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Comparing the Impact of Client-Led Music Therapy with Autistic Clients Enrolled in an Applied Behavior Analysis Program Versus Those in Standard Care

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COMPARING THE IMPACT OF CLIENT-LED MUSIC THERAPY WITH AUTISTIC CLIENTS ENROLLED IN AN APPLIED BEHAVIOR ANALYSIS PROGRAM VERSUS THOSE IN STANDARD CARE

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A thesis committee has examined the thesis titled:

COMPARING THE IMPACT OF CLIENT-LED MUSIC THERAPY WITH AUTISTIC CLIENTS ENROLLED IN AN APPLIED BEHAVIOR ANALYSIS PROGRAM VERSUS THOSE IN STANDARD CARE

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ABSTRACT

This study investigates the efficacy of client-led music therapy as a complementary intervention for enhancing aspects of social and behavioral functioning in autistic children enrolled in applied behavior analysis (ABA) programs compared to those in standard care. Utilizing a quantitative approach with pre- and post-intervention assessments, the study evaluates changes across categories of Social Communication, Social Cognition, Social Awareness, Social Motivation, and Restricted Interests and Repetitive Behaviors using the Social Responsiveness Scale-2 (SRS-2). Findings reveal no statistically significant differences in pre- to post-intervention scores for either group, yet promising trends emerge. In the study, child-led music therapy within ABA interventions showed potential for improving social motivation and restricted interests/repetitive behaviors, aligning with ABA's targeted approach. Conversely, child-led music therapy within standard interventions demonstrated broader enhancements across socialization categories, suggesting its potential for comprehensive improvement. Individual variability underscores the importance of personalized intervention strategies tailored to each child's unique needs. Overall, while this study may not have achieved statistical significance, it highlights the potential of client-led music therapy as a supplementary intervention for improving social and behavioral outcomes in autistic children across different care contexts.

Keywords: Music therapy, autism, applied behavior analysis, child-led music therapy

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CHAPTER 1: INTRODUCTION

This study sought to understand the impact of client-led music therapy on autistic children who are enrolled in an applied behavior analysis (ABA) program, as compared with the impact on autistic children who are enrolled in standard care. Data were collected through a quantitative study with an experimental design, using pre- and post-intervention assessments to show whether client-led music therapy is effective for autistic participants enrolled in ABA and for those enrolled in standard care. Furthermore, the study investigated whether client-led music therapy with autistic participants is more effective or less effective for those enrolled in ABA compared to those in standard care.

Importance of the Study to the Researcher and the Field

I spent my music therapy internship working with both children and adults who were diagnosed with ASD. This allowed me to observe the long-term impact that ABA programs may have on adult clients, often appearing to leave them with difficulties in experiencing intrinsic motivation or making decisions based on their own wants and needs within relationships or situations, without prompting. ABA is widely regarded as the most evidence-based approach for working with autistic clients (*Applied Behavior Analysis (ABA) | Autism Speaks*, n.d.). I believe this is largely because a majority of studies of ABA are performed in a quantitative manner, while many studies of humanistic approaches focus on qualitative measures and thus tend to be viewed as less legitimate. In my work with children, I have had the question posed to me of whether we are doing our young clients in ABA programs a disservice by allowing them so much "freedom" and not correcting their self-regulatory behaviors in client-led music therapy, since they are typically prompted to stop these behaviors in their day programs and/or at home. This study sought to address the comparative lack of quantitative data related to the benefits of

client-led approaches. For this reason, I chose to perform a quantitative study with an experimental design investigating the impacts of client-led music therapy with children with ASD, both independently and in conjunction with ABA programs, as measured via pre- and post-intervention assessments using the Social Responsiveness Scale, Second Edition (SRS-2) (Constantino & Gruber, 2012).

Research Questions

The following questions will be explored in the study:

1. Will client-led music therapy improve SRS-2 scores of autistic children enrolled in ABA programs?
2. Will client-led music therapy improve SRS-2 scores of autistic children enrolled in standard care?
3. Will client-led music therapy improve SRS-2 scores to a greater or lesser extent for autistic children enrolled in ABA compared to those in standard care?

Research Design

The researcher collected data using a quantitative study with an experimental design. The researcher recruited as participants four autistic children, two of whom are currently enrolled in an ABA program, and two of whom are not. Two of the children have been enrolled in a typical ABA program for at least 20 hours a week, as this is generally the recommended duration for ABA (Tiura et al., 2017), for at least a year. The other two participants are enrolled in standard care and either have never been enrolled in an ABA program or have been out of ABA for at least a year. The four autistic participants each received one 30-minute music therapy session each week over the course of 4 weeks. The researcher acted as the therapist for all four children. Prior to the initial treatment session for each child, the therapist administered a pre-intervention

assessment to their parent/guardian using the SRS-2 and obtained a pretest score. Following this assessment, the child received four music therapy sessions. Following the fourth music therapy session, each child again was evaluated by the same parent/guardian via the SRS-2 assessment.

Definition of Terms

This section will outline and provide definitions and specifications for key terms that will be used throughout the study: autism, applied behavior analysis (ABA), standard care, music therapy, and child-led music therapy.

Autism Spectrum Disorder

The *Diagnostic and Statistical Manual of Mental Health Disorders* (American Psychiatric Association, 2013) defines autism spectrum disorder (ASD) as

> a neurodevelopmental disorder exhibiting deficits in formulating relationships, socio-emotional reciprocity, communication, warranting receptive or restricted behaviors that make it challenging for an individual to function in daily life.

The current neurodiversity movement is moving music therapy towards a more anti-oppressive way of describing children with ASD. There is still a tendency in contemporary music therapy to describe children in a pathologizing, problem-focused way (Metell, 2019). In this study, I refer to participants and others on the autism spectrum as “autistic people” to adhere to the autistic community’s most common preference on this subject, according to the Autistic Self Advocacy Network (*Autism research for US: Creating an agenda led by the Autistic Community*) by implementing identity first language. This preference is reportedly due to the fact that autistic people understand that autism is an inherent part of their individuality, from which they cannot be separated.

Applied Behavior Analysis

Applied behavior analysis (ABA) is a method of behavioral treatment for autism that originated in the 1960s and uses an operant discrimination paradigm to help autistic children to acquire new skills and reduce the occurrence of "interfering" or "challenging" behaviors (Schreibman et al., 2015). ABA relies on an "A-B-C" principle to understand behaviors and how to change them. The first component is an antecedent (the "A"), which occurs immediately before a behavior. This can be a verbal command or request, a physical change in the environment, or any aspect of the environment, even an internal thought or feeling (Kearney, 2015). The "B" stands for the behavior that results from the antecedent. This is the response or lack of response to the antecedent, be it a verbal response, an action, or some other response (Kearney, 2015). Lastly, the "C" indicates the consequence. This is what comes directly after the behavior and is the point at which the therapist may apply the reinforcement for a desired behavior, or no reaction for an "incorrect" or "inappropriate" behavior (Kearney, 2015). Any intervention in which behaviors are prompted by an antecedent and reinforced afterwards is considered ABA for the purposes of this study.

It is also important to note that ABA is considered an evidence-based best practice treatment by the American Psychological Association. It has passed scientific tests that prove its usefulness, quality, and effectiveness, according to Autism Speaks, a non-profit organization and the largest autism research network in the United States and is therefore required to be covered by many private health insurance companies nationwide, including Medicaid (*Applied Behavior Analysis (ABA) | Autism Speaks*, n.d.). It should be noted, as well, that Autism Speaks has recently faced criticism by other organizations led by autistic people for its minimal donations to autistic people and their families, and the lack of autistic representation within the network (Autistic Self Advocacy Network, 2020).

