. However, Participant 2 continued to strike his drum in a drum roll fashion, even as the researcher snapped to the beat, pointed on each beat and used a syllable to highlight the beat. He eventually stopped playing his drum roll, tapped his drum to the beat, and guessed his peers' emotions throughout the intervention. He gave a strong, fast, drum roll and ended with a single tap during his demonstration. This was similar to how he played sporadically at the beginning of the intervention. He allowed his peers to guess how he felt. With a soft voice, Participant 2 then stated that he felt "Happy and mad." He went on to explain that he was mad because it would be their last day making music together. However, he was happy that he would be going swimming later that day. Following this, he contributed to a conversation surrounding a peers' emotions. The discussion was about a bird that some of the students had found deceased earlier that week. He asked a question regarding the bird, and added, "I think he's a phoenix." He followed the transition instructions.

He was the only student to remain calm and in his spot as the researcher introduced new instruments for the second, "Group Combo" intervention. He raised his hand calmly when he wanted a specific instrument. He sat patiently for his second instrument, while simply tossing his egg shaker up and down. He didn't comment on any other wants and/or needs, even when asked, until the researcher held up rhythm sticks. He took a couple of seconds and then silently nodded his head. He asked clarifying questions for instructions. He immediately followed directions and shook his egg shaker to the same pattern as the researcher. He shook his egg shaker quietly while he waited for next rhythm to be presented. He watched the researcher's movements and listened to her vocal syllables intently, shaking his egg shaker to match the rhythm and perform the movements in sync with the researcher.

As the researcher began the body percussion intervention, he quickly joined in, snapping with the researcher and stomping his feet on the floor in a seated position. He volunteered to improvise a phrase and was willing to repeat it multiple times so others could repeat it accurately. He quietly participated in the rest of the intervention. When asked if he wanted to lead again, he politely declined. At one point, Participant 4 had a obtained a puppet. As she attempted to guess the type of animal it was, Participant 2 spoke up and tried to guess for her, demonstrating an unprompted pro-social skill.

During the next intervention, which involved rhythm sticks, he led in matching the metronome for everyone. He was the researcher's partner, and helped the researcher demonstrate how to tap the sticks with a peer. When the researcher suggested the use of drums, he immediately retrieved his, without prompting. He was the first to lead with an improvisation, and he participated throughout the intervention. He perfectly repeated phrases and he was extremely focused. He transitioned directly into the final intervention; he repeated the rhythmic phrases as instructed by the researcher. Just as the researcher finished the closing comments, he stood up and exited the room quietly, without a word.

Overall, his behavior during this session was unlike any other session. He focused throughout the entire session and required little redirection. He cooperated with others in six of the six of the interventions. He remained on task in five of the six interventions, only becoming off task briefly. He was present without interrupting others in five of the six interventions, only interrupting a peer once during the session. He demonstrated pro-social interactions in six of the six of the interventions, with a total of nine pro-social interactions demonstrated. He calmly interacted with his peers multiple times throughout the session, responded to their direct

statements, and intentionally contributed to discussions. Lastly, for the first time, he remained with the group during the entire session. This information may be found in Table 2.

Interview

Participant 2 was present within the final interview. He entered the session, seemingly content, while tossing a football up and down. He excitedly informed the researcher that his birthday party was the next day. He continued discussing this with one of his peers. As they created their final rainstorm, he energetically struck his drum to create the thunder. During the last "Drum About It," intervention, expressed excitement because he would be going bowling and participating in a kickball tournament later that day. He also stated that he was mad because it was the last day. He had been active during the beginning of the interview. However, following this, he was fairly quiet throughout the interview. The first question asked by the interviewer was, "How did it feel to make music together?" In response, Participant 2 simply said, "Good." When the researcher asked Participant 1, "Why did it feel good?" he stated, "I don't know." One student mentioned that they had been upset before coming to the session, but their feelings changed once they arrived. The researcher asked Participant 2 what he thought about their response, if he ever felt like he was angry before coming to music and if he got to play it out. He stared at the researcher and looked around the room. The researcher then asked, "What felt good about [making music], what did you like?" He stated, "The drums. The rhythm sticks." He said it made him feel "good" to play them. The next question the researcher asked was, "How do you feel your connection with each other changed while we were doing music?" When the researcher asked Participant 1 the question directly, he stated, "I don't want to talk." Other students answered the question, as Participant 2 remained reserved. Nevertheless, the researcher asked the next question, "Do you feel your behavior changed at all, while we made

music together?" One participant asked her to re-state the question. In doing so, the researcher adapted and said, "How did the music change how you acted?" Some participants responded by detailing external events that had previously affected their mood, and how their emotional state changed when they came to the sessions. The researcher asked Participant 1 if he had an experience wherein the music made him feel differently. He simply shook his head, indicating "no." The next question posed to the group was, "What were things you noticed about yourself while we made music together?" The researcher prompted Participant 2 to speak. Participant 2 said, "Mmm. Nothing." The researcher said, "You didn't notice anything about yourself? You didn't notice that you have great rhythm, you . . . listened to others play, and you played too?" He then stated, "I did." Participant 4 encouraged him to talk, stating, "That he came in at the good time when we was playing with the drums . . ." In response to Participant 2, The researcher asked, "What else? What did you think about when we made music?" He said, "Mmm. Not really, nothing." Participant 1 did not explicitly state that he noticed anything about himself, unless he agreed with suggestion provided by the researcher. He seemed upset or disinterested. Although, when the researcher asked if he was having a good day, he said yes. Finally, the researcher asked, "What do you feel is important to speak about [as we discuss our experience in this study]?" The two students who remained in the interview highlighted aspects of the study that they did not like. When the researcher asked Participant 1 if there was anything he did not like, he said, "Mmm. Nothing." The researcher clarified, "You liked everything?" He only nodded, indicating, "Yes."

Table 2

Participant 2's Target Behaviors

	Cooperated with others for entire intervention	On-task for entire intervention	Present without interrupting others for entire intervention	Demonstrated pro-social interactions within the intervention	Remained with the group for entire session
Session One (2 Interventions)	0	0	0	1	0
Session Two (4 Interventions)	3	2	3	3	1
Session Three (6 Interventions)	1	0	1		0
Session Four (6 Interventions)	6	5	5	6	1

Note. Pro-social interactions are not included per intervention in Session 3, as Participant 2 did not remain in the view of the recording device. Therefore, his total pro-social interactions could not be accurately noted.

Participant 3

At the time of the study, Participant 3 was a nine-year-old, African American female. She was a student in the 4th-5th grade classroom. She had not been diagnosed with an emotional or behavioral exceptionality but was working on emotional and/or behavioral goals in her classroom.

Session One

Participant 3 began the first session seemingly a bit hesitant or nervous. She sat behind her djembe and glanced around the room as she watched the researcher and observed others. She experimented with her drum by tapping it, and then striking it a couple of times with her first. When instructions were given at the beginning of the session, she rubbed and tapped her drum, changing tempo as directed by the researcher. When the researcher asked everyone to maintain a slow tempo, Participant 3 followed along after other students and tapped faster and louder, seemingly ignoring the researcher's request. However, she stopped once the researcher prompted the group to stop playing. As they finished, she demonstrated interest in the intervention. She

stated, “Can we do that again?” She continued following directions throughout the first intervention. She played happily and smiled as she exerted energy while playing her drum.

As the researcher transitioned into the first intervention, she picked up her djembe and flipped it upside down, tapping her drum as the researcher provided instructions. but stopping when the researcher addressed playing out of turn. Upon the researcher looking for volunteers for the call and response intervention, Participant 3 volunteered, raising her hand and speaking eagerly, saying, “Let me do it! Let me do it!” When the researcher called her by another student’s name, she advocated for herself to be called the correct name. During this intervention, she repeated after the researcher and remained on task most of the time. However, during moments when the researcher addressed other students directly, she shook an egg shaker rigorously out of turn. When the researcher and her peers played call and response phrases, she listened intently, making eye contact with others and repeated their phrases, often smiling. As one student gave their improvisation, Participant 3 demonstrated critical thinking and awareness of time. She said “It’s hard. He’s like doing five over the four,” implying that this peer’s phrase went over the allotted four counts, which made the phrase challenging. When it was her turn to improvise a phrase, she kept her eyes on the researcher while playing her drum timidly. She continued to watch the researcher as she listened to her peers repeat her phrase. While the researcher prepared to cue another student in to lead, Participant 3 yelled, “1 2 3, go!” Though no other student followed after her, she was seemingly attempting to imitate the researcher, but interrupted the researcher’s cue in doing so. The category, “animal” was chosen for next intervention. This category was not Participant 3’s first choice. Nevertheless, she went on to explain the rules of the intervention, which included patting the legs and not restating a noun

within the category that had already been mentioned. She participated throughout the intervention and said "Zebra" when it was her turn.

When she was given a hand chime for the next intervention, she began playing it immediately, and released a spontaneous high-pitched yell while the researcher gave further instructions. Participant 3 listened as the researcher demonstrated the sounds of various instruments. She commented on the sound of a guiro, stating, "It sounds like a frog!" She later asked the researcher, "Can we just . . . do a steady beat?" At one point, Participant 3 struggled to follow directions. She had accessed the researcher's device after having already been instructed to refrain from doing so. Nevertheless, during the last intervention, she smiled while she watched the researcher, as she and her peers played their instruments louder and softer. She sat quietly once the researcher counted down, bringing the session to an end.

Overall, Participant 3 was engaged, but energetic throughout the first session. She cooperated with others throughout all three of the interventions. She remained on task in two of the three of the interventions. She was present and refrained from interrupting others throughout two of the three of the interventions. She interrupted others twice during the session, which happened as the researcher provided instructions to the students. She demonstrated pro-social interactions in all three of the interventions, as she participated in each, made eye contact with others and repeated after them. She demonstrated a total of 4 pro-social interactions. Lastly, she remained with the group the entire session. This information may be found in Table 3.

