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Effectiveness of Music-Infused ABA Strategies on Children with Autism Spectrum Disorder

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Effectiveness of Music-Infused ABA Strategies on Children with Autism Spectrum Disorder

by

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ABSTRACT

Given the nationwide increase in the diagnosis of autism, particularly in the pediatric population, there is obvious value in examining the effectiveness of intervention methods. This research sought to examine the effectiveness of a music-infused approach combined with Applied Behavioral Analysis methodology. The exploratory mixed method design pilot study examined and comprehended the narratives of special education early childhood teachers assigned and trained to deliver a music-infused intervention program within a natural self-contained Applied Behavioral Analysis program, five days a week, 20 minutes a day, for a duration of 6 weeks to a population of ten preschool students, ages 3-5, diagnosed with autism spectrum disorder. Two self-contained classes were assigned as the treatment groups and one preschool self-contained classroom served as the control group. Emphasis was placed on the perceptions of the pre and post semi-structured interviews of the special education early childhood teachers. Evidence was examined through a quantitative source to build a coherent justification for the coded themes established adding to the validity of this study.

Interview perception questions for the special education early teachers focused on the following areas: (1) contribution of music, if at all, to communication and social learning in a self-contained class with preschool children diagnosed with autism, (2) do music activities infused with ABA strategies improve social and or communication skills, and (3) when instructed with music-infused ABA lessons do preschool children diagnosed with autism communicate or socialize more with their peers. Based on the findings of the study, music-infused ABA strategies interventions in self-contained classrooms is effective for improving social group building skills and communication skills, supporting the individual discrete trials of Applied Behavioral Analysis instruction. The study showed that when musical stimuli (beanbags

and instruments) were present, preschoolers diagnosed with autism spectrum disorder were able to express music in the following ways: imitation, using their voice, improvising with a musical instrument, and dancing. The special education early childhood teachers reported that music-infused activities in the ABA self-contained classroom is effective in encouraging improved joint attention, strengthening cognitive abilities, building motor skills, and developing emotions and self-regulations. The widely held perception of the teachers who were interviewed commented that it is appropriate to use music infused with ABA strategies in the self-contained preschool programs as it was an effective intervention for 6 weeks showing some improvement in social and communication skills in a more naturalistic approach to learning similar to interactive music making in general education preschool classrooms.

Keywords: music-infused, Autism, Social Skills, Communication Skills, Autism Spectrum Disorder

DEDICATION

This work is dedicated
to my wonderful father, Louis Sodano,
who always believed in me and taught me
that education is a lifelong pursuit,
and that nothing is impossible
no matter what challenges I might face.
Every day of my life my father gave generously
of his love and support,
and during my research I felt that even more.
His encouragement strengthened me to finish this process.

I love you, Dad, with my whole being.
I am the luckiest girl in the world to have you as my dad.
You are the wings beneath my wings, always!

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CHAPTER 1

AUTISM AND INFUSED MUSIC INTERVENTION

Autism spectrum disorder, a neurodevelopmental disorder, refers to a spectrum of core features characterized by challenges with social skills, restricted and repetitive behaviors, speech and nonverbal communication, as well as by unique strengths and differences (American Psychiatric Association, 2013). Interest in autism education is increasing, especially with the rising trends in autism spectrum diagnosis. Autism is currently identified in about 1 in 44 children, occurs in all racial, ethnic, and socioeconomic groups, and is four times more common among boys than girls (CDC, 2018). "The rising incidence of autism spectrum disorder has led to the surge in the number of children needing autism interventions" (Srinivasan & Bhat, 2013, p. 22).

The purpose of this exploratory mixed method pilot study was to examine and comprehend the narratives of special education early childhood teachers assigned and trained to deliver a music-infused intervention program within a natural self-contained ABA program, five days a week, 20 minutes a day, for a duration of 6 weeks to a population of ten preschool students, ages 3-5, diagnosed with autism spectrum disorder. Emphasis was placed on the perceptions of the pre and post semi-structured interviews of the special education early childhood teachers of the music-infused intervention and the preschooler participants diagnosed with autism spectrum disorder who went through the ABA program infused with music activities to increase social and communication skills. In addition, evidence was examined through a quantitative source (VB-MAPP) to build a coherent justification for the coded themes established adding to the validity of this study.

Central to this research agenda will be an examination of the progress gained by the preschool participants in the areas of social and communication skills in an ABA strategy program that incorporates music and rhythm experiences; and the way the strategies are perceived and explained by the special education early childhood teacher participants. To assist in the possible social and communication skills improvement of a music-infused ABA program, this researcher provided two training sessions on how to deliver the music-infused program in an ABA classroom, training manuals and music equipment for the special education teachers. The research incorporated semi-structured pre and post interviews with each special education teacher for inquiry regarding the progress, if at all, gained in the areas of social and communication skills and what kind of progress in an ABA direct instruction program that incorporates music-infused and rhythm experiences throughout a six-week intervention pilot study within a self-contained classroom. Daily observations of the preschool students were documented in field notes to assess in what ways, if at all, social and communication skills that were improved and by what daily music –infused experiences influenced progression.

Background of the Problem

Children with autism spectrum disorder demonstrate social communication impairments, difficulty in making and sustaining eye contact, and or sharing thoughts and feelings during social exchanges (Srinivasan & Bhat, 2013; American Psychiatric Association, 2013). Many children with an autism spectrum disorder have communication impairments that involve language deficits, ranging from complete lack of speech through severe language delays, poor comprehension of speech, echoed speech, overly literal language or stilted language (American Psychiatric Association, 2013). Other core features associated with an autism spectrum disorder include restricted, repetitive patterns of behavior. Interests or activities can manifest into simple

outward motor type behaviors (i.e., hand flapping, finger flicking, twisting of body, and compulsive behaviors for example, inflexible adherence to fixed routines and rituals) and repetitive speech (i.e., echolalia, stereotyped use of words, phrases, and parroting of words (Bodfish et al., 2000; Boyd et al., 2012; Srinivasan & Bhat, 2013). Srinivasan and Bhat (2013) suggest that individuals diagnosed with autism spectrum disorder are representative of a multisystem development disorder with primary social communication impairments and secondary perceptual motor and behavioral comorbidities. Results of Srinivasan's and Bhat's (2013) study concluded that "novel, embodied rhythm-based, multisystem interventions grounded in singing, music-making, joint-attention and social synchrony can be used to alleviate the core social communication deficits and behavioral deficits of children with autism spectrum disorders" (2013, p.11).

Despite the impairments associated with the diagnosis of an autism spectrum disorder, unique abilities and interests in music have been identified as positive characteristics and encouraged as neurodevelopmental benchmarks among children with autism (Demaine, 2012; Wigram & Gold, 2006; Whipple, 2004). Since autism is a neurodevelopmental disorder (American Psychiatric Association, 2013), the positive effects of music on the neurological limitations of autism should be considered when developing interventions for enhancing spontaneous social interactions and communication for preschoolers diagnosed with autism spectrum disorder.

In 1912, psychiatrist Dr. Eugene Bleuler, introduced the term "autism" to society with its literal definition of an "escape from reality". In the early 20th century, autism was considered a behavioral characteristic and children were not labeled with "autism" as a diagnosis. Preceding classifying children with the diagnosis of autism, psychiatrists in the early 20th century proposed

that children with autistic behaviors had a form of dementia as substantiated by the loss of cognitive skills (Corbier, 2005; Dermaine, 2012). Kanner (1943) published the first accounts of his research, which formed the foundation for the differential diagnosis between autism and other related disorders, such as emotional disorders, behavioral disorders, and intellectual disabilities. Kanner first classified children with autistic characteristics with "early infantile autism" and suggested that these children evidenced by his research, that these children, presented with average to above average cognitive abilities. Kanner proposed that children with early infantile autism also present with withdrawn and restrictive behaviors as a result of parents, specifically mothers withholding affection (Kanner, 1943). In Kanner's (1943) pioneering research study, "Autistic Disturbances of Affective Contact" his case descriptions of 11 children (eight boys and three girls), all under the age of 11 reported that the children demonstrated communication and social abnormalities and their behaviors were not indicative of intellectual dysfunction. Kanner gave these 11 children the diagnosis of "infantile autism." Among the cases studied, Kanner reported that 6 out of 11 children possessed musical abilities in the areas of perception, memory and musical performance (Demaine, 2012). Specifically, one child (case 4) was recognized to be able to sing 37 different songs by the onset of age three. Another child (case 9) was reported to identify 18 symphonies by the age of 18 months. Kanner concluded from his research findings that children with autism possessed excellent rote memory when compared to typical 1, 2, and 3-year-old peers. Kanner found when comparing the two groups that the neurotypical population were not able to access such detailed information from working memory. Since the reported findings of Kanner, researchers have continued to investigate musical abilities among children diagnosed with autism spectrum disorder (Demaine, 2012).

The etiology of autism as defined by Kanner was based on the Freudian theories of psychoanalysis. By comparison to Kanner research studies among children with autism, psychologist Bernard Rimland (1964) shifted from a psychoanalytic perspective to a neurobehavioral developmental disorder caused by impairments in the growth and development of the brain or central nervous system. Similar to Kanner (1943), Dr. Rimland's (1978) research sample of 543 children diagnosed with autism demonstrated with unique special skills with "musical ability the most frequently reported skill reported by memory, art, pseudo-verbal abilities, mathematics, map directions, coordination, calendar calculating and extrasensory perception" (Rimland, 1978: 48-65). Furthermore, at that time, Dr. Rimland proposed, "music may allow for a clinical intervention and / or used as a possible diagnostic tool" (Rimland, 1978: 48-65).

As early as the 1950's music therapy emerged as an instrumental clinical approach for the treatment of various psychological and behavioral needs, and progressively used for children with autism (Hillecke et al., 2005; Kaplan & Steele, 2005; Kim et al., 2008; 2009: Whipple, 2004; Wigram & Gold, 2006). Wigram (2002) reported that improvised music is often utilized to encourage spontaneous expressive language and non-verbal social interactions for children with autism. In addition, improvised music strategies such as turn taking, reflection and call and response most often elicit communication (Wigram, 2002; Wigram & Elefant, 2009).

The American Psychiatric Association's Diagnostic and Statistical Manual, Fifth Edition (DMS-5, 2013) provides standardized criteria to assist psychiatrists and psychologists with the diagnosis of autism spectrum disorder. One of the criteria listed and associated with the diagnosis of autism spectrum disorder (DSM-5) is the following: autism is a neurological disorder. Since this research study is exploring the implementation of a music-infused program

within an ABA program and its effects upon preschoolers diagnosed with autism spectrum disorder, the effect of music research on the neurologic underpinnings of autism spectrum disorder will be considered with respect to these primary core areas characterized as deficits with autism: social interaction and communication.

Effects of Music Stimulation-Engaging the mirror neuron system in ASD

Wan et al.'s (2010) research regarding music stimulation and its effect on the fetus in the third trimester found that a sound or melody played consistently to an unborn child may stimulate attention and memory. Stimulation through music produces positive effects on a fetus when speech has not yet been developed.

In another prenatal study, Partanen (2013) investigated prenatal music exposure to melodies using the brain's event-related potential. Mothers in the learning group played *Twinkle, Twinkle, Little Star*, five times a week at different intervals: during the last trimester of pregnancy, right after the baby's birth, and again at four months of age. The infants were played a modified version at the age of four months. There was also a control group, which received no prenatal music stimulation, no music after delivery and no music stimulation at the age of 4 months. The conclusion found that the infants in the learning group had stronger event-related potential than the control group. The results demonstrate that extensive prenatal music stimulation to a melody induces neural representations that last for several months.

Neuroscience research has shown that there are benefits to playing music and talking directly to the fetus during the prenatal stage (Mannes, 2011; Partanen et al., 2013). These positive effects on fetal brain development have also shown to positively engage the mirror neuron system (Wan et al., 2010). Over the past ten years, some researchers (Hajikhani, N., 2007; Iacoboni et al., 2006; Oberman, L.M. et al., 2008; Williams, et al., 2004) have proposed

that mirror neuron dysfunction might underlie the behavioral characteristics (social interactions, emotional tuning, communication) presented in ASD. Mirror neurons are not only involved in the perception and motor actions in human beings, but in the higher cognitive processes such as imitation and language. Some researchers argue that the mirror neuron system does not account for all the deficits in autism; hence more research will need to be conducted before a clear consensus on the role that the mirror neuron system plays regarding autism core deficits. However, Wan et al. (2013) argued that the intervention of music designed to engage the brain regions (mirror neuron system), which overlap the mirror neuron system in autism may have significant clinical potential. Wan et al. (2010) suggested that the brain engagement could be stimulated through the forms of music making. Collaborate music making with others (i.e., playing instruments or singing) has been shown in research to engage brain regions that overlap the mirror neuron system region. Furthermore, many children with ASD enjoy participating in musical activities, which may enhance their ability to focus and interact with others, fostering the development of social skills and communication. Interventions incorporating methods of music infused with behavioral methods offer a promising approach for facilitating social skills and communication in children with ASD and developmental disabilities (Wan et al., 2010).

Statement of the Problem

Based on the analysis of two years of medical records accumulated from 2012 to 2014 from monitoring sites across America, The Centers for Disease Control and Prevention (CDC) released the 2018 estimated autism prevalence figure. “The new estimate represents a 15 percent increase in prevalence nationally since 2012: to 1 in 44 children, from 1 in 64 two years previous” (CDC, 2018, p. 1). A significant finding of this 2018 estimated autism prevalence update reported a high of 1 in 34 in the state of New Jersey (20 percent increase) where

researchers had better access to students' educational records. The rising numbers of children diagnosed with autism spectrum disorder, particularly in the state of New Jersey, demonstrate an increasing need for interventions that innately reach the unique interests and abilities of children with autism spectrum disorder (CDC, 2018). The current trends of autism interventions include the use of Applied Behavior Analysis (Lovas, 1987), Picture Exchange Communication Systems (PECS) (Bondy & Frost, 2003), and Teaching and Education and Related Communication Handicapped Children (Meisbov et al., 2004). These developmental skill-based approaches suggest specific strategies for developing, reinforcing and supporting social communication such as joint attention and empathy based on social cognition.

One of the core deficits of children with autism spectrum disorder is a qualitative impairment in the area of socialization. Children with autism spectrum disorder often struggle to develop meaningful social relationships with their peers, repeatedly lack understanding of the nonverbal behaviors that regulate social interactions, fail to express appropriate emotions, fail to form attachments, lack joint attention to others as well as objects, lack the understanding of social cues of others, and lack social or emotional reciprocity (American Psychiatric Association, 2013). There is a lack of exploratory mixed method research from the perspective of the teacher that investigates music as an effective intervention infused within ABA strategies that could potentially help maximize social, joint attention, and communication skills of preschoolers diagnosed with autism spectrum disorder.

Purpose of the Study

The purpose of this study was to examine and comprehend the narratives of special education early childhood teachers assigned and trained to deliver a music-infused intervention program. This program took place within a natural self-contained ABA program, five days a

week, 20 minutes a day, for a duration of 6 weeks, to a population of ten preschool students diagnosed with autism spectrum disorder. In this study, specific attention to the views of educators regarding the contribution of daily music-infused interventions to enhance social and communication learning skills amongst preschoolers diagnosed with autism spectrum disorder needs to be considered as, "The rising incidence of autism spectrum disorder has led to the surge in the number of children needing autism interventions" (Srinivasan & Bhat, 2013 p.1). The findings of this study may provide a suggested model that other school leaders and special education early childhood teachers can implement to improve the social interactions and communication skills for preschoolers with autism spectrum disorder.

Research Questions

This study will examine several elements linking music with self-contained preschool classrooms developed for students diagnosed with autism spectrum disorder. The research questions that will guide this study are as follows:

1. How do preschool Special Education early childhood teachers perceive the contribution of music, if at all, as an intervention to increase communication and social learning skills in a self-contained classroom with preschool children diagnosed with autism spectrum disorder?
2. In what way, if any, do music activities infused with ABA strategies improve the social and or communication skills of preschool children diagnosed with autism spectrum disorder in their teachers' perceptions?
3. In their teachers' perception, do preschool children diagnosed with autism spectrum disorder communicate and/or socialize more often with peers instructed with music - infused ABA daily lessons?

Research Design

Through an exploratory mixed method design (Creswell et al., 2003), an interview-based inquiry, (qualitative narrative) and quantitative data collection (VB-MAPP), this researcher looked to augment the existing literature of interventions for preschool children diagnosed with autism spectrum disorder. This was done by presenting the perceptions and experiences of two special education early childhood preschool teachers, with emphasis on documenting these teachers' experiences and perceptions in the instruction of a music-infused program as an effective intervention with direct instruction of Applied Behavioral Analysis. Quantitative data from the criterion assessment, Verbal Behavior Milestones Assessment and Placement Program, was used to support the qualitative interview coded research. Emphasis was placed on the perceptions of the pre and post semi-structured interviews of the special education early childhood teachers. Evidence was examined through the quantitative source in order that the researcher build a coherent justification for the coded themes and add to the validity of this study.

Student participants were recruited via general parent outreach to two ABA self-contained preschool natural classrooms with approval from the suburban Public School District Board of Education. Central to this research agenda was an examination of the progress gained in the areas of social and communication skills with an ABA strategy program infused with daily music activities. The inductive logic process was utilized following Creswell's (2013) suggestion when collaborating with the participants interactively, with the attention that the participants have an opportunity to shape the themes or categories that emerge from the process (p. 45).

The special education early childhood teachers initially were provided two training sessions by this researcher on the instruction delivery of the pilot music-infused program in an

ABA classroom. This researcher is a certified special education preschool teacher who implemented daily pre-composed music activities for four years in a preschool self-contained classroom. The teachers were given training manuals and music equipment to carry out the music intervention instruction. Two natural self-contained preschool classes were provided the music-infused interventions in the ABA classroom and one natural self-contained preschool served as the control group. The two preschool self-contained treatment groups received 20 minutes of Music-Infused ABA intervention, five days a week, targeting social and communication skills for 6 weeks.

Qualitative data were collected through semi-structured pre and post interviews using the research questions, open-ended questions and follow-up questions to probe for further meaning. Interview questions focused on teachers' background and personal use of general music in the self- contained special education preschool classroom. Post interviews of the three special education early childhood teachers were regarding their perceptions and experiences of the contribution of music as an intervention to increase social and communication skills and as well in what ways do music activities, if any, increase social and communication skills of preschool children diagnosed with autism spectrum disorder. Observations of the preschool students diagnosed with autism spectrum disorder of two ABA programs gathered through field notes took place daily by the special education early childhood teachers to assess potential improvement and positive changes of social and communication skills during this six -week pilot study program with program implementation and or no changes. Data collection from interviews and observation field notes were coded. The coded data were classified into the themes and subthemes such as: verbal communication, nonverbal communication (eye-contact and gestures), joint attention, social communication skills (turn and look), and strengthening cognitive skills.

Descriptive statistics and primary outcome measures of pre and post ratings on the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP) on the following domains: Social Play, Intra-verbal, Listening, and Independent Play were used as to enhance validity of this pilot study. The researcher utilized the exploratory mixed method (Plano-Clark et al., 2003), which allows one to make use of a second source of data to shed light on a qualitative finding. The researcher used this method type of two-phase mixed method because this was a pilot study and other measures were not available in literature to compare results and it also provided validity to the qualitative results. The VB-MAPP are administered every 6 weeks in the ABA program by the special education early childhood teachers providing information regarding progress in the areas of social and communication skills. The results of this individual student quantitative data were used to build a coherent justification for the coded themes. Because of the sample size and the exploratory nature of this study, the results are interpreted with caution.

Significance of Study

The significance of this research is essentially at the forefront of the federal education law, the Individuals with Disabilities Education (IDEA) of 2004. As a result of amendments to IDEA in 2004, provisions of services to assist students with disabilities progress in general education classrooms as well as accessing the general education curriculum in general education or special education classrooms were afforded in this law. Furthermore, three major principles are linked to the research of this study and IDEA: accessibility, equitability and flexibility.

Based on the findings of this research, supported by cognitive, social and learning theories, educators can implement the music infused interventions to improve social skills and communication of preschoolers with autism spectrum disorders. Preschool special educators can implement an infused music program as a reinforcer for enhancing social skills and

communication. The music infused intervention requires minimum training and is flexible with respect to daily lesson planning. Cerniglia (2013) proposed that preschool teachers do not require training and experience in music to effectively teach it in an early childhood setting.

Theoretical Framework

The theoretical framework for this purposed study, social learning theory, emphasizes learning through observing and interacting with others as well as modeling from others (Woolfolk, 1998). Russian psychologist Lev Vygotsky (1896-1934) described the acquisition of learning through the concept of socio-cultural theory of learning and his research of the development of the term zone of proximal development (ZPD), in which learning takes place when a child can grasp a concept in a collaborative setting (shared experiences within a cultured environment), and through repeated opportunities for discovery and support, then progress to completing a skill independently (Kelly, 2002; White, 2015). Paralleling the work of Vygotsky, James V. Wertsch's, Voices of the Mind (1991) describes an approach to educational teaching that encompasses the social learning theory on basic cultural, historical, and instructional contexts of human life.

Social Learning Theorist Albert Bandura (1976), originator of the concept of social learning theory, believes that human behaviors are only one component of learning; beliefs, thoughts, and expectations also comprise learning. Furthermore, Bandura's (1976) research supports the concept that learning can be the result of imitating others in the natural environment. Thus, music instruction presented as teacher modeling for example of a play song for preschoolers with autism spectrum disorder whereby the performance includes observing, imitating and interacting with others reflects Bandura's social learning theory (Kelly 2009). Dialogically to extend and elaborate foundations established by Vygotsky and embeds his ideas,

for example, meditational processing- especially, language, as it effects children's thinking and processing.

The effects of positive social relationships on a child's well-being are cited in social learning theorist, Lev Vygotsky's ideas (1978). The major theme of this theoretical framework is that socialization plays a fundamental role in the development of learning. According to Vygotsky (1978), cognition occurs through provisions of collaborative or cooperative dialogue with a skillful teacher. The teacher can model behaviors and provide verbal instructions for the child whereby the child seeks to understand the actions, or the instructions provided by the teacher (parent, tutor), with the intent of internalizing the information in order to use to regulate their own performance. Vygotsky's social theory promotes a reciprocal learning experience for the children and teacher as a teacher should collaborate with each child in order to help facilitate meaningful construction. With the learning emphasis on the discovery approach, more focus is on providing the student with opportunities with opportunities to create individual meaningful ways to experience music (Kelly, 2009). Furthermore, Vygotsky's theory led to an educational practice, cooperative learning, that is widely recognized among professionals in psychology and education (Jellison, 2015).