Standard Care

In the proposed study, “standard care” refers to any method of treatment for autism that does not involve ABA. This can include variations on speech therapy, occupational therapy, traditional talk therapies, and more. However, “standard care” could also indicate the absence of any therapies, other than the music therapy provided in this study. It cannot include any methods of treatment that identify as ABA.

Music Therapy

According to Edwards (2016), music therapy is a relational therapy that uses music in therapeutic processes with individuals or groups, carried out by a qualified practitioner who has undergone appropriate training and professional development. It is a unique way of working in which the dynamic capacities of music are used to serve the needs of a client or group. However, defining music therapy can be difficult, as it is highly dependent on the context of practice and the needs of the clients. The field of music therapy is a diverse community of practitioners with many models, approaches, techniques, and methods, and it is constantly evolving in response to new dilemmas and needs in communities, as well as emerging technologies.

Bruscia (2013, p.36) provides an in-depth exploration of the field of music therapy. He defines music therapy as "a reflexive process wherein the therapist helps the client to optimize the client’s health, using various facets of music experience and the relationships formed through them as the impetus for change." He emphasizes the importance of a trained and credentialed music therapist in providing music therapy services and highlights the unique qualities of music that make it an effective therapeutic tool. Bruscia also discusses the various approaches to music therapy, including psychodynamic, humanistic, behavioral, and cognitive-behavioral approaches. Moreover, he stresses the need for a client-centered approach in music therapy, in which the

therapist works collaboratively with the client to establish goals and tailor interventions to meet the client's needs.

Child-Led Music Therapy

Child-led music therapy is a developmental approach to music therapy that honors and follows the preferences, direction, and pace of the child receiving treatment. The therapist also honors the individual differences of every child and works on the basis of their strengths, as opposed to targeting their perceived weaknesses (Greenspan & Weider, 2006). This approach is developmental in that it addresses aspects of social-emotional development – such as relating, communicating, and engagement – through the nature of the relationship built between the client and the therapist. In child-led music therapy, the therapist observes the child and follows their lead in play, using music as the primary medium to create mutual experiences (Carpente, 2010).

CHAPTER 2: LITERATURE REVIEW

This literature review explores the efficacy of the treatments defined above in addressing the core features of autism as defined in the *Diagnostic and Statistical Manual of Mental Health Disorders* (American Psychiatric Association, 2013). We also examine whether the studies of treatments that brand themselves as ABA appear to be internally consistent and explore potential ethical concerns raised by internally contradictory studies and by ABA itself. There is robust literature on these different treatment methods individually; however, there is little research discussing the reality that many clients are enrolled in both ABA and child-led music therapy and investigating the potential impact of this on the efficacy of treatment, given the simultaneous use of two very different approaches. This literature review examines the following topic areas: ABA with autistic people, developmental approaches to autism treatment, and client-led music therapy with autistic children.

ABA with Autistic People

Currently, ABA is widely considered to be the gold standard for ASD treatment (Kearney, 2015), as it utilizes evidence-based techniques to address various negatively perceived behaviors commonly associated with ASD (Kearney, 2015). Despite the widespread public acceptance of ABA and its support and funding by insurance companies and research grants (Bottema-Beutel & Crowley, 2021), ethical concerns have arisen in recent years about the nature of ABA interventions. Many of these concerns have been raised by members of the autistic community who received ABA intervention in childhood and have reflected, as adults, upon their experience of ABA's negative effects. A study that surveyed a group of autistic adults revealed that these former ABA participants found the program to be "dehumanizing" (McGill & Robinson, 2021, p. 274). In addition to feeling as though they were "more like animals than a person" in ABA treatment, these participants expressed feeling a loss of their autistic identity

and sense of self (McGill & Robinson, 2021, p. 274). They reported that the repetitive nature of the program made them feel as though they had no agency or intrinsic motivation, and were only doing tasks in the correct way, as seen by the program, to avoid punishment (McGill & Robinson, 2021). ABA treatments may also be associated with the development of anxiety and depression in autistic adults (Kupferstein, 2020). In a study by Kupferstein (2020), a majority of autistic adults who participated in ABA treatments reported experiencing post-traumatic stress symptoms as a result of their time in ABA.

In addition to these ethical concerns expressed by members of the autistic community, there has recently been a question about the credibility of ABA research studies in general (Bottema-Beutel & Crowley, 2021). As more autistic people have become critical of ABA interventions and have raised public awareness of their concerns, researchers (both autistic and neurotypical) have also begun to investigate the prevalence of conflicts of interest among researchers of autism interventions (Bottema-Beutel & Crowley, 2021). One hundred fifty ABA studies were examined to see if there was the presence of a researcher who was employed as an ABA provider or training consultant; this was found to be the case in 84% of the studies (Bottema-Beutel & Crowley, 2021). Only 2% of the studies disclosed the presence of these conflicts of interest, which calls into question the probity of these studies and their results (Bottema-Beutel & Crowley, 2021). If there are undisclosed conflicts, it is entirely possible that the investigators' personal interest may unduly influence the results reported.

Another emerging concern related to ABA is ambiguity in what is required for an intervention to be considered "behavioral." There is a growing evidence base supporting the use of Naturalistic Developmental Behavioral Interventions (NDBIs), which claim to integrate both developmental and behavioral approaches (Frost et al., 2020). These interventions are labeled as

"behavioral" and fully qualify as ABA techniques according to the Behavior Analyst Certification Board (BACB; Hampton & Sandbank, 2021). However, their major characteristics include focusing primarily on children's social development, embedding their teaching into a naturalistic context which can be easily generalized, and encouraging spontaneous initiation by the participants (Frost et al., 2020). Most of these features are in direct contrast to behavioral interventions which, as described earlier, utilize structured environments, repetition of identical "desired" responses, adult-led prompts to initiate behaviors, and external motivations (Kearney, 2015; Frost et al., 2020). Evidence supporting NDBI interventions has grown exponentially in the last decade (Hampton & Sandbank, 2021). Despite this, when surveyed, a majority of BACB certificants indicated that they had little if any knowledge of NDBI practices and did not believe them to be effective or appropriate for the autism field (Hampton & Sandbank, 2021). The concern here is how so many practitioners can have minimal knowledge of the mounting research supporting a practice that is classified under their scope of intervention, and whether this practice can even be considered an ABA technique given its developmental nature.

The historic use of music therapy within ABA interventions has typically been highly structured and adult-led, with music serving as a tool to reinforce ABA practice (Lim, 2010). Often, music therapy is utilized within a verbal behavior approach to emphasize certain sounds and assist autistic children in organizing verbal patterns and producing words functionally (Lim & Draper, 2011). Music is also incorporated into the "ABC" method of ABA. It can be presented as the antecedent variable in order to prompt children to sing certain words or sounds, and also as a positive reinforcement after children produce the desired behavior (Lim & Draper, 2011). Studies of behavioral music therapy within ABA interventions concluded that these ABA interventions were equally effective with and without the use of music therapy (Lim & Draper,

2011). This raises the question of whether utilizing music in a behavioral way is the most effective form of music therapy, or whether perhaps another approach would have more impact.