Session Three

Participant 3 was absent from the second music therapy session. She had been participating in an off-site extra-curricular program. She rejoined the group during the third music therapy session. She entered the third session with a bright affect as she conversed with

her peers. She had retrieved teddy bears that were in the room but placed them aside as the researcher distributed hand drums. She handled her hand drum, toying with it before instructions began. She made eye contact with the researcher and smiled, seemingly awaiting what would come next. She immediately matched another peer's steady beat and followed rhythmic patterns, as prompted by the researcher. When asked if she wanted lead a call and response, she gestured toward the rhythm sticks. She didn't want to lead a call with the hand drums, but as the researcher began to choose another student, she emphasized wanting to lead. Instead of improvising with only her hand drum, she incorporated body percussion in her phrase. She was the first to engage in this creative expression during this session. However, after her turn, she became off task and played her hand drum while another student led their call. Shortly after this, she re-engaged with her peers, attempting to repeat after them, while smiling, making eye contact, and responding verbally.

During the second intervention, "Drum About It," she rested on her knees and leaned forward while engaging in eye contact and listening intently. She raised her hand and closed it when the researcher said stop, signaling to others when to stop as well. While she did not interrupt anyone, she wanted to be the first to guess one of her peer's emotions. She then yelled in attempt to guess their emotion, which caused another peer to tell her to quiet down. She smiled as she guessed how others felt throughout the intervention. During this intervention, one of her peers tossed a toy to her. She then retrieved another toy, which was in arms reach, and kept it in her hands as she continued participating in the intervention. When it was her turn, she improvised a rhythm, and smiled explaining she was happy because her class would be taking a field trip later that day.

As the researcher began distributing rhythm sticks for the third intervention, Participant 3 began to have vocal outbursts. She interrupted the researcher, yelling, “Sticks! Sticks! I’m a cheerleader bear! I want blue and red!” Following this, she put away the toy she had and said thank you as she held her rhythm sticks. She watched the researcher’s demonstrations of the rhythmic phrase and attempted to learn it. She also wanted to learn the toss and catch trick that her peers had been trying. However, after a few moments, she became off-task, tossing her sticks in the air tapping them on the floor as she pleased. She went to the restroom at the beginning of the next intervention and returned shortly after. She immediately engaged in the body percussion intervention. She made eye contact with the researcher and with her peers, as she repeated their call and response body percussion phrases.

During the fifth intervention, Participant 3 retrieved her rhythm sticks and played with them at her leisure before official directions were given. When one student silently improvised a rhythm, Participant 3 repeated it. She did this with multiple students, and she remained engaged as long as clear instructions were given. When the researcher looked for students to volunteer, she raised her hand and began to ask if she could go next, eagerly waiting to lead. She was patient and waited for her turn but asked why she always had to be the last to lead. The researcher reminded her that she led first during the initial intervention, but she lowered her tone, stating, “Nuh uh.” Nevertheless, when it was her turn, she led her peers in an improvised call and response.

She practiced the final chant aloud during the last intervention twice, seemingly for her own retention purposes. This was something she did more than once during the session. She repeated the researcher’s improvised rhythmic phrases and followed the dynamics cues, which facilitated a soft, calm ending to the session. Participant 3 then calmly exited the room first.

Overall, Participant 3 cooperated with others in each of the six interventions. Overall, she remained on task during four of the six interventions. She was present during and refrained from interrupting others in three of the six interventions. When she did interrupt someone, it was often in the form of a loud vocalization, as the researcher gave instructions. In total, she interrupted someone else three times during the session. She excelled in pro-social interactions. She demonstrated pro-social interactions in each of the six interventions. She demonstrated pro-social interactions a total of 11 times. Lastly, she remained with the group the entire session. This information may be found in Table 3.

Session Four

Participant 3 entered the fourth session quietly, with a book in hand. She was noticeably in a different state of being as compared to previous sessions. She immediately wandered to a desk chair in the room but left that specific chair when asked. She retrieved another stationary chair in the room. At this point, she hadn't responded verbally to the researcher's greeting and redirections thereafter. After asking to return a pencil to her classroom she commented on the researcher's visual schedule of the music therapy session, stating, "This is too much!" in a high pitched, kidlike manner. She went back and forth, seemingly taking displeasure in the number of interventions for the session. She then retrieved her book and began reading as the researcher provided introductive statements. Participant 3 was reluctant to participate in the session, as she did not leave the second chair when initially prompted and required multiple prompts to put her book away. She quarreled verbally with Participant 5, who sat next to her, twice within the first few minutes, and silently taunted her throughout the session.

At the beginning of the session, she began to create the rainstorm with others, making eye contact with the researcher as instructions were given. She smiled as she began creating the

thunder, by striking her drum loud and hard. As the researcher transitioned to the next intervention, she struck her drum loudly, interrupting the researcher but not causing anyone else to become off task. During the second intervention, she immediately recalled the chant and began tapping her hand drum and snapping to the beat of the metronome. She guessed her peers' emotions, making contact with them and often leading the chant to introduce their emotional demonstrations. When it was her turn, she dropped her shoulders, bent her torso and tapped her drum quietly with one finger. She allowed her friends to interpret her drumming and informed them that she was mad. She explained that it was because other students in her classroom had found a deceased bird on the playground. She became emotional surrounding this discussion. She asked if the bird had been buried and requested for it not to be buried. When the researcher asked where she wanted the bird to go, she stated, "To God" with a brightened affect. As her peer attempted to console her, stating, "He's already to God," she said "Don't say that . . ." along with something unintelligible. It was unclear why she responded to her peer in that way. She transitioned easily from the discussion and began participating again. However, she disengaged shortly after this and moved her chair back, becoming distracted by a zebra puppet in the room.

Participant 3 re-engaged as the researcher previewed new instruments for the next intervention. She discussed her preferences for instruments, eventually choosing an egg shaker and castanet. She played the rhythms, as led by the researcher. During a pause in the intervention, she interrupted the researcher twice, attempting to obtain a new instrument. She had multiple verbal outbursts and struggled with impulse control during this session. At one point, she stood up and walked to another part of the room but came back when prompted. She was seemingly antsy. However, she helped one of her peers by attempting to demonstrate a rhythm

that the peer struggled with. Additionally, she clicked her castanet and smiled as the researcher engaged directly with her.

She participated in the next body percussion intervention and volunteered when the researcher asked. However, she laid with her back on the floor, appearing disengaged. When it was her turn, she led an advanced rhythm while stomping her feet and clapping in a syncopated pattern. She volunteered to lead a second body percussion phrase. This time, she was leading the phrase for the puppet she had obtained, implying that it was the puppet's phrase. After another one of her peers improvised a phrase, she asked, "Are we done now?" She groaned when the researcher said, "Almost," and referenced the order of the interventions that was visible on a sheet.

Participant 3 was engaged with the rhythm sticks and her peers at the beginning of the next intervention. When the instructions became complicated with rhythm sticks, she spoke up for herself and said, "This is hard." Nevertheless, she succeeded when the group switched to improvising with hand drums, as they tapped their own and their peers' drums. She smiled as she repeated the phrases correctly, and stated, "That's great!" She had been waiting patiently as her peers led their improvisations. When she was ready, she quietly asked, "Can I go?" She watched the researcher throughout the final intervention and repeated after her, following rhythmic and dynamic cues.

At the end of the session, she interacted with a peer, inquiring about the peer's bracelet. She then collected the book she entered with and exited the room. Overall, Participant 3 cooperated with others in five of the six interventions. While she cooperated with others, there were multiple times when she and one peer in particular teased each other throughout the session. For example, when Participant 5 played her hand drum out of turn, Participant 3 grasped

the drum and they briefly made faces and taunted each other. She remained on task in four of the six interventions. She was only present in and refrained from interrupting someone else during one of the six interventions. She interrupted others seven times total in this session. Additionally, she made multiple verbal outbursts, that were not always interruptions. It seemed as though she struggled with impulse control throughout the session. Nevertheless, she participated in each intervention and demonstrated pro-social skills in each of the six of the interventions. She demonstrated pro-social skills a total of 13 times during the session. These pro-social skills were evident in the number of times she was willing to lead her peers, her providing additional demonstrations to her peers, collecting instruments for the researcher, and engaging in conversation with her peer at the end of the session. Lastly, she remained with the group the entire session. However, she did wander around the room twice, which affected her remaining on task score. This information may be found in Table 3.

Interview

Participant 3 was present in the final interview. She tapped and struck her drum briefly while creating the rainstorm. During the opening activity, Participant 3 also confirmed that she was sad because it was the last day together, but she was happy because she would also be going bowling. The first question asked in the interview was, “How did it feel to make music together?” In response to this question, Participant 3 said it made her feel good. She also stated that it made her feel happy to hear another participant explain that it was nice getting to know her. She inquired about whether they would have the opportunity to play music again when they came back. She also stated something unintelligible, about something being her favorite. The second question posed within the interview was, “How do you feel your connection with each other changed while we were doing music?” Participant 3 stated, “We all got to play music and

we had our own ideas." For further clarification, the researcher asked, ". . . do you feel like you were able to express yourself?" Participant 2 nodded her head, indicating "yes." She revealed that she enjoyed making music. More specifically, she identified the opening activity, "Drum about it" as her favorite. The third question the researcher asked was, "Do you feel your behavior changed at all, while we made music together?" Participant 3 asked the researcher to state the question again. In an attempt to adapt the question, the researcher asked, "How did the music make you change how you acted?" After one of her peers gave an example of the effect of the music on their behavior, Participant 3 provided her own example. She explained that when she comes to the program, she feels tired, and doesn't get sleep because her brother stays up all night. The research asked, "And how does that relate to us making music?" Participant 3 stated that the music made her feel energetic. She said ". . . When we like play the music with the drums – the drums are my favorite because we get to make loud noise and that's one of my favorite[s]. And it does wake me up . . ." Following this, Participant 3 then stated that she wanted to leave. She left the interview after answering this question for an undisclosed reason.