Social learning theorist, Bandura (1997, p.19) comments "self-efficacy influences how a child thinks, reflects, and reasons; how he or she sees him or herself and others; and how he or she feels or behaves". Bandura (1997, p. 279) notes that self-efficacy is related to motivation, mental schemas, behavioral patterns, and an individual's reaction in a social situation. "Music learning and musical activities can be considered as broad educative experiences; learning improves self-efficacy and, consequently, the sense of life management. Thus, individuals recognize their own potential capabilities and opportunities, and a strengthened sense of self –

esteem contributes to social participation (Kaikkonen, M. 2015; Blair, D.; McCord, K. 2016, p.11)". According to Bandura, learning is the result of interacting with and imitating others. Students can imitate a concept modeled by the teacher. Furthermore, Bandura's theory of observational learning holds that an individual can understand and copy behavior that is observed in a model. (Baldwin, 1973). An individual must attend to a modeled behavior, remember that behavior, and later recreate that behavior. Bandura, Grusec, and Menlove (1966) found that overall observational learning is not impacted by whether incentive is provided, and that learning is strongest when the activities are actively concurrently practiced while the model is demonstrating the behavior.

In keeping with the view of the unique characteristics of autism, Applied Behavior Analysis involves learning theory. The consistent use of reinforcement to increase behaviors, generalize learned behaviors or reduce undesirable behaviors is essential to Applied Behavior Analysis (ABA). There are different teaching strategies under the subject matter of ABA, which include: shaping and chaining behaviors, discrete trial instruction, pivotal response training, incidental teaching, and fluency -based instruction.

In classrooms for preschoolers with autism spectrum disorder, although programs are designed with the natural setting in mind, the core of the program is built around the learning theory of ABA. The characteristics of autism are so unique that different behavior learning strategies of the components of ABA are integrated throughout the daily schedule of the preschool day. Grounded in social and cognitive learning theory, child development theory, and the research of Vygotsky, Bandura, Premak and Wolf, young children learn best through engagement. The concept of infusing music, as a strategy into preschool ASD programs with ABA strategies will potentially maximize preschoolers' experiences in communication and

social interaction skills by affording engaging musical activity opportunities through meaningful social connections.

The increased prevalence of students diagnosed with autism spectrum disorder has encouraged a positive action on the part of educators to create effective interventions practices to support their social interaction and communication engagement in the natural setting. Due to the lack of social communication skills, many children with autism spectrum disorders will communicate when they are motivated to express a desire (Prizant et al., 2006). Music motivates children naturally, particularly those with autism (Kern, 2008). Children with autism need to learn socially appropriate ways to express their emotional state (Laurent & Rubin, 2004) and when making music, the music may serve as a focus for attention (Walworth, 2010). Implementing infused music strategies with behavior learning components may support children with autism to comfortably attain the goal of applying and generalizing social and communication skills in the natural setting.

Definition of Terms

Applied Behavior Analysis (ABA). "The process of systematically applying interventions based upon the principles of learning theory to improve socially significant behaviors (i.e., social skills, adaptive living skills, reading skills, communication and academics) to a meaningful degree, and to demonstrate that the interventions employed are responsible for the improvement in behavior (Baer, D., Risley, T., Wolf M., 1968, p. 313-327)."

Autism Spectrum Disorder (ASD). "Autism, or autism spectrum disorder (ASD), refers to a broad range of conditions characterized by challenges with social skills, repetitive behaviors, speech and nonverbal communication. There is not one autism but many subtypes, most influenced by a combination of genetic and environmental factors. Because autism is a spectrum disorder,

each person with autism has a distinct set of strengths and challenges. The ways in which people with autism learn, think and problem-solve can range from highly skilled to severely challenged. Some people with ASD may require significant support in their daily lives, while others may need less support and, in some cases, live entirely independently. Several factors may influence the development of autism, and it is often accompanied by sensory sensitivities and medical issues such as gastrointestinal (GI) disorders, seizures or sleep disorders, as well as mental health challenges such as anxiety, depression and attention issues (retrieved from: www.autismspeaks.org (2002)

Individuals with Disabilities Act (IDEA). Federal legislation initially named the "Education for all Handicapped Children Act", signed by President Ford in 1975, which revolutionized educational policies and programs for students with disabilities. This law was re-authorized and signed by President Bush in 2004 as the "Individuals with Disabilities Improvement Act". IDEA provides for full educational opportunities to all students with disabilities, ages 3 through 21.

Early Childhood. The National Association for Early Childhood (NAEYC) defines "early childhood occurring birth to age eight. It is during this time period that a child goes through the most rapid phase of growth and development. This research study focused on preschool children from ages three to five.

Music Education. "A global human phenomenon involving the development of cognitive, psychomotor, and affective social skills" (Kelly, 2009, p.5). The focus of music education is for students to learn and appreciate music and develop or refine musical skills, usually with the goal of performing as a group (class).

Music Therapy. "An established health profession in which music is used within a therapeutic relationship to address physical, emotional, cognitive, and social needs of an individual (retrieved from: www.musictherapy.org (2017)." Music therapy interventions can be designed to improve communication and language skills, enhance memory skills, promote social skills, support physical rehabilitation, manage anxiety and express feelings.

Social Communication Skills. "An individual may say words clearly and use long, complex sentences with correct grammar, but still have a communication problem - if he or she has not mastered the rules for social language known as pragmatics. Pragmatic communication is the use of language for greeting, informing, demanding or requesting. Pragmatic communication is the use of changing language according to the needs of a listener or situation, such as speaking differently inside a building than outside. Finally, pragmatic communication if the use of language for following rules for conversations and storytelling, such as taking turns in conversations, staying on topic, how close to stand to someone when speaking, or how to use facial expressions and eye contact" (retrieved from: www.asha.org (2017).

Social Skills. Typical social skills in preschool children ages, 3 to 5, involves the development of social interactions with peers and development of play behaviors. Play behaviors begin with solitary play and gradually work towards cooperative play. Social skills include imitating and responding to others verbally and nonverbally, having empathy, making good friendships, and presenting with appropriate affect to the social situation.

CHAPTER 2

LITERATURE REVIEW

Conceptual Underpinnings for the Study

Each preschool child is different in the way he or she communicates, behaves, and thinks, however, there are some consistent characteristics common for children diagnosed with autism spectrum disorder (Hourigan, 2014). The common characteristics of these preschoolers are the following: lack of social interaction, empathy, uneven and inconsistent skills in communication, and sensory processing. These are also identified as common core deficits when a comprehensive team conducts an assessment to diagnosis a child with autism spectrum disorder.

Theoretical Framework

Theory of Mind

Social cognition learning theorists, Premack and Woodruff (1978) site the Theory of Mind (ToM) as social cognitive development whereby intuitive awareness begins to develop at birth and later becomes more reflective and explicit. The Theory of Mind appears to be unique to those diagnosed with autism spectrum disorders and developmental disabilities. These individuals have difficulty understanding that others have their own plans, points of view and thoughts. Lack of Theory of Mind has also been appropriately termed “mindblindness” (Baron-

Cohen, 1995), which for children diagnosed with autism spectrum disorder creates major barriers in communication and closeness.

Furthermore, children with autism have difficulty understanding other peer and adult emotions, attitudes and beliefs. For example, a child with autism can become confused by the emotional the act of an adult crying. While an adult may elicit tears due to the emotion of sadness, tears can also be emitted for happiness. “Children with autism tend to have odd or inappropriate reactions to the mental states of others (Hourigan, 2014).” This mental state of confusion may result in the child with autism laughing at the adult who is crying.

Theory of Mind (ToM) as well as empathy, the ability to understand and share the feelings of another, are closely related and affect how the child with autism will engage in a social group setting and thus closely linked to music learning because of the affective nature of musical expression (Cross, Laurence, Rabinowitch, 2012). Interventions designed to support affective development and theory of the mind challenges by music educators and special educators from the Prism Project (2009) explored implementing the appropriate reactions to an emotion within a performing arts program. Furthermore, Hourigan (2014) reports that the educators found that music can be used to explore the extremes of emotion by infusing appropriate movement and facial expressions with the emotion.

A review of the literature conducted by Molnar-Szakacs and Heaton (2012) reported that while impaired emotion is characteristic to children with autism, research indicates that these children are able to identify emotions embedded in lyrics to music. Molnar-Szakacs and Heaton (2012) suggest that music might be a means for understanding the noted lack of empathy. Allen and Heaton (2009) have stated that music is able to reach children with autism; that music may have clinical implications for social and emotional development.

Vygotsky-Zone of Proximal Development (ZPD)

The effects of positive social relationships on a child's well-being are cited in social-cultural-learning theorist, Lev Vygotsky's ideas (1978). The major concept of this theoretical framework is that socialization and social interactions play a fundamental role in the development of learning. Vygotsky emphasized early childhood development is not spontaneous but rather the outcome of a child's interaction with his or her environment (Leong & Bodrova, 2000). According to Vygotsky (1978), cognition occurs through provisions of collaborative or cooperative dialogue with a skillful teacher. Vygotsky's view of a teacher is to facilitate a child's learning experience by scaffolding developmentally age- appropriate experiences while setting high expectations (Ogunnaike, 2015). The teacher can model behaviors and provide verbal instructions for the child whereby the child seeks to understand the actions, or the instructions provided by the teacher (parent, tutor), with the intent of internalizing the information in order to use to regulate their own performance. Vygotsky's social theory promotes a reciprocal learning experience for the children and teacher as a teacher should collaborate with each child in order to help facilitate meaningful construction. With the learning emphasis on the discovery approach, more focus is on providing the student with opportunities to create individual meaningful ways to experience music (Kelly, 2009). Furthermore, Vygotsky's theory led to an educational practice, cooperative learning, that is widely recognized among professionals in psychology and education (Jellison, 2015). Vygotsky stated that learning is a social act, which needs to take place in cooperative social learning environments (Bodrova & Leong, 2007). Vaiouli and Ogle (2014) stated, "Music activities can facilitate social communication in the early childhood setting and

provide a frame to initiate and maintain peer interaction, increase attention, and develop appropriate play activities, all of which are important goals for young children with autism spectrum disorder. However, early childhood educators may need to modify and or scaffold the music strategies presented due to challenges some children with autism spectrum disorder have in relation to auditory over-stimulation when hearing music."

The framework for Vygotsky's theory is embedded in the concept of the Zone of Proximal Development (ZPD). Through his research, Vygotsky explained that the ZPD, which occurs during purposeful play activity, is the gap between a child's present level of development and the child's potential level of development (Vygotsky, 1978). Vyotgsky believed that play is a purposeful activity and essential for early childhood development (Vygotsky, 1967) in that it allows preschoolers to learn age appropriate social, cognitive, emotional, language and physical skills. "Young children engage in music as play" (Kemple et al., 2004; Moorehead & Pond, 1978; Neelly, 2001). Similar to Vygostsky's belief of play for all children to enhance their social skills, cognitive and communication, studies in which interactive music activities and songs were integrated in the daily routines of early childhood settings with children diagnosed with autism spectrum disorder reported positive results on the children's level of engagement and academic growth (Carhnahan et al., 2009; Lanter & Watson, 2008; Vaiouli & Ogle, 2014).

Vygotsky also believed that the role of primary teachers is to facilitate the learning experience of the child by scaffolding a task in order for the child to develop the skill independently in the near future (Bodrova & Leong, 2007). Task analysis, comparable to Vygotsky's principle of scaffolding, is linked to the evidenced-based Applied Behavior Analysis, "For most music therapists, designing sessions within an ABA framework will not require a shift

in philosophy, but rather a proper understanding of the various principles and practical applications of Applied Behavior Analysis" (Kern & Humpal, 2012; Martin, 2012 p.102).

The levels of assisted performance in the ZPD for one child may vary from one developmental area to another or at different times in the learning process. The level of assisted performance includes direct social interactions from the facilitator to the child along with providing any or all the following mediators: giving prompts, rephrasing questions, modeling the task or part of it, and or requesting the child to restate has been said, asking the child what he understands (Bodrova & Leong, 2007).

From Vygotsky's social-constructivist perspective, preschool teachers have to do more than set the approach for music within the preschool setting by providing space, time, musical materials and pushing the button on the CD player (Kemple, Baley, & Hartie, 2004). Providing preschool children with a rich musical setting along with consistent teacher support that gradually fades as the musical skill becomes independent, enhances skills of imitation, repetition modeling and motivation (Kemple et al.,2004).

Voices of the Mind

The ideas of both Bakhtin and Vygotsky have been compared by Developmental Psychologist, James V. Wertsch (1991) and have been constructed into a more fundamental cultural-historical model of human consciousness also known as: A Social cultural Approach to Action. Wertsch (1991), focuses upon the Bakhtinian notions as voice, utterance, speech genres, and dialogicality to extend and elaborate foundations established by Vygotsky and embeds his

ideas, for example, meditational processing- especially, language, as it effects children's thinking and processing.

Furthermore, the relevance of Voices of the Mind for this study is Wertsch's (1991) unique focus on developmental issues such as integrating the "natural" or biological course of development of the child and cognition as well as problems such as emotions, human needs, or motivation that offer insights into the process of the development of the mind, human growth and functioning as an accountable learning approach in the social cultural development of a child (Wertsch, 1985).

Observational Learning

Bandura's theory of observational learning holds that an individual can understand and copy behavior that is observed in a model (Baldwin, 1973). An individual must attend to a modeled behavior, remember that behavior, and later recreate that behavior. Bandura, Grusec, and Menlove (1966) found that overall observational learning is not impacted by whether incentive is provided, and that learning is strongest when the activities are actively concurrently practiced while the model is demonstrating the behavior. Behavior is least likely to be learned when a competing activity is performed during observation time. In keeping with the theories of observational learning, Charlop, Schreibman, and Tryon (1983) found that all students in the study were able to learn through observation of a peer model, and that the acquired generalization and maintenance of the responses were better when learned through observation than by trial and error. Egel, Richman, and Koegel (1981) had similar results, finding that

autistic children's learning of discrimination tasks was improved after observing normal children correctly performing the task.

More recently, Greer, Singer-Dudek, and Gautreaux (2006) defined observational learning as the process of acquiring a skill, or a set of skills, as a result of observing others along with contingencies of reinforcement or punishment (Cochran, Leaf, & et. al., 2015). Research has indicated that typically developing children are capable of learning by simply observing others with which they come into contact (peers or adults) along with response contingencies (Catania, 2007). According to Catania (2007) an individual must demonstrate an assortment of prerequisite behaviors such as: generalized imitation, self-awareness, verbal behavior, and the ability to discriminate; in order to successfully acquire skills through observation.

(Lovaas, 2003) demonstrate delays across these prerequisite skills sets, which could explain why children with autism may not as readily learn through observation as their typical peers. However, to provide teachers, clinicians, and therapists such as music therapists, with strategies to increase observational learning skills in children with autism, curriculum guides have been written, offer activities to practice and skills to acquire to make observational learning more likely to occur (Leaf & McEachin, 1999; Lovaas,1981; 2003Maurice et al. 2001; Taubman et al., 2001).

In a study conducted by Nadel and colleagues (2011), an observational learning design was used to study how well non-verbal children with autism (N=20) compared to typical children (n=20), aged 2-3 years old, when asked to complete a sequence of steps to open a latched box. The children with autism observed a live demonstration and a video demonstration of a series of steps indicating how to open the latched box within four testing periods. Results of this study indicate that the typically developing children learned the sequence at least partially if not fully

after two video presentations. The children with autism spectrum disorder learned the sequence whether partially or fully by the second live demonstration; suggesting that children with autism can learn behaviors by observing the actions of others.

Applied Behavior Analysis

Applied Behavioral Analysis (ABA) is an applied science, which examines how biological and environmental factors affect changes in behavior (Kern and Humpal, 2012). For preschoolers diagnosed with autism spectrum disorder, Applied Behavioral Analysis methods are often used to promote improved quality of life and socially relevant behaviors (Leach, 2010). For more than thirty years, the efficacy of applied behavior analysis-evidence- based methods have been used, studied and documented around the world to determine which strategies are empirically supported for improving behavior, communication, and learning of individuals diagnosed with autism spectrum disorder. The National Autism Center (NAC) and the US Surgeon General's report (U.S. Department of Health and Human Services, 2011) have recognized Applied Behavioral Analysis studies as effectively reducing inappropriate behavior, increasing communication, learning and appropriate social behaviors (Kern and Humpal, 2012). Music therapists, Kern and Humpal (2012) recommend that music therapists need to understand the common terms associated within the context of the framework of Applied Behavioral Analysis. Upon gaining a better understanding of the four major principles of Applied Behavioral Analysis, which include reinforcement, prompting, task analysis and generalization, Kern and Humpal (2012) support that music therapists keep informed about current ABA

research in order that they may be better equipped to deliver music therapy treatment infused these ABA principles.

In keeping with the view of the unique characteristics of autism, Applied Behavior Analysis (ABA) also involves learning theory (Cooper, 1982). The consistent use of reinforcement to increase behaviors, generalize learned behaviors or reduce undesirable behaviors is essential to Applied Behavior Analysis (Rosenwasser & Axelrod, 2001; Harris & Delmolino, 2002). There are different teaching strategies under the subject matter of Applied Behavioral Analysis, which include: shaping and chaining behaviors, discrete trial instruction, pivotal response training, incidental teaching, and fluency-based instruction (Fox, 2008).

Many preschool classrooms intended for youngsters with autism spectrum disorders are built around the learning theory of ABA (Peters-Scheffer et al., 2011). The characteristics of autism are so unique that different behavior learning strategies of the components of Applied Behavioral Analysis are integrated throughout the daily schedule of the preschool day for these students to experience success in the natural learning environment (Peters-Scheffer et al., 2011). Grounded in social and cognitive learning theory, observational-learning and zone of proximal development through the psychological research of Vygotsky, Bandura, Premak and Wolf, young children learn best through engagement, observation, motivation, and practice (Strain & Schwartz, 2001).

The concept of infusing music as an intervention into preschool programs with Applied Behavioral Analysis strategies maximizes learners' experiences to progress in communication and social interaction skills and affords the child the opportunity to make meaningful social connections while engaged in the learning process (Lim, H. & Draper, E., 2011).

The increased prevalence of autism spectrum disorder has encouraged a call for action on the part of special educators to create effective interventions practices to support their social interaction and communication engagement in everyday life (Christensen et al., 2016). Due to the lack of social communication skills, many children with autism spectrum disorder will communicate when they are motivated to express a desire (Prizant et al., 2006). Music motivates children naturally, particularly those with autism (Kern, 2008). Children with autism need to learn socially appropriate ways to express their emotional state (Laurent and Rubin, 2004) and when making music, the music may serve as a focus for attention (Walworth, 2010). Implementing infused music strategies with behavior learning components may support children with autism to comfortably attain the paramount goal of generalizing social and communication skills across different environments.

Social Skills

"Autism spectrum disorder is characterized by deficits in social communication and/or social interaction across multiple contexts" (Karal & Wolfe, 2018; American Psychiatric Association, 2013). Children with autism spectrum disorder struggle to develop meaningful social relationships with their peers (Peter, Tullis, & Gallager, 2016). Southall and Campbell (2015) define socialization "as the process of realizing the norms and customs of a community through ongoing interactions and behaving accordingly in order to participate in society, which helps a person to enact different roles in various professional, educational, and casual relationships." Najdowski (2012) proposed effective socialization requires that an individual know appropriate behaviors for acceptable social interaction and have the ability to perform.

These behaviors based on social cognition, or the understanding of their peers and the situation within which they exit. Southall and Campbell (2015) explain social cognition as recognizing or understanding the mental states of others, often referred to as Theory of Mind (ToM), originated by Premack & Woodruff in 1978. Since that time, many researchers believe that social deficits in children with autism spectrum disorder are most consistent to the framework of Theory of the Mind (ToM) and represent the negative aspect of Theory of Mind or the inability to realize that other individuals' perspectives (emotions) are different from their own (Southall & Campbell, 2015). A child with autism spectrum disorder might have difficulty understanding why people cry, requiring understanding of context and social cues (Hourigan, 2014). Children with autism can become confused by the act of crying and reason that this is an act that only should happen when one is sad. This state of confusion is a common challenge for a child with autism (Hourigan, 2014). In 2015, research conducted by David Greenberg, Peter Rentfrow and Simon Baron-Cohen provide evidence from open-ended descriptions of strong musical experiences to demonstrate the ways in which empathy and music inter-relate.

One study, currently in its tenth year, The Prism Project, in partnership with the School of Music at Ball State University, Muncie, Indiana, utilizes the performing arts and direct interaction as a medium, which affords opportunities for children with autism to learn appropriate social skills, and skills of empathy (Hourigan, 2014). Over the past ten years, the students of the research –formed practice and pedagogy of the Prism Project continual provide insights into the effectiveness of music to build social skills and empathy in an expressive way (Hourigan, 2014).

Establishing the importance of social skill development for preschoolers diagnosed with autism has been recognized as a major component of education programming and goals included

in the Individuals with Disabilities Education Act (Karal &Wolfe, 2018). The National Association for Music Education (NAfME; Boston, 2000; Vaiouli & Olge, 2015) has compiled a list of long-term benefits of music experiences that when used intentionally in preschool classrooms will encourage engagement, emotional regulation and academic skills. Music activities in a group setting can support social skills such as turn taking, reciprocity, following directions as well as increase joint attention (Lee, 2010a, 2010f, 2011d, 2012a).

Measurement of social skills is an issue that allows parents and educators data points against which to measure student growth. Social skills, as a concept, is complex and difficult to define in measurable terms (Koenig, De Low Reyes, Cicchetti, Scahill, & Klin, 2009; White, Koenig, & Scahill, 2007). Questionnaires are the typical method for assessing social skill levels, and this data are compared against a normative sample (McMahon, Vismara, & Solomon, 2013). Some studies have utilized direct observation and note strength to this approach is the ability to directly examine social performance. Elliott & Gresham (1987, p. 97) argue that the use of observation is "the most ecologically valid method of assessing children's social skills." Additionally, observation is the main method for measuring student skill and progress in ABA programs (Vismara & Rogers, 2010).