Developmental Approaches

In light of some of the recent criticisms of ABA interventions, there has been a rise in popularity of more developmental approaches to autism treatment, which typically center on improving social communication, meaningful or spontaneous use of language, and ability to engage with others (Pajareya & Nopmaneejumruslers, 2011). As with ABA, there are several specific approaches that have been born out of the developmental perspective, with their own distinct advantages and disadvantages in addressing specific goals. Two of the most prominent developmental approaches are the Developmental, Individual Difference, Relationship-based (DIR/Floortime) model and the Early Start Denver Model (ESDM).

In the DIR/Floortime approach, developed by Stanley Greenspan and Serena Wieder, the complex phenomenon of play is explored and utilized to address some of the developmental challenges faced by autistic individuals (Hess, 2013). Some elements that Greenspan and Wieder (1999) identified as emerging naturally in typically developing children through the course of different stages of play are flexibility, expressive and receptive communication, and imagination. These are qualities that have also been identified as areas of challenge for autistic children. The DIR/Floortime model draws upon the natural interests of autistic children in order to develop a relationship and join the child's world, where the therapist is able to create shared experiences (Hess, 2013). The purpose of these shared experiences is to help the individual master their Functional Emotional Developmental Capacities (Hess, 2013), which refer to the fundamentals of relating and communicating with others.

Studies have begun to show evidence of increased social communication and active engagement skills in individuals who have participated in DIR/Floortime (Boshoff et al., 2020;

Mahoney & Solomon, 2016). Additional studies show statistically significant improvements on three standard autism measures, the Functional Emotional Assessment Scale, the Child Autism Rating Scale, and the Functional Emotional Questionnaires, after participating in DIR/Floortime for 15 hours a week for 3 months (Pajareya & Nopmaneejumruslers, 2011). Mahoney and Solomon (2016) also found DIR/Floortime to be an effective mechanism for increasing the social engagement of children. In a study which relied on the reporting of parents following a DIR/Floortime program, several parents reported observing an improvement in their child's social communication, capacity for flexibility when engaging with others, and use of meaningful language (Shamsudin et al., 2021).

When discussing DIR/Floortime, it is important to mention that the need for parental participation may be a limiting factor in its effectiveness. DIR/Floortime has been found to be more effective when there is parental implementation in the home. This finding aligns with the belief, in most developmental methods, that treatment should occur in the child's natural setting in order to facilitate the greatest chance of generalization (Pajareya & Nopmaneejumruslers, 2011). This requires a large time commitment from the parents, as they are strongly encouraged to take DIR/Floortime trainings, attend sessions with their child, and implement these strategies in the home for around 15 hours a week, as is typically recommended (Pajareya & Nomaneejumruslers, 2011). Some parents express having difficulty with this kind of time commitment due to other obligations such as work and other children in the home (Shamsudin et al., 2021). Parents' implementation of the DIR/Floortime method can also be impacted by their own personal limitations related to play. Some parents struggle with allowing the play to be child-led, express frustrations with the child not wanting to follow them or use DIR/Floortime

interactions as a reward for completing other tasks that are desired by the parent (Shamsudin et al., 2021).

Another prominent developmental approach to autism treatment is the Early Start Denver Model (ESDM). Much like the DIR/Floortime method, ESDM centers the use of play in order to build positive relationships. The therapist strives to boost clients' language and social skills through joint play and activities (Vismara & Rogers, 2008; Rogers et al., 2019). The primary goals of ESDM are related to acquisition of language and meaningful language use. While ESDM invites parent coaching and participation, it is not as vital to this treatment method as it is to DIR/Floortime. Li et al. (2018) found that children's social interaction increased significantly after participating in an ESDM program, and that this increase was greater than that of a group participating in conventional ABA intervention. It is important to note that while ESDM is viewed as a developmental model for autism intervention, it does purport to be derived from ABA principles (Rogers et al., 2019). This further blurs the lines in the identification of treatments, although it does not detract from the outcomes of ESDM.

Client-led Music Therapy with Autistic Children

A common central characteristic of developmental approaches to therapy with autistic children is the belief that they should be led by the child, making sure to acknowledge the child's individual needs and interests. This principle is the foundation for client-led music therapy. Client-led music therapy utilizes the medium of music to follow the child's musical lead and spontaneously create music based on the child's responses, both musical and non-musical (Carpente & LaGasse, 2015). In a music-centered form of client-led therapy, there are often music-centered goals that focus on cultivating the individual's social and emotional skills through music (Carpente & LaGasse, 2015). These goals may include musical relatedness, musical communication, and musical thinking (Carpente & LaGasse, 2015). Through such

musical goals and experiences, children can learn how to engage, adapt, and interrelate with others both inside and outside the music (Carpente, 2010).

In comparison to conventional child-led play therapies, child-led music therapy was shown in a 2009 study by Jinah Kim, Tony Wigram, and Christian Gold to produce markedly more initiation of engagement, emotional synchronicity, and joint experiences in autistic children. It was twice as common for clients to interact with the therapist in music therapy than standard play therapy, as well (Kim et al., 2009). Utilizing music as the medium for therapy may be particularly effective in garnering engagement with autistic children due to the structure and predictability found in music (Kim et al., 2008). These characteristics appear to allow autistic children to feel more comfortable engaging in interactions in a flexible and reciprocal manner, which then allows therapeutic relationships to form (Geretsegger et al., 2015). Child-led music therapy has also been found to improve initiating and responding to joint attention (Kim et al., 2008), affective sharing (Kim et al., 2009), and nonverbal communication skills (Gattino et al., 2011). In light of the growing research on child-led improvisational music therapy, it has come to be regarded as a promising method for improving social interaction in autistic children, but there is not yet enough research for it to be considered an evidence-based intervention (Carpente, 2016).

A specific music therapy model that follows the principle of client-led music therapy is Nordoff-Robbins Music Therapy (NRMT), which was developed by Paul Nordoff and Clive Robbins. NRMT involves improvisation, play, and spontaneity through music as the medium for treatment, drawing upon diverse musical resources (Carpente, 2010). A case study utilizing this method in combination with DIR/Floortime principles showed that within a few months, an individual was able to experience increases in his ability to self-regulate, engage in relationships,

and communicate purposefully (Carpente, 2010). It is important to note that there have also been studies which document the lived experience of autistic individuals who participated in NRMT, and they reported enhancement in their ability to develop their own identities as autistic folx, ability to create meaningful relationships, and feelings of acceptedness (Low et el., 2021). In this era of autism awareness, it is vital that we consider the perspectives and experience of autistic individuals when evaluating different methods of treatment. Unfortunately, there are few quantitative studies demonstrating statistical data-based improvements to support NRMT. A majority of the research investigating NRMT thus far is qualitative in nature.

CHAPTER 3: METHODOLOGY

Research Objectives and Purpose

This study sought to assess the impact of client-led music therapy on autistic children who are enrolled in an ABA program and compare it to the impact on children with ASD who are enrolled in standard care.

Participants and Inclusion Criteria

The researcher recruited four autistic children for this study. Each child received one 30-minute music therapy session each week for 4 weeks. The sessions were conducted by the same therapist, the researcher, for all of the four children. There were two participants enrolled in an ABA program and two participants enrolled in standard care. To reiterate, in this study, standard care refers to any form of autism treatment that does not involve ABA, including the absence of any therapy. Participant 1 was an 8-year-old, male identifying autistic person with 1 year of music therapy experience, who is enrolled in ABA. Participant 2 also a participant enrolled in ABA, was a 5-year-old, male identifying autistic person with 6 months of music therapy experience. Participant 3 was a 12-year-old, male identifying autistic person with 7 months of music therapy experience enrolled in standard care. Participant 4 was a 4-year-old, female identifying autistic person with 10 months of music therapy experience, also enrolled in standard care. Participants were recruited on a volunteer basis using data accessible to the administration at the Westchester Conservatory of Music. The inclusion criteria for the client participants were as follows:

1. Children between the ages of 3 and 12, to ensure they were in their primary developmental years, as identified by the United States Centers for Disease Control and Prevention (CDC, 2020). The development in these years is the most influential for building a foundation for the future learning, health, and life success of children (CDC, 2020).