Table 3

Participant 3's Target Behaviors

	Cooperated with others for entire intervention	On-task for entire intervention	Present without interrupting others for entire intervention	Demonstrated pro-social interactions within the intervention	Remained with the group for entire session
Session One (3 Interventions)	3	2	2	3	1
Session Two (4 Interventions)					
Session Three (6 Interventions)	6	4	3	6	1
Session Four (6 Interventions)	5	4	1	6	1

Participant 4

At the time of the study, Participant 4 was a nine-year-old African American female in the 4th-5th grade classroom. She had not been diagnosed with a specific exceptionality. However, she had been working towards behavioral goals in her classroom and had been facing homelife challenges that affected her emotional and behavioral health.

Session One

She was vocal during the first music therapy session. She followed instructions immediately and jumped at the chance to respond to any prompts the researcher had. Participant 4 had been seated in the middle of the room, inside of the circle each other participant had formed. The researcher prompted her to join the circle. When she joined the rest of the group, she was out of the recording device's view. The researcher could not note any other visual behavioral data from this session, which could have included any silent behaviors. However, in watching and listening to the recording multiple times, the researcher gathered behavioral data primarily from what she could make of the audio of the video for Participant 4. Descriptions for the first session are primarily based on the researcher's direct comments to Participant 4.

Throughout the session, Participant 4 repeated after her peers during call and response interventions, often repeating their exact phrases, as the researcher acknowledged her by saying, "Exactly, Participant 4" once, and "Participant 4 had it!" She inquired about rhythm sticks multiple times. She also advocated for herself. When the researcher stated that it was another person's turn, she said, "No, it's my turn" in a calm, matter of fact manner. She went on to improvise her own phrase on her instrument, during the first intervention. She also advocated for others by informing the group on whose turn was next. During the second intervention, "Concentration," she participated, and called the name of an animal during her turn.

During the final group combo intervention, she demonstrated interest in the miscellaneous instruments the researcher had. She calmly asked if the researcher had another instrument similar to a chime in which another one of her peers had. Shortly after the researcher demonstrated how to play the instruments, one participant asked if they could all just play a steady beat. At this time, Participant 4 recalled a previous music teachers' definition of a beat. She stated, "The beat is the part that doesn't change. The beat is the part that stays the same." Shortly following this, Participant 4 decided to leave the session, just as the final intervention began. She informed the researcher that she would come back the next day. It is unclear why she decided to leave the first session. Participant 4 met many of the target behaviors during the two interventions in which she remained with the group. She cooperated with others in both interventions. She remained on task during both interventions. She was present without interrupting others in both interventions. She demonstrated pro-social interactions in both interventions. She demonstrated a total of 4 pro-social interactions. However, she left the session early, and did not meet the target behavior of remaining with the group for the duration of the session. This information may be found in Table 4.

Session Three

Participant 4 entered the third music therapy session just after the session began. She immediately went to sit in a special chair, slightly away from other peers, but when redirected by the researcher, she sat with the group. She watched her peers calmly and repeated after them. At one point, she proposed an activity suggestion, wherein, students repeat someone's 'call' and then add additional beats at the end. One peer chimed into clarify that it was a game they played previously, with another instructor. While they did not play the game Participant 4 suggested,

she went on to lead her peers with no hesitation, and even repeated her improvisation three times, to give others the opportunity to repeat after her.

During the transition into the "Drum About It" intervention, the researcher prompted the students to play a steady beat and informed them that everyone would get a chance to drum about what was on their mind. Participant 4 then asked, "So, can we do a drum roll?" When the researcher began playing a metronome, she immediately played along to it, without being prompted. As the researcher gave an example of demonstrating how you feel, Participant 4 interpreted the "happy" emotion by saying, "Cause we're all participating." She interpreted her peers' responses and discussed why she thought they felt the way they said they felt. Although she had been laying on the floor most of the intervention and was displaying a nonchalant, relaxed, comfortable persona, while fiddling with a toy, she was involved and seemed to care about her peers' emotions. She asked one peer why they were happy and inquired about the experiences they had. She sat up on her knees when it was her turn, striking her drum loudly with both hands. She smiled as her peers guessed her emotions. She stated that she was "Kind of happy and mad . . ." She smiled while explaining that the day before had been a bad day, but she may go swimming later on.

During the transition, she expressed wanting a blue rhythm stick. However, she was content when she did not receive it. She went on to smile at a peer, mentioning that the red stick she had received was the same color as their hair. It took her a few minutes to begin her participation in this activity. Although the researcher asked her to reposition herself, she had been laying on the floor, and only sat up when she realized she would need to be seated crisscrossed. However, when it was time for her to learn the rhythmic phrases, she participated fully. She asked questions for clarity and repeated the phrases along with the worded syllables.

When the researcher told her she learned quickly, she said, “That’s what somebody told me” at another location, proudly. After learning the phrase, she watched her peers play and gazed about the room. She became restless towards the end of the intervention and disengaged while playing with her sticks. Eventually, she reengaged before the intervention officially ended. However, it was evident that she was tired. She yawned and required multiple prompts before resting on her feet as instructed by the researcher.

At the beginning of the next intervention, Participant 4 repeated the researcher’s body percussion movements, and imitated the accompanying syllables with the same vocal inflection. However, just after the first example, she sat down in a sensory chair, but stated that she would still perform the movements. She performed the movements while sitting in the chair and repeating after the researcher. When the researcher prompted her to stand again, she did so, without hesitation. She raised her hand and her eyebrows as she eagerly volunteered to be the first to lead the body percussion call and response. However, when someone else was chosen, she patiently waited and raised her hand again to volunteer later. Before the next intervention, the researcher reminded the students that the next day would be their last day to make music. Participant 4’s mouth dropped, and she gasped. She stated, “I want to keep on doing it. I don’t want it to end. . . Why is it gonna end tomorrow?” In the next intervention involving rhythm sticks, one student improvised a rhythmic phrase. Participant 4 recognized the rhythm and said, “That kind of sounds like stomp, stomp, stomp, stomp clap!” She had recognized the rhythmic pattern that she heard in this improved phrase with rhythm sticks to be the same pattern she heard within the previous intervention with body percussion. She was the first to rub her sticks together during her improvisation, as opposed to simply tapping. Shortly after, she observed

another student with a stuffed animal. She then picked up a stuffed animal again and played the final improvisation with the toy in hand.

The researcher informed participants that the next intervention would be their last one for the day. She "Are you only here for the summer, are you gonna be here all the time? Are you gonna be here next summer?" She was partially distracted while sitting with the same stuffed animal. Nevertheless, she repeated the researcher's cool down improvisational phrases, and did not interrupt others. As the researcher ended the session, she stated, "I'm lucky I made it the whole way. I wish yesterday, I was here." Participant 4 made statements throughout the session that suggested she enjoyed being there. She seemingly liked to lead her peers, and she was musically inclined.

Overall, Participant 4 cooperated with others in all six interventions. She remained on task in five of the six interventions. However, throughout the session, she would gaze off, seemingly disengaged but still listening to her environment and responding to prompts. She was present without interrupting others in four of the six interventions. She only interrupted someone else a total of two times during the session. She demonstrated pro-social interactions in all six of the six interventions. She demonstrated a total of 12 pro-social interactions during the session. These interactions included her leading her peers, following her peers, and smiling at, and asking her peers clarifying questions regarding their states of being. Lastly, she remained with the group during the entire session. This information may be found in Table 4.

Session Four

Participant 4 walked into the fourth session jollily. In a matter-of fact way, and with a high-pitched voice, she stated, "Today's the last day!" She went on to attempt to gain the researcher's attention multiple times by asking, "On the last day, do we get a treat?" She

maintained her good mood, even after she realized the researcher did not hear her and was not responding. As the participants arranged their seating for the session, one of her peers accidentally knocked over her bottle of juice, and then apologized. Participant 4 made sincere eye contact and accepted the apology. She then sat quietly and fiddled with her hand drum, awaiting instructions before beginning the first intervention.

When the researcher prompted participants to begin rubbing their hand drums, she rubbed her drum with one hand, and rested the other on her chin. She then calmly stated, "It sounds like rain." Following her lead, the researcher said, "Exactly." The researcher said informed her that some people create rainstorms using their drums. She listened intently and glanced around the room at her peers. Smiling, she stated "lightning" as she struck her drum harder and faster. She was verbal and physically active throughout the intervention. She commented on different parts of the storm creation and demonstrated intense rain while rubbing her drum. Once the researcher began counting down to end the intervention, Participant 4 stopped creating the storm and waited quietly.

The researcher then provided the chant for the next intervention, "Drum About It." Participant 4 began smiling and tapping her drum to the beat as she recalled the chant from the previous day. She raised her hand to provide the first emotional improvisation. She smiled and struck her drum in an emphatic syncopated rhythm as if to respond happily that she would go first. Then, when it was her turn, she tapped the drum with both hands alternatively. She began at a mezzo piano volume and quickly softened to a piano. As her peers guess how she felt, she made eye contact with them, listening to their perceived interpretations. She explained that she felt sad because it was the "Last day of making music." Throughout the rest of the intervention, she was typically the first to guess her peers' feelings; she spoke before everyone else as she

guessed. She was seemingly excited to interpret their feelings. However, her excitement was disruptive, as she interrupted a peer, and attempted to answer for a peer when the researcher asked them to explain their emotions.