There have been many studies examining the change in social skills demonstration after an intervention. Hillier et al (2007) found that the longer participants were involved in an intervention, the more frequently they engaged with each other. It was similarly found that autistic students appeared to generalize social skills training, as demonstrated by increased time interacting with peers at school after an intervention (Bauminder, 2002; LeGoff, 2004; Owens et al., 2008; Ruble, Willis & Crabtree, 2008). However, the studies do not show definitively which social skills are the most important as far as social skills assessment and intervention. Overall,

these results indicate that social skills are educable and changeable, with the potential to respond to intervention.

Communication Skills

One of the most challenging restrictions for preschool children diagnosed with autism spectrum disorder is a speech/language deficit. Every preschool child diagnosed with autism spectrum disorder is different, however, all have problems with speech and communication skills but not in the same way (American Speech -Hearing Associates, 2018). One of the core diagnostic characteristics of autism recognized by the American Psychiatric Association (DSM-V, 2013) is a communication deficit. The American Speech -Hearing Association (2018) reports that a child with autism spectrum disorder may have initially developed expressive language but shortly lose it by the developmental age of 12-18 months. Regarding preschoolers diagnosed with autism spectrum disorder, 40% are nonverbal. The preschoolers who develop expressive speech often demonstrate atypical prosody. These preschoolers do not demonstrate difficulty in the area of expressive lexical content, but tend to have problems in producing utterances with expressions (National Autism Association, 2018)

Dermaine (2017) reports that "among the other skills needed language development is joint attention or dyadic attention interaction." Music therapist, Dr. Dermaine, (2017) suggests that joint attention and dyadic attention are critically important in cognitive and social development for the child diagnosed with autism. Joint attention allows the child to focus on the person who is speaking to the child and assists with finger pointing and tracking objects. Poor eye gaze affects joint attention and generally presents as a characteristic of ASD (Dermaine, 2017; Murray et al., 2008; Osterling, Dawson, &Munson, 2002).

Music Therapy and Autism

The effects of music therapy and the autistic population have been previously studied in some research. Reschke-Hernández summarized in 2011 that music therapy with the intent to improve communication, expressive language, and receptive language appeared as early as 1964, but many types of music therapy approaches began to emerge in the 1980's, particularly as interventions for echolalia, social skills, play, and motor skills. Crane (2016) described how music therapy is suited for treatment of social skills, joint attention, communication and behavior in the autistic population. A technique known as "piggybacking" was described as familiar tunes with changed words to fit the need of the situation. Piggybacking is notable for its ability to be molded into social stories and therapeutic songs, which can be useful for social and behavioral training. Additionally, the rhythmic timing aspect of music has been found to be helpful in many social areas, such as turn taking and responsive communication. Kern et al (2013) evaluated different practices in music therapy in assisting individuals with ASD. The study found that current trends include providing most treatment in public schools, followed by in the home and finally in private practice. Additionally, a broad range of client age was noted, but most clinicians worked with children and preteens. Therapist-identified goals of music therapy include increases in communication skills, social skills, and emotional skills. The most common clinical approach was a behavioral approach to music therapy, and included singing and vocalization, instrument play, movement and dance, and free/thematic music improvisation.

Hourigan and Hourigan (2009) outlined strategies based on personal experience that can be helpful for music therapists and music educators when interacting with the autistic population.

Specific strategies noted were the usage of Picture Exchange Communication Systems (PECS), limiting the length of instructions, and anticipating transitions.

Improvisational Music Therapy was investigated in the effect on joint attention for 10 preschool children with autism (Kim, Wigram & Gold, 2008). The study juxtaposed improvisational music therapy with standard play sessions and found that improvisational music therapy was more effective in eliciting joint attention behaviors than play alone. Improved behaviors of note included more eye contact, lengthier eye contact, and turn-taking. Improvisational Music Therapy was further examined by Raglio, Traficante and Oasi (2011) through a case study of three videotaped sessions with a seven-year-old child diagnosed with Autism. Overall development was evaluated to be at 17 months of age, with challenges noted in communication and cognition. The authors noted that physical contact, eye contact, attuned movement, and social approaching dramatically increased.

Boso et al (2007) examined the impact of interactive music therapy on behavioral and musical skills for young adults with the autism diagnosis. They found that significant improvements were made as measured by scales examining symptoms, psychiatric presentation, as well as musical skills. This study looked at 8 young adults in their 20's and 30's, and took part in 52 weekly music therapy sessions, utilizing piano, drums, and electric keyboards.

Gattino et al (2011) investigated how Relational Music Therapy (RMT) impacted verbal, nonverbal, and social communication for 24 boys diagnosed with autism. While no change was found when evaluating symptoms of autism, a positive change was found in nonverbal communication. RMT is significant for improvisation, as the behaviors and actions of the participant are the focus and interventions are based on observation of these areas.

Schwartzberg and Silverman (2014) described music therapy treatments for children with autism. Music therapists answered surveys, and it was found that therapists tended to use more pre-existing songs, followed by original compositions and "piggyback" songs with lyric replacement. However, the most common songs utilized were named as original compositions. For example, most therapists indicated a live-performed original composition (as opposed to pre-recorded, or live-performed pre-existing song) for their "hello/welcome" song, teaching and enhancing behavior/psychosocial skills, facilitating improvement in cognitive functioning, sensory integration/exploration, body regulation, transitioning between interventions, and "goodbye/closure" song. Therapists endorsed almost equal numbers for live-performed original compositions and live-performed pre-existing compositions for improvement in perceptual motor skills, teaching/enhancing communication skills. Typically, prerecorded songs were not endorsed.

Generally, music therapy is classified as an emerging evidence- based practice by the Standards National Project conducted by the National Autism Center (2009). Though research reports that some children with autism spectrum disorder may be over-stimulated by music and or the loud noises it produces, studies in which pre-composed songs and interactive music making are incorporated into the daily routine of children with autism spectrum disorder, report positive results on the level of social engagement and their academic growth (Canahan et al., 2009; Lanter & Watson, 2008).

Music as an Intervention

Some studies have examined the efficacy of music as an intervention for autistic students. Kim, Wigram & Gold (2008) studied improvisational music therapy in ten autistic boys and found that improvisational music therapy was more effective than play in facilitating nonverbal social communication. Pasiali (2004) studied the effects of prescriptive therapeutic songs on three children with autism and whether the intervention improved social skills acquisition. Some indication was found that prescriptive songs could be utilized as a helpful intervention. Boso et al. (2007) studied eight young adults with severe autism, and their reactions to one year of weekly music therapy sessions. Significant improvements were found on their clinical psychiatric functioning as well as their music skills. Reitman (2006) examined severely autistic preschool children, and the effect of music therapy on joint attention. Overall joint attention was found to improve between 8 and 40%, with other positive secondary effects such as decreased resistance to change, decreased specific fears, and increased phonological skills. Venuti et al. (2017) examined synchrony (a component of interaction that underlies reciprocity and emotive regulation) in children with ASD who were provided improvisational music therapy. The amount of synchrony was found to improve following music therapy and was determined to be a good indication of efficacy of music therapy in the ASD pediatric population.

The use of pre-composed songs and music activity songs during instructional time such as circle time is one way to promote social engagement and learning for all learners in the group, including those diagnosed with autism spectrum disorder (deVries, 2006; Hallam, 2010; Lanter & Watson, 2008). The research of Kaplan and Steele (2005) concluded that young children with autism tend to be more engaged when language is presented in pre-composed songs during

extended language activities. Music making activities (games) have been used to cue early childhood students and engage students with autism spectrum disorder. The use of familiar pre-composed songs supports successful transitions for preschoolers with autism spectrum disorder. Kern et al (2007) and Vaiouli & Ogle (2014) recommend the use of pre-composed songs into preschool classroom routines as they offer structure, while their rhythmic and melodic aspects promote attention to instructions and social interactions.

Music –based interventions have been used to enhance these specific social skills: eye contact, engagement, and spontaneous initiation of social interactions in children with autistic spectrum disorder (Kern & Aldridge, 2006; Kern et al, 2007; Kern et al., 2007; Kim et al., 2009; Stephens, 2008). Kim (2009) conducted a 12-week intervention study of improvisational music therapy. The outcome of this study concluded significant increases in the frequency and duration of shared positive affect and joint attention with the music therapist. Similarly, a seven-month music intervention involving different types of rhythmic movement games to music between a child with autistic spectrum disorder and his mother led to an increase in the frequency of eye contact and spontaneous initiation of interactions by the child with the mother (Wimpory et al., 1995).

According to Srinivasan and Bhat (2013), at least 12% of all autistic spectrum disorder interventions in schools integrate music into therapy treatments, ranging from singing directions to actively playing instruments. The benefits of incorporating music into treatments include improved communication skills (Braithwaite & Sigafoos, 1998; Shore, 2003), socialization and play skills (Finnegan & Starr, 2010; Kern & Aldridge, 2006), as well as engagement (Standley & Hughes, 1997). In 2015 Hashemian and Mohammadi (2015) conducted a quantitative research analysis with children between the ages of 9 to 11 years old, diagnosed as having mild

intellectual disabilities with a core deficit of social communication skills. Hashemian's and Mohammadi's (2015) research consisted of one control group without music therapy sessions of any kind and the experimental group with exposure to seven sessions of music therapy. Results of Hashemian's and Mohammadi's (2015) research demonstrated that music therapy could increase social skills in children with intellectual disability. Hashemian and Mohammadi hypothesized that the effect of music therapy on social growth may be due to the overall effect that music has on mood regulation.

Music therapy treatments for young children with autism spectrum disorder were found effective for improving communication, interpersonal skills, personal responsibility, and play (Whipple, 2012). Music therapy interventions were found to elicit joint attention (Kalas, 2012); enhance auditory processing, sensory-motor, perceptual/motor, and gross/fine motor skills (LaGasse & Hardy, 2013); and identify and appropriately express emotions (Katagiri, 2009). All these studies though different in design, methodology, and outcome measures, suggest some evidence to support integrating music into autistic spectrum disorder interventions.

Whipple (2004) reviewed nine quantitative studies regarding music therapy integrated as an intervention with children with autistic spectrum disorder. Whipple (2004) suggested that music appeared to be a powerful tool for children with autism spectrum disorder as it achieves positive results regardless of its use or purpose. Wigram and Gold (2006) concluded from their study that music therapy promoted interpersonal communication, reciprocity and the development of relationship-building skills. Whipple (2012) conducted a meta-analysis study by examining eight experimental studies implementing music therapy for young children with autism spectrum disorder. Whipple found music to be an effective therapy treatment for addressing the core deficits of autism spectrum disorder, with positive results noted in the areas

of interpersonal skills, play, communication, and personal responsibility. Furthermore Whipple (2012) suggested that the use of music therapy, with children diagnosed with autism spectrum disorder, increased communicative behaviors such as vocalization, verbalization, gestures, vocabulary comprehension, and echolalia with communicative intention.

Summary

In Chapter 2, the literature review has presented the underpinning for the research study to be described in chapter 3. The rising numbers of children diagnosed with autism spectrum disorders demonstrate an increasing need for interventions that innately reach the unique interests and abilities of children with autism spectrum disorders (CDC, 2018). The National Autism Center (NAC) and the US Surgeon General's report (U.S. Department of Health and Human Services, 2011) have recognized Applied Behavioral Analysis studies as effectively reducing inappropriate behavior, increasing communication, learning and appropriate social behaviors (Kern and Humpal, 2012). Since music therapy sessions have shown improvement for children with autism spectrum disorder in social, communication and language skills including cognition and joint attention (Wigram &Gold, 2006; Whipple, 2012; Hashemian & Mohammadi, 2015) and Applied Behavior Analysis. The concept of infusing music as an intervention into preschool programs with Applied Behavioral Analysis strategies maximizes learners' experiences to progress in communication and social interaction skills and affords the child the opportunity to make meaningful social connections while engaged in the learning process (Lim, H. & Draper, E., 2011). This study addresses the problem of whether music infused Applied Behavior Analysis programming may be a vehicle for increasing social skills and communication for children with

autism versus traditional programming embedded in the theoretical framework of social cognitive learning theory.

CHAPTER 3

METHODS

The purpose of this study was to examine and comprehend the narratives of special education early childhood teachers assigned and trained to deliver a music-infused intervention program within a natural self-contained ABA program, five days a week, 20 minutes a day, for a duration of 6 weeks. to a population of ten preschool students, ages 3-5, diagnosed with autism spectrum disorder. This chapter will describe the research design, research setting, data collection, instruments, data analysis and role of the researcher. The research questions that guided this exploratory mixed method study are the following:

1. How do preschool Special Education early childhood teachers perceive the contribution of music, if at all, to communication and social learning in a self-contained classroom with preschool children diagnosed with autism spectrum disorder?
2. In what way, if any, does music activities infused with ABA strategies improve the social and or communication skills of preschool children diagnosed with autism spectrum disorder in their teachers' perception?
3. In their teachers' perception, do preschool children diagnosed with autism spectrum disorder communicate and/or socialize more often with peers when instructed with music infused ABA daily lessons?

Research Design

The exploratory mixed method research design was used for this study for three special education early childhood teachers to examine the effectiveness of a music- infused intervention with a preexisting variable of a diagnosis of autism in all student preschool participants. Emphasis was placed on the perceptions of the pre and post semi-structured interviews of the special education early childhood teachers. Evidence was examined through a quantitative source (VB-MAPP) to build a coherent justification for the coded themes established adding to the validity of this study. Two self-contained preschool ABA classroom groups were chosen for the pilot study to receive music- infused intervention ABA instruction for a duration of 6 weeks, five days a week, 20 minutes a day and one natural self-contained class and special education early childhood teacher for the control group. This research design invoked the concept of methodological congruence advanced by Morse and Richards (2002,) and Creswell (2013, p.50). Creswell states, "that the purposes, questions, and methods of research are all interconnected and interrelated so that the study appears as a cohesive whole rather than as fragmented, isolated parts" (Creswell, 2013, p.50). The researcher whose role is one of the inquirers followed an interconnected research process.

Narrative analysis is increasingly used for studies of educational experiences because it is concerned with the general notion that teachers and learners are storytellers and characters in their own stories and other stories (Clandinin & Connelly, 2000). Through narratives or stories, humans communicate how they make sense of the world they experience, and narrative analysis uses stories as units of analysis in order to generate common themes in order to comprehend how people create meaning from their experiences (Clandinin & Connelly, 2000). This research

design is appropriate for inquiries exploring the effects of music on the social and communication skills development and what the teachers' perceptions and experiences are of a daily music curriculum within the ABA program of preschool children diagnosed with autism.

By way of semi-structured pre and post interviews, the special education early childhood teachers described the social and communication skills improvement noted, as a result of the intervention of music-infused activities in the natural setting of their self-contained classroom during the six- week pilot study. This narrative research study looked to augment the existing literature of interventions for preschool children diagnosed with autism spectrum disorder by presenting the perceptions and experiences of two special education early childhood preschool teachers, with emphasis on documenting these teachers' experiences and perceptions in the instruction of a music-infused program as an effective intervention with direct instruction of Applied Behavioral Analysis in self-contained natural setting classrooms with preschool participants with a preexisting variable of a diagnosis of autism spectrum disorder. The inductive logic process was utilized following Creswell's (2013) suggestion when collaborating with the participants interactively, with the attention that the participants have an opportunity to shape the themes or categories that emerge from the process (p. 45). Pre- interview questions focused on the three special education early childhood teachers' background and personal use of general music in the self- contained special education preschool classroom. Post interviews of the two special education early childhood teachers were regarding their perceptions and experiences of the contribution of music as an intervention to increase social and communication skills and as well in what ways do music activities, if any, increase social and communication skills of preschool children diagnosed with autism spectrum disorder.

The special education early childhood teachers were provided two training sessions by this researcher on the instruction delivery of the pilot music-infused program in an ABA classroom. This researcher is a certified special education preschool teacher who implemented daily pre-composed music activities for four years in a preschool self-contained classroom. The teachers were given training manuals and music equipment to carry out the music intervention instruction. Two natural self-contained preschool classes were provided the music-infused interventions in the ABA classroom and one natural self-contained preschool served as the control group.

Observations of the preschool students diagnosed with autism spectrum two ABA programs gathered through field notes took place daily by the special education early childhood teachers to assess potential improvement and positive changes of social and communication skills during this six -week pilot study program with program implementation and or no changes. Data collection from interviews and observation field notes were coded. The coded data were classified into the themes and subthemes such as: verbal communication, nonverbal communication (eye-contact and gestures), joint attention, social communication skills (turn and look) strengthening cognitive skills.

This researcher utilized the exploratory mixed method (Creswell, Plano Clark, et al., 2003), which allowed the examination of a quantitate data source (VP-MAPP) in order to build a coherent justification for the themes of social and communication skills findings with the qualitative research. The VB-MAPP, a criterion assessment, is administered every 6 weeks in the ABA program by the special education early childhood teachers to providing information regarding progress in the areas of social and communication skills. The results of this individual student quantitative data were used to build a coherent justification for the validity of the coded

themes established through observation noted. However, because of the sample size and the exploratory nature of this study, the results of the VM-MAPP should be interpreted with caution.

Research Setting

This exploratory mixed method research study looked to augment the existing literature of interventions for preschool children diagnosed with autism spectrum disorder by presenting the perceptions and experiences of three special education early childhood preschool teachers, with emphasis on documenting these teachers' experiences in the presentation of a music program as an effective intervention infused with the direct instruction of Applied Behavioral Analysis for preschool students with the preexisting variable of a diagnosis of autism. Central to this research agenda will be an examination of the progress gained in the areas of social and communication skills with music infused intervention within a classroom that utilizes ABA methodology. This was achieved through post semi-structured interviewing as the primary method of data collection, an open-ended method of questioning, and open and inductive coding as primary forms of analysis. To obtain the perceptions and experiences of special education early childhood teachers, an early childhood elementary school with special education self-contained preschool classes with ABA instruction was chosen for this study. The community grade span of this suburban school ranges from Pre-K 3 to Pre-4.

According to 2020-2021 enrollment data from the National Center for Education Statistics (NCED, 2021), an Elementary School in a northeastern suburban location, serviced 238 students with a total of 25 classroom teachers, inclusive of special education teachers. The average student to teacher ratio for general education was 9.52. For school year 2020-2021, this Preschool accommodated a total of 21 early childhood classes. Approximately 63.2% of this school's student population identify as typical students and receive instruction in general

education. Special education students make up approximately 36.8% of the student population and receive Individual Educational Programming in one of seven designated special education self-contained classes. Of the 36.8% classified students placed in self-contained, approximately 12.3% of the preschool students have a diagnosis of autism and are placed in one of three self-contained preschool classrooms receiving daily ABA instruction.

Research Sample and Data Sources

The sample for this study were retrieved from a northeastern, suburban preschool public school. Ten students and three special education early childhood teachers were recruited for this study and included: (a) Application for Approval for Proposed Research Project by a Public School District employee had been completed by the researcher and Public School District Board approved (b) parental consent was received (See Appendix A), (c) the child has a pre-existing diagnosis of autism spectrum disorder, (d) is placed in one of three preschool classrooms utilizing ABA strategies. A total of 10 preschool students diagnosed with autism spectrum disorder are a part of the pilot study. Students will be dropped from the study if the observation sessions are not completed, or if they do not fulfill the inclusion requirements for the study. Prior to the implementation of this study, a flyer describing the dissertation project and parental consent form with approval from the building administrator was sent home to the parent (Appendix B).

Since this study looked to augment the existing literature of interventions for preschool children diagnosed with autism spectrum disorder, three special education early childhood teachers who instruct self-contained preschool classes with ABA strategies were recruited to

participate in this study to discuss their perceptions of a music-infused ABA intervention with emphasis on documenting these teachers' experiences in the instruction of a music program as an effective intervention infused with the direct instruction of ABA in a music -infused program with the preexisting variable of a diagnosis of autism in all participants (see Appendix C). The special education early childhood teachers' recruitment is a voluntary consent.

Instruments

To study this research pre and post semi-structured questions were asked and collected using listening responses by the participants in this research. The special education early childhood teachers were each provided CD players, music CD's, bean bags, visual prompts and musical training handbook constructed by the researcher. These materials were disseminated to the participants at a training session preceding the music-infused ABA program.

Music- infusion took place utilizing the audio CD entitled "Bean Bag Activities & Coordination Skills" (Stewart, 2000) as well as an appropriate number of bean bags per student for the activity. The CD includes 14 tracks, with 7 songs of singing as well as music, and the same 7 tracks without vocals. The CD is advertised as assisting children with the development of gross motor skills, balance, and right/left discrimination and social skills. The activities include individual and group activities and are adaptive to the Special Education population. Table A lists the songs on the CD as well as the target activity.

Table A. (Stewart, 2000) Song Titles with Target Activity

Song Title	Target Activity
Who's Got the Bean Bag?	Circle Passing Game
Make Friends with a Bean Bag	Toss and catch
Bean Bag Rock	Rhythms and Body Identification
How Many Ways?	Right/Left Discrimination
Bean Bag Catch	Throw and Catch with Partner
Pass the Bean Bag	Slow and Fast
Bean Bag Parade	Marching, Balance

Intervention

Participants were recruited via general parental outreach and consent receipt from two identified ABA preschool classrooms. Before any inclusion factors are verified or data are collected, Institutional Review Board approval was sought from Seton Hall University as well as approval from the Public School District Board of Education.

Each student of the two participating preschool self-contained ABA classes in this pilot study received weekly music-infused ABA sessions at 20 minutes per session, 5 days per week, for a duration of 6 weeks. Methodology and training instruction of the infused- music program in the ABA classrooms were provided to all three teachers before the implementation of the study.

The intervention took place in two self-contained ABA preschool classrooms. One self-contained classroom served as the control group. During the intervention students were seated on a main rug (circle time activity rug) in the classroom. The intervention was led by the classroom teacher and assisted by existing teacher's paraprofessionals. All classroom professionals

received prior training by this researcher as to the program, songs and motions of the musical activities. When necessary, the students received hand-over-hand support from classroom adults in following physical motions to the songs. The intervention utilized pre-recorded songs.

Music was infused into the typical ABA programs by facilitating adherence to song and movement through PECS systems, tangible rewards, and ABA behavior modification as appropriate for the students in the classrooms.