2. A parent or guardian to fill out the SRS-2 pre-intervention and post-intervention assessments for each child participant. This was required to be the same parent or guardian for both the pre-intervention and post-intervention assessment.
3. Diagnosis of ASD as outlined by the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (5th ed., 2013). Each child's parent or guardian confirmed the diagnosis by submitting documentation of diagnosis through an Individualized Education Plan (IEP).
4. Two of the participants have been enrolled in a typical ABA program for at least 20 hours a week, as this is generally the recommended duration for ABA (Tiura et al., 2017), for at least a year.
5. Two of the participants are enrolled in standard care and either have never been enrolled in an ABA program or have been out of ABA for at least a year.

Recruitment

Following approval by the Internal Review Board at Molloy University, four children were recruited as participants using a convenience sampling from the researcher's current place of employment, a community music conservatory in the northeast United States. The researcher consulted the administrative staff and sent out an email invitation to eligible clients that included

information about the purpose of the study, the possible risks and benefits, and measures taken to protect participants' rights. The researcher acted as the music therapist in this study. Informed consent was obtained from the parents/guardians of the children, and assent was obtained from the children themselves. The children and their parents were informed that they could withdraw from the study at any time and for any reason.

Materials

During the music therapy sessions, the music therapist and clients had access to an upright piano, an acoustic guitar, a pentatonic xylophone, a tambourine, egg shakers, a djembe drum, a cymbal, and a set of mallets.

The researcher utilized the Social Responsiveness Scale, Second Edition (SRS-2), as an assessment tool. The SRS-2 is a 65-item quantitative measure of communication, interpersonal skills, and repetitive/stereotypic behavior on a continuous scale based on ratings by an individual familiar with the child's skills and behaviors in their daily lives (Nelson et al., 2016). Studies by Awadu (2021) and Nelson et al. (2016) have shown the SRS-2 to be both reliable and valid. In the proposed study, the SRS-2 was completed both pre- and post-intervention by the participants' parents or guardians. The results of these assessments were saved on a secure thumb drive which was used exclusively on the researcher's personal laptop computer.

Procedures

The study was conducted over the course of 4 weeks. Each client received one 30-minute individual music therapy session each week for 4 weeks. Prior to or during the first session, and following the last session, the music therapist asked the parents or guardians of each client to

complete the SRS-2 assessment at their convenience. During the weekly sessions, the therapist followed the parameters for child-led music therapy, as defined above. The therapist utilized empathy techniques outlined by Bruscia, including imitating, synchronizing, incorporating, pacing, reflecting, and exaggerating (Bruscia, 1987). The therapist observed and listened to the child's reactions, responses, and initiated music, and then created musical experiences that were focused on meeting the child's affect in the moment (Geretsegger et al., 2015), employing a variety of therapeutic interventions (improvisation, recreative, receptive, and songwriting). They aimed to build a relationship with the child by establishing an accepting musical environment that was respectful of the child's differences, responses, reactions, and needs (Geretsegger et al., 2015). Since the therapist was also the researcher for this study, they were aware that this could have an impact on the therapy they were providing and made sure to remain mindful of this possibility for bias in order to avoid letting it impact the participants' quality of care. The therapist made sure to show up equally with each child, regardless of their status within the study, and remain ever-present in the moment-to-moment interactions within the child-led music therapy.

Data Collection

Prior to the intervention, the researcher requested that a parent/guardian of each child complete the pre-study assessment, the SRS-2. The researcher then conducted the same assessment following 4 weeks of intervention, during which the children received one 30-minute client-led music therapy session each week.

Data Protection

Data are being stored and protected on a HIPAA-compliant, secure thumb drive, with access granted only to the researcher, the researcher's thesis advisors, and a statistician who received the numerical data with no names or personal identification of participants. Three years after completion of the study, the information on the thumb drive will be permanently deleted.

Data Analysis

Pre- and post-intervention assessment scores on the SRS-2 were collected from both groups. The assessment scores of the ABA group were compared to those of the standard-care control group to see if there were any statistically significant differences between the changes in the scores of the two groups. The P-value was used to measure any statistical significance, indicating the likelihood that an observed difference was due to chance. The analysis of the numerical data was performed by a professional statistician, and the implications of the results were then analyzed by the researcher. The researcher examined the data of the ABA participants and the standard care participants, respectively, to assess any changes between their pre- and post-study scores. The researcher then compared the changes in their scores in order to determine if there was a significant difference in improvement between the two groups over the course of music therapy.

CHAPTER 4: RESULTS

In this study, the SRS-2 assessment was used to collect and score the participants' pre- and post-intervention data. It is important to note some logistics in regard to the way data are scored according to the SRS-2 manual (Constantino & Gruber, 2012). The "T-score" is the total score, meaning that it incorporates all five areas of focus from the participants' scores. Additionally, for this assessment, a higher score indicates a higher deficiency in the observed area; thus, a lower post-test score indicates improvement in that area, and vice versa. The scores can be interpreted based on the following key (Constantino & Gruber, 2012):

Score:	**Indication of Range:**
≤ 59	Normal Range
60-65	Mild Range
66-75	Moderate Range
≥ 76	Severe Range

Independent-samples t-tests were run to determine if there were differences in overall T-scores (summarizing all five of the following categories), social awareness, social cognition, social communication, social motivation, and restricted interests and repetitive behaviors between pre- and post-intervention assessments in both the ABA and standard care (STD) conditions. There were no statistically significant differences between the pre- and post-intervention test scores under the ABA condition, $p > .05$ (Table 1, Figures 1.1, and Figure 1.2).

Table 1

Independent Samples t-test Results for the ABA Condition

ABA Condition	***t*-Statistic**	***p*-Value**
T-Score	0.128	0.910
Social Awareness	0.585	0.617
Social Cognition	1.265	0.333
Social Communication	0.504	0.664
Social Motivation	-0.446	0.699
Restricted Interests and Repetitive Behavior	-0.317	0.781

There were also no statistically significant differences between the pre- and post-intervention test scores under the STD condition, $p > .05$ (Table 2, Figures 2.1, and Figure 2.2).

Table 2

Independent Samples t-test Results for the STD Condition

STD Condition	***t*-Statistic**	***p*-Value**
T-Score	-0.263	0.817
Social Awareness	0.000	1.000
Social Cognition	0.588	0.616
Social Communication	-0.243	0.831
Social Motivation	-0.692	0.560
Restricted Interests and Repetitive Behavior	-0.221	0.846

In summary, for these values, neither p-value provides strong evidence to reject the null hypothesis. However, the p-value of 0.910 for the ABA condition suggests slightly weaker evidence for its statistical significance, compared to the p-value of 0.817 for the standard care condition.