Participant 4 moved closer the researcher as new instruments were introduced at the beginning of the group combo intervention. She told the researcher which instruments she preferred and did not prefer. She was almost impatient, as she attempted to retrieve an instrument and said thank you, although the instrument was not being offered to her. Nevertheless, she experimented with the timbre of her tone chime and egg shaker before and as the researcher gave instructions. Throughout the intervention, she synchronized with the researcher and attempted to play the various rhythms as instructed on her instruments.

During the next intervention, Participant 4 engaged in the seated body percussion at first, stomping on the floor as prompted by the researcher. However, she later became distracted and gazed at decorations on the wall and did not participate in the next few movement phrases. She then asked to go to the restroom and returned a short period of time later. When she returned, she immediately re-engaged and began repeating the movements after the researcher. She led her peers through an improvised body percussion phrase. Then, after observing one of her peers, she obtained a small puppet. She went on to lead another improvised phrase, stating that that phrase was the one her puppet wanted to hear.

At the beginning of the rhythm sticks intervention, she smiled when prompted to tap her sticks with a friend. She was intrigued. She inquired about trying a different tapping pattern with the rhythm sticks. Upon transitioning to hand drums, she demonstrated leadership by practicing in front of others. If she performed a pattern incorrectly, she would replay the phrase in an attempt to master it. She took a longer amount of time to begin when she was prompted to lead

her own pattern. Nevertheless, she led. She was helpful to her peers. For example, when one peer gave a phrase and others struggled to repeat it, she gave an example to demonstrate to her peers. As the researcher began to transition to the final intervention, she asked "What about you?" She demonstrated care for the researcher, and seemingly wanted to be sure everyone had a turn.

During the final intervention with hand drums, she repeated the cool down phrases after the researcher, with one hand on her chin. She watched for any changes in the phrases, such as the use of the entire hand versus the use of fingers. She stated the chant when prompted and ended the final round while laying on her stomach. She displayed a calm demeanor by the end of the session. She rested her head on her hand drum just as the last intervention ended. Once the session was over, she returned her puppet to its place, gave a leftover hand drum back to the researcher, and exited the room calmly and quietly.

Overall, she was interactive throughout the session. While she was highly engaged, there were moments when she rested her head on her hand, but it was unclear if she was bored or simply comfortable. She cooperated with others in each of the six interventions. She remained on task in five out of six interventions, yet sometimes would end the intervention slightly early. She was present without interrupting others in four out of six interventions. She interrupted others four times during the session. She demonstrated pro-social interactions in each of the six interventions. She demonstrated pro-social interactions a total of 13 times during the session. Lastly, she remained with the group throughout the session. This information may be found in Table 4.

Interview

Participant 4 was present in the final interview. She participated in the rainstorm creation and was excited to strike her drum and imitate thunder. During the opening activity, "Drum

About It," she expressed sadness due to it being the last day, but happy because she would be going bowling later. The first interview question was, "How did it feel to make music together?" After her peers had given numeric ratings, Participant 4 stated, "All the numbers out of all the numbers." She also stated that it made her feel "Good" to hear that another one of her peers enjoyed getting to know her other peers. The next question the researcher asked was, "How do you feel your connection with each other changed while we were doing music?" Participant 4 did not answer the question during this open group discussion. However, in response to the discussion her peers were having, she wanted everyone to share the grade they were going into. Following this, the researcher asked, "How did the music make you change how you acted?" Participant 4 stated, "Good, but sometimes a little bad." She further went on to detail Day 1, when she voluntarily left the session early and stated that she would be back. It is unclear whether she felt leaving the session early made her feel bad, or if the music made her feel bad and she left the session because of this. Within the discussion of this question, Participant 4 went on to describe an external event that had affected her mood before the interview. She stated, , ". . . When we didn't have music, people used to make me mad for no reason." After one of her peers encouraged her to share an event that happened earlier that day, she went on to detail the incident. She was standing up for another student within the center who was being bullied. She got into a verbal altercation with the bullies. One threatened her, and she responded that she would punch them in the face. However, when the researcher asked, "Playing what we did this morning helped a little a bit? And it made you feel what?" Participant 4 stated, "better." Following this, she suggested that other students in the program may also feel better if they participated in music. The fourth question was, "What were things you noticed about yourself while we made music together?" In response, Participant 4 stated that she was "kind" and

"respectful to others." She also learned that if she "was kind and respectful to others . . ." then they would be kind and respectful to her. As they discussed this question, Participant 4 noticed that one of her peers seemingly did not notice anything about himself. In an attempt to get him to speak, she spoke on what she noticed about him. In reference to his participation in the music therapy sessions, she verbalized that she noticed ". . . he came in at the good time when we was playing with the drums . . ." Lastly, the researcher asked, "What do you feel is important to speak about [as we discuss our experience in this study]?" Participant 4 stated that she disliked having to change the room in which the music therapy sessions took place, which happened once on the final day of the music therapy sessions.

Table 4

Participant 4's Target Behaviors

	Cooperated with others for entire intervention	On-task for entire intervention	Present without interrupting others for entire intervention	Demonstrated pro-social interactions within the intervention	Remained with the group for entire session
Session One (2 Interventions)	2	2	2	2	0
Session Two (4 Interventions)					
Session Three (6 Interventions)	6	5	4	6	1
Session Four (6 Interventions)	6	5	4	6	1

Participant 5

At the time of the study, Participant 5 was an eleven-year-old Caucasian female in the 5th-6th grade classroom. She had not been diagnosed with an emotional and/or behavioral exceptionality. However, the director of the program described her as a student who was working toward emotional and/or behavioral goals. Her teacher described her as "sweet," "kind," and a

student who listens, sits quietly, and works quickly. She was the oldest participant within the study.

Session Two

Participant 5 was not present within the first music therapy session. However, Participant 5 joined the second music therapy session. She entered quietly and sat crisscrossed on the floor. She displayed social interactions, as she spoke to the researcher, and made eye contact with her peers. She asked for a bean bag chair but did not complain when the researcher denied her request. When given a hand drum, she flipped it quietly and waited for instructions to be given. Once, when another student played their drum loudly out of turn, she glanced in their direction, giving them a seemingly annoyed look with her eyes.

Throughout the first intervention, Participant 5 seemed bashful and self-critical of any mistakes she may have made. For example, when she attempted to tap her drum to a steady beat with the researcher, she stopped and said, "I'm already off beat," and glanced around the room at her peers. Additionally, she glanced at the recording device multiple times, and reminded a relative of hers that it was recording. She adopted a strong leadership, yet almost "motherly" role. This may have also been due to the fact that two other participants were her relatives. She would provide additional prompts and redirect her peers throughout the session when she felt they may not be following directions as instructed. She did this in an authoritative manner, though most interactions were kind.

She often made eye contact with the researcher and listened intently to instructions for the second intervention. When it was her turn to lead a call during the second intervention, she simply tapped a steady beat on her hand drum, while everyone joined in. At one point during this intervention, she became slightly distracted, as she checked her phone briefly.

During the next intervention, she demonstrated interest in the rhythm sticks. When she saw the rhythm sticks and their different colors, she was reminded of boom whackers. She asked, "Are them like boom whackers but smaller?" She went on to discuss how the rhythm sticks did not have holes, contrary to boom whackers. When she was provided a set of rhythm sticks, she experimented with them playfully, tapping them on the ground and together. However, she became easily overwhelmed by the sound of the sticks tapping together. She prompted others to stop playing when she felt they became loud, often becoming slightly bossy. She asked the researcher for clarity when directions were given. She was attentive and an actively attempted to learn the rhythmic phrase. She was still playful and attempted the trick that her peers were trying. She smiled when she achieved the phrase and asked the researcher to listen to her as she repeated the phrase for her own learning. She watched others as they demonstrated what they had learned. Participant 2 was one of her relatives. When he was redirected, she looked at him with disappointment, and at times glared at him, seemingly angrily or annoyed.

During the final intervention, she began by rubbing her drum as instructed by the researcher. After being prompted to tap their drums, she watched the researcher's hands intently and said "off" after the initial count down. Preparing for the final cool down part of the intervention, she laid on her stomach and squinted her eyes while watching the researcher. She slowed down her tapping and put her head down after the final beat. She retrieved her drum and sat quietly at the end of the session. She kindly asked the researcher for help putting on her anklet that she removed before the session began. The researcher thanked her for joining. She replied, "You're welcome," and stated that she'd be back tomorrow.

Overall, Participant 5 cooperated with others in four of the four interventions. While she cooperated with others, it is unclear whether she truly got along with them. She remained on task

in all four of the four interventions. She was present without interrupting others during each of the four interventions. She demonstrated pro-social interactions in all four interventions. She had a total of 15 pro-social interactions. She often would re-direct others, but not in an overwhelming manner, although one could tell she may have been annoyed at times. However, these interactions were an attempt to benefit others in the group and/or the researcher. Lastly, she remained with the group during the entire session. This information may be found in Table 5.

Session Three

Participant 5 joined the third session with a seemingly nonchalant attitude, as she toyed with a balloon that she brought in with her. Once the first intervention began, she participated immediately, making eye contact with the researcher and repeating improvised phrases led by her peers. While she had been resting on a bean bag chair, she removed the chair with no hesitation when prompted by the researcher. When asked if she was ready to lead her peers with an improvised phrase, she paused briefly, seemingly unsure or taken aback. However, she nodded her head and led her peers.

