

Molloy College
DigitalCommons@Molloy

Theses & Dissertations


2019

Exploring the Use of Marimba in Nordoff Robbins Music Therapy with Children with Autism Spectrum Disorder

Lucas McCarren

This research was completed as part of the degree requirements for the [Music Therapy](#) Department at Molloy College.

Follow this and additional works at: <https://digitalcommons.molloy.edu/etd>

 Part of the [Music Therapy Commons](#)
DigitalCommons@Molloy Feedback

Exploring the Use of Marimba in Nordoff Robbins Music Therapy with
Children with Autism Spectrum Disorder

A Thesis

Submitted in partial fulfillment of the requirements
For the degree of Master of Science
In Music Therapy

by

Lucas McCarren
Molloy College
Rockville Centre, NY
2019

MOLLOY COLLEGE

Exploring the Use of Marimba in Nordoff Robbins Music Therapy with
Children with Autism Spectrum Disorder

By

Lucas J McCarren

A Master's Thesis Submitted to the Faculty of

Molloy College

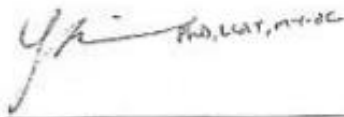
In Partial Fulfillment of the Requirements

For the Degree of

Masters of Science

May 2019

Thesis Committee:



Yasmine Iliya
Faculty Advisor

05/07/19

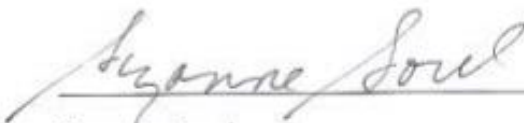
Date



Ariel Weissberger
Committee Member

05/05/19

Date



Suzanne Sorel
Department Chair

5-14-19

Date

Abstract

This study explored the use of the marimba in Nordoff Robbins music therapy with children with Autism Spectrum Disorder. Three clients each received two individual 30 to 45-minute music therapy sessions over the course of three weeks. After reviewing the sessions an inductive thematic analysis was completed in order to determine themes that occurred throughout the study. Five themes were discussed using clinical examples and musical transcriptions. These themes included: (a) sharing the marimba to strengthen the therapeutic relationship, (b) the use of marimba as an accompanying instrument, (c) rhythmic structuring, (d) the use of Nordoff Robbins repertoire on marimba, and (e) the use of mallet techniques to reflect emotional qualities of the music. The use of mallet techniques in addition to the timbre and range of the instrument allowed for the marimba to be used clinically to engage clients in musical interactions. The examples included in the study indicated that the musical qualities of the marimba can be used to engage clients with ASD. There is still limited research on the use of the marimba in music therapy.

Key Words: Marimba, Percussion, Nordoff Robbins, Mallet Percussion, Autism Spectrum Disorder.

Acknowledgements

First I would like to thank Yasmine Iliya and Ariel Weissberger for their continued feedback and support as I completed this thesis. I also need to thank Dr. Sorel, Dr. Kim, and Dr. Carpente for their guidance during my education prior to beginning this study and throughout the study. I owe a huge thanks to Jacqueline Birnbaum, Robin Mitch Mitchell, and the staff at the Rebecca Center for Music Therapy at Molloy College for their willingness to educate and supervise me during the Nordoff Robbins level one training.

As this study focused on the use of the marimba I need to reflect on the wonderful education and experiences I had when first being introduced to the instrument in the Fair Lawn High School Marching Band taught by Paul Kafer, Jamie Szeinberg, Daniel Burbank, Jennifer Ferreira, and George Agens. My percussion education then continued into my undergraduate career under the direction of Britton Matthews who educated, supported, and challenged me throughout my entire undergraduate education.

Thank you to Anna Villa-Bager and the wonderful staff at MarbleJam Kids who provided me with the support and resources that were required to complete this study. I also could not have completed this study without all of the participant's willingness to allow themselves to grow and engage with me musically throughout the study, in addition to their supportive families that allowed their children to be involved in this study in order to promote the efficacy of music therapy.

Lastly, I would like to thank Evelyn Selesky who listened to me play the marimba in my undergraduate audition for the music therapy program at Molloy College. Her unconditional positive regard and passion for music therapy will continue to motivate me to be the best music therapist I can possibly be for the entirety of my career as a music therapist.

Table of Contents

I	Abstract	iii
II	Acknowledgements	vi
III	Table of Contents	v
IV	Introduction	1
	The Marimba	1
	Context of the Researcher	4
	Context of the Researcher in Nordoff Robbins Music Therapy	5
	Research Question	7
V	Literature Review	8
	Music Therapy and ASD	8
	Nordoff Robbins Music Therapy	11
	Percussion in Music Therapy	15
	Current Mallet Percussion Research and Clinical Implications	18
	Conclusion	20
VI	Method	22
	Participants	23
	Materials	24
	Clinical Procedure	24
	Data Analysis	26
	Protection of Human Subjects	28
	Reliability, Validity, and Trustworthiness	28
	Presentation of Findings	30

VII	Results	31
	Participant Descriptions	31
	Participant A	31
	Participant B	32
	Participant C	32
	Thematic Results	33
	Theme #1: Sharing the marimba	33
	Theme# 2: The use of marimba as an accompanying instrument	36
	Theme # 3: Rhythmic structuring	39
	Theme # 4- The use of Nordoff Robbins repertoire on marimba	43
	Theme #5: The use of mallet techniques	46
VIII	Discussion	52
	Implications for Clinical Practice	57
	Limitations	58
	Recommendations for Further Research	59
	Conclusion	60
IX	References	61
X	Appendices	66
	Appendix A: IRB Approval	66
	Appendix B: Consent Form	67

Introduction

The Marimba

The marimba is a Spanish instrument that is associated with Central America. It is also the national instrument of Guatemala (Coleman, 1930). The earliest documentation of the instrument dates to the 1680s. It is believed that the marimba has African descent due to its similarity to the African xylophone. It began as a diatonic instrument, and in the 1890s the instrument expanded its diatonic range and added accidentals to create the full chromatic scale (Kinsbruner, 2008). It is a percussive instrument that is struck with yarn mallets to produce a specifically pitched sound made by the wooden keys vibrating through a resonator that is placed underneath the instrument. The instrument is large enough to be played by two people at the same time known as marimberos (Oxford Dictionary of Music, 2012). This provides opportunity for individuals to share the instrument and play either melody, harmony, or a bass line.

In more recent years the marimba has been used in marching bands, jazz bands, drum and bugle corps, and concert percussion ensembles (Lucas, 2017; Parker, 2010). There have been several mallet grasps developed and amplification modifications due to the growth of the use of the instrument in high schools and jazz bands (Cheeseman, 2012; Stevens, 2005).

The marimba has several musical roles including the ability to play faster dancing rhythms and repetitive melodic patterns (Rager, 2008). When comparing the musical roles of the marimba to the xylophone it was noted that the xylophone has a limited ability to communicate emotion due to the timbre of instrument. The marimba has a larger range of timbre due to its large size and range where the xylophone does not have a lower range and is smaller (Shultz, 2008). The difference in the marimba is that there are larger keys in the lower register of the instrument, providing it with low pitched notes that resonate for a longer period of time when compared to the xylophone. The marimba also is typically between four and five octaves where

the xylophone has a more limited range closer to three octaves. This range of timbre due to the size of the marimba has yet to be discussed in the field of music therapy. There is potential for the marimba to elicit different emotional and musical responses in clients due to this range and timbre.

The large range of timbre and flexibility to