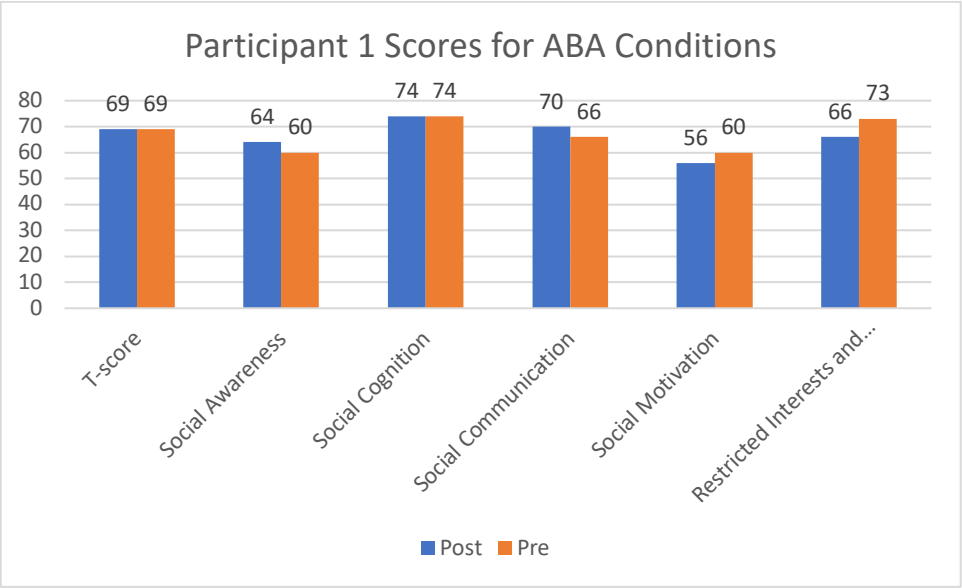
It should be noted that the very small sample size (n=2 for each group) severely limits the power of the test. More observations are generally necessary in order to reach robust conclusions.

Descriptive Analysis

Due to the very small sample size in this study, it is helpful to perform a descriptive analysis of the data. The data offer insights into the effectiveness of client-led music therapy for those in Applied Behavior Analysis (ABA) interventions compared to client-led music therapy for those with Standard (STD) interventions in enhancing various aspects of social and behavioral functioning among participants. Descriptive analysis allows us to analyze the findings for each participant individually, as well as for the average of each group. We can then examine the overall trends.

Figure 1.1

Participant 1 Post and Pre-Scores for ABA Conditions

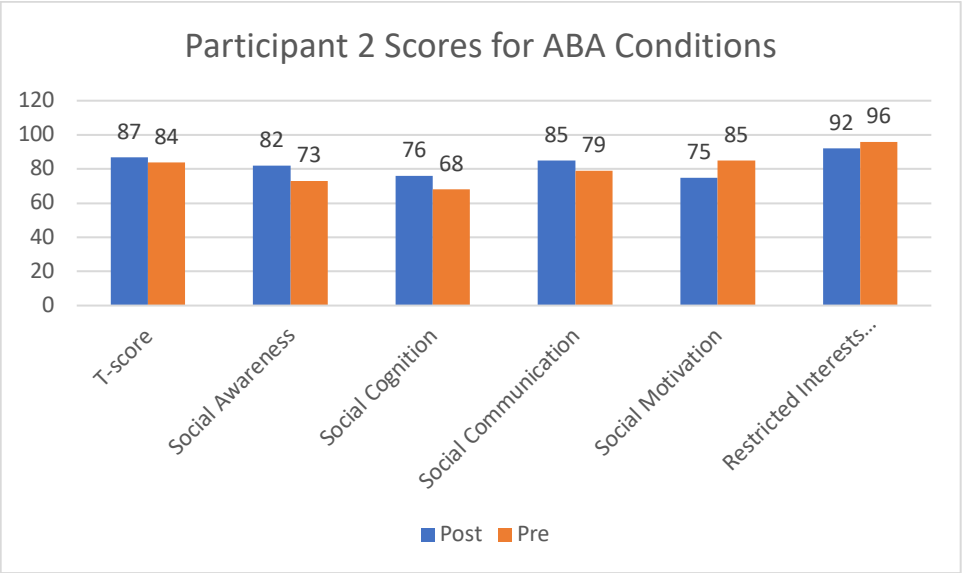


ABA Participant 1 (as seen in Figure 1.1):

- Pre-intervention T-scores indicate mild to moderate challenges across all domains, with particular deficiencies in Social Cognition and Restricted Interests/Repetitive Behavior.
- Post-intervention, there was a slight improvement in Social Motivation and Restricted Interests/Repetitive Behavior scores, while Social Awareness and Social Communication scores showed a slight decline in functioning.
- Though there were some fluctuations among the domains, the T-Score for this participant remained consistent.

Figure 1.2

Participant 2 Post and Pre-Scores for ABA Condition

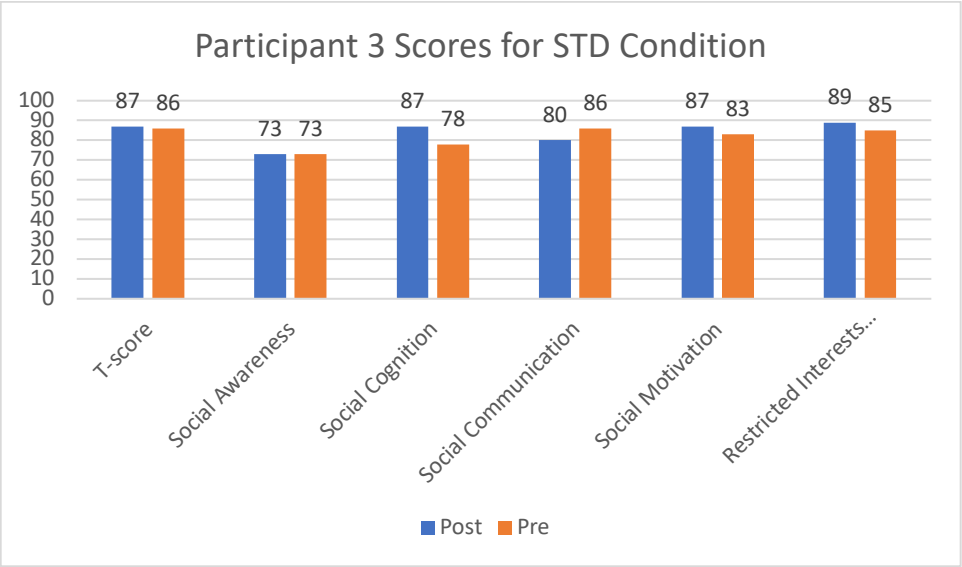


ABA Participant 2 (as seen in Figure 1.2):

- Initially, this participant exhibited moderate to severe deficits across all domains, the most severe being related to Restricted Interests/Repetitive Behaviors and Social Motivation.
- Post-intervention, improvements were notable in Social Motivation and Restricted Interests/Repetitive Behaviors, but the other three domains all showed increased severity of deficits.
- Though there were some positive developments, the overall T-score for this client showed a slight decline in functioning.