At the beginning of the second intervention, the researcher asked everyone to play a steady beat. She asked clarifying questions about the instructions and wondered how individuals would guess what emotions someone was feeling based on their drums improvisation. As the researcher explained the intervention and taught the chant, she snapped along and repeated the chant, seemingly adamant about learning it. The researcher gave an example and asked the students to guess how she felt and why, based on her improvisation. Participant 5 was quiet, observing her younger peers answer the questions and seemingly thinking critically on her own. After the younger peers attempted to guess and explain the researcher's emotions, and just before the researcher gave another example, Participant 5 interjected and confidently stated, "You were

having energy when you did it." She went on to be the first participant to guess and describe the researcher's next example. She commented on the researcher's dynamics and energy. She waited for turn to improvise but became impatient as the peer before her continued to describe their emotions. She interrupted the peer and asked the researcher if they could move on. During her turn, she improvised a phrase, let her peers guess and disclosed that she was happy because her class would be going on a field trip. Following this, she briefly became distracted by a toy as her peers talked. Nevertheless, she waited patiently for instructions to be given during the next intervention.

After learning the phrase with her rhythm sticks, she wanted to lead and demonstrate the phrase for her peers. At one point, her peer, a younger relative of hers almost hit her with his sticks and continued to tease her. She jumped at him and told him to stop. Overall, she stayed engaged during this intervention.

She rested on her feet during the next body percussion intervention. She immediately repeated body percussion phrases after the researcher while saying the accompanying syllables. She would ask a question and repeat the phrase to clarify for own retention of the phrase. She smiled and happily repeated after her peers, even after she had volunteered to lead first. When it was finally her turn, she hesitated and took her time to lead, seemingly becoming unconfident. She attempted to adapt her phrase because her adaptation was easier for others to repeat. However, she performed her original phrase once more, giving herself and her peers another chance to repeat the phrase.

She drifted on and off-task during the next intervention involving rhythm stick improvisation. She would retrieve her phone briefly, and then sit it down and re-engage. Following this, her energy seemed to deplete, and she had retrieved the balloon that she entered

the session with. This hindered her from participating fully in the final intervention. She clapped the last phrase during the cool down softly and listened to researchers closing remarks. She then exited the session without word.

Overall, Participant 5 cooperated with others in each of the six interventions. However, throughout the session, there were moments of minor strife with specific individuals that didn't interfere with her working with the group in general, to reach the common goal. She remained on task in five of the six interventions. She was present without interrupting others in five of the six interventions. She only interrupted a peer once during the session. She demonstrated pro-social interactions in five of the six interventions. She demonstrated a total of 11 pro-social interactions. Lastly, she remained with the group throughout the entire session. This information may be found in Table 5.

Session Four

Participant 5 entered the final session in a seemingly content mood. She engaged in conversation with another staff member, inquired about the location of her peers, asked if they would receive a treat because it was their last day of making music together. However, just before the session began, she made multiple sardonic comments. For example, when learning how they would be sitting, she stated "I don't want to sit on that cold floor." Additionally, when the researcher said, "The first thing we're going to do to support each other –," she interrupted, saying, "Is nothing." She was easily redirected and stated that she was joking after the researcher addressed her comments. Nevertheless, she made eye contact with a peer and apologized after accidentally knocking their water bottle over.

Before officially beginning the session, the researcher discussed the remainder of the week, noting that this was their last time making music. Without prompting, Participant 5 stated,

"There's been times when I really wanted to leave . . . but it's fun here." She followed the researcher's instructions to play the hand drums, until the researcher asked everyone to rub the drums. At this point, she continued striking the drum. When another peer grabbed her drum, in attempt to get her to stop playing, she pulled back and made a disgruntled face, saying, "Bruh." She then began rubbing the drum as directed. She advocated for herself, explaining that it was uncomfortable rubbing her hand on the drum while creating the rainstorm. Her smile widened as the group continued making the storm and struck their hand drums more intensely. She was attentive, anticipating the researcher's count down. Stopped striking her drum before count 1 and clapped her hands together right on the beat.

As the researcher introduced the next intervention, Participant 5 emphatically stated the chant, demonstrating her remembrance of it and her participation in the session. She raised her hand to volunteer to express her feelings first but waited and continued participating when the researcher chose someone else. She was seemingly pleased when she correctly guessed a peer that was her relative's emotions. During the same intervention, another participant discussed an emotional moment, when students at the center found a deceased baby bird, Participant 5 attempted to reassure her by smiling and saying, "He's already to God." This conversation continued, but she seemingly became impatiently as she waited for her turn. She said, "okay," implying that she was prepared to begin the chant for her turn. She struck her drum confidently and emphatically using both hands. She allowed most of her peers to interpret as she watched them with a smile. She calmly stated, "no" when a peer guessed her emotion incorrectly. Participant 5 then went on to explain that she was tired, because she "didn't get enough sleep the night before." She also mentioned that she that she was happy because her class was going

swimming, and she would “at least” still see the researcher around the center once the music therapy sessions were over.

During the transition into the group combo, the researcher asked which instruments each student wanted. Participant 5 spoke erratically, repeating the word “me,” as the researcher held up instruments. She then self-corrected, raised her hand, and put a finger over mouth, as if to say, “quiet.” When she received her instruments, she experimented with the various timbres. Participant 5 was engaged throughout this intervention. She was inquisitive and wanted to learn about the various percussion instruments. She also made intentional efforts to repeat rhythms with her instruments as the researcher instructed, even if they were challenging.

The researcher informed the participants that the next intervention involved body percussion. Participant 5 then stated, “No, I don’t want to do this part.” Reluctantly, she continued to participate by stomping her feet and clapping her hands after the researcher and her peers. When it was her turn, she improvised a phrase, striking the floor and stomping her feet. She smiled after her peers repeated after her. She participated thoroughly during the next intervention and asked questions for clarity throughout. She smiled with contentment after correctly repeating a phrase. When it was her turn to improvise, she got innovative. Not only did she tap the friend to the right of her, but also the peer across from her. When asked to repeat it, she did so with no hesitation, twice. While her musical skills were not perfect, she continued to try.

During the final intervention, she leaned in, watched the researcher, and repeated the chant, all while following dynamic and temporal cues. At the end of the session, she retrieved her phone, acknowledged the researcher’s comments about meeting the next day, and asked for

the researcher to bring them a snack. She stood up from the floor, commented on how her knees were “broken,” stretched, and exited the room quietly.

Overall, Participant 5 cooperated with others in four out of six interventions. She remained on-task in each of the six interventions. She was present without interrupting others in three of the six interventions. She interrupted others a total of four times during the session. Participant 5 demonstrated pro-social interactions in five of the six interventions. She demonstrated 10 pro-social interactions total. Lastly, she remained with the group during the entire session. This information may be found in Table 5.

Interview

Participant 5 was present in the final interview. However, she had been out of the view of the camera for most of the interview. She talked with Participant 1 his birthday party. Before creating the rainstorm, she asked if she could do the tapping, which represented rain drops. Shortly after, during the “Drum About It” activity, she explained that she was mad because it was the last day to play music, but she was happy because she would be receiving ice cream later that day. When asked, “How did it feel to make music together?” Participant 5 stated that it was fun. She expressed that she enjoyed getting to know the younger students, as she learned that they were “really nice people,” and “could be fun.” Participant 5 went on to joke about another participant being “mean” to her all the time. They went back and forth, seemingly joking about it together. Participant 5 added to her response to the question by stating, “Oh and if like we were mad, we get to take our anger out on . . . playing with the drums.” She described an experience that occurred before one of the treatment sessions. She had been upset with a sibling just before coming into the session. She stated, “. . . and then I came to music and I’m like, ‘You know what? There’s no point of being mad.’” She mentioned that she expressed her feelings on the

drums when she arrived at the music therapy sessions. The next question was, “How do you feel your connection with each other changed while we were doing music?” Participant 5 responded by saying, “I feel like we all learned that we liked somethings the same, like music . . .” The third interview question was, “Do you feel your behavior changed at all while we made music together?” By the time the researcher asked for a response from Participant 5, she either non-verbally indicated “no,” or did not answer the question. Next, the researcher asked, “What were things you noticed about yourself while we made music together?” Participant 5 learned that she “really liked music.” At first, the idea of participating in music making with her peers was off-putting to her. She stated that she thought she would “hate being here.” However, after participating, she was surprised that she enjoyed it. She mentioned that making music was “a fun thing to do” and a “fun way to make noise without being annoying or something else.” The final question prompted the students to talk about anything else they felt was important discuss regarding the study. Participant 5 mentioned disliking specific sensory stimulation, which was the feeling of rubbing the head of the drums, and striking the drum too hard, as it hurt the palm of her hand.

Table 5

Participant 5’s Target Behaviors

	Cooperated with others for entire intervention	On-task for entire intervention	Present without interrupting others for entire intervention	Demonstrated pro-social interactions within the intervention	Remained with the group for entire session
Session One (3 Interventions)					
Session Two (4 Interventions)	4	4	4	4	1
Session Three (6 Interventions)	6	5	5	5	1
Session Four (6 Interventions)	4	6	3	5	1

CHAPTER V: DISCUSSION

Through this case study analysis, the researcher observed multiple effects on the participants' social, emotional, and behavioral skills, that seemed to occur due to the use of percussion and rhythm-based strategies. One example of a rhythm-based strategy was the use of a metronome, which seemed to have a positive effect on behavior in this study. For example, Participants 2 and 4 had nearly immediate responses when the researcher began playing a metronome. During the second music therapy session, Participant 2 had entered with an energetic mood. However, once he began entraining and tapping his hand drum to the metronome provided by the researcher, his demeanor changed, and he began tapping calmly. During the third session, Participant 4 immediately began entraining to the metronome by tapping her hand drum to the steady beat without being prompted. For these two participants, the metronome seemed to provide a sense of stability and direction, even without instructions being given. While the same procedures were not taken, these results are similar to Park and Choi (2017), Shaffter (2001), and Leisman (2013), in that they support the positive effects of the use of a metronome on children with emotional and behavioral goals.