Data Collection

Assuming Institutional Review Board approval, parental consent, approval for proposed research project by a northeastern public school system, and meeting inclusion factors; special education early childhood teachers were given a letter of solicitation and a letter of informed consent from the IRB to review prior to the implementation of this pilot study (see Appendix C and Appendix XX). Upon receipt of the signed informed consent form from the participants, the researcher provided two training sessions of the music –infused program activities to the special education teachers. Post semi- structured interviews allowed this researcher to collect data in a relatively consistent manner as many of the questions focused and predetermined on phenomenon in this pilot study (Creswell, 2013), yet allowing for data collection of reciprocal conversation between participant and researcher. Data collection from post interview open-ended interviews of the participants occurred at the conclusion of the 6- week pilot study. All efforts will be made to conduct the post interview in a location convenient for the participants. Post interviews were recorded with a MacBook Pro Laptop digital voice recorder and notations were made on the interview protocol from participants' comments.

This research also examined observations of data (see Appendix E) presented by participants and researcher of social and communication skills attained as a result of the intervention of a music-infused activities ABA program. The coded data were classified into the following themes: verbal communication, nonverbal communication (eye contact and gestures), and social communication skills (turn and look). Participant names, student names and the names of the institutions are not used in this pilot study. To ensure protection and confidentiality, pseudonyms are assigned to each participant, a numerical number to the student and the institution is described in terms of institutional type and regional location. MacPro Audio interviews recordings of participants is stored on a password protected USB memory device locked in a desk drawer at the researcher's home. All digital recordings, interview protocols, interview transcripts, field notes, observations and photographs are stored in a locked file cabinet in the researcher's home and will be retained for three years in compliance with IRB guidelines. Following the retention of at least three years all stored research items will be destroyed if it has been determined that the research requires no further analysis.

Data Analysis

The data collection to be analyzed in this pilot study was obtained from post semi-structured interviews determined by participants' perceptions and experiences from their involvement in this pilot study. These semi-structured interview questions are designed to elicit responses revealing teachers' perceptions regarding the effectiveness of a music-infused ABA program to improve social and communication skills of preschoolers diagnosed with autism spectrum disorder. Interview questions also address teachers' perceptions regarding whether

music-infused ABA interventions provide more opportunities for communication and socialization with peers in their preschool self-contained class.

Field notes and reflective memos were written following each interview, describing the narratives and experiences of the participants' interviews and observations of each of their students following the implementation of the music program. Field notes and memos enabled the researcher to make connections to the participants' responses and perceptions as well as to the observations of the effectiveness of the music-infused program. Audio recordings of the interviews were listened to along with reading each interview transcript. Using Huberman and Miles' (1994) method of data management, this researcher collected, stored, and retrieved data systemically and methodical, ensuring these three objectives: (1) data are accessible; (2) types of analyses used in the pilot study are documented; and (3) that data and analysis are stored post conclusion of pilot study.

To ensure that Huberman's and Mile's data management are aligned in this pilot study the researcher used Harold G. Levine's (1985), five principles of storage and retrieval system: Formatting, cross-referral, indexing-coding, abstracting, and pagination (Creswell, 2013). The exploratory mixed method (Creswell, Plano Clark, et al., 2003), which allowed the examination of a quantitative data source (VP-MAPP) in order to build a coherent justification for the themes of social and communication skills findings of the qualitative research. The VB-MAPP, a criterion assessment, is administered every 6 weeks in the ABA program by the special education early childhood teachers to providing information regarding progress in the areas of social and communication skills. The results of this individual student quantitative data were used to build a coherent justification for the validity of the coded themes established through

observation noted. However, because of the sample size and the exploratory nature of this study, the results of the VM-MAPP should be interpreted with caution.

Role of the Researcher

In this exploratory mixed method research, the role of the researcher is considered as the primary data collection instrument, requiring the recognition of the researcher's personal values, biases and assumptions from the onset of this study (Creswell, 2014; Creswell, Plano Clark, et al., 2003). As explained by Creswell (2014), researchers' personal histories, experiences and interests innately assigns the role of inquirer to the researcher. Bogdan and Bilken (2007) state that qualitative researchers must be concerned with the effect that their personal histories and experiences on the data they collect and analysis. The contribution of the researcher to the natural setting according to Locke (1987) can be useful and positive rather than detrimental. This researcher must consider as well as be cognizant of her personal history and experiences in the field of special education, early childhood and teaching and assessment of child diagnosed with autism as subjectivity when interacting with special education early childhood teachers may further influence the data collected. Procedures to assure the transparency of potential researcher biases will be utilized in this study.

My perceptions of a music-infused program for preschoolers diagnosed with autism spectrum disorder have been shaped by my personal experiences. From September 1982 to June 1986, I served as curriculum coordinator as well as special education early childhood preschool teacher for a New Jersey Public school district. During my tenure in this public school district, I had the privilege of teaching preschool self-contained classes that contained children diagnosed

with autism as well as multiple disabilities. As part of the state approved curriculum, High Scope, I was able to infuse weekly music activities into the preschool program. From 1986 to 2013, I served as a Learning Disabilities Teacher Consultant with New Jersey certification in the following areas: Teacher of the Handicapped (1976), Preschool through Grade 3 1983), Learning Disabilities –Teacher Consultant (1986) Supervisor Certificate (1985) and Nationally Certified Educational Diagnostician (2007, 2013, 2018) for four school districts, specifically assessing children and writing individualized educational programs for preschool and kindergarten students with disabilities. Most recently (2014-2018), I have been employed as a Learning Disabilities Teacher Consultant for a suburban public school in the Northeastern region of the United States. I serve as a member of the Child Study Team for a public school that provides education for grades preschool through kindergarten. In addition to assessing and writing goals and objectives for preschool children diagnosed with autism, I am involved with assisting special education teachers and parents with modifications and accommodations to enhance the learning potential of the preschoolers' and kindergartens' program. Since I have a professional background highly enriched in the assessment and education for preschoolers with the diagnosis of autism, including teaching a preschool class with ABA strategies, I believe this understanding of the context of this study and the role I bring to this study, enhances my awareness, knowledge, and sensitivity to many of the challenges, decisions, and issues that the special education early childhood teachers may encounter when implementing the music-infused program and, in addition, my understanding and knowledge will assist me in working with the participants in this study. Furthermore, I bring knowledge of both the structure of early childhood education and the role of the special education early childhood teacher. Particular attention will be paid to the role of music-infused activities within an ABA instructed preschool

self-contained program in initiating the possibility of more effective social and communication skills when compared to ABA instruction alone.

Due to previous experiences working closely with preschool children diagnosed with autism spectrum disorder, I bring certain biases to this pilot study. Although all efforts were made to ensure my objectivity, my professional biases shape the way I view and understand the data I collect and the way I interpret my experiences with the participants' interview sessions and observations of the students. The beautiful and magical thing about infusing music activities into a preschool self-contained program is that it strikes a different chord in every student, depending on his or her own learning abilities and early life experiences. I commenced this study from my professional perspective that music education is an empowering, fundamental force that is an essential right of all students. This music- infused activity program will recognize "a learning spark (Sodano, 2011)" in preschool students, which will enhance social play and communication skills. Though expectations are enormous, the researcher questions how much, if any, does a daily music program add to the growth of social and communication skills when infused in a preschool program that provides for Applied Behavioral Analysis instruction. I view the music-infused ABA program as significant; filled with adjustments to program, carry-over music links to parents and general education music teacher, frustrations, challenges with the program and unanticipated educational generalization and application of skills learned to another developmental area.

This researcher sought IRB approval to conduct this study as well as to conduct the pilot study from the northeastern suburban public school district's Board of Education. This researcher is responsible for creating, disseminating and collecting consent forms from the parents of the identified children in the self-contained early childhood preschool ABA

classrooms. The researcher is responsible for designing pre and post interview questions and for conducting and gathering the interview data from the special education early childhood teachers. The researcher was responsible for training the special education early childhood teachers on how to conduct music-infused ABA strategies and provided all music materials to the teacher participants. The researcher conducted weekly check-ins with the special education early childhood teachers to ensure intervention fidelity.

Validity and Reliability

This exploratory mixed method pilot study utilized a variety of strategies to ensure validity and reliability of research findings. Thorough records are kept in order that the provision of rich, detailed descriptions is provided to the reader so that one who is interested will have a solid framework for comparison (Miller, 1992; Merriam, 1988). This researcher provided multiple methods of collecting the data and analysis, which strengthens reliability as well as validity such as: interviews, observations, and document analysis (Merriam, 1988). Personal bias or comments that may influence this research will be notated in reflective memos. All experiences as a special education teacher and or learning disabilities teacher consultant that may influence this research were written into a researcher's journal and to follow with discussions with my dissertation mentor as well as administers of the northeastern suburban public school district. Furthermore, peer debriefing was utilized to add validity to this research document. This process involved a dissertation committee chairperson who reviewed and asked questions about this pilot qualitative study in order that it may be accepted research to other educators other than this researcher (Creswell, 2013).

Limitations/Delimitation

It is important to consider that the results of this study be derived from three focus groups representing one school whose geographical location is a suburban area in the Northeastern United States. Furthermore, this study utilized a convenience sample within a target school. Therefore, the results cannot be generalized to the population of children diagnosed with autism spectrum disorder. Notwithstanding these limitations, this study provided implications for further research. This study could be conducted using an exploratory mixed method over a broader geographical range. This study could be conducted using a broader number of children diagnosed with autism. This study could examine a broader spectrum of disability found within the autistic population. Other interventions to improve social interactions and communications could also be investigated and the outcomes of the different interventions can be compared.

Summary

In Chapter 3, the exploratory mixed methodology utilized in this pilot study to identify the suburban public school district special education early childhood teachers' perceptions and experiences regarding the infusion of daily music activities following the one-on-one discrete trial instruction of Applied Behavioral Analysis strategies with preschool children diagnosed with autism spectrum disorder was described. The population sample for this pilot study included two self-contained preschool classes with a total population of ten preschool students diagnosed with autism spectrum disorder who received an infused 20 -minute daily session of music activities converged with group instruction with Applied Behavior Analysis strategies. The

population sample also included a self-contained preschool class control group who did not receive music-infused intervention instruction within the ABA program; however, all the preschool self-contained classes were administered the VB-MAPP as a part of the ABA curriculum. This gave the researcher the opportunity to exam the quantitative data source (VP-MAPP) in order to build a coherent justification for the themes of social and communication skills findings in this qualitative research. According to Creswell (2014), the ability to triangulate different data sources of information provides validity to a researcher's study.

The approach to collect and analysis the data were obtained from pre and post semi-structured interview responses by teachers' perceptions and experiences from their involvement in this pilot study. These semi-structured interview questions were designed to elicit responses revealing teachers' perceptions regarding the effectiveness of a music-infused ABA program to improve social and communication skills of preschoolers diagnosed with autism spectrum disorder. Interview questions addressed teachers' perceptions regarding whether music-infused ABA interventions increased more opportunities for communication and socialization with peers in their preschool self-contained class. In addition to field notes, and interview transcripts, memos were written in which the researcher was able to draw relationships between data collected and developing new concepts. Concepts were linked to theoretical concepts along with the coding of common themes. During this research study, ethical and research bias considerations were used to ensure that all data collected were confidential, secure, and protected through triangulation, peer debriefing, and personal bias shared with dissertation mentor and trustworthy administration.

CHAPTER 4

RESEARCH FINDINGS

The purpose of this pilot exploratory mixed method study was to examine the effects of a music-infused ABA intervention on the social and communication skills of a population of ten preschool students, ages 3-5, diagnosed with autism spectrum disorder being educated in three preschool self-contained classes in a suburban area in the northeastern United States. Two of the self-contained preschool classes were assigned as treatment groups and one self-contained group was assigned as the control group with participants receiving either 20 minutes of Music-Infused ABA intervention or 20 minutes of non-musical "typical" intervention, 5 days a week. The music-infused ABA intervention targeted social skills and communication skills for 6 weeks.

Qualitative data were collected through semi-structured interviews with the special education early childhood teachers whose public-school buildings include ABA self-contained classrooms and daily log recordings of the student's performance to the music-infused ABA intervention lessons. The semi-structured interview questions to evoke the perceptions of the special education early childhood teachers were created by the researcher. Descriptive statistics and primary outcome measures of pre and post ratings on the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP) on the following domains: Social Play, Intra-verbal, Listening, and Independent Play were used. Because of the sample size and the exploratory nature of this study however, the results are interpreted with caution.

In this study, specific attention to the insights from the special education early childhood teachers' perceptions and experiences of infusing music with a daily ABA group lesson plan and rating its effectiveness in achieving communication performance and social skills benefits for

preschoolers diagnosed with autism was investigated. I also focused on how the special education teachers use music within an ABA group lesson to develop and enhance positive social interaction skills (if any) as well as to reduce ABA prompt dependency (if any). The study was guided by three research questions. The interview consisted of these research questions and each question consisted of three follow-up sub-questions to assist in explanation. This study also sought to contribute to the literature gap on the benefits of promoting a music-infused ABA intervention program for the potential to develop and build social and communication skills in addition to practice social behavior in a self-contained ABA class for preschool children diagnosed with autism.

Due to the COVID-19 pandemic, all communication with special education early childhood teacher participants was via email, text, or phone. Each special education early childhood teacher participant was assigned a pseudonym to ensure confidentiality. To ensure protection and confidentiality, a numerical number was assigned to each student participant in each ABA self-contained classroom.

Research Questions

This study examined several elements linking music with self-contained classrooms with ABA programming developed for preschoolers diagnosed with autism spectrum disorder. The research questions that guided this study were as follows:

1. How do preschool Special Education early childhood teachers perceive the contribution of music, if at all, as an intervention to increase communication and social learning skills

in a self-contained classroom with preschool children diagnosed with autism spectrum disorder?

2. In what way, if any, do music activities infused with ABA strategies improve the social and or communication skills of preschool children diagnosed with autism spectrum disorder in their teachers' perceptions?
3. In their teachers' perception, do preschool children diagnosed with autism spectrum disorders communicate and/or socialize more often with peers when instructed with music-infused ABA daily lessons?

Participant Profiles

In this chapter findings from interviews conducted with three Special Education early childhood teachers relating to their perceptions of the benefits of a music-infused ABA program in a self-contained class with preschool children diagnosed with autism spectrum disorder, ages 3-5, with the primary goal to enhance social skills and communication and their professional experiences after participating in the 6-week study. Student participants were recruited via general parental outreach consent as well as consent receipt to three identified ABA self-contained preschool classrooms with approval from the suburban Public School District Board of Education. Three teachers served as respondents to interview. All teachers were female, and all three teachers were placed in Special Education Preschool Disabilities classrooms for students with autism spectrum disorder. All three teachers were dually certified in Special Education and Preschool-3, as well as being registered as Applied Behavioral Technicians. Two of the teachers (Teacher B and Teacher C) shared they had acquired their Master of Arts degree in Special

Education. Teacher A reported that she is in process of acquiring her Master of Arts degree in Special Education. Teacher A has taught for 2 years in preschool special education, and both Teachers B and C have each taught preschool special education for 14 years.

Prior to implementing the 6- week study, the participants reported in the pre-interviews (Appendix F) that the students did not receive music therapy as a related service, nor did they receive music from a general education music teacher in the preschool self-contained program.

Regular Use of Music in the ABA Classroom

All the special education early childhood teachers reported that their students had opportunities to listen to music in the classroom as a support during the following activities: opening songs, weather, calendar, circle time, finger-play, transitions, to signal clean, choice time, line up and dismissal time. One of the teachers (Teacher C) communicated, "I use classical music in the ABA classroom during rest time or small group activities, if needed, which helps calm, soothe, and release tension of my preschool students." Another teacher (Teacher A) explained when she plays music on the CD, she believes the children understand the movement of the action of the words as the children's dancing pace ultimately matched the tempo of the music. All participants described how frequently robotic the Applied Behavioral Analysis program is for a preschool in a self-contained classroom as it is directly taught to the student in an isolated cubby.

Teacher Perception of ABA Program Characteristics

Additionally, they shared ABA strategies are grouped with Different Roads to Learning curriculum and Verbal Behavior Milestones and Placement Program Assessment Program. These

programs are intertwined and play a crucial role in the students' ABA therapy. The special education early childhood teachers indicated generally, in their opinion, their classroom is starved for group activities in order to develop and enhance socialization, communication and general preschool activities. Common among the participants was their principle that ABA is equated to general education preschool standards because some of the domains are readiness oriented. The participants collectively remarked that the stronger a preschooler's academic level was in the self-contained program in the developmental area of academics, the greater the possibility of the student being educated in general education. On the other hand, deficits in socialization skills and communication skills as well as gaps in perception, linguistic structuring, social play, group/classroom skills or attention are key areas that are difficult to generalize in ABA classrooms because of isolated ABA lessons and the majority of related services for each student. All participants defined ABA as a gateway for preschoolers diagnosed with autistic spectrum disorder to express non-verbal and verbal functional expressive language, cognitive, and social skills, yet it can present as repetitive, robotic, and lacking emotional spontaneity.

Teacher Perceptions of Effective Classroom Recommendations

Teacher B recommended it would be very productive for administers to think of a preschool self-contained class as "just preschool" because "these children are "just babies-sometimes experiencing their first school experience; just like other early preschoolers, however, a child with a diagnosis of autism." Teacher B spoke candidly about having lessons such as music, yoga, and sensory skills built into the ABA program as well as mainstreaming with general education preschool classes to enhance socialization and communication experiences for the preschool students diagnosed with autism spectrum disorder.

Data analysis of descriptive narratives obtained through pre, and post semi-structured interviews describes the experiences regarding the special education early childhood teachers' perceptions of the contribution of music as an intervention to increase communication and social learning skills in a self-contained classroom with preschool children diagnosed with autism spectrum disorder. In addition, these participants describe their perceptions of a music-infused ABA intervention in their classroom and discuss if there were any benefits, at all, in social or communication development after the pilot study. After reviewing the narratives of their interviews, it became clear there was a need to discuss the research questions interviews of the special education early childhood teachers separate from the results of the Class A and Class B student participants' daily observational statistical data recorded by Teacher A and Teacher B. The findings have been organized by theme and subthemes emerged from the coding process of each participant's interview is explained by the research question and the daily observational data recorded by the special education early childhood teacher of each preschool participant.

Intervention Implementation during COVID-19

This study was intended to be implemented five days a week over the course of six weeks. However, due to the COVID-19 pandemic, the intervention was only able to be administered on days the students were in the building receiving instruction. Some days the school was closed for quarantining, and on those days the intervention was not able to be implemented. However, each of the six weeks had at least three days of intervention implementation. Therefore, this intervention is considered by this researcher to be implemented with all possible fidelity, and this does not impact the usability of the results.

Assessment – Criterion

Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP)

Descriptive statistics and primary outcome measures of pre and post ratings on the Verbal Behavior Milestones Assessment and Placement Program on the following domains: Social Play, Intra-verbal, Listening, and Independent Play were also used. The VB-MAPP is a criterion-reference assessment tool and skills tracking system to assess language, social skills, learning and behavior of children diagnosed with autism spectrum disorder or other developmental disabilities. The researcher chose this criterion assessment tool as it is used as part of the ABA curriculum by the special education early childhood teachers as part of classroom practice for its strong focus in the areas of language and social interaction measurement which are the dominant areas of investigating in this pilot study. Each question is rated from 0 to 5 with zero, ½, and one points credit possible for a question. High scores are associated with no communication or social problems; low scores imply moderate to severe problems with social and communication skills. The following tables show the pre and post-test differences in ratings given by classroom teachers on the VB-MAPP in the areas of independent play, social play, listener respond, and intra-verbal. Scores noted with an asterisk (*) show an improvement between pre and post-test administrations. Throughout administrations and classrooms, no students were found to have scored lower on the second administration. The VB-MAPP is intended to monitor interventions and progress, and significant differences between scores are not statistically calculable. However, an improvement in scores is notable when examining student performance and skills.

Table 1 reflects VB-MAPP pre- and post-test results in Class A. Class A received the music-infused ABA intervention. In Class A, all students had at least one area of improvement. No students were found to have improved in the area of independent play. Notably, all students were found to have improved in social play. All students were initially rated as "0," and student growth ranged between 1 and 2.5 points. Two students were found to have improved in listener respond, and three students were found to have improved in intra-verbal.

Table 1

Class A (Intervention) Pre and Post-Test VB-MAPP Scores

	VB-MAPP Skill Area							
	Independent Play		Social Play		Listener Respond		Intra-Verbal	
Student	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	5	5	0	2.5*	1.5	1.5	1	3*
2	3	3	0	2*	4.5	5*	2	3*
3	2	2	0	1*	2	5*	0	0
4	4.5	4.5	0	1*	0	0	0	1.5*
Pre-test date: 03/01/2021; Post-test date: 04/23/2021								
Areas of growth marked with *								

Table 2 reflects VB-MAPP pre- and post-test results in Class B. Class B received the music-infused ABA intervention. In Class B, all students had at least one area of improvement. One student was found to have improved in the area of independent play. Four students were found to have improved in social play. Four students were found to have improved in listener respond, and five students were found to have improved in intra-verbal. It should be noted that most teacher responses were found to be either "0", or the minimum score indicating the most dysfunction or lack of skill or "5", or the maximum score indicating least dysfunction or lack of

skill. This teacher's results must be interpreted with caution given the degree of improvement endorsed, but one can presumed that these are areas of improvement for the individual student.

Table 2

Class B (Intervention) Pre and Post-Test VB-MAPP Scores

	VB-MAPP Skill Area							
	Independent Play		Social Play		Listener Respond		Intra-Verbal	
Student	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	5	5	5	5	0	5*	0	5*
2	5	5	0	4*	5	5	0	0
3	0	5*	0	5*	0	5*	0	5*
4	5	5	5	5	5	5	2	5*
5	5	5	0	5*	0	5*	0	5*
6	5	5	0	5*	0	5*	0	5*
Pre-test date: 03/01/2021; Post-test date: 04/23/2021								
Areas of growth marked with *								

Table 3 reflects VB-MAPP pre- and post-test results in Class C. Class C did not receive the music-infused ABA intervention and is considered the control group. In Class C, all scores were the same between pre-and post-test. There was no area of change for any student, in any area. As per previously mentioned teacher report, this may have been because no new interventions were introduced.