Figure 2.1

Participant 3 Post and Pre-Scores for STD Condition

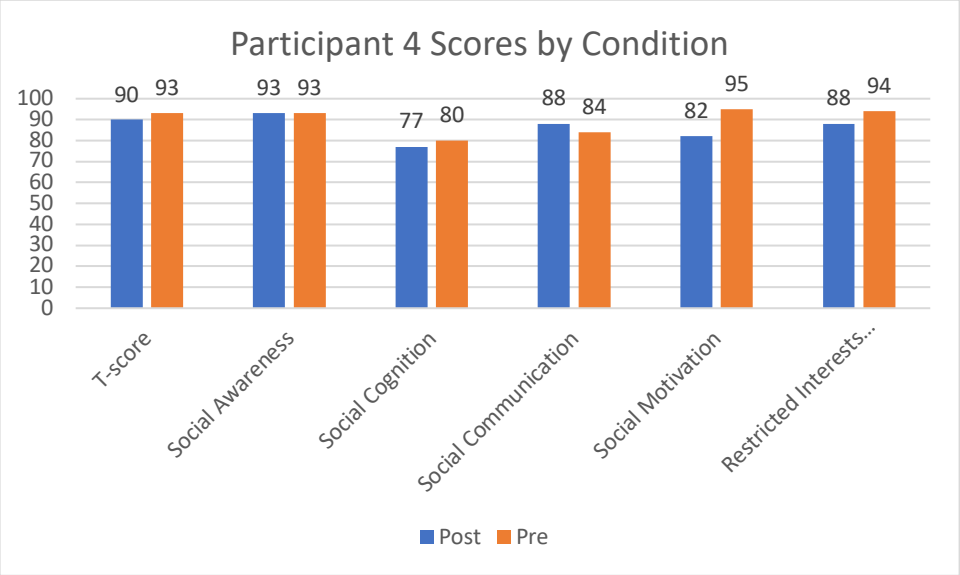


STD Participant 3 (as seen in Figure 2.1):

- Pre-intervention scores indicate moderate to severe challenges across all domains, the most severe being related to Social Communication and Restricted Interests/Repetitive Behaviors.
- Post-intervention, improvements were observed in Social Communication, while other domains showed a slight decline or stagnancy.
- The overall T-score for this client showed a very slight decline in functioning.

Figure 2.2

Participant 4 Post and Pre-Scores for STD Condition



STD Participant 4 (As seen in Figure 2.2):

- Initially, this participant exhibited significant social and behavioral challenges across all domains.
- Post-intervention, improvements were observed in Social Cognition, Social Motivation, Restricted Interests/Repetitive Behavior, and T-score, with a slight decline in Social Communication, and no change in Social Awareness.
- This is notably the only participant with a marked improvement in T-score.

Figure 3.1

Overall Joint Scores for ABA Participants

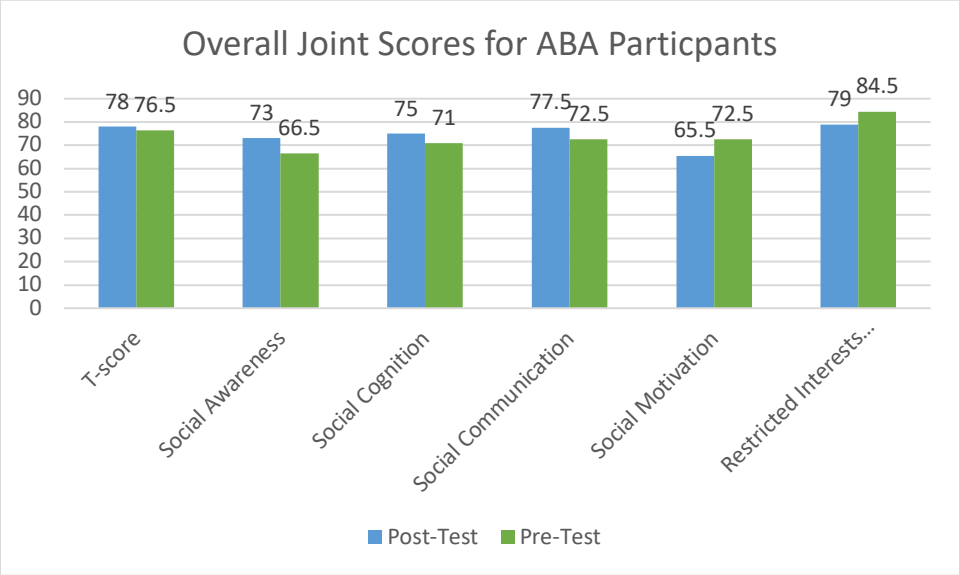
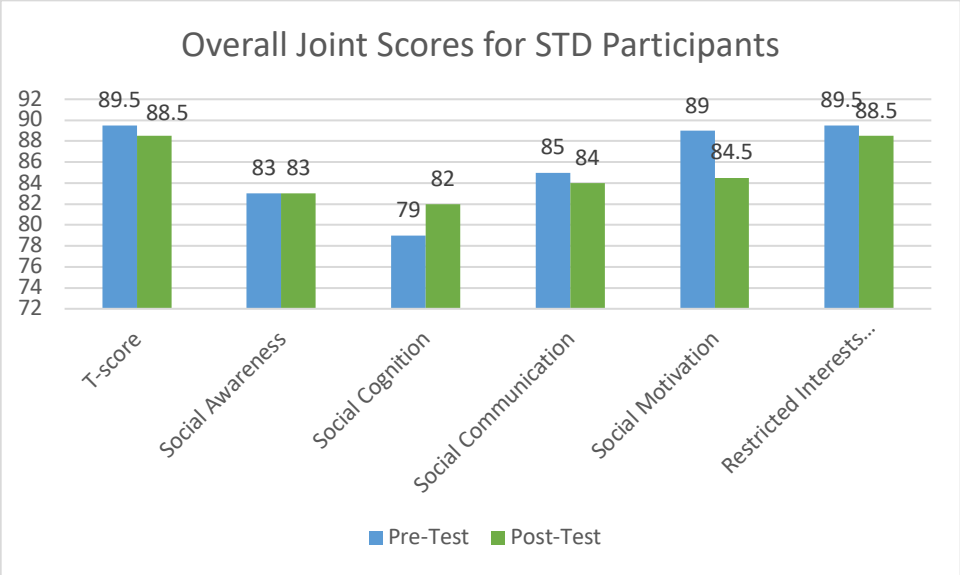


Figure 3.2

Overall Joint Scores for STD Participants



Overall Trends:

- For ABA participants (Figure 3.1), the average of their scores shows a noticeable improvement in Social Motivation and Restricted Interests/Repetitive Behaviors, but a slight decrease in Social Awareness, Social Cognition, and Social Communication.
- For STD participants (Figure 3.2), on average, notable improvements are observed in Social Motivation and to a lesser extent in Social Communication and Restricted Interests/Repetitive Behavior, while Social Awareness remains relatively stable.
- Comparing the average pre- and post-intervention T-scores:
    - For ABA participants, on average, there is a slight decline in functioning noted from the pre- to post-intervention score.
    - For STD participants, on average, there is a slight improvement noted from the pre- to post-intervention score.

Comparison between ABA and STD:

- Client-led music therapy for autistic children receiving ABA may be effective in enhancing Social Motivation and Restricted Interests/Repetitive Behavior, as both participants experienced improvements in these areas.
- Although participants receiving STD showed more variance in areas of improvement than those enrolled in ABA, client-led music therapy appeared to yield more well-rounded results for those receiving STD, with fewer areas showing deterioration, and more areas that, on average, improved or remained the same.
- For both ABA and STD participants, client-led music therapy appeared to have varying degrees of effectiveness in addressing Social Cognition.

CHAPTER 5: DISCUSSION

This quantitative study sought to explore the impact of client-led music therapy on autistic children who are enrolled in an applied behavior analysis (ABA) program, as compared with the impact on autistic children who are enrolled in standard care. Through an experimental design using pre- and post-intervention assessments, the study investigated the functional domains of Social Communication (COM), Social Cognition (COG), Social Awareness (AWR), Social Motivation (MOT), and Restricted Interests and Repetitive Behaviors (RIRB). The aim was to show whether client-led music therapy is effective for autistic participants enrolled in ABA and for those enrolled in standard care. Furthermore, the study investigated whether client-led music therapy with autistic participants is more effective or less effective for those enrolled in ABA compared to those in standard care.