The demonstration of pro-social skills was one factor that was addressed throughout this study. The definition of pro-social skills utilized within this study was the display of behaviors that "benefit one or more people" (American Psychological Association, n.d.). The most common pro-social behaviors that participants demonstrated included making eye-contact with others, cooperating with others, leading others, and making intentional conversation with others. One method that facilitated these interactions was during improvisation. Improvisation was a technique that was often utilized within the music therapy sessions, similar to Matney (2004), and Santos (2019). The researcher improvised rhythmic phrases through body percussion, with

rhythm sticks, and on hand drums. The researcher prompted the students to improvise through those mediums as well. While it was the same technique, it was utilized in various ways, which kept the interventions from becoming repetitive. This seemed to keep the participants engaged. They were often found demonstrating pro-social interactions by intentionally making eye contact, repeating after, and listening intently to the researcher and their peers during these improvised interventions. Improvisation provided a sense of surprise and unpredictability, which kept the participants engaged. Most of the participants seemingly enjoyed performing improvisations and leading their peers, as they frequently volunteered to lead. However, there were instances wherein the participants were only engaged when they received the opportunity to lead, or they disengaged after they led. For example, this happened with Participant 2 during the first session, and Participant 3 during the third session. Nevertheless, another skill that was collaterally addressed was leadership. The researcher found that some pro-social actions were often demonstrated when a participant exhibited led each other. This was primarily through their improvisation moments. During these moments, they practiced patience, and they were willing to repeat themselves for others to try again. Some even adapted their initial improvisations, seemingly in an attempt to allow others the opportunity to repeat correctly. However, they also demonstrated leadership skills when they assisted each other with getting back on task. For example, there was a moment when the researcher asked the students to place their hand drums behind their backs during a transition. When Participant 1 noticed that one of her peers had not followed the instruction, she demonstrated leadership by calmly providing the peer with an additional prompt. This was also a pro-social interaction; in that it helped her peer get back on-task. Leadership actions such as these also benefit the group. Leadership was also a trait that Litchke and Finley observed in their (2019) case study. This was a recurring skill exhibited by

Participant 5 as well. However, there were moments when Participant 5 gave additional prompts to her peers, but the researcher questioned whether they were pro-social versus authoritative.

Specific percussion instruments also seemed to affect behavior, arousal, and mood. For example, Participants 2, 3 and 4 seemed to be intrigued with the rhythm sticks. At the beginning of the study, during the first session, they asked multiple questions regarding the rhythm sticks, specifically regarding when they would utilize the sticks. This interest in the rhythm sticks was demonstrated throughout the study. The participants stated that they enjoyed playing the instruments that they were interested in. For example, Participant 2 mentioned that it felt good to play the drums and the rhythm sticks. Additionally, drums seemed to have an effect on arousal. Participant 3 specifically stated that when she participated in the music therapy sessions, specifically while playing the drums, it helped her become more "energetic." Rhythm-strategies were also found to affect arousal by Husain, Schellenberg and Thompson (2002). However, tempo was the specific element of rhythm that affected arousal within their study. During the final session, there was a group combo intervention. The participants demonstrated interest in the miscellaneous percussion instruments as the researcher demonstrated their various sounds, and how to play them. For example, Participants 3 and 4 moved closer to the researcher as she played the instruments. These reactions may have also been a result of the novelty of the instruments, as they had not been used since the first session. Conversely, there were moments when participants demonstrated disinterest in percussion-based interventions. One example was body percussion. Participant 5 demonstrated disinterest in the body percussion intervention during the final session. However, she continued participating and went on to lead her peers in a call and response improvisation.

Positive effects were not only observed by the researcher, but the participants verbally stated positive impacts on their behavior, mood, and interactions with their peers. During the interview, Participant 3 described an experience when she felt upset and almost got into an altercation before coming to the music therapy session interview. She stated that coming to music helped her calm down, altering her mood. It should be noted that the participants only engaged in the opening "Drum About It" activity and it may not have specifically been the music or the use of drums that altered her mood. However, it is possible that she experienced mood-altering effects from the one activity, which could support the findings of Currie (2012), Lowry et al (2018), Rensburg et al., (2016), and Shaffer et al., (2001). Participant 2 stated that she was "kind" and "respectful" to her peers during the music therapy sessions. Her recognition of this behavior is an example of her being introspective and acting pro-socially based on her own findings. Similar to this, Pater et al. (2021), and Porter et al., (2016) also found improvements in similar social skills including empathy, communication and interaction skills in their students with ASD, and anxiety, and depression. During the interview, it was made evident that participating in the rhythm-based music therapy sessions was something the students enjoyed and looked forward to participating in.

The researcher also observed a positive effect on the participants' emotional skills. The researcher specifically observed empathy amongst the participants. For example, when the participants were prompted to guess how their peers were feeling during the "Drum About It" intervention, they were required to analyze the way their peer played their drum and guess why their peer felt they were feeling. They had to exercise empathy and truly consider how their peers were feeling. Their display of empathetic behavior is proven by their success in demonstrating pro-social interactions throughout the study. This was notably evident with Participant 2. During

the first session, he did not demonstrate cooperation with others, nor did he refrain from interrupting others. However, within the fourth session, he was patient and contributed to conversation with his peers as one peer discussed an emotional situation. This display of empathy, which was also found amongst the other participants, was consistent with the findings of Pater et al., 2021, Porter et al., 2016, and Santos, 2019. The researcher also observed confidence during the interview. The students spoke up for themselves, clarifying their internal feelings so their peers and the researcher understood. The researcher observed that while they were appreciative of their peers' contributions to discussions, they were also confident in their own feelings and wanted to respectfully affirm those feelings. Confidence was also found in Lowry et al. (2018).

Lastly, there were moments when the participants demonstrated creative expression. This often happened when they were prompted to perform call and response improvisations. For example, Participant 4 was prompted to improvise a call and response phrase with her hand drum during the third music therapy session. However, when she improvised, she included body percussion within her phrase. Some participants thought outside of the norm and improvised creative percussive phrases during their respective turns. Similar events happened with Participants 2 and 3. During another body percussion intervention, Participant 4 did not want to stand and fully participate with her peers for a brief period of time. Nevertheless, she participated within the intervention as well.

Conclusion

In answering the research question, it is the researcher's opinion that percussion, and rhythm-based music therapy interventions may improve pro-social interactions, on-task behavior, cooperation with others, confidence, and empathy in students who have emotional and

behavioral goals. Specifically, the use of metronomes may be beneficial in providing stability, consistency and direction within rhythm-based interventions. Additionally, rhythmic improvisation and call and response interventions seemed to be beneficial in maintaining engagement and thus, increasing the social skill of cooperation with others. Students demonstrated their emotions and practiced empathy with others through the use of percussion instruments within the interventions, such as hand drums. Some participants also stated that coming to the make music had effects on their mood. Lastly, percussion instruments that the students were interested in, such as rhythm sticks and drums, seemed to positively affect behavior to an extent, as well. However, due to limitations within the study, it cannot be proven that the percussion and rhythm-based music therapy interventions were the sole factor in influencing these positive outcomes. It may be beneficial to compare using percussion-based methods to using other methods, such as singing to draw stronger conclusions. While positive conclusions can be drawn from the case studies, it is difficult to conclude that they were a direct result of the percussion interventions. Further research should be conducted and analyzed to formulate any objective conclusions.

Limitations

There were multiple limitations that may have impacted results of the study. First, the student attendance. Only Participant 1 was present each of the music therapy sessions. The researcher cannot draw strong conclusions due to inconsistency in attendance. Second, the length of the treatment period. The music therapy sessions only took place on four consecutive days. It would have been ideal for more music therapy sessions to take place over a longer period of time, and on inconsecutive days. This may have enabled the researcher to draw stronger conclusions and observe how students' behaviors changed on days wherein music therapy did

not take place. Additionally, it is important to note that some target behaviors had a direct effect on others. For example, if a participant was not on task, then they could not be cooperating with others, nor working actively towards a common goal. However, participants could be on-task, but not necessarily cooperating with others. Lastly, a larger participant pool may have yielded stronger conclusions, as there were only five participants who were analyzed within the study.

Recommendations

The researcher recommends multiple practices that may aid in future studies related to the topic. First, the location of the music therapy sessions should be kept in room with little distractions present and that will allow for consistency and privacy for the participants. It is encouraged that one finds ways to minimize distractions within the room. However, there were takeaways from moments when students were distracted. For example, Participants 3 and 4 improvised phrases for puppets that they found in the Kindergarten room during session four. Personifying materials in this way may be beneficial for some students, as it may provide them with an opportunity to participate in a way that masks their personal feelings, which could be less vulnerable. Individual sessions may help students who are shy and who may not like loud noises. Providing structured autonomy throughout interventions may be beneficial when prompting students to express themselves or improvise. Individual interviews may be helpful so that students state their own beliefs and experiences and are not tempted to repeat what another student has said. Relatively, when discussing emotions, the facilitator may include a list of emotion words for students to use. A schedule with interventions to be completed during the session may help with student engagement. This may include words to chants. Rules and expectations regarding instrument handling should be stated before beginning the session. Student seating within the session is important, considering some students may dislike each

other, be related, or be close friends. It is important to be culturally aware of the demographic of the students, as some behaviors that may be viewed as negative in one social setting, may not be viewed the same in another social setting. For example, teasing or taunting each other. Additionally, repetition may be beneficial. For example, the participants became more engaged with the "Drum About It" intervention the more it was implemented. Repetition may provide familiarity. Timing interventions may be beneficial. The researcher observed that there were moments when some participants became off-task, but it may have been a result of an intervention lasting for longer than it should have. Time should be given for children to experiment with the timbre and different ways they can play their instruments. Sometimes, it is okay to allow out-of-turn behaviors to guide the session, so long as they are not disruptive, nor do they require redirection. Sometimes the out-of-turn behaviors are exactly what the students want and need to be doing. However, the leader of the intervention must assess this on a case-by-case basis. The participants often volunteered to lead in improvisation. However, there were moments when participants disengaged after they had the opportunity. One may consider receiving the opportunity to lead as an incentive. Nevertheless, solo moments are important, as they provide children the opportunity to understand what it means to be a leader and to have others follow you. Participants 3, 4, and 5 made comments that referenced other musical settings. Within this music therapy experience, they connected what they were doing within the session to external occasions. Future researchers can learn to implement what their clients know into their music therapy sessions, which may increase engagement amongst their clients.