Table 3

Class C (Control) Pre and Post-Test VB-MAPP Scores

	VB-MAPP Skill Area							
	Independent Play		Social Play		Listener Respond		Intra-Verbal	
Student	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	4.5	4.5	2	2	0	0	0.5	0.5
2	5	5	2	2	0	0	2	2
3	4.5	4.5	4.5	4.5	0.5	0.5	0	0
4	3	3	3	3	0.5	0.5	1	1
Pre-test date: 03/01/2021; Post-test date: 04/23/2021								
Areas of growth marked with *								

Research Question 1: *How do preschool Special Education early childhood teachers perceive the contribution of music, if at all, as an intervention to increase communication and social learning skills in a self-contained classroom with preschool children diagnosed with autism spectrum disorder?*

Participants in this pilot study came to use a daily 20-minute music program infused within their ABA curriculum self-contained classroom for 6 weeks when they were in school. Teacher A and Teacher B narratives discussed the themes of Social Skills and Communication Skills along with the following subthemes: improving joint attention, developing emotions/self-regulation, strengthening cognitive abilities, and building motor skills. Consequently, the participants reported by infusing music with ABA strategies, the students gradually decreased their reliance on prompts for spontaneous verbal responses. Teacher A and Teacher B stated that the majority of the students in Class A and Class B, particularly noted in week 4 of the pilot

study as the pivotal week for all students in this study, as they began to sing more naturally with less imitation, rote or echolalia performance. Teacher C (control Class C) commented to the researcher by the end of the study no progress was recorded on the VB-MAPP post- test for the preschoolers in 6 weeks since the administration of the VB-MAPP pre-test. Teacher C stated one of the factors in her opinion as to why her students' performance showed relatively no progress might have been due to no new strategies being introduced, and reduced school day hours due to the Covid-19 Pandemic. Subsequently, Teacher C shared she sees the benefits of music practices in her self-contained ABA classroom in the area of self-regulation and anxiety. Teacher C continued to state, "Generally when I play music, I notice that it reduces anxiety, promotes student relaxation and increases happiness. Though, I frequently use music during transitioning times, closing songs, finger-plays, and opening circles, I notice that preschoolers diagnosed with autism spectrum disorder benefit from familiar songs in circle activities as it tends to bring the children closer together as a social group. Teacher C continued to comment the following:

> "Now that the pilot study has been completed, my teacher colleagues reported they are going to continue the music program within the ABA classroom as it contributed to self-initiation, turn-taking behavior, meaningful gestures with non-verbal children as well improved communication with limited verbal children, sustained joint attention and social interactions; as a result I will ask my colleagues to review the training packet with me in order that my class can benefit from the intervention music strategies with ABA therapy lessons for the remainder of the school year."

Themes - Social Skills and Communication Skills

The analyses of the interview responses of Teacher A and Teacher B resulted in a theme of improved social and communication skills which supported the purpose of this pilot study which was to examine the effects of music-infused ABA intervention on the social and communication skills of preschool children diagnosed with autism.

Research Question 2: *In what way, if any, do music activities infused with ABA strategies improve the social and or communication skills of preschool children diagnosed with autism spectrum disorder in their teachers' perceptions.*

Teacher A and Teacher B both agreed the music activities supported an opportunity for group building skills versus isolated skills that are independently taught throughout the school day through the ABA therapy instruction. Both special education early childhood teachers expressed how the children enjoyed the music activities as they were presented in a "natural preschool lesson infused with some ABA prompts when required." Participants stated music is natural, providing for movement." Not only did the children enjoy the music activities, but the teachers also reported they too enjoyed participating in musical activities with their students as they were slowly observing positive results as their preschoolers were building social relationships through the music-infused ABA strategies. Appropriate social responses were recorded as student data by Teacher A and Teacher B as improved behaviors that lead to meaningful social engagement and or non-verbal (gestures to a peer) and verbal communications. Across all of the music-infused ABA lessons, the data recorded for the students showed a variety of improved social responses. Improved social responses noted for the 10

students were the following: joint eye contact, smiling, laughter, clapping, turn and look, sharing, waiting for turn, dancing, engaging in social play, singing with peers, giving thumbs up to recognize another's accomplishment, prompts decreasing-independent social play increasing, knew when it was his/her turn and choosing to sit with peer. All of the students in both Class A and Class B showed social improvements by week 4 of the pilot study. Table 4 shows the social responses that were observed and recorded for the students in Class A and Class B, and whether they represented a new or improved skill.

Teacher A indicated that Class A showed an improvement in social skills. Teacher A discussed with the researcher various factors in her opinion that may have contributed to this result. The frequency of the language of the students in Class A was reported to be essentially non-verbal. The difficulty with language expression may have impeded on his/her ability to vocalize (communicate) with their peers. Social skills began to emerge for Class A students as the weeks passed in this pilot study. Class A listened attentively at the music circle, followed the teacher with minimal prompts, and shared appropriately during the musical activities. The students' preference was observed to favor musical instruments and beanbags versus vocal communication. However, Teacher A noted that one student (2) became more communicative towards week five of the study speaking three-word phrases such as: "I want red" and "I want those" upon immediately viewing musical instruments. Regarding communication skills, Teacher A noted student one spontaneously requesting different color beanbags for the beanbag songs as well as expressing two- and three-word phrases such as, "Who won?" "I want sticks," and "It's right there."

Teacher B indicated an improvement for communication skills with music-infused ABA strategies for preschool children diagnosed with autism spectrum disorder in their teacher's

perception. Overall, Teacher B documented three verbal students, two limited verbal students and one non-verbal student in Class B. Factors that may have contributed to this improvement with the music-infused strategies was that most of the students were verbal. They may have been able to mimic the songs with both ABA and musical prompts early in the presentation of the lessons for memory cues. There might not be avoidance from singing since the students have the ability to vocalize. Consequently, Teacher B stated some of the communication phrases during the music-infused ABA strategies were self-initiated and spontaneous particularly when the students were requesting instrument choices or expressing recognition for a peer's accomplishment. Music activities were noted to attribute to Class B increasing communication in social group circle more consistently by turning and talking to a partner in order to successfully complete a musical game activity.

Table 4

New or Improved Social Skills Displayed During Intervention, Class A and B

Class / Student	Social Skill	New / Improved Skill
A1	Joint eye contact	Improved
	Model good social behaviors	Improved
	Share and take turns	New
A2	Sustain attention	Improved
	Independently sit next to a variety of students in circle	New
	Clap when others succeed	New
A3	Independently attend music circle without prompting	Improved
	Turn and look at peers	New
	Pass beanbag to a peer in circle	New
	Wait and share without eloping around the classroom	New
A4	Increase joint attention with music stimuli presented	Improved
	Share beanbag and instruments with peers	New
	Intentionally sit next to peers	New
B1	Build self-confidence with increased music skills	Improved
	Expressions of social/emotional support for peers (i.e., clapping, thumbs up, "you did it")	New
	Decreased restlessness and distracted behaviors	Improved
	Sustain joint attention	Improved
B2	Sit appropriately next to peers in music circle	Improved
	Listen to music with good intent	Improved
	Wait turn and share	Improved
B3	Increase emotional expressions (smiling, laughing, and pointing happily to peers)	Improved
	Demonstrate recognition of what to do in an organized music activity play activity with peers without prompts	New
B4	Reciprocal social interactions with teacher established during music activity when activity was learned	New
	Sit next to peers independently	Improved
	Social communication expressions expressed for peers ("You did it")	New
B5	Lead turn taking	New
	Lead song instruction	New
	Communicative social expressions resulted in clapping and cheers for peers	New
B6	Active social participant –dancing to music and imitating songs with peers	New
	Able to follow musical activities to complete a game with peers	New
	Made a friend in music for choice time activity	New
	Communicative social expressions resulted in clapping for support for peers.	New

Research Question 3: *In their teachers' perception, do preschool children diagnosed with autism spectrum disorder communicate and/or socialize more often with peers when instructed with music-infused ABA daily lessons?*

In response to research question three, in their teachers' perceptions, do preschool children diagnosed with autism spectrum disorder communicate and/or socialize more often with peers when instructed with music-infused ABA daily lessons, the results show that Class A socialized more often with peers then communicated whereas Class B gained improvement both in socialization and communication. It was reported some of the children in Class A did engage in verbal responses during the music-infused ABA lessons, however these responses were simple requests made directly to the teacher for musical instruments ("I want sticks;" "I want those"). Teacher A conveyed one of the non-verbal student's was not able to vocalize at the present, but with the music program this student became motivated to gesture for musical stimuli. Teacher A communicated music was an internal motivator for the students. Though communication is a deficit for her students, at the music circle with ABA prompts, the students wanted to "play" and socially engage with a friend. Teacher A acknowledged music seemed natural, and she observed the students dancing, singing, and passing the beanbags in a game format, which is a preschool activity. Teacher A explained that the potential for small group social skill to grow is a great possibility with the continuation of a music program.

The contribution of a music-infused ABA program highlighted by both Teacher A and Teacher B was the observable decrease of inappropriate behaviors, which afforded the students the opportunities to improve social and communication skills. As the students became comfortable with the music routines and songs, the memorizations of words improved, behaviors

were reduced, and joint attention increased. The students in both classes were observed to turn and look at their peers in order to model appropriate social behaviors and good social play behavior. Teacher B conveyed that three of the students in her class (Student 1, Student 4, Student 6) transferred most appropriate social/emotional communicative expression to their peers at music circle time, thus exhibiting much progress in these areas ("You did it"; "Look"; "Thank you"; Thumbs up; clapping for peers).

Research on the effects of music-infused ABA lessons on Class B concerning communication as helping to engage students in social group relationships. A possible factor to consider in Class B is the following: three students are verbal; two limited verbal and one non-verbal and may have contributed to this outcome. Since the majority of Class B had some vocalization, Teacher B did not report any reluctance to sing due to lack of vocalization. Teacher B conveyed that Class B music was a motivator for the students and emotionally these students socially expressed happiness, smiles and laughter. Socially Teacher B documented reciprocal conversations during music lessons (i.e., "Please, give it to me;" "Pass it to me;" "Your turn;" "Her turn"). Teacher B reported Student 5's social skills were improving as he was given several opportunities to lead the music groups. Intentionally students began sitting next to peers of choice. Teacher B explained music with preschool instruction and prompts when needed offered the students the opportunity to gather in a small group and develop both social and communication skills naturally. Both teachers agreed the music-infused ABA strategies were able to reach to strengths of each student and allowed preschool children diagnosed with autism spectrum disorder to communicate and/or socialize with peers.

Table 5a - *# Word Utterances – Class A*

Class / Student		# Word Utterances - Class A
A1	Week 1	"Get it"; "Come on" modeling of names
	Week 2	No verbalizations recorded this week
	Week 3	"It's right there"; (Who tossed the beanbag?) Student was able to respond appropriately.
	Week 4	Student able to respond with "Yes" and No" utterances to choices of Beanbag colors for uses in musical games.
	Week 5	"I want sticks"; "I want those sticks" (with teacher prompts)
	Week 6	"I want sticks" (with teacher prompts)
A2	Week 1	Names peers' names at circle; "Come on."
	Week 2	No verbalizations recorded this week.
	Week 3	Says "N when not interested in participated in musical game".
	Week 4	"That's mine." Imitating pre-composed musical songs.
	Week 5	Naming students at musical circle time.
	Week 6	"I want red."; "I want those."
A3	Week 1	Crying, noisy, no utterances recorded.
	Week 2	Crying, noisy, watching peers at circle; with prompts imitating songs.
	Week 3	Eye contact sustained; watching peers during bean bag musical activities; gesturing at beanbags as their move around circle.
	Week 4	Responds to high five gesture given by teacher; Points and gestures to beanbags as they move in the circle.
	Week 5	Gestures to Teacher and walks over to teacher to get musical instrument of choice.
	Week 6	When given two instruments, student gestures for the one of choice.
A4	Week 1	(Echolia) Mimics teacher "What color?" "Red"." Who has it?" Student is heard to say his name.
	Week 2	Student talking to himself. "What, yea, ball" verbal prompts recalled during musical games.
	Week 3	Student imitates teacher. Student heard to say independently - "I want drum." - when shown two instruments.
	Week 4	Repeats activity phrases of songs with intent and verbal prompts of teacher.
	Week 5	"I want a turn". Repeats this phrase independently.
	Week 6	Student cried when could not have instrument of choice.

Table 5b - # *Word Utterances – Class B*

Class / Student		# Word Utterances - Class B
B1	Week 1	"My turn"
	Week 2	"I got blue." "I caught it."
	Week 3	"Pass to me."
	Week 4	"Pass to me." "My turn." Imitating words of songs.
	Week 5	"Great job" (to peer).
	Week 6	Singing words to songs.
B2	Week 1	"Me"
	Week 2	"Me." "Give me."
	Week 3	Gestures for bean bag from peer.
	Week 4	"Me." "My turn." "I want it."
	Week 5	"My turn." "More please." "Do again." "I go it."
	Week 6	"We do it all again."
B3	Week 1	"My turn." "Me."
	Week 2	"My turn." "Me."
	Week 3	"Give me." "My turn." "I want that."
	Week 4	"Do again." "More please."
	Week 5	"More." "Me." "Pass it."
	Week 6	"Give it." "Me."
B4	Week 1	Imitative singing.
	Week 2	"I catch it." "Look at me."
	Week 3	"Me, mine, pass." "My turn, give it."
	Week 4	No vocalizations record this week.
	Week 5	"I did it." "My turn." "Give it to me."
	Week 6	"I did it." "Pass it to me."
B5	Week 1	No verbalizations recorded this week
	Week 2	"Me, mine, no," "I want, my turn"
	Week 3	"I want, give me, my turn, and mine" "Pass it to me".
	Week 4	"I want that." "Me please". "Her turn".
	Week 5	"Catch it." "Here." Student names the colors of the beanbags as they were passed around the circle.
	Week 6	"I want." "Give me." "My turn".
B6	Week 1	Singing unrelated song
	Week 2	"more" "again"
	Week 3	"Thank you"
	Week 4	Imitating pre-composed songs
	Week 5	"Pass to me." "My turn." "I did it." "I got it." "again" "yellow"
	Week 6	Imitating songs with a purpose

Subthemes

The analyses of the interview responses of Teacher A and Teacher B participants also resulted in the following five subthemes by utilizing effective music –infused ABA intervention during the 6-week pilot study: improving joint attention, strengthening cognitive abilities, emotions/self-awareness/ self-regulation and building motor skills.

Improving Joint Attention. Joint attention is the ability to share focus on an object or area with another person (National Institute of Mental Health, 2011). Participants in this study conveyed that all students showed increased improved joint attention with music –infused ABA intervention strategies as they became more comfortable with the routine of the musical songs. The overall frequency of musical experiences for Class A and Class B reportedly gravitated the verbal and limited verbal preschoolers' interest in the musical instruments and sang pre-composed songs with the teachers. Non-verbal preschoolers of Class A and Class B, beginning week four, showed sustained attention and interest to musical instruments through gestural selections of instruments and beanbags. Immediate attraction to the musical instruments was observed for each student and reportedly without hesitation played with prompts initially appropriately to pre-composed music. Teacher A and Teacher B revealed that the non-verbal preschoolers imitated rather than echoed the songs in the music social group following their teacher and peers. Participants shared that the students modeled the teachers' movements regarding the use of musical instruments and beanbags game activities. When a child is making music, the music may serve as a focus for attention and outlet for emotional expression (Walworth, 2010). Both verbal and non-verbal preschoolers were reported to look at their peers, pass and throw beanbags in successful musical game activities and play catch with a peer partner. When two people sing together, a natural attention may occur through participating in

the music making (Walworth, 2005; Walworth, Register, and Engel, 2009). The results of increased joint attention shared by the participants for this study were improved for this period of research time.

Strengthening Cognitive Abilities. According to the learning theorist Vygostsky (1978), cognition occurs through provisions of collaborative or cooperative dialogue with a skillful teacher. Vygotsky's view of a teacher is to facilitate a child's learning experience by promoting a reciprocal social learning experience for the children and teacher as a teacher should collaborate with each child in order to help facilitate meaningful construction. The purpose of this 6 -week pilot study was to examine the effects of music-infused ABA intervention on the social and communication skills of a population of ten preschool students, ages 3-5, diagnosed with autism spectrum disorder. As the participants gathered the observational daily performance in the areas of social and communication skills of the student's engagement through music-infused ABA strategies intervention, communication and gestural skills were steadily improving. Teacher narratives revealed embedded cognitive skills in communication responses. Teacher A noted student (2) became more communicative towards week five of the study speaking three-word phrases such as: "I want red" (beanbag) and "I want those" (musical instruments). The overall frequency of pre-composed beanbag music-infused ABA strategies intervention for Class B resulted in strengthening primary color recognition and rote counting to six as documented by Teacher B. As the students became comfortable with the music routines and songs, the memorizations of directions of musical songs and words of songs were noted to improve.

Developing Emotions / Self-regulation. Across both music-infused ABA interventions (Class A and Class B), the data recorded for the preschoolers diagnosed with autism spectrum disorder showed a variety of improved social skill responses. Participants also noted music

seems to provide support with emotional regulation with preschoolers diagnosed with autism spectrum disorder. Both special education early childhood teachers documented the following providing smiling, laughter, clapping, turn and look, sharing, waiting for his/her turn, dancing, engaging in social play, singing with peers, giving thumbs up to recognize another's accomplishment, Participants stated music is natural, providing for movement." Not only did the children enjoy the music activities, the teachers reported they too enjoyed participating in musical activities with their students as they were slowly observing positive results as their preschoolers were building social relationships through the music-infused ABA strategies Teacher B cited it is important to note that this student developed a sense of self-confidence from the music as he could achieve some accomplishments such as singing, dancing, catching, throwing, making friends, and participating in a group. The following emotions were listed for student six who towards week four was always a happy group participant: smiling, laughing, and cheering on peers.

Teacher B documented that his self-confidence seemed to build as he pointed to himself and said with a smile, "My turn." Student one willingly sang all the songs and socially pointed to his peers when it was their turn to sing. Communication responses recorded included noticeable spontaneous cheers of praise for his peers such as: "Great job" and "Wow." He appropriately clapped for his peers when they caught beanbags. This student became self-confident at times that Teacher B allowed him to lead the music activities. Teacher B cited that it is important to note that this student developed a sense of self-confidence from the music as he could achieve some accomplishments such as singing, dancing, catching, throwing, making friends, and participating in a group. The following emotions were listed for student six who towards week four was always a happy group participant: smiling, laughing, and cheering on peers.

Building Motor Skills. "Movement and music help develop essential core skills." (Lara and Bowers, 2016) including gross and fine motor skills/planning; sensory processing and integration. Music and movement (dance) can be a fun, motivating, engaging, multisensory tool which analysis of observational data identified as a contribution to developing coordination, balance, improving overall gross motor and fine motor skills. Participants agreed listening to music gave the preschoolers the opportunity to model the actions of the teachers and their peers playing musical instruments. One preschooler in Class B was noted to increase musical imitations of playing a drum in a pattern that matched that of his teacher thus improving fine motor skills. Throughout the study, Teacher A and Teacher B communicated the consistent improvement in the areas of catching, throwing, dancing, passing, clapping, and pointing for beanbag or musical instruments of choice enhanced both gross motor and fine motor skills. A powerful perspective of music-infused ABA interventions revealed improved gross and fine motor skills, but also contributed to developing self-confidence and cooperation as the preschoolers catching and throwing skills to music were more coordinated.

Descriptive Behavioral Analysis

Observational data recorded from Teacher A and Teacher B participants describes each ASD diagnosed preschooler's social, social/behavior and communication responses daily as they participated in music-infused ABA intervention programming for 6-weeks. Emphasized versions of each preschooler's narrative description are presented to reveal a concise outline of their participation in the music-infused ABA intervention program and the progress they made during the pilot study. Among the ten participants of preschoolers, the overall duration that each

preschooler engaged in musical activities for the entire session ranged between 15-20 minutes as recorded individually by their special education early childhood teachers. Table 5 describes the characteristics of Class A, Table 6 describes the characteristics of Class B, and Table 7 describes the characteristics of Class C.

Table 6

Description of Class A: Preschool Self-Contained Autism classroom, ages 3-5

Child	Gender	Frequency of Speech	Communication Method	Diagnosis
1	M	Very Limited	ABA, gestures, PECS, iPad	Autism
2	F	Very Limited	Prompts with ABA	Autism
3	M	Nonverbal	Gestures, tacts, mands, ABA	Autism
4	M	Echolalia	ABA, verbal prompt	Autism

Student 1:

Student 1 was a male student described as having very limited speech. He used ABA, gestures, PECS, and an iPad as primary modes of communication. During the first three weeks of the pilot study student 1 showed a pattern range of 5 to 10 minutes of documented joint attention when both following directions from the teacher with the music activities as well as to the beanbags and musical instruments. Communication responses increased to music stimuli (i.e., requests for bean bags, instruments), particularly when he turned and looked at a peer and imitating passing the bean bag in a musical game. His increased musical imitations resulted in increased social awareness and social attention of his classmates around him. Regarding his classmates, he pointed and named them each correctly at music time. Week four was documented as a "pivotal week" for student 1 as joint attention increased with a range of 15-20 minutes. The student appeared to look forward to the music lessons and spontaneously requested

different color beanbags for the beanbag songs. Two- and three-word phrases such as, “Who won?" "I want sticks,” and “it’s right there” were becoming a part of his speech vocabulary. By the sixth week of the pilot study, it was recorded that student 1 was modeling the other students’ good behaviors and he was able to follow through with appropriate sharing and turn and take responses in a music activity.

Student 2:

Student 2 was a female student described as having very limited speech. She used prompts with ABA as her primary mode of communication. Student 2 with prompt assistance showed immediate engagement with the music-infused ABA activity, beanbags and musical instruments. She sustained 20 minutes of joint attention from the onset of the pilot study. Student 2 is reported as a “rather quiet” child, who sits by her peers in a circle but does not engage in conversation. However, by week three, student 2 was conversing in one- and two-word phrases with the peer next to her. At one point, when another student attempted to take her instrument from her, she stated, “That’s mine!” Teacher A documented that as student 2 became more comfortable with music-infused ABA activities, she noted that it seemed to reduce anxiety with regards to speaking and memory. Student 2 became more verbal towards week 5 of the study speaking three-word phrases such as: “I want red” and “I want those.” Though she always sat next to another student, she did not engage with her peer. By the end of the sixth week, Teacher A commented that student 2 was able to sit next to different students with no issues, wait her turn, look and watch other classmates, and clap for other successes.