Based on the interpretive analysis of the data, there are no statistically significant changes between the pre- and post-intervention scores in any domain, under either condition, $p > .05$. This can in part be attributed to the very small sample size of the group, which limits the power of test. Thus, I will be focusing mostly on the data and patterns from the descriptive analysis. In statistics, a descriptive analysis involves the exploration and summary of data to understand its key characteristics, patterns, and trends. It aims to provide a clear and concise overview of the dataset without making inferences or drawing conclusions beyond what the data themselves show. For this reason, we are able to discuss the data while using such a small sample size.

We saw in the data for ABA Participants 1 and 2 that despite the improvement in specific areas, the average pre- to post-intervention T-scores show a slight deterioration. If studied on a larger scale, this could possibly indicate that while certain targeted behaviors improve, there might be unintended consequences or limitations in the broader application of these techniques.

Client-led music therapy with children enrolled in ABA interventions seemed particularly effective in enhancing social motivation and decreasing restricted interests/repetitive behaviors. The improvement in these areas may reflect the nature of ABA practices and their use of operant discrimination to help autistic children acquire new skills or reduce certain behaviors (Schreibman et al., 2015), such as repetitive behaviors. It could be speculated that the improvement in social motivation could derive from the social prompting utilized in ABA interventions. However, the deterioration in other areas could indicate limitations of ABA in addressing broader social skills and could lead to mixed outcomes in the broader context of social functioning.

The data for Participants 3 and 4 showed notable improvements across multiple areas: social motivation, social communication, and restricted interests/repetitive behavior, as well as stability in social awareness. This suggests that client-led music therapy with those who are enrolled in STD interventions can more effectively target a wider array of domains of social functioning. The data also showed a slight improvement in the average pre- to post-intervention T-scores for this group, which further supports the suggestion of a broader improvement of social functioning through client-led music therapy and standard care. It should be noted that the degree of improvement in certain areas varied among participants, which indicates that more data are needed to confirm whether these interventions could consistently lead to significant gains across all domains of social functioning.

Clinical Implications for the Field of Music Therapy

Music therapy is still a growing field, and it is important to continue to advocate for its inclusion in treatment plans, to gather data that will support the field, and to deepen our knowledge of the needs of our clients. While this study failed to show statistical significance in the pre- to post-intervention improvement for either group, SRS-2 scores improved after client-

led music therapy in at least one individual category, for children enrolled in ABA as well as those enrolled in standard care programs. The individual differences among participants' scores highlights how important it is for clinicians to pay detailed attention when assessing clients, to ensure that intervention strategies are personalized to the specific needs and challenges of each client. This study may also indicate the importance of knowing the programs in which clients are involved outside of music therapy. ABA participants may be receiving targeted help in areas such as social motivation and restricted interest/repetitive behavior. Music therapists may be able to build upon this knowledge and pay more attention to other areas when designing interventions for these clients, to help them develop a more well-rounded social skill set.

Limitations

There were several limiting factors within this study which may have contributed to inconclusive outcomes. One limitation was population. Due to the therapist's convenience sampling, all of the participants were located in the same geographic area in the northeast US. This limited the diversity of the population in ethnicity, economic status, and the types of programs they had access to. This was particularly evident through the researcher's difficulty in locating two participants for the standard care condition. Of the nine prospective participants, seven were enrolled full-time in ABA programs. The limited population also created the need for the researcher to open the age range for the study wider than anticipated. Participants ranged from 3 to 12 years in age; their wide range of ages and developmental stages made it difficult to compare the results.

Another limitation was the size of this study. Having only two participants in each category limits the power of the test and does not allow for wide generalization of the results of this study. The duration of the study can also be considered a limitation. In order to fit within the time constraint of the thesis process, the intervention was limited to 4 weeks, with participants

receiving only four music therapy sessions. It can be argued that 4 weeks may not be an adequate duration of therapy for clients to demonstrate significant, measurable change.

An additional limitation is the existence of variables that could not be controlled in this study, such as the length of time for which the participants were already engaged in music therapy prior to the study. Participants were at varying stages in their therapy, with different levels of comfortability with the therapist, and differing closeness to reaching prior goals or developing new goals in their therapy.

Recommendations for Future Research

This study sought to explore the impact of client-led music therapy on autistic children who are enrolled in an applied behavior analysis (ABA) program, as compared with the impact on autistic children who are enrolled in standard care. Quantitative methods would be recommended for future research on this topic, as they allow for the data to be laid out in a concrete way and show measurable improvements, especially if executed over a longer period of time. To expand upon the data explored in this study, a future study could be conducted with a larger sample size, and a larger number of sessions over a longer period of time. A larger sample size would strengthen the power of the test and allow for more robust and generalizable conclusions. It would also provide the opportunity for inclusion of a wider variety of sociocultural backgrounds among participants. Conducting a study over a longer period of time would allow for the therapeutic development of the participants to progress further, as improvements are not always linear and often take time.

In future studies, I would also recommend incorporating a music therapy assessment such as the IMCAP-ND, which has been demonstrated to be reliable and valid for assessing neurodevelopmental capacities in this population (Carpente & Gattino, 2018; Carpente et. al, 2022). Use of this assessment alongside the SRS-2 would provide two data sets to compare, as

well as involve an outside scorer with a different perspective from that of a parent/caregiver scoring their child. Additionally, the use of a music-centered assessment would help to further support the idea of music therapy as its own full intervention and supplement the data supporting the IMCAP-ND in quantitative studies.

In addition to further quantitative studies, it is also essential to qualitatively explore the experience of autistic clients who have been enrolled in both ABA and client-led music therapy, and those who have been enrolled in both standard care and client-led music therapy. It is important to demonstrate statistical improvement in order to support effective care for autistic children and support music therapy as an evidence-based practice. However, it is even more important to remember that at the end of the day, autistic clients are human beings. Exploring their opinions and experiences is vital to understanding the impact of ABA interventions, standard care, and client-led music therapy. Through the self-advocacy of autistic people, we are able to better understand their needs and wants from these programs, and there is no better place to obtain information than from the mouths of the people whose lives it will impact.

CHAPTER 6: CONCLUSION

In conclusion, this study examined the impact of client-led music therapy on autistic children enrolled in applied behavior analysis (ABA) programs compared to those in standard care. Despite the absence of statistically significant changes in pre- to post-intervention scores for either group, promising trends emerged. Child-led music therapy within ABA interventions demonstrated notable improvements in social motivation and restricted interests/repetitive behaviors, aligning with the targeted nature of ABA practices. Conversely, child-led music therapy within standard interventions exhibited broader enhancements across socialization categories, indicating its potential for more comprehensive improvement. Nonetheless, individual variability underscored the necessity for personalized intervention strategies tailored to each child's specific needs. In essence, while this study did not yield statistical significance, it sheds light on the potential of client-led music therapy as a supplemental intervention for enhancing aspects of social and behavioral functioning in autistic children across various care settings.