REFERENCES

American Psychological Association. (n.d.) *Prosocial*. https://dictionary.apa.org/prosocial

Anonymous. (2022). Point sheet record. Adapted with permission.

Baker, & Mackinlay, E. (2006). Sing, soothe and sleep: A lullaby education programme for first-time mothers. *British Journal of Music Education*, *23*(2), 147–160. https://doi.org/10.1017/S0265051706006899

Berger, D.S. (2012). Pilot study investigating the efficacy of tempo-specific rhythm interventions in music-based treatment addressing hyper-arousal, anxiety, system pacing, and redirection of fight-or-flight fear behaviors in children with Autism Spectrum Disorder (ASD). *Journal of Biomusical Engineering, 2*. https://doi.org/10.4303/jbe/M110902

Berry, D. (2012). Inhibitory control and teacher-child conflict: Reciprocal associations across the elementary-school years. *Journal of Applied Developmental Psychology, 33*(1), 66–76. https://doi.org/10.1016/j.appdev.2011.10.002

Center for Disease Control. (2021). *Children's mental health*. https://www.cdc.gov/childrensmentalhealth/data.html

Centers for Disease Control and Prevention. (2013). Mental health surveillance among children – United States, 2005-2011. Morbid and Mortality Weekly Report 2013, 62(2). https://www.cdc.gov/mmwr/pdf/other/su6202.pdf

Currie, M., & Startup, M. (2012). Doing anger differently: Two controlled trials of percussion group psychotherapy for adolescent reactive aggression. *Journal of Adolescence, 35*(4), 843-853. https://doi.org/10.1016/j.adolescence.2011.12.003

Cresswell, J.W. (2014). Research design (4th ed.). SAGE.

Danielson, M.L., Bitsko, R.H., Ghandour, R.M., Holbrook, J.R., Kogan, M.D., & Blumberg, S.J. (2018). Prevalence of parent-reported ADHD diagnosis and associated treatment among U.S. children and adolescents, 2016. *Journal of Clinical Child & Adolescent Psychology, 47*(2), 199-212. https://doi.org./10.1080/15374416.2017.1417860

De Mers, C.L., Tincani, M., Van Norman, R.K., Higgins, K. (2009). Effects of music therapy on young children's challenging behaviors: A case study. *Music Therapy Perspectives, 27*(2), 88-96. https://doi.org/10.1093/mtp/27.2.88

Dimaio, L. (2010). Music therapy entrainment: A humanistic music therapist's perspective of using music therapy entrainment with hospice clients experiencing pain. *Music Therapy Perspectives, 28*(2), 106-115. https://doi.org/10.1093/mtp/28.2.106

IRIS Center. (2023). *What should teachers understand in order to address student diversity in their classrooms?* https://iris.peabody.vanderbilt.edu/module/div/cresource/q2/p05/

Gardstrom, S. C., Carlini, M., Josefczyk, J., & Love, A. (2013). Women with addictions: Music therapy clinical postures and interventions. *Music Therapy Perspectives, 31*(2), 95-104. https://doi.org/10.1093/mtp/31.2.95

Gadberry, A.L. (2011). Steady beat and state anxiety. *Journal of Music Therapy, 48*(3), 346-356. https://doi.org/10.1093/jmt/48.3.346

Ghandour, R.M., Sherman, L.J., Vladutiu, C.J., Ali, M.M., Lynch, S.E., Bitsko, R.H., & Blumberg, S.J. (2019). Prevalence and treatment of depression, anxiety, and conduct problems in US children. *The Journal of Pediatrics, 206*, 256-267.e3 https://doi.org/10.1016/j.jpeds.2018.09.021

Ghetti, C. M. (2011). Clinical practice of dual-certified music Therapists/Child life specialists: A phenomenological study. *Journal of Music Therapy, 48*(3), 317-345. https://doi.org/10.1093/jmt/48.3.317

Gomez-Baya, D., Tomé, G., Reis, M., & Gaspar de Matos, M. (2020). Long-term self-regulation moderates the role of internal resources for resilience in positive youth development in Portugal. *The Journal of Genetic Psychology, 181*(2-3), 127-149. https://doi.org/10.1080/00221325.2020.1735986

Guzic, B.L., Tonkin, K., Donovan, J., Walkovich, D., Dmuth, B.R., Walkovich, D., Demuth, B.R., Walkovich, B., Roberts, J.B., & Bapat, A. (n.d.). *Percussion and distance learning: Improving attention-to-task in children with Autism***.** https://static1.squarespace.com/static/574191f24c2f8522317db6b1/t/577bee216a4963d30fb2e6a8/1467739682715/FULL+PercussionAndDistanceLearningAutism.pdf

Heiderscheit, A., & Madson, A. (2015). Use of the iso principle as a central method in mood management: A music psychotherapy clinical case study. *Music Therapy Perspectives, 33*(1), 45-52. https://doi.org/10.1093/mtp/miu042

Hense, C., Silverman, M.J., & McFerran, K.S. (2018). Using the healthy-unhealthy uses of music scale as a single-session music therapy intervention on an acute youth mental health inpatient unit. *Music Therapy Perspectives, 36*(2), 267-276. https://doi.org/10.1093/mtp/miy013

Huang, T.L., & Charyton, C. (2008). A comprehensive review of the psychological effects of brainwave entrainment. *Alternative Therapies in Health and Medicine, 14*(5), 38-50. https://pubmed.ncbi.nlm.nih.gov/18780583/

Husain, G., Schellenberg, E.G., & Thompson, W.F. (2002). Effects of musical tempo and mode on arousal, mood, and spatial abilities. *Music Perception, 20*(2), 151-171. https://doi.org/10.1525/mp.2002.20.2.151

Institute for Music and Neurologic Function. (n.d.). *Rhythmic activities for everyday care*. https://www.health.ny.gov/diseases/conditions/dementia/edge/interventions/bethabraham/docs/beth_abraham_handbook_rhythmic_activities.pdf

IRIS Center. (2023). *What should teachers understand in order to address student diversity in their classrooms?* https://iris.peabody.vanderbilt.edu/module/div/cresource/q2/p05/

Jackson, N. A. (2003). A survey of music therapy methods and their role in the treatment of early elementary school children with ADHD. *Journal of Music Therapy, 40*(4), 302-323. https://doi.org/10.1093/jmt/40.4.302

Koyama, M., Wachi, M., Utsuyama, M., Bittman, B., Hirokawa, K., & Kitagawa, M. (2009). Recreational music-making modulates immunological responses and mood states in older adults. *Journal of Medical and Dental Sciences, 56*(2), 79-90. https://doi.org/10.11480/jmds.560201

LaGasse, A.B., & Hardy, M.W. (2013). Considering rhythm for sensorimotor regulation in children with Autism Spectrum Disorders. *Music Therapy Perspectives, 31*(1), 67-77. https://doi.org/10.1093/mtp/31.1.67

LaGasse, A. B., Manning, R. C. B., Crasta, J. E., Gavin, W. J., & Davies, P. L. (2019). Assessing the impact of music therapy on sensory gating and attention in children with autism: A pilot and feasibility study. *Journal of Music Therapy, 56*(3), 287–314. https://doi-org./10.1093/jmt/thz008

Lee, H.J. (2005). *The effect of live music via the iso-principle on pain management in palliative care as measured by self-report using a graphic rating scale and pulse rate* [Master's thesis, Florida State University]. Florida State University Libraries. http://purl.flvc.org/fsu/fd/FSU_migr_etd-3199

Leisman, G., Mualem, R., & Machado, C. (2013). The integration of neurosciences, child public health, and education practice: Hemisphere-specific remediation strategies as a discipline partnered rehabilitation tool in ADD/ADHD. *Frontiers in Public Health, 1,* 22. https://doi.org/10.3389/fpubh.2013.00022

Litchke, L., & Finley, C. (2019). Social-emotional benefits of Drumtastic Ability Beats® dyadic partnership between a college veteran with PTSD and an elementary student in a special education setting. *Therapeutic Recreation Journal, 53*(2), 175–184. https://doi-org/10.18666/TRJ-2019-V53-I2-9129

Lowry, R.G., Hale, B.J., Draper, S.B., & Smith, M.S**.** (2018). Rock drumming enhances motor and psychosocial skills of children with emotional and behavioral difficulties. *International Journal of Developmental Disabilities, 65*(3), 152-161. https://doi.org/10.1080/20473869.2018.1429041

Maenner, M.J., Shaw, K.A., Baoi, J., Washington, A., Patrick, M., DiRienzo, M., Christensen, D.L., Wiggins, L.D., Pettygrove, S., Andrews, J.G., Lopez, M., Hudson, A., Baroud, T., Schwenk, Y., White, T., Rosenberg., C.R., Lee, L., Harrington, R.A., Huston, M., Hewitt, A., . . . Dietz, P.M. (2020). Prevalence of Autism Spectrum Disorder among children aged 8 years – Autism and developmental disabilities monitoring network, 11 sites, United States, 2016. *Morbidity and Mortality Weekly Report Surveillance Summaries, 69*(4), 1-12. http://dx.doi.org/10.15585/mmwr.ss6904a1

Matney, B. (2004). *Percussion in music therapy: An instructional manual based on analysis of the related literature* [Master's thesis, Texas Woman's University]. ProQuest Dissertations & Theses Global.