Student 3:

Student 3 was a male student described as being nonverbal and required hand over hand prompts for most of the curriculum activities. He reportedly tends to walk around the classroom. For the first three weeks of the study, Teacher A recorded that he showed only brief attention to the music and there were times noted when he cried initially at the start of the music. Positive social responses increased by week three as he was observed to come to music circle independently, taking his sit appropriately, and passing a beanbag to a peer sitting next to him in a musical game. He showed more eye contact when spoken to with his teacher and established better focused with his peers during the music-infused ABA activities. The overall frequency of responding to high five gestures when asked to show hands in the air during week four for this student as recorded for this student was about 50%. Teacher A observed this student modeling his peers playing musical instruments and this student increased musical imitations of playing a drum in a pattern that matched that of his teacher, peers, and the song he listened too. With regards to communication, non-verbal communication was showing some progress. Student 3 began to gesture for music stimuli of choice. Social awareness of his peers was noted as he exhibited the following: ability to wait and share at the music circle without getting up and walking around the classroom; turn and share; independently pass beanbag to a peer; throw and catch and beanbag with his friends and clean up when music stops.

Student 4:

Student 4 was a male student described as engaging in echolalic speech. He used ABA and verbal prompts as primary modes of communication. For most of the 6 weeks Teacher A

reported that student 4 displayed echolalia speech, however occurrences of echolalia were reduced by increased incidences noted of intermittent sustained joint attention as a result of modeling of musical activities combined with ABA prompts. As he became more familiar with the routine of the sounds of certain songs, he was able to sit independently for longer periods of time at the circle and maintained a steady eye gaze at his peers around him. As his classmates began to toss and catch beanbags to the music, student 4 was noted to be motivated by his peers and the musical activity. With prompts from his aide, student 4 imitated the toss and catch process during week 4 and throughout the following weeks was able to socially play with supports. Student 4 showed more attraction toward instruments, particularly, the sticks or xylophone. During these musical exchanges, Teacher A observed that his behaviors were reduced as he was independently engaged in the instrumental playing and the rhythm of the music once it began. Teacher A reported that another student grabbed an instrument from student 4 and his general behavioral response would be one of crying and screaming. However, the music had a relaxing effect on student 4 and when Teacher A gave student 4 another instrument, he was compliant to accept. By the conclusion of the pilot study student 4 had better social responses as he was sharing beanbags and instruments, intentionally sitting next to different students, appropriately tapping students to be recognized by them, sitting appropriately and responding to his name when called.

Table 7

Description of Class B: Preschool Self-Contained Autism classroom, ages 3-5

Child	Gender	Frequency of Speech	Communication Method	Diagnosis
1	M	Verbal	ABA, PECS, iPad	Autism
2	M	Limited	ABA, tacts, mands	Autism

3	M	Limited	ABA, gestures, mands, PECS, iPad	Autism
4	M	Limited	ABA, gestures, token economy	Autism
5	M	Verbal	ABA, verbal prompts, iPad	Autism
6	M	Limited	ABA, PECS, prompts, mands	Autism

Student 1:

Student 1 was a male student described as engaging in verbal speech. He used ABA as primary modes of communication. Teacher B recorded for this student that his pivotal week was week 3. Student 1 showed immediate engagement with the beanbag musical song activities and was able to follow directions independently. He smiled, laughed, and made eye contact with his teacher and peers in the music circle, independently chose musical instruments, and sat appropriately to his peers during the duration of the music-infused ABA lessons. As the lessons increased, Teacher B noted that this student did not require prompts to initiate music social interactions. Teacher B documented that his self-confidence seemed to build as he pointed to himself and said with a smile, "My turn." Student 1 willingly sang all the songs and socially pointed to his peers when it was their turn to sing. Communication responses recorded included noticeable spontaneous cheers of praise for his peers such as: "Great job" and "Wow." He appropriately clapped for his peers when they caught beanbags. Teacher B documented that music-infused ABA strategies had seemed to calm student 1 and during the 6-week pilot study his overall behavior had improved regarding joint attention and restlessness.

Student 2:

Student 2 was a male student described as nonverbal. He used ABA as primary modes of communication. Teacher B cited that student 2 was initially motivated by the beanbag music

being played, as he was able to attend on the average between 5-7 minutes before moving around the classroom. During some of the initial musical exchanges, the student had difficulty imitating the routine, but was observed gazing at the musical play with the beanbag activities of his peers while communicating to the teacher and teacher aide the following one- and two-word phrases: "Me" and "give me." By week four, Teacher B recorded that student 2 began to show some progress regarding memory of routine of the directions and words of songs. Joint attention was recorded at 12 minutes for the fourth week and increased to 17 minutes for the 5th and 6th weeks. Student 2 smiled, laughed and moved to the rhythm of the music-infused ABA program instructed by Teacher B. Teacher B also recorded that he was able to socially sit appropriately with peers, wait his turn, and share with minimal prompts by week 5. His communication responses were more spontaneous and used in context better than before (i.e., "my turn," "more please," "pass to me," and "do again." Teacher B wrote that overall, this student benefited from the music-infused ABA program in both the social and expressive language areas. His turn taking skills and sharing had greatly improved as he watched others play along in the musical activities. Student 2 showed immediate engagement with the musical songs that enabled him to sing and dance, which increased his verbalizations throughout the continuation of the study.

Student 3:

Student 3 was a male student described as engaging in verbal speech. He used ABA as primary modes of communication. At the beginning of the music-infused ABA lesson one, Teacher B reported that student 3 was sustained in music activities for 10 minutes with assisted prompts given to model the gross motor activities of the songs. As the student became more self-confident with the routine and motor activities of each song, Teacher B noted increased social

expressions of smiling, laughter, and pointing happily to each of his peers in the music circle. Social awareness of what to do in an organized music play activity with peers and participation in social play at times independently was documented as good progress for student 3. He exhibited more appropriate social play, as he was able to pass his beanbag in a timely manner to the peer sitting next to him without requiring a prompt to do so. Additionally, it was noted that he shared beanbags with and without prompt assists. Student 3's joint attention gradually increased to 15 minutes by the conclusion of the study. Regarding communication responses, he was able to independently initiate the following one- and two-word phrases: "me," "give me," I want that," "do again," "move please," "my turn," and "more."

Student 4:

Student 4 was a male student described as engaging in limited speech. He used ABA as primary modes of communication. Initially student 4 was reported to be an observer student who seemed attracted to the music-infused beanbag game activity. Teacher B noted that as this student learned how to pass, toss, and catch the beanbag along with the music directions, social interactions were establishing within the small group. He chose to sit with peers, pass beanbags appropriately to the time of the rate of the music, and clap and dance to the beat of the music. Student 4 showed emotions such as laughter, smiling and giving "thumbs up" to peers that made great beanbag catches or throws. Teacher B noted that student 4 had been a quiet child at the beginning of this study; however, by week 4 communication responses were more frequently independent. Teacher B had listed the following two- and three-word phrases as self-initiated: "I did it," "look at me," "I catch it," "my turn," "pass it," and "give it." Academically, Teacher B

noted that the student counted the beanbags and instruments correctly as well as identified the colors of the beanbags periodically.

Student 5:

Student 5 was a male student described as engaging in verbal speech. He used ABA as primary mode of communication. For the first music-infused ABA lesson student 5 was initially reported to be an observer, though after watching the beanbag music game for 5 minutes he passed the beanbag with physical prompts. Towards the end of lesson one, student 5 waved his hand for a turn, but no gestures or verbalizations were noted. However, for music-infused ABA lesson two, Teacher B documented a complete reversal for student 5. He showed immediate attraction to the music performance and was willing to participate. Joint attention for all music activities increased to 15 minutes for lesson two. Student 5 made requests for instruments when the music box came out ("I want _____."). Socially, he was able to extend good eye contact to his peers as he comfortably passed a beanbag to each child before the start of the music-infused ABA lesson. Student 5 began to sit next to different peers with comfort. Positive displays of emotions such as laughing, smiling, and cheering for others were noted. Teacher B noted that the sounds of music increased this student's desire to express his wants and needs such as: "I want that," "no, give that to me," "pass that to me," "her turn," and "here, your turn." This student seemed to become self-confident at times that Teacher B allowed him to lead the music activities.

Student 6:

Student 6 was a male student described as engaging in limited verbal speech. He used ABA as primary mode of communication. Teacher B recorded for this student that his pivotal week was week four. Student 6 showed engagement with the beanbag musical song activities and was able to follow directions with minimal prompting. Joint attention was sustained for 20 minutes, the full lesson. His immediate attraction seemed to be to the beanbag passing and social play was appropriate with this music-infused ABA lesson. Communication responses noted that he went from non-verbalizations to verbal requests such as: "pass it to me," "give it to me," "my turn," "I did it," "thank you," as well as requests for certain color beanbags. In social play, this student would turn and share, wait his turn appropriately, and follow musical directions to complete a game with peers. Teacher B cited that it is important to note that this student appeared to develop a sense of self-confidence from the music as he could achieve some accomplishments such as singing, dancing, catching, throwing, making friends, and participating in a group. The following apparent emotions were listed for student 6 who towards week four was always a happy group participant: smiling, laughing and cheering on peers. Cognitively Teacher B noted that the beanbags were supporting color recognition.

Table 8

Description of Class C (Control): Preschool Self-Contained Autism classroom, ages 3-5

Child	Gender	Frequency of Speech	Communication Method	Diagnosis
1	F	Limited	ABA, gestures, PECS, iPad	Autism
2	F	Limited	Prompts with ABA	Autism
3	M	Nonverbal	Gestures, tacts, mands, ABA	Autism
4	M	Limited	ABA therapy, verbal prompts	Autism

Class C (Control Class)

Teacher C (control Class C) commented to the researcher that by the end of the study no progress was recorded on the VB-MAPP post- test for the preschoolers in 6 weeks since the administration of the VB-MAPP pre-test. Teacher C stated that one of the factors in her opinion as to why her students' performance showed relatively no progress might have been due to the lack of exposure to the music-infused strategies ABA intervention program and reduced school day hours due to the Covid-19 Pandemic.

Summary

This chapter presented data from an exploratory mixed method design with emphasis on a qualitative pilot case study utilizing a demographic questionnaire and in-depth interviews of three special education early childhood teachers' perceptions and experiences of infusing music ABA interventions into a daily group lesson for 6 weeks and rating its effectiveness in improving communication and social skills for preschoolers diagnosed with autism in a suburban school district. In addition, quantitative from the VB-MAPP was used to support the validity of the coded themes of the qualitative interview results. The results of the participants' interviews show links to the research questions and the literature review used to design this pilot study. The study also focused on how the special education teachers use music within an ABA group lesson to develop and enhance positive social interaction skills to support reduction of ABA prompt dependency. Salient themes and subthemes emerged during data collection, criterion pre and post assessment, and analysis. Participants indicated an overall positive view on music-infused ABA strategies intervention as an educational practice for preschoolers diagnosed with autism spectrum disorder to assist in improving listening and attention skills for both verbal and non-verbal students, which ultimately appeared to have an effect on improving social and communication skills. The special education early teachers' observations provided clarification on the use of music-infused ABA strategies and the improvement data recorded in the areas of communication and social skills.

Participants answered the following interview questions highlight what music activities infused with ABA strategies improve the social and or communication skills and communicate and do preschoolers socialize more often with peers when instructed with music-infused ABA

daily lessons. The research questions were addressed via interview, data student collection, analysis process, and pre and post assessment analysis. The following chapter addresses the implications for theory, practice, and policy for preschool children diagnosed with autism spectrum disorder, and suggested areas for future research.

CHAPTER 5

Discussion of Findings and Recommendations

Introduction

According to the Center for Disease Control (2020), autism affects an estimated 1 in 44 children in the United States (Autism Speaks, 2021) and occurs in all racial, ethnic, and socioeconomic groups, and is four times more common among boys than girls (CDC, 2020). "The rising incidence of autism spectrum disorder has led to the surge in the number of children needing autism interventions" (Srinivasan and Bhat, 2013). The current trends of intervention strategies for preschoolers diagnosed with autism spectrum disorder include more discrete individual instruction such as: Applied Behavior Analysis (Lovas, 1987), Picture Exchange Communication Systems (Bondy and Frost, 2003), and Teaching and Educating and Related Communication Handicapped Children (Meisbov et al., 2004). Given the nationwide increase in the diagnosis of autism, particularly in the pediatric population, the researcher's goal in this study was to show that the inclusion of pre-composed music in a small group lesson in the education of pre-school children diagnosed with autism spectrum disorder receiving Applied Behavioral Analysis can be an effective intervention that schools might consider implementing on a wider basis.

This concluding chapter provides the findings of the interviews, observations and quantitative date compared to existing research, and discusses the implications for theory, practice and policy. In conclusion, this chapter proposes recommendations for future research to yield a cultivation of music-infused ABA strategies and small group intervention lessons for

preschoolers diagnosed with autism spectrum disorder that may serve to enhance the development of communication and social skills.

Overview of the Study

In this pilot study, the focus of the research was to gain insight on the effectiveness of a music-infused program within an Applied Behavioral Analysis framework in a natural self-contained setting with preschool aged-children with the diagnosis of autism spectrum disorder to enhance social skills and communication skills. In addition, the researcher explored whether the special education early childhood teachers could implement pre-composed music-infused programs in preschool Applied Behavioral Analysis self-contained classrooms to influence the development of social and communication skills. The current study was guided by three research questions: (1) How do preschool Special Education early education childhood teachers perceive the contributions of music, if at all, as an intervention to increase communication and social learning skills in a self-contained classroom with preschool children diagnosed with autism spectrum disorder? (2) In what way, if any, do music activities infused with ABA strategies improve the social and or communication skills of preschool children diagnosed with autism spectrum disorder in their teachers' perceptions? (3) In their teachers' perception, do preschool children diagnosed with autism spectrum disorder communicate and/or socialize more often with peers instructed with music infused ABA daily lessons?

Theoretical Framework

Learning theorists examining the role of socialization and communication is a fundamental role in the development of cognition and learning, emphasize learning through observing and interacting with others as well as modeling from others (Woolfolk, 1998). According to Vygotsky (1978), cognition occurs through provisions of a collaborative setting (shared experiences within a cultured environment) with a cooperative dialogue skillful teacher and with repeated opportunities for discovery and support, then progress to completing a skill independently (Kelly, 2002; White, 2015). Vygotsky's social learning theory promotes a reciprocal learning experience for the children and teacher as a teacher should collaborate with each child in order to facilitate meaningful construction. Furthermore, Vygotsky's learning theory led to educational practice, cooperative learning, which create experience individual meaningful ways to experience music (Kelly, 2009).

Social learning theorist, Bandura (1997, p.19) remarks, "self-efficacy influences how a child thinks, reflects, and reasons; how he or she sees him or herself and others; and how he or she feels or behaves." Bandura notes that self-efficacy is related to motivation, behavioral patterns, mental schemas, and an individual's reaction in a social situation. Due to the lack of social communication skills, many preschoolers diagnosed with autism spectrum disorder will communicate when they are motivated to express a desire (Prizant et al., 2006). Music motivates children naturally, principally those diagnosed with autism spectrum disorder (Kern, 2008). Furthermore, Bandura emphasizes that learning is the result of interacting and imitating others. Paralleling Vygotsky, Bandura's observational learning hold that an individual can understand and copy behavior that is observed in a model. Music instruction presented as teacher modeling for preschoolers diagnosed with autism spectrum disorder whereby the performance includes

observing, imitating, and interacting with others reflects both Bandura's and Vygotsky's learning theories (Kelly 2009).

Methodology

For this study, three special education early childhood teachers were interviewed using criteria sampling. Each participant had to teach in a self-contained preschool class with preschool children diagnosed with autism spectrum disorder, ages 3-5, and have training in Applied Behavioral Analysis. Student participants were recruited via general parental outreach to three ABA self-contained preschool classrooms with approval from the suburban Public School District Board of Education. Two of the self-contained preschool classes were assigned as treatment groups and one self-contained group was assigned as the control group with participants receiving 20 minutes of Music-Infused ABA intervention or non-musical intervention, 5 days a week, targeting social skills and communication skills for 6 weeks.

Qualitative data were collected through semi-structured interviews using the research questions, open-ended questions, and follow-up questions to probe for deeper meaning. Interview questions focused on the teachers' background and personal use of general music in the self-contained classroom; and questions to evoke the teachers' perceptions of the benefits of music for the enhancement of social and communication skills. Descriptive statistics and primary outcome measures of pre and post rating on the Verbal Behavior Milestones Assessment and Placement and Program (VB-MAPP) on the following domains: Social Play, Intra-verbal, Listening, and Independent Play were used as part of a research exploratory mixed method design to support validity of coded themes. The length of the interviews ranged from 40 minutes to 60 minutes. Data were collected through interviews, field notes, reflective journaling, and noted common themes and research connections. The researcher used in vivo coding (placing emphasis on the actual words of the participants), process coding, and attribute coding to extract each interviewer's interactions and demographic characteristics for the first cycle of coding. The

second cycle of coding included in vivo coding and grouping of similar codes of research questions and individual student responses to music-infused ABA instruction that resulted in the emergence of themes. After completion of coding cycles, the researcher examined and charted new and improved individual social skills for all 10 student participants (by student/by class); and again, tabled word utterances over the 6-week study (by student/by class) to gain a more in-depth measure of the contribution of music as an intervention to increase communication and social learning skills in a self-contained classroom with preschool children diagnosed with autism spectrum. Next, summary tables for Class A, Class B, and Class C were created for pre-test and post-test scores from the Verbal Behavior Milestones Assessment and Placement and Program (VB-MAPP). Pre- and post-testing were examined to develop a more thorough understanding of the phenomenon being studied as this criterion–reference assessment is utilized by participants in this study as part of the ABA curriculum to assess language, social skills, learning and behavior of children diagnosed with autism spectrum disorder.

Some of the themes that emerged from this study were consistent with the existing literature in research that was conducted in music therapy, however this researcher could not find literature or current research regarding music-infused ABA strategies with preschool children diagnosed with autism spectrum disorder.

Overview of Key Findings

The purpose of this study is to examine the effects of music-infused Applied Behavioral Analysis strategies on the social and communication skills of a population of preschool students, ages 3-5, diagnosed with autism spectrum disorder that received a music-infused program within an Applied Behavioral Analysis framework in a natural self-contained setting. Additionally, this

study explored the perceptions of special education early childhood teachers who taught a music-infused program within an Applied Behavioral Analysis framework in a natural self-contained setting five days a week, 20 minutes a day, for a duration of 6 weeks. The findings from the interviews, daily log recordings of the individual student's performance and the descriptive statistical ratings from the Verbal Behavior Milestones Assessment and Placement Program indicate a few themes consistent with those current in the research literature concerning music therapy and inclusion for preschool diagnosed with autism spectrum disorder.

Findings in this study add to previous literature in the area of music therapy on students diagnosed with autism spectrum disorder with respect to imitation of musical sounds, improving joint attention, improving self-regulation/behavior, strengthening cognitive abilities, building motor abilities and developing communication responses. This researcher could not find past and current literature regarding music- infused ABA strategies with preschool students diagnosed with autism disorder in a natural setting to compare with the results of this study. Teacher A and Teacher B reported the following new findings with pre-composed music-infused ABA strategies: developing and expressing self-emotions (smiling, laughter, thumbs-up); turning and looking at peer during music activities; recognizing peer's accomplishment during music activities; self-initiation; and fading reliance on ABA prompts. Based on the findings of this current study, when it comes to music-infused activities infused with ABA strategies to improve communication and social skills for preschool children diagnosed with autism spectrum disorder, it appears that music-infused ABA strategies research and instruction should be encouraged. More specifically, music-infused ABA strategies seem to reduce impulsive behaviors and promote student relaxation as perceived by all teacher participants.

Because this research is a pilot study and exploratory, it is extremely important to note that the results have indicated possible developments and associations that cannot be generalized without further investigation. It is essential to emphasis that these results are indicative of this pilot study sample and can only suggest potential developments in enhancing communication and social skills of preschoolers diagnosed with autism spectrum disorder.

Research question one: How do preschool Special Education early education childhood teachers perceive the contributions of music, if at all, as an intervention to increase communication and social learning skills in a self-contained classroom with preschool children diagnosed with autism spectrum disorder?

In response to research question one, the special education early childhood teachers reported that their students have weekly opportunities to listen to music in the self-contained classrooms as a support during activities such as: opening circle, weather, calendar, circle time, finger-play transitions, choice time, line up transitions, and dismissal time. One of the participants spoke about using classical music during rest time or small group activities to promote relaxation and reduce emotional anxiety, if needed. The participants spoke about being able to see the positive attributes of music as it motivates preschoolers naturally as well as seems to soothe their students' emotionally. These findings are supported by the research of Kern (2008) and Prizant et al. (2006) indicating that preschoolers diagnosed with autism spectrum disorder due to lack of social communication will communicate when they are motivated to express a desire.

All participants described how frequently robotic the Applied Behavioral Analysis program is in a self-contained classroom as it is directly taught to the individual preschooler in

an isolated cubby area. All participants agreed their classroom is starved for group activities such as music in order to develop and enhance socialization, communication, and general preschool activities. Research supports that the use of pre-composed songs and music activity songs during instruction time such as circle time is one way to promote social engagement and learning for all learners including those diagnosed with autism spectrum disorder (deVries, 2006: Hallam, 2010; Lanter & Watson, 2008). Existing literature supports these findings: Kern et al (2007) and Vaiouli & Ogle (2014) recommend the use of pre-composed songs into preschool classroom routines as they offer structure, while their rhythmic and melodic aspects promote attention to instructions and social interactions. Moreover, a study conducted by Lim & Draper (2011) strengthens this study's findings by concluding that the likelihood special education early childhood teachers would continue to infuse music as an intervention to increase communication and social learning skills in a self-contained classroom with preschool children diagnosed with autism spectrum disorder hinged on the support of the school administrators. One participant remarked that it would be productive for administrators to think more of a preschool self-contained class as a general education class because in her opinion preschoolers diagnosed with autism spectrum disorder are "just babies" – sometimes experiencing their first school experience; just like other early preschoolers, however, a child with a diagnosis of autism spectrum." Teacher B explained her philosophy, which is similar to Vygotsky, "I would like to see more lessons such as music, yoga, and sensory skills built into the ABA program as well as mainstreaming into general education play preschool classes to enhance socialization and communication experiences for the preschool students diagnosed with autism spectrum disorder." Vygotsky (1967) believed play is central for early childhood education as it allows preschoolers to learn age appropriate social, cognitive, emotional, language and physical skills

that are essential to overall development. Moreover, Kemple et al. (2004), Moorehead & Pond (1978) & Neelly (2001), research findings support young children engage in music as play. Teacher C, during her pre-interview, noted that she uses music in a non-structured, non-manualized way in her classroom, and was able to speak about the impact of music in her classroom.