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APPENDICES

Appendix A: IRB Approval

MOLLOY UNIVERSITY

1000 Hempstead Ave., PO Box 5002, Rockville Center, NY 11571-5002
www.molloy.edu

Patricia A. Eckardt, PhD, RN, FAAN
Chair, Molloy University Institutional Review Board
Professor, Barbara H. Hagan School of Nursing and Health Sciences
E: peckardt@molloy.edu
T: 516.323.3711

DATE:	February 29, 2024
TO:	Annie Fitzgerald
FROM:	Molloy University IRB
PROJECT TITLE:	[2141519-2] COMPARING THE IMPACT OF CLIENT-LED MUSIC THERAPY WITH AUTISTIC CLIENTS ENROLLED IN AN APPLIED BEHAVIOR ANALYSIS PROGRAM VERSUS THOSE IN STANDARD CARE
REFERENCE #:	
SUBMISSION TYPE:	Amendment/Modification: Minor
ACTION:	APPROVED
APPROVAL DATE:	February 29, 2024
EXPIRATION DATE:	February 1, 2025
REVIEW TYPE:	Expedited Review
REVIEW CATEGORY:	Expedited review category # 7

Thank you for your submission of Amendment/Modification materials for this project. The Molloy University IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

You may continue with your project

This submission has received Expedited Review based on applicable federal regulations.

Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require that each participant receives a copy of the consent document.

Please note that any revision to previously approved materials must be approved by this committee prior to initiation. Please use the appropriate revision forms for this procedure.

All UNANTICIPATED PROBLEMS involving risks to subjects or others (UPIRSOs) and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to this office.

Appendix B: Informed Consent Form

Graduate Music Therapy
1000 Hempstead Avenue
Rockville Centre, NY 11570
1-888-466-5569

Title of Study: COMPARING THE IMPACT OF CLIENT-LED MUSIC THERAPY WITH AUTISTIC CLIENTS ENROLLED IN AN APPLIED BEHAVIOR ANALYSIS PROGRAM VERSUS THOSE IN STANDARD CARE

This study is being conducted by:
Annie Fitzgerald, MT-BC afitzgerald@lions.molloy.edu
Maria Guerrero, PhD, MT-BC mguerrero@lions.molloy.edu

This consent form is designed to inform you about the study in which your child is being invited to participate. Here you will find a brief summary about the study; however, you can find more detailed information later in the form. This study is being done to assess the impact of music therapy on children with autism spectrum disorder and to compare the outcomes between children enrolled in Applied Behavior Analysis (ABA) programs and those enrolled in standard care. Participation in the study will take a total of 2 hours over the course of 4 days within a 4-week period. The child will take part in their regularly scheduled music therapy sessions. Parents will be asked to complete a pre- and post-study assessment that is comprised of written questions about their child. All data collected will be stored on a HIPAA-compliant flash drive that only my thesis advisor and I will have access to.

Why am I being asked to take part in this study?
This study will help music therapists to better understand the relationship between a child's day-to-day care and the addition of music therapy to their treatment plan. There is currently a lack of statistical evidence showing the efficacy of music therapy in Autism treatment, and this study aims to show potential benefits of music therapy to social and emotional development.

What will I be asked to do?
Parents will be asked to provide their Autistic child's IEP as evidence of diagnosis. At the beginning of the study, you will be asked to complete the Social Responsive Scale – Second

Edition (SRS-2), to the best of your ability, in regard to your child. Your child will then take part in their regularly scheduled music therapy sessions for 4 weeks. At the end of these 4 weeks, you will be asked to complete the SRS-2 again.

Where is the study going to take place, and how long will it take?
The total time commitment for this study is 2 hours within a 4-week period, over the course of four 30-minute sessions. The study will take place during the Autistic child's regularly scheduled in-person music therapy sessions at the music therapy center, and the assessments will be filled out by the parent/guardian during their child's initial and final sessions, or online prior to these sessions.

What are the risks and discomforts?
The risks and discomforts of the study will be minimal. It is not possible to identify all potential risks in research; however, reasonable safeguards have been taken to minimize known risks. If new findings develop during the course of the research which may change your willingness for your child to participate, we will tell you about these findings.

What are the expected benefits of this research?
The participants will not benefit directly from the research.

Do I have to take part in this study?
Your child's participation in this research is your choice and your child's choice. If you decide to consent for your child to participate in the study, you may change your mind and stop their participation at any time without penalty or loss of benefits to which they are already entitled. Your decision whether or not to give consent for your child to participate in the study will not affect their music therapy services.

What are the alternatives to being in this study?
Instead of consenting for your child to participate in this research, you may choose for them not to participate.

Who will have access to my information?
Only the primary investigator (Annie Fitzgerald) and the thesis advisor (Maria Guerrero) will have access to the HIPAA-compliant flash drive on which assessment scores and all other participant information will be stored.

How will my information be used?
The pre- and post-assessment scores from the SRS-2 will be sent by the researcher to a professional statistician after being stripped of all personal or identifying information. Each participant will be given a letter (A, B, C, or D) to represent them in the data. The scores will be analyzed in regard to changes over the course of four sessions of music therapy.

Can my participation in the study end early?
Your child's participation in this study is voluntary and can be stopped at any time. Any collected data will be destroyed upon the withdrawal of the participant.

Will I receive any compensation for participating in the study?
There is no compensation for participating in this study.

What if I have questions?
Before you decide whether you wish for your child to participate in this study, please ask any questions that come to mind now. Later, if you have questions about the study, you can contact Annie Fitzgerald, MT-BC, at afitzgerald@lions.molloy.edu or Maria Guerrero, PhD, MT-BC, at mguerrero@molloy.edu.

What are my rights as a research participant?
Your child has rights as a research participant. All research with human participants is reviewed by a committee called the *Institutional Review Board (IRB)* which works to protect research participants' rights and welfare.
If you have questions about your child's rights, your rights, an unresolved question, or a concern or complaint about this research, you may contact the Molloy IRB office at irb@molloy.edu, or the IRB CHAIR, Dr. Patricia A. Eckardt, at peckardt@molloy.edu or (516) 323-3000.

Documentation of Informed Consent:
You are freely making a decision whether to consent for your child to be in this research study. Signing this form means that:
1. You have read and understood this consent form.
2. You have had your questions answered, and
3. After sufficient time to make your choice, you have decided to give consent for your child to be in the study.

You will be given a copy of this consent form to keep.

_____ _____
Your signature Date

_____ _____
Your printed name Date

_____ _____
Signature of researcher explaining study Date

_____
Printed name of researcher explaining study

Appendix C: Child Assent Form

MOLLOY UNIVERSITY ROCKVILLE CENTRE, NY

CHILD ASSENT TO PARTICIPATE

COMPARING THE IMPACT OF CLIENT-LED MUSIC THERAPY WITH AUTISTIC CLIENTS ENROLLED IN AN APPLIED BEHAVIOR ANALYSIS PROGRAM VERSUS THOSE IN STANDARD CARE

1. My name is Annie Fitzgerald.

2. We are asking you to take part in a project about music therapy.

3. If you agree to be in this project, you will make music and play with your therapist by playing instruments, singing, and dancing.

4. Please talk to your mom and dad before you decide. I will also ask your parents to give their permission for you to be a part of this project. But even if your parents say "yes," you can still decide to say "no".

7. If you don't want to be in this project, you don't have to. Remember, being in this project is up to you, and no one will be upset if you don't want to participate or even if you change your mind later and want to stop.

8. You can ask any questions that you have about the project. If you have a question later that you didn't think of now, you can call me or ask me next time.

9. Checking off the "I want to participate" box, and signing your name at the bottom of this form means that you agree to be in this project. You and your parents will be given a copy of this form after you have signed it.

☐ I WANT TO PARTICIPATE

☐ I DO NOT WANT TO PARTICIPATE

Printed Name of Minor:_____

Signature: _____

Date of Signature: _____