Merriam-Webster. (N.d.a). *Percussion*. https://www.merriam-webster.com/dictionary/percussion

Merriam-Webster. (N.d.b. *Rhythm.* https://www.merriam-webster.com/dictionary/rhythm

Moffitt, T.E., Arseneault, L., Belsky, D., Dickson, N., Hancox, R.J., Harrington, H., Houts, R., Poulton, R., Roberts, B.W., Ross, S., Sears, M.R., Thomson, W.M., & Caspi, A. (2011). A gradient of childhood self-control predicts health, wealth, and public safety. *PNAS Proceedings of the National Academy of Sciences of the United States of America, 108*(7), 2693-2698. https://doi.org/10.1073/pnas.1010076108

Moore, K. S., & Hanson-Abromeit, D. (2018). Feasibility of the Musical Contour Regulation Facilitation (MCRF) intervention for preschooler emotion regulation development: A mixed methods study. *Journal of Music Therapy, 55*(4), 408–438. https://doi.org/10.1093/jmt/thy014

Park, Y., & Choi, Y. (2017). Effects of interactive metronome training on timing, attention, working memory, and processing speed in children with ADHD: A case study of two children. *Journal of Physical Therapy Science, 29*(12), 2165-2167. https:/doi.org/10.1589/jpts.29.2165

Porter, S., McConnell, T., McLaughlin, K., Lynn, F., Cardwell, C., Braiden, H., Boylan, J., Holmes, V., Rogan, S., Clinician, L., Diamond, K., Allen, J., Reilly, C., Davidson, F., McDowell, C., Boyd, R., Oldfield, A., Mullowney, M., Downes, C., … Gardner, C. (2017). Music therapy for children and adolescents with behavioural and emotional problems: A randomised controlled trial. *Journal of Child Psychology and Psychiatry, 58*(5), 586–594. https://doi.org/10.1111/jcpp.12656

Ponitz, C.C., McClelland, M.M., Matthews, J.S., & Morrison, F.J. (2009). A structured observation of behavioral self-regulation and its contribution to kindergarten outcomes. *Developmental Psychology, 45*(3), 605-619. https://doi.org/10.1037/a0015365

Center on PBIS. (2021). *Positive Behavioral Interventions & Supports*. www.pbis.org.

Preyde, M., Berends, A., Parehk, S., & Heintzman, J. (2015). Adolescents' evaluation of music therapy in an inpatient psychiatric unit: A quality improvement project. *Music Therapy Perspectives, 35*(1), 58–62. https://doi.org/10.1093/mtp/miv008

Rensburg, E.J., Hatting, R., Rooyen, C., Chelin, M., Merwe, C., Putter, L., Herholdt, J., Taylor, M., & Buitendage, T. (2016). The short term effect of a group drumming intervention on aggressive behaviour among adolescent girls diagnosed with conduct disorder. *South African Journal of Occupational Therapy, 46*(2), 16-22. https://doi.org/10.17159/2310-3833/2016/v46n2a4

Rimm-Kaufman, S.E., Curby, T., Grimm, K.J., Nathanson, L., & Brock, L.L. (2009). The contribution of children's self-regulation and classroom quality to children's adaptive behaviors in the kindergarten classroom. *Development Psychology, 45*(4), 958-972. http://doi.org/10.1037/a0015861

Roberds, J. A. (2005). *The effect of Interactive Metronome training on response inhibition within ADHD children* [Master's thesis, La Salle University]. ProQuest Dissertations & Theses Global.

Ross, S. (2016). Utilizing rhythm-based strategies to enhance self-expression and participation in students with emotional and behavioral issues: A pilot study. *Music Therapy Perspectives, 34*(1), 99-105. https://doi.org/10.1093/mtp/miv021

Santos, A. dos. (2019). Empathy and aggression in group music therapy with teenagers: A descriptive phenomenological study. *Music Therapy Perspectives, 37*(1), 14–27. https://doi.org/10.1093/mtp/miy024

Shaffer, R. J., Jacokes, L.E., Cassily, J.F., Greenspan, S.I., Tuchman, R.F., & Stemmer, P.J. (2001). Effect of Interactive Metronome training on children with ADHD. *American Journal of Occupational Therapy, 55*(2), 155-162. https://doi.org/10.5014/ajot.55.2.155

Specialized Education Services, INC. (n.d.). *Our CASE Approach*. https://sesischools.com/about-us/our-case-approach/

Tierney, A., & Kraus, N. (2015). Neural entrainment to the rhythmic structure of music. *Journal of Cognitive Neuroscience, 27*(2), 400-408. http://doi.org/10.1162/jocn_a_00704

The Better Health Channel. (2012). *Behavioural disorders in children*. https://www.betterhealth.vic.gov.au/health/healthyliving/behavioural-disorders-in-children

Trapp, S., Havlicek, O., Schirmer, A., & Keller, P.E. (2020). When the rhythm disappears and the mind keeps dancing: Sustained effects of attentional entrainment. *Psychological Research, 84*, 81-87. https://doi.org/10.1007/s00426-018-0983-x

Valois, R. F., Paxton, R. J., Zullig, K. J., & Huebner, E. S. (2006). Life satisfaction and violent behaviors among middle school students. *Journal of Child & Family Studies, 15*(6), 695–707. https://doi.org/10.1007/s10826-006-9043-z

Pater, M., Spreen, M., & Yperen, T.(2021). The developmental progress in social behavior of children with autism spectrum disorder getting music therapy. A multiple case study. *Children and Youth Services Review 120*. https://doi.org/10.1016/j.childyouth.2020.105767

APPENDIX A: POINT SHEET RECORD PRIOR TO RESEARCHER ADAPTATIONS

(ANONYMOUS, 2022)

Figure A1

Point Sheet Record prior to researcher adaptations (Anonymous, 2022).

Student I.						Week Average
Goal 1 Refrains from Interrupting						#DIV/0!
Goal 2 Arrives to class on Time						#DIV/0!
Goal 3 Emotional Intelligence						#DIV/0!
Respect Others						#DIV/0!
Respect Self						#DIV/0!
Respect Property						#DIV/0!
Stays on Task						#DIV/0!
Responds Well with 1 Reminder						#DIV/0!
Participates in Collaboration						#DIV/0!
Stays in Designated Area						#DIV/0!
Daily Total	####	####	####	###	####	#DIV/0!
Period 1						#DIV/0!
Period 2						#DIV/0!
Period 3						#DIV/0!
Period 4						#DIV/0!
Period 5						#DIV/0!
Period 6						#DIV/0!
Period 7						#DIV/0!
Period 8						#DIV/0!
Comments						
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						

APPENDIX B: POINT SHEET RECORD FOLLOWING RESEARCHER ADAPTATIONS

Figure B1

Point Sheet Record following researcher adaptations

Student	Monday	Tuesday	Wednesday	Thursday	Friday	Weekly Avg
Cooperates with others						#DIV/0!
Remains on task						#DIV/0!
Refrains from interrupting others						#DIV/0!
Demonstrates pro-social interactions						#DIV/0!
Remains with the group						#DIV/0!
Total:						
Comments:						

Staff member participants divided each box into respective columns, representing the number of trials in which students were expected to demonstrate the target behaviors. This data was transferred into numerical data in Microsoft excel for analysis by the researcher.

APPENDIX C: BEHAVIORS TRACKED BY STUDENTS' CLASSROOM TEACHERS AND THE RESEARCHER

Behaviors Tracked by Students' Classroom Teachers and the Researcher

1. **Cooperation with others**

   Definition: Students will cooperate with others by working towards a common goal with others.

2. **Remains on task**

   Definition: Students will remain on task by participating in tasks as instructed through the duration of the task.

3. **Refrains from interrupting others**

   Definition: Students will refrain from interrupting others during tasks, and class discussions.

4. **Pro-Social Interactions**

   Definition: Students will demonstrate pro-social interactions with others by displaying behaviors that benefit one or more other people (American Psychological Association, n.d.)

5. **Remains with the group**

   Definition: Students will remain with the group throughout tasks without needing to be redirected to another location – classroom, director's office, "think seat."

Reference:

American Psychological Association. (n.d.) *Prosocial*. https://dictionary.apa.org/prosocial

APPENDIX D: INTERVIEW QUESTIONS FOR THE STUDENTS

Interview Questions for the Students

1. How did it feel to participate in the music therapy sessions?
2. How did your relationship or connection with your peers change throughout your participation in the study?
3. How did your relationship or connection with your teacher change throughout your participation in the study?
4. How do you feel your behavior changed throughout your participation in the study?
5. What were things you noticed about yourself while we participated in the music therapy sessions?
6. What else do you feel is important to discuss as we talk about our experience in this study?

Interview Questions for the Staff

1. What did you notice about the students' behavior during the study?
2. What else do you feel is important to discuss as we talk about their experience in this study?
3. How do you feel the students were impacted by the music therapy sessions?

APPENDIX E: PHRASE MODIFICATIONS FOR BEHAVIORS TRACKED BY THE RESEARCHER

Phrase Modifications for Behaviors Tracked by the Researcher

1. Cooperation with others: Students will cooperate with others by working towards a common goal with others for the duration of the intervention.
2. Remains on task: Students will remain on task by participating in tasks as instructed through the duration of the intervention.
3. Be present without interrupting: Students will be present for the duration of the intervention without interrupting others.
4. Pro-social interactions: Students will demonstrate pro-social interactions with others by displaying behaviors that benefit one or more other people (American Psychological Association, n.d.).
5. Remains with the group: Students will remain with the group for the duration of the session, without needing to be redirected to another location, classroom, director's office, or "think seat."