This study found that participants consistently documented week four as the pivotal week for most students in Class A and Class B to sing more naturally with less imitation, rote or echolalia performance. Fading of prompts was also recorded in Class A and Class B. Teacher C's (control Class C) perception as to why her students' performance showed comparatively no progress in social and communication skills when measured on the post VB-MAPP might have been due to the lack of exposure to the music-infused strategies ABA intervention program as well as the reduced school day hours due to the Covid-19 Pandemic. Conversely, Teacher C remarked she believed her students benefited from familiar songs in circle activities, as it tends to bring the children closer together as a social group (deVries, 2006; Hallam, 2010; Lanter, & Watson, 2008).

Research question two: In what way, if any, do music activities infused with ABA strategies improve the social and or communication, skills of preschool children diagnosed with autism spectrum disorder in their teachers' perceptions?

In response to question two, both Teacher A and Teacher B agreed the music activities supported an opportunity for social group building skills versus isolated skills that are given through ABA therapy instruction, where Teacher C noted lesser improvements. Participants believed the children enjoyed music activities (structured in the intervention groups, unstructured

in the control group), endorsing the quote, "Music is natural, providing for movement (Lara, 2016)." The participants spoke about being able to see positive social relationships and improved behaviors, which lead to meaningful social engagement and or non-verbal (gestures to a peer) and one/two-word verbal communications through music activities infused with ABA strategies.

This study also highlighted improved social responses for all ten preschool students who received the intervention. Participants observed and recorded positive data for social skills in the following areas: joint eye contact, smiling, turn and look, waiting for turn, engaging in social play with peer, singing with peers, giving thumbs up to acknowledge peer's accomplishment, prompts fading-independent social play increasing, knowing when it was his/her turn to participate in a musical activity, and choosing to sit with a peer. Teacher A and Teacher B indicated that social improvements were becoming more consistent by week four of the pilot study. Conversely, Teacher A spoke of a significant difference in social skills improvement adjacent to communication skills. Various possibly factors may have contributed to this outcome. First, Teacher A reported since two very limited, one non-verbal and one echolalia students represented the student population in the self-contained ABA classroom, reluctance to sing (communicate) might have possibly reflected measured delays in expressive language and lack of experience in vocalizing with peers in preschool activities. Secondly, Teacher A noted that students' preference favored the musical instruments and beanbags in contrast to imitating or modeling singing. This finding is consistent with a study by Dermaine (2017) that found some non-verbal children diagnosed with autism were observed to show immediate attraction to the musical instruments when compared to musical stimuli that used voice. Additionally, Joanne Lara with Keri Bowers (2016), author of Autism Movement Therapy Method: Waking Up the

Brain, have combined music and movement in the 40 years plus years of their individual and collective work in an autism therapy program for children and found how movement and music improves and builds autism's core deficits of speech and language, social skills, and behavioral challenges.

This study found that Class B seemed to be motivated by the pre-composed music that was played by the teacher. Descriptive statistics (VB-MAPP post-test) indicated an improvement for communication skills with music-infused ABA strategies. Various possibly factors may have contributed to this outcome in Class B. First, Teacher B reported the student population in the self-contained ABA classroom (four students with limited verbal skills, and two students who were verbal), preschoolers mimicked songs, laughed, smiled, danced, sustained eye contact, imitated rhythm of music, and drew closer to teacher and peers in musical circle as the music was played and singing was led. Second, the preschoolers may not have avoided singing since some had the ability to vocalize simple word phrases. Teacher B noted music activities were notes to contribute to more consistency in turn and look to a partner and turn and share a beanbag to successfully complete a musical game.

Research question three: In their teachers' perception, do preschool children diagnosed with autism spectrum disorder communicate and/or socialize more often with peers instructed with music -infused ABA daily lessons?

In response to question three, Teacher A reported that Class A socialized more often with peers by the conclusion of the intervention and Teacher B reported Class B gained improvement both in socialization and communication by the conclusion of the pilot study. It is extremely important to note that Teacher A indicated that possible variables for limited verbal responses

made during the music-infused ABA lessons may have been due to the measurable delays in expressive language delays, echolalia expression, and lack of experience in vocalizing with peers in group preschool activities. Alternatively, Teacher A expressed to this researcher that one of the non-verbal preschoolers who was not presently vocalizing appeared to become internally motivated with the music-infused ABA program which afforded the student opportunities to create communicative gestures. Teacher A described music activities as natural and observed preschool students diagnosed with autism spectrum disorder smiling, dancing, and passing beanbags in a game format, which is a preschool-age-appropriate activity. Teacher A's perception was that music-infused activities in ABA self-contained classrooms should be encouraged in order for small group social skills to grow.

Teachers A and B conveyed that the music-infused ABA strategies program often demonstrated positive levels of calmness and self-regulation, which afforded the preschoolers the opportunities to improve social and communication skills, while Teacher C (control) endorsed the value of music in her classroom. Teachers also noted that as the preschoolers became more comfortable with the music routines and songs, the music-infused ABA strategies supported the preschoolers' ability to sustain attention, improved cognitive memorization of words of songs, decreased inappropriate behaviors (i.e., flapping, screaming, running around the classroom), and increased the behaviors of turning and looking at their peers in order to model appropriate social behaviors and play. Teacher B believed that music-infused ABA strategies created social/emotional communicative expressions from peer to peer (i.e., "You did it"! "Look!"; Clapping for peers; and Giving thumbs up) at music circle time by week four. Literature supports this, as researchers have acknowledged the connection between infusing music therapy as an intervention into preschool programs with Applied Behavioral Analysis strategies as developing

positive social building skills, interpersonal communication and language skills including cognition and joint attention (Wigram & Gold, 2006; Whipple, 2012; Hashemian & Mohammadi, 2015; Kern et al. 2013; Hillier et al. 2017).

Teacher B found music provided for natural instruction with the preschoolers, offering the students the opportunity for fading the dependency of the usage of them in order to complete a musical game activity at times independently. The teachers in the present study observed that the music-infused ABA strategies were able to reach to individual strengths of each preschool child diagnosed with autism spectrum disorder and create experiences for verbal communication, gestures, socializations with gestures, and or social interactions with peers.

Subthemes

Subthemes were developed based upon the answers to research questions. This section includes conclusions concerning common perceptions among public school special education early childhood (Teacher A and Teacher B) regarding the instruction of music-infused ABA strategies in the self-contained ABA preschool class.

Improving Joint Attention

The widely held perception of the participants in this study is that of those preschoolers diagnosed with autism spectrum disorder who participated showed increased improved joint attention with music–infused ABA intervention strategies as they became more comfortable with the routine of the musical program. It was mentioned that week four was pivotal for both Class A

and Class B, as there appeared to be increased engagement with music stimuli and show sustained joint attention to task (Walworth, 2010; Walworth, Register, and Engel, 2009). Participants indicated that preschoolers modeled their movements regarding the use of musical instruments and beanbag game activities and overall were able to sustain joint attention on the average fifteen out of 20 minutes. The results of increased joint attention conveyed by Teacher A and Teacher B for this study were noted improved for this period of research time.

Strengthening Cognitive Abilities

Participants found that the daily application of the music-infused ABA practices not only steadily improved communication and social skills responses; they noticed an increase in cognitive performance for some of the students. Teacher A noted that students were using color words to identify beanbags (i.e., "I want red," "Yellow beanbag"). The overall frequency of pre-composed beanbag music-infused ABA strategies for Class B resulted in strengthening primary color recognition and rote counting to six of the collection of the beanbags as documented by Teacher B. Both Teacher A and Teacher B shared that some of the students began using color words to identify other musical instruments in the program. Participants noted that as some of the students became more comfortable with the music routines and singing of the songs, the memorizations of directions of musical songs and words of songs were noted to improve. This is in line with literature, as researchers have recognized the link between music therapy sessions and an improvement for children with autism spectrum disorder in social, communication, and language skills including cognition and joint attention (Wigram & Gold, 2006; Whipple, 2012; Hashemian & Mohammadi, 2015) and Applied Behavior Analysis.

Developing Emotions/Self-Regulations

Teacher participants within the study conveyed those students often demonstrated levels of calmness, reduced anxiety, and decreased behavioral issues during music-infused ABA strategies intervention. This calmness and reduced anxiety, and better behaviors encouraged improved social building relationships and self-confidence skills. Participants stated that the following,

Teacher B specifically commented, “Music is natural, providing for movement.” Teacher B also noted the importance of a preschooler diagnosed with autism spectrum disorder achieving individual accomplishments like singing, dancing, catching, and making friends in a natural music group similar to a general education preschooler (Vygotsky, 1978; Bodrova & Leong, 2007; Kemple et al., 2004; Neely, 2001).

Teacher A and Teacher B believed that it was important to encourage music daily in the preschooler’s day as it was observed to provide support with emotional regulation. Teacher B documented the following emotions as becoming more consistent week four two of the students in Class B: smiling, laughing, happy and cheering on peers in musical groups. In addition, verbal responses recorded included spontaneous cheers of praise for peers such as “Great job” and “Wow” (Hashemian & Mohammadi, 2015; Katagiri, 2009).

Building Motor Skills

Participants in this study consistently referred to music as natural, providing for movement, enjoyment, and self-regulation. The teachers agreed that movement (dance) and

music is a fun, motivating, engaging, multisensory tool which analysis of observational data identified as a contribution to developing coordination, balance, improving overall gross motor and fine motor skills. Lara and Bowers (2016) proposed the following, “Movement and music helps develop essential core skills, including gross and fine motor skills/planning; sensory processing and integration”. Teacher participants agreed that listening to music gave the preschoolers the opportunity to model the actions of the teachers and their peers playing musical instruments as well as the actions in the musical games (Balwin, 1973; Lovaas, 2003). Teacher A and Teacher B communicated consistent improvement in the areas of catching, throwing, dancing, passing, clapping, and pointing for beanbags or musical instruments of choice, enhancing both gross and fine motor skills (Kalas, 2012; LaGasse &Hardy, 2013).

Implications for Theory

The findings and analysis of the effectiveness of a music-infused ABA program for preschool children diagnosed with autism spectrum disorder has beneficial implications for special education early childhood teachers, administrators, public schools, and educational institutions to provide a natural intervention practice within the self-contain preschools given nationwide increases in the diagnosis of autism and thus the need of interventions for children with autism. The teachers in this study defined ABA as a gateway for preschoolers with autism to express non-verbal and verbal functional expressive language, cognitive, and appropriate social skills, yet ABA intervention can represent as repetitive, robotic, and lacking emotional spontaneity as instruction is isolated at times in their opinion. This study emphasized social learning theory as presented by Bandura (1976), Vygotsky (1978) and Wertsch (1991). Bandura’s (1976) research

supports the concept that learning can be the result of imitating others in the natural environment. Accordingly, the music-infused ABA strategies presented as teacher modeling of a musical activity for preschoolers with autism spectrum disorder, which includes observing, imitating, and interacting with the special education teacher and their peers. Vygotsky's (1978) social theory promotes a reciprocal learning experience for the children and the teacher and the teacher who should collaborate with each child in order to help facilitate meaningful interaction. The teachers interviewed in this study emphasized the flexibility of utilizing a pre-composed music-infused program with ABA prompts, which afforded the opportunity to facilitate a child's learning experience by scaffolding developmentally age-appropriate abilities. Paralleling the work of Vygotsky, Wertsch's (1991) social learning theory, Theory of the Mind, positions impaired empathy is characteristic to children diagnosed with autism. Research suggests that music might be a means for identifying and exploring emotions by infusing motions and facial expressions (Molnar-Szakacs &Heaton, 2012; Prism Project, 2009).

The use of pre-composed music with ABA strategies allowed each of the preschool children diagnosed with autism spectrum disorder to explore music freely and engage in social relationships in -group music activities. Music-infused ABA strategies were motivating and engaging and allowed the preschoolers to demonstrate to, the special education early teachers how he or she responded to the pre-composed music with ABA strategies. If the special education early childhood teachers perceived this intervention as positive in regards to the research of the social learning theorists, the implications of increasing the effectiveness of music-infused ABA program will be suggested to other colleagues within the district and across multiple naturalistic classroom settings, thus supporting further use and research of music-

infused ABA programs as an evidenced-based collaborative set of strategies to teach social and communication skills to preschool children diagnosed with autism spectrum disorder.

Recommendations

This section includes recommendations for special education early childhood teachers, parents of preschoolers diagnosed with autism spectrum disorder, public school leaders, and all schools. Recommendations for policy, practice, and future research, based on the interviews and analysis of special education early childhood teacher narratives are further discussed in this section.

Recommendations For Practice and Policy

The findings of this pilot study might offer special education early childhood teachers and school district administers the opportunity to address the spectrum of social skills, communication skills, and behavioral challenges influencing preschool students diagnosed with autism spectrum disorder being educated in the self-contained ABA preschool classrooms within the local public schools.

As explained by one of the participants in this study, “It would be very productive for administers to think more of a preschool self-contained class as general education preschool because “these children are just babies”-sometimes experiencing their first school experience; just like other early preschoolers, however, children with a diagnosis of autism.” The teachers spoke sincerely about the need to have daily lessons such as music, yoga, and sensory skills built into the ABA curriculum to enhance socialization, communication, and self-regulation experiences for the preschool students to prepare, if possible, some of the students for general preschool inclusion. The participants commented that the preschoolers did not receive music therapy as a related service, nor did they receive music from a general education music teacher in

the preschool self-contained program. During the interviews, the participants indicated that music infused with ABA provided for meaningful individual and collaborative social and communication experiences in a group effort. Consequently, by practicing the music-infused ABA program interventions, teachers reported better self-regulation, emotional regulation, joint attention, and willingness by the preschoolers diagnosed with autism spectrum disorder to engage at music circle. Furthermore, Teacher B found the music-infused program flexible and as the classroom's behavior was more regulated during week four of music-infused ABA strategies, an empowered decision to change the location to the playground for group music with music stimuli was made. The change in location was reported to increase motivation with the musical stimuli which in turn improved d enhanced the interaction of social communication the teacher and the teacher. Music-infused ABA strategies are natural practices that engage and support social communication in natural settings similar to a general preschool education classroom. The most important mission of this research is to build a larger cohort of special education early childhood teachers, which would support music-infused ABA programs among preschoolers diagnosed with autism spectrum disorder throughout the district with administrators and stakeholders encouraging the implementation of this music program. Most importantly, if a special education early childhood teacher utilizes a music-infused ABA program within a self-contained classroom, it would be aligned with the Division for Early Childhood recommended practice guidelines, suggesting practitioners provide children with appropriate support in natural environments during daily routines and instruction for young children must be child-focused and contextually relevant (Division for Early Childhood of the Council for Exceptional Children, 2014; E1;INS2, INS5;INS8).

The use of pre-composed music-infused ABA strategies is a relatively cost-effective program, requiring few musical stimuli. The special education early childhood educators in the suburban district who experienced instructional practice in this pilot study can advance the success of this research to the advantage of the preschool curriculum by inviting administrators, general education music teachers, physical therapists, and occupational therapists by observing and participating in a music-infused ABA program thus creating a collaborative partnership for enhancing social communication skills. Gathering experiential knowledge may further assist the implementation of the music-infused ABA practices within the classroom. With support of the special education administrators, the special education early childhood teachers could provide continuous professional development for teachers to increase the practices that can be used with ABA strategies for building social and communication skills.

To engage more parents of preschoolers diagnosed with autism spectrum disorder, the special education early childhood teachers could ask administrators for the following parent initiatives: Parent volunteers as music or yoga instructors; and Parent volunteers to engage in the music-infused ABA programs. To increase the effectiveness of social and communication skills of preschoolers takes a collaborative effort. As a practice, teachers and administrators will establish continual positive relationships with parents if parents are an effective part of their child's learning.

Recommendations For Future Research

The findings from this study found that music-infused ABA intervention programming within the self-contained preschool public school district classrooms may be a feasible practice

for increasing social and communication skills for preschool children diagnosed with autism spectrum disorder. Pre-composed music, musical stimuli and musical activities provided a naturalistic intervention, infused with ABA strategies, to enhance preschoolers' using their voice, gesturing to communicate, imitating words of the songs, improvising with a musical instrument, and dancing to the movement of the music and notably improving social and communication skills. Teachers interviewed in this study inclusively commented the need to synthesis music and sensory skills curriculums with the ABA discrete trial program to develop and enhance the spectrum of deficits characterized by challenges in social and communication skills. Furthermore, having a knowledge evidenced based research music-infused strategies to pool from for preschool special education early childhood teachers may heighten improvement of social and communication skills for preschool children diagnosed with autism spectrum disorder, given the nationwide increase in the diagnosis of autism, particularly in the pediatric population and the need for autism interventions (CDC, 2021; Srinivasan & Bhat, 2013). Much further research is required as these findings are novel to the field of qualitative research in music-infused ABA strategies on Preschool Children with Autism Spectrum Disorder. Several follow-up studies that could use the same or similar protocol used in this study could be engaged with a larger sample size.

The first follow up study can apply the same protocol used in this present pilot study with a larger sample of preschool 3-5 children diagnosed with autism spectrum disorder, receiving education in self-contained ABA intervention in self-contained classrooms in public school districts. Additionally, it can be utilized for a longer period of study. This study could possibly identify more generalized developmental social abilities, types of one/two-word communication verbalizations, and any established reciprocal conversations. Additional analysis of music-

infused ABA strategies could support the narratives of this qualitative research that cites improved social, communication, and joint attention skills when a preschool student diagnosed with autism spectrum disorder is engaged with music-infused with ABA strategies. Additionally, targeting social skill deficits relevant to each preschooler could be matched to ABA goals and utilized within the protocol as an aide for each preschooler's social and communication development. Pre and post standardized tests should be a part of the research process to compare the contribution of a pre-composed music-infused activities to the ABA program to enhance the over a period of instructional time, if any, of social and communication skills.

This qualitative study detailed the perceptions of suburban public school special education early childhood teachers regarding infusing pre-composed music activities into the ABA self-contained program utilizing ABA practices. A second study could use the protocol in this current study, allowing for the perceptions of the parents while providing for a parent home component designed by the researcher. This home link would be related to the music-infused ABA program in the self-contained classroom. This home link would be distributed weekly as per the length of the study and data recorded by weekly session by researcher. One of the variables in this study is additional practice, which could influence positive social and communication skills for preschool children diagnosed with autism spectrum disorder.

A third follow up study could explore pre-composed music-infused ABA programs on preschool children diagnosed with autism spectrum disorder with improvisational music-infused ABA programs diagnosed on preschool children diagnosed with autism spectrum disorder. This current study found that preschoolers diagnosed with autism spectrum disorder responded positively to pre-composed music, and as a result, by the end of the 6-week pilot study, had opportunities for successful social relationships and communications. A comparison of this study

with improvisational music-infused ABA programs could rule out as a factor if preschoolers diagnosed with autism spectrum disorder show more frequent performances of joint attention and improved social and communication skills with improved music (Gold, Wigram, & Elephant, 2009). This comparison study could rule out which musical interest as a factor is stronger in addressing appropriate music-infused interventions with ABA strategies to provide a unique variety of naturalistic and intentional and developmental interventions to facilitate development social and communication skills of preschool children diagnosed with autism spectrum disorder in self-contained classrooms.

Conclusion

In conclusion, this exploratory mixed method pilot study was based upon the responses to research questions concerning perceptions among special education early childhood teachers who were trained to deliver a music-infused ABA program, in self-contained preschool classes, in a suburban area in the northeastern United States, for duration of 6 weeks to preschool students diagnosed with autism spectrum disorder. The purpose of this study is to examine, comprehend, and experience the narratives of the special education early childhood teacher perceptions regarding music-infused ABA strategies with the ten identified limited verbal and non-verbal preschool students diagnosed with autism spectrum disorder within the self-contained classrooms. Based on the findings of the study, music-infused ABA strategies interventions in self-contained classrooms is effective for improving social group building skills and communication skills, supporting the individual discrete trials of Applied Behavioral Analysis instruction. The study showed that when musical stimuli (beanbags and instruments) were

present, preschoolers diagnosed with autism spectrum disorder were able to express music in the following ways: imitation, using their voice, improvising with a musical instrument, and dancing. The special education early childhood teachers in this study reported that music-infused activities in the ABA self-contained classroom is effective in encouraging improved joint attention, strengthening cognitive abilities, building motor skills, and developing emotions and self-regulations.

This exploratory study seems to be the first of its design with special education early childhood teachers as facilitators of a music-infused program as an educational practice within their self-contained classrooms as opposed to a music therapist delivering this intervention, which may not be funded by the local public-school districts. While the results are to be interpreted with caution, as the limitations outlined in this study noted the need for a larger sample size as well as continued research as an accepted evidenced based practice, these preliminary outcomes support current literature regarding intervention utilizing music therapy, which suggests that preschool children diagnosed with autism spectrum disorder respond positively to pre-composed music in the goal areas of social and communication developing emotions and self- regulation. Furthermore, music stimuli provided motivating incentives for the students who participated in this study and yielded outcomes that demonstrated levels of calmness, reduced anxiety, and decreased behavioral. This calmness and reduced anxiety, and better behaviors encouraged improved social building relationships and self-confidence skills. These findings adding to the current body of research that exists on music therapy practices in education (Whipple, 2012; Wigram &Gold, 2006).

The widely held perception of the teachers who were interviewed commented that it is appropriate to use music infused with ABA strategies in the self-contained preschool programs

as it was an effective intervention for 6 weeks showing some improvement in social and communication skills in a more naturalistic approach to learning similar to interactive music making in general education preschool classrooms. Future research directed towards exploring music abilities among larger samples of preschool students diagnosed with autism spectrum disorder can further develop more research evidenced based practices that special education early childhood teachers could use in a self-contained classroom to increase social and communication skills among limited verbal and non-verbal preschoolers diagnosed with autism spectrum disorder.

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APPENDIX A

SETON HALL UNIVERSITY
1 8 5 6

February 27, 2020

Josephine Sodano

Re: Study ID# 2020-019

Dear Ms. Sodano,

At its February 26, 2020 meeting, the Research Ethics Committee of the Seton Hall University Institutional Review Board reviewed and approved your research proposal entitled "The Effects of an Applied Behavior Analysis Music Infused Program on Increasing Teacher Perceptions of its Effectiveness Helping Preschool Students Ages 3 to 5 with Autism Spectrum Disorder" as submitted. This memo serves as official notice of the aforementioned study's approval as exempt. Enclosed for your records are the stamped original Consent Form and recruitment flyer. You can make copies of these forms for your use.

The Institutional Review Board approval of your research is valid for a one-year period from the date of this letter. During this time, any changes to the research protocol, informed consent form or study team must be reviewed and approved by the IRB prior to their implementation.

You will receive a communication from the Institutional Review Board at least 1 month prior to your expiration date requesting that you submit an Annual Progress Report to keep the study active, or a Final Review of Human Subjects Research form to close the study. In all future correspondence with the Institutional Review Board, please reference the ID# listed above.

Thank you for your cooperation.

Sincerely,

Mara Podvey

Mara C. Podvey, PhD, OTR
Associate Professor
Co-Chair, Institutional Review Board

Office of the Institutional Review Board
Presidents Hall · 400 South Orange Avenue · South Orange, New Jersey 07079 · Tel: 973.275.4654 · Fax 973.275.2978 ·
www.shu.edu

APPENDIX B

Letter of Solicitation

Effectiveness Of Music- Infused ABA Strategies on Children with Autism Spectrum Disorder

Dear Preschool, Special Education Teachers:

You are invited to participate in a study on the experiences of preschool children diagnosed with autism spectrum disorder titled: *Effectiveness of Music-Infused Applied Behavior Analysis Music Strategies on Children with autism spectrum disorder.*

Preschool special education teachers who have been trained in Applied Behavior Analysis and implement Applied Behavior Analysis strategies within their self-contained preschool classrooms are eligible to participate in this study by willingly participating in two interviews. An initial interview of no more than 90 minutes which discusses the teachers' perceptions of the potential contributions of music to enhance communication and social learning skills of preschool children diagnosed with autism spectrum disorder will be conducted prior to the music infusion research. A follow-up interview of no more than 90 minutes will be conducted at the conclusion of the study to discuss perceptions of the actual contributions of music. The follow-up interview will take place between March 1, 2021, through April 23, 2021, at a place and time that is convenient for you.

Your participation in this study is voluntary. If you grant permission, the interview will be recorded with a digital recorder as well as notated in a journal by this researcher. Information from this research will be used solely for the purpose of this study and any publication that may result from this study. **All conversations will remain confidential; your name and other identifying characteristics will not be used in reports and presentations.**

Thank you for your time, support and consideration of this study. If you have any questions or would like to participate, please contact me as soon as possible at jsodano@shu.edu.

Sincerely,

Josephine Sodano
Doctoral Candidate
Ed. D in Higher Education Leadership, Management and Policy
Seton Hall University College of Education and Human Services

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Appendix C

Teacher Informed Consent Form

Effectiveness of Music- Infused ABA Strategies on Children with Autism Spectrum Disorder

Researcher's Affiliation**:** Ms. Josephine Sodano is a doctoral candidate in the Seton Hall University College of Education and Human Services, Ed. D, in Higher Education Leadership, Management and Policy program.

Purpose of the Research: The purpose of this study is to examine the effects of music-infused Applied Behavioral Analysis intervention programming on the social and communication skills for preschool students diagnosed with autism spectrum disorder in a self-contained classroom. Specific attention to the perceptions of special education early childhood teachers regarding the contribution of daily music-infused interventions to enhance social and communication learning skills amongst preschoolers diagnosed with autism spectrum disorder will be given to the child's social and communication progress with music facilitation provided by the special education teacher versus a music therapist. The findings of this study may provide a model that school leaders and educators can implement to improve social and communication skills for preschoolers with autism spectrum disorder

Research Procedures: Research procedures include the following: research subject (special education early childhood teacher) participation in a pre and post digital audio recorded, semi-structured interview that does not exceed 90 minutes by this researcher. Participants' information and identities will not be released. Interview questions will focus on the participants' perceptions of contribution of a music infused program with Applied Behavior Analysis strategies as an intervention to improve social and communication skills, specifically with increased frequency instruction within the classroom.

Interview Guide Instrument: Sample questions that will be asked of each participant will include:

- What is your opinion on instructing daily music activities in an early childhood special education classroom?
- Describe the types of music activities you use in the classroom independent of the music general education teacher?
- Do the preschoolers have access to musical instruments in the classroom and if so, describe how the preschoolers use the musical instruments?
- Do the preschoolers have the opportunity to pick music as a preferred activity outside of it being presented to them as a group?
- How do you perceive the contribution of music, if any, to the improvement of communication and social skills of preschool children diagnosed with autism spectrum disorder?
- What changes have you noticed, if any, in joint attention, social skills, and communication as the preschoolers are engaged in a musical activity?

Voluntary Nature of Participation: Your participation is completely voluntary. You may withdraw from this study at any time.

Anonymity Preservation and Confidentiality: Anonymity may be not possible because the researcher will know some of the participants as part of the interview process as of the principal researcher only retired as Learning Consultant from the district of Teaneck Public Schools. However, before the principal researcher's retirement, new staff changes were made for the upcoming school year. This researcher does not know these staff members for the self-contained preschool classes. All interview responses will remain confidential, and pseudonyms (aliases) will be assigned to each participant. Participants' identities will not be revealed in preliminary and final reports published materials. During the study, the dissertation mentor and committee members will have access to the coded information through the researcher.

Anticipated Risks: There is little to no foreseen risks or discomfort involved in the completion of this study.

Benefits: Your participation in this study will provide valuable information in further understanding in the effects of music-infused with Applied Behavior Analysis strategies for improving social and communication skills for preschoolers diagnosed with autism spectrum disorder. The findings of this study may provide a model that both school administrators and teachers can implement to improve social and communication skills with children diagnosed with autism spectrum disorder.

Participant Compensation: There will be no monetary compensation provided to participate in this study. Participation is of a voluntary nature.

Contact Information: At any time during the study or after the study is completed, questions regarding this research and research participant's rights can be directed to the principal researcher, Josephine Sodano at jsodano@shu.edu. The Dissertation Mentor, Dr. Michael Kuchar can also be reached at mkuchar@shu.edu in the Department of Education Leadership and Policy at Seton Hall University, 400 South Orange Avenue, South Orange, New Jersey 07079. If you have questions about your rights as a human research subject, you may contact Dr. Mara Podvey, Co-Chair, and Institutional Review Board (IRB) at IRB@shu.edu.

Audio Record Consent: A digital recorder will be used to record the interviews. Participants will be identified by a pseudonym (alias). Audio files will be kept confidential on a separate, password protected USB memory device transferred from a digital audio recorder. Only the recorder will have direct access.

However, the dissertation mentor and committee members will have the right to access the data files upon request. The USB memory device and transcripts will be stored in a locked file cabinet in the personal possession of the researcher until the study is completed. Participants will have access to their interview data upon request. After the research is completed, the audio files, transcripts and print materials will be destroyed.

Consent: To indicate consent to participate in this research study, please sign and date this form in the space provided below, retain a copy of the signed form for your records and forward the original to researcher.

_____ I understand the purpose, procedures, and voluntary nature of this study. I agree to participate in this study.

Participant's Name (Please Print)

Participant's Signature **Date**

_____
Principal Researcher

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Appendix D

Parent Informed Consent Form

Effectiveness of Music- Infused ABA Strategies on Children with Autism Spectrum Disorder

Researcher's Affiliation**:** Ms. Josephine Sodano is a doctoral candidate in the Seton Hall University College of Education and Human Services, Ed.D. in Higher Education Leadership, Management and Policy program.

Purpose of the Research: The purpose of this study is to examine teacher perceptions of the effects of music-infused Applied Behavioral Analysis intervention programming on increasing the social and communication skills on preschool students diagnosed with autism spectrum disorder. Music facilitation will be provided by the special education teacher versus a music therapist in a group setting. The findings of this study may provide a model that school leaders and educators can implement to improve social and communication skills for preschoolers with autism spectrum disorder.

Research Procedures: Research procedures include the following: A participating child and his/her class will be exposed to 6 weeks, 5 days per week, 20 minutes per day of a music- infused program within their ABA strategies as an intervention to increase social and communication skills. The special education teacher will be the facilitator to a group lesson of music. *The special education early childhood teachers will be the facilitators of this music study.* The goal of the music –infused Applied Behavior Analysis strategy is to hopefully improve spontaneously modeling and verbalization of songs and activities by increasing joint attention, social and communication skills. The emphasis **only will be on the teachers' perceptions of the progress gained by the students if any in the areas of social and communication skills.**

Instruments Used: A shortened version of the Verbal Behavior Milestones Assessment, a curriculum assessment tool measuring language and learning milestones, will be administered before and after this study to measure improvements in these areas. Music- infusion will take place utilizing the audio CD entitled "Bean Bag Activities & Coordination Skills" (Stewart, 2000) as well as an appropriate number of bean bags per student for the activity.

Voluntary Nature of Participation: Parental consent for a child's participation is voluntary and one may refuse to participate or discontinue participation for their child at any time without penalty.

What you will be asked to do: Participants will be asked to sign a Parent Consent form informing them that their child will be exposed to a music-infused program with ABA strategies for 6 weeks, 5 days per week and 20 minutes a day as an additional intervention to improve social and communication skills.

Anonymity Preservation: Anonymity is not possible because the researcher and special education early child teachers know the students as part of the music intervention study conducted in the classroom. However, all pre-composed music instruction will remain confidential, and pseudonyms (aliases) will be assigned to each student participant. Participants' identities will not be revealed in preliminary and final reports or published materials. During the study, the dissertation mentor and committee members will have access to the coded information through the researcher.

Confidentiality: Participant names, student names and the names of the institutions are not used in this pilot study. To ensure protection and confidentiality, a pseudonym will be assigned to each participant, a numerical number to the student and the institution will be described in terms of institutional type and regional location. MacPro Audio interviews recordings of participants will be stored on a password protected USB memory device locked in a desk drawer at the researcher's home. All digital recordings, interview protocols, interview transcripts, field notes, and observations will be stored in a locked file cabinet in the researcher's home and will be retained for three years in compliance with IRB guidelines. Following the retention of at least three years all stored research items will be destroyed if it has been determined that the research requires no further analysis.

Records: Written and electronic records will contain no participant names, student names and the names of the institutions. All records will only reflect the deidentified pseudonym. All digital recordings, interview protocols, interview transcripts, field notes, and observations will be stored in a locked file cabinet in the researcher's home and will be retained for three years in compliance with IRB guidelines.

Risks or Discomforts: There are no anticipated risks associated with this study.

Benefits: A child's participation in this study may provide valuable information in further understanding the effects of music-infused with Applied Behavior Analysis strategies for improving social and communication skills for preschoolers diagnosed with autism spectrum disorder. The findings of this study may provide a model that both school administrators and teachers can implement to improve social and communication skills with children diagnosed with autism spectrum disorder.

Participant Compensation: There will be no monetary compensation provided to participate in this study.

Contact Information: At any time during the study or after the study is completed, questions regarding this research and research participant's rights can be directed to the principal researcher, Josephine Sodano at jsodano@shu.edu. The Dissertation Mentor, Dr. Michael Kuchar can also be reached at mkuchar@shu.edu in the Department of Education Leadership and Policy at Seton Hall University, 400 South Orange Avenue, South Orange, New Jersey 07079.

Consent: To indicate consent to participate in this research study which is providing an additional intervention group musical activity with the goal of enhancing communication and social skills; please sign and date this form in the space provided below, retain a copy of the signed and dated form for your records and forward the original to me.

_____ You (parent(s)) understand the purpose, procedures, and voluntary nature of this study, which will be conducted by the special education early childhood teachers only. You hereby give your consent to have your child participate (who is registered in the ABA class) in the research study "Effectiveness of Music-Infused ABA Strategies on Children with Autism Spectrum Disorder," details of which have been provided to you above, including anticipated benefits and risks.

_____ You fully understand that your child will receive at any time without prejudice or effect, 6 weeks 5 days a week; 20-minute daily sessions of: Music intervention by their special education teacher. You (parent) also understand that you are free to ask questions about any procedures that will be undertaken to the principal researcher. You may contact, Josephine Sodano, Learning Consultant at (908) 839-9336.

Finally, you understand that the information obtained during this study will be kept confidential unless the principal researcher consents to its release. (Return signature page to researcher; keep remaining pages for your records.)

_____**Child's Name**
(Please Print)

Parent's Signature **Date**

The researcher hereby certifies that she has given an explanation to the above individual of the contemplated study and its potential benefits.

_____
Principal Researcher

Appendix E

Interview Protocol

Effectiveness of Music-Infused ABA Strategies on Children with Autism Spectrum Disorder

Process: Study participants will be three special education early childhood teachers in a semi-structured, open-ended, in-depth pre and post interviews that will last between 60 and 90 minutes. This study utilizes the qualitative research methodology strategy of narrative analysis. The interview questions will be used as a guide to help maintain the focuses of the interview, and to assure that the research questions are thoroughly addressed. Study participants will be informed that they may share as much or as little as they prefer; all stories each of the three participants chose to share will be accepted. There are several pre-determined questions and probes in the interview protocol in order to elicit specific information that provide teachers' perception of music-infused with Applied Behavior Analysis strategies and address the research questions.

Consent Process: Once potential special education early childhood teachers express interest study after the letter of solicitation, I will personally deliver a consent form to each participant's classroom, and ask that they read it, sign two copies, retain one for their records and the other copy is for my records.

Pre-Interview Script:
"Thank you for your participation today. My name is Jo Sodano, a doctoral candidate in the Higher Education Leadership, Management and Policy program at Seton Hall University. You were invited to participate in this study because you are a special education preschool teacher who instructs preschoolers who are diagnosed with autism spectrum disorder and utilizes Applied Behavior Analysis as part of curriculum instruction. During this 60-to-90-minute pre-interviews, I will ask you questions about your teaching background, best practices with children diagnosed with autism spectrum disorder, and your perceptions of daily music infused with Applied Behavior Analysis strategies daily activities to enhance social and communication skills.

The purpose of this study is to examine the effects of music-infused Applied Behavior Analysis intervention programming to improve the social and communication skills for preschool students diagnosed with autism spectrum disorder and ***your perceptions of the*** **progress gained by the students if any in the areas of social** ***skills and communications skills.*** *At the end of this qualitative study, you will be invited to participate in a 60-to-90-minute post interview. Particular attention will be paid to how the daily infusion of music with Applied Behavior Analysis strategies are dependent on the infusion of Applied Behavior Analysis or does music making itself provide an intrinsic reward that improves social and communication skills.*

As stated in the Consent Form that you signed, your participation in this study is voluntary, and the interview will be recorded with a digital recorder so that your responses may be documented accurately. If at any time during the interview you wish to discontinue the use of the recorder or the interview itself, please free to let me know. Information from this study will be used solely for

the purpose of this study and any presentations or publications that may result from this study. All interview conversations will remain confidential; your name and other identifying characteristics will not be used. Thank you in advance for your time and for being part of this study."

Post-Interview Script:

"Thank you for your participation in this study. The purpose of this study was to examine the effects of Music-Infused Applied Behavior Analysis intervention programming to improve the social and communication skills for preschool students diagnosed with autism spectrum disorder.

In this study, you applied music-infused Applied Behavioral Analysis during structured time to the students in your classrooms. You were given a pre-interview, where I asked you questions about your teaching background, best practices with children diagnosed with autism spectrum disorder, and your perceptions of daily music infused with Applied Behavior Analysis strategies daily activities to enhance social and communication skills. Now you will be asked post-interview questions in order to determine whether your perceptions have changed.

Thank you for participating in this study. It is my hope that the data collected can be used to pilot other programs where music can be used to assist students with autism spectrum disorder with various skills.

If you have any questions about this study, please contact me.

Thank you!

Appendix F

Pre-Interview Guide

Effectiveness of Music- Infused ABA Strategies on Children with Autism Spectrum Disorder

Pseudonym: _____

Participant Interview Number: _____

Classroom Pseudonym: _____ Location: _____

Date of Interview: _____ Start Time: _____

Interview Questions	Research Questions Addressed
1. Can you tell me about your years as an early childhood special education teacher, curriculum utilized within your classroom, ABA training, your comfort with music? 2. When did you decide to pursue your teaching career in the field of Autism and Applied Behavior Analysis and Why?	Background questions Demographic – Information of Participants Establish background of participants and ensure study eligibility in addition to questions asked in participants' perceptions of music utilized as a curriculum with children diagnosed with autism spectrum disorder.
3. What are your thoughts on infusing music daily as part of the curriculum in the special education preschool Applied Behavior Analysis classroom? 4. What do you feel is the appropriate use of music in your classroom? 5. What types of music, if any at all, do you utilize within your preschool Applied Behavior Analysis classroom? If you utilize music, please explain what types you feel is the most significant and why. If you do not use music activities, please explain which types of music, if any, you would like to have access to in your classroom and why. 6. Describe the types of music activities preschoolers in your classroom have access to; how do they typically use music and with what frequency? (Per day/week).	1. **How do preschool Special Education Early Childhood Teachers perceive the contribution of music, if at all, to communication and social learning in a self-contained classroom with preschool children diagnosed with autism spectrum disorder?** Gain an understanding of how participants view the contribution of music from their classroom experiences as an effective strategy to improve social skills.

7. With what frequency do you utilize music activities in the classroom? (Per day/week) Is music conducted before or after direct instruction (Applied Behavior Analysis)? 8. When preschoolers are engaged in music activities infused with Applied Behavior Analysis strategies, do you feel communication and social skills may improve and if so, why? 9. Describe a social and or communication response noted from a preschool child diagnosed with autism spectrum disorder who is participating in a music activity.	**2. In what way, if any, does music activities infused with Applied Behavior Analysis strategies improve the social and or communication skills of preschool children diagnosed with autism spectrum disorder in their teachers' perception?** Overall professional teaching experience in the field of special education/early childhood/ academic scholarship and implementation of Applied Behavior Analysis programs.
10. What challenges, if any, have you experienced, as a special education teacher, implementing music activities in a special education Applied Behavior Analysis classroom? 11. Do you perceive social and communication skills improving by the daily contribution of music infused in an Applied Behavior Analysis classroom and why? 12. How would you determine if music is being used effectively and if preschoolers diagnosed with autism spectrum disorder have benefited socially and communicatively through daily instruction?	3. **In their teachers' perception, do preschool children diagnosed with autism spectrum disorder communicate or socialize more often with peers when instructed with music infused Applied Behavior Analysis daily lessons?** Exploration of strategies for social, communication and pragmatic language success.
13. Do you have any questions for me regarding this interview or is there something you would have wanted me to have ask regarding your perceptions of music infused with Applied Behavior Analysis strategies to improve social skills and communication? 14. If I need to clarify any of your responses, may contact you?	**Interview Wrap-Up** Opportunity to share additional comments or elaborate on anything already shared Opportunity to correct any misinterpretation or add additional comments

Appendix G

Music-Infused Applied Behavior Analysis Protocol

Effects of Music -Infused ABA Strategies on Children with Autism Spectrum Disorder

Music-Infused Protocol: This pre-composed music-infused protocol is proposed for administration by special education early childhood teachers who utilize Applied Behavior Analysis as a majority of their curriculum throughout the preschool day. All pre-composed musical activities chosen (Georgiana Stewart, Bean Bag activities and Coordination Skills, Kimbo,1977) are designed in a group format, however, the activities range from individual, partner to group participation.

The goal of the music-infused Applied Behavior Analysis strategies is to improve spontaneous modeling and verbalization of songs and activities thus increasing social and communication skills (pragmatic language).

Preparation:

- Identify space in classroom, preferably circle rug where teacher, aide and preschoolers can move freely within a contained setting. Use either carpet squares, preschool chairs or laminated colored shapes taped to the rug to designated preschooler
- Teacher and Paraprofessionals to present a choice of two instruments to each preschooler and "I have a drum. (present the drum and play the instrument. Repeat with the second instrument of choice. Teacher will assist with verbal prompting – "I want drums". "I want bells" as the child chooses.
- Distribute instruments to preschooler's place in the music circle.
- Have preschoolers sit in a circle to enhance social/communication skills to each preschooler (instruments are to be used with the Hello circle song.)

Duration: 20 minutes of active participation with music infused with Applied Behavior Analysis strategies.

Steps:

- **Hello Song: Sing brief melody with instruments to acknowledge the beginning of music time- "Time for music, time to play, we will play with friends and have fun today!" Match prompt to instrument for clean up into box.**

• Beanbags – Introduce the Beanbag before CD music playing- Start activity when preschoolers are focused, and beanbags are their laps for the most part (or supported by the teacher and aide). Encourage the preschoolers to get to know their beanbag by squeezing, gripping, holding and exercising their fingers with the bean bag (Collect bean bags). Begin playing the musical song, "Who's Got the Bean Bag?" and singing along with the CD. Encourage the child to imitate/model the activity in the song and throughout the six weeks add the following pre-composed songs: "Make Friends with A Bean Bag; Bean Bag Rock; How Many Ways; Bean Bag Catch; Pass the Bean Bag: Bean Bag Parade".

• Movement pre-composed – Encourage the preschoolers to sing, move and allow their body to make music with the bean bag song and with partners (turn and share)

• Vocal pre-composed – Encourage preschoolers to imitate words of the beanbag songs and sing directly to their classmates, adults, or partners to enhance social or communication skills.

• Goodbye Song – Wave good-be to the bean bag, and say, "Bean bag I'll be seeing you. Bean, Bean, beanbag. Bean, bean, beanbag. Beanbag, I'll be seeing you."

• Keep Records: Use the music-infused data sheet to record the following: the communication and social responses produced (improved or decreased); behavior responses produced (improved or decreased); and music imitation responses (appropriate motor movements and singing to songs).

Appendix H

Data Sheet for Teachers

Effectiveness of Music- Infused ABA Strategies on Children with Autism Spectrum Disorder

Music-Infused Data Sheet:

Pseudonym: _____

Preschooler Number: _____

Classroom Pseudonym: _____ Location: _____

Date of Music –Infused Program: _____ Week _____

Use this music-infused data sheet to record the social, communication, verbal, motor, and behaviors the preschooler has performed during the music lesson.
Music Modeling- Modeling of the songs and activities produced by the preschooler (joint attention increased; expressive language; how long did the preschooler engage in the music-infused program.
Social Responses- produced by the preschooler (turn and look at another student; turn and share instrument/beanbag; greetings increased at appropriate time; social play with song appropriate; independent follow through with song activity; able to sit next to a neighbor.

Communication Responses- produced by the preschooler (verbal and nonverbal-gesturing/nodding/pointing); eye contact; one- or two-word phrases to a partner or to an adult
Additional observations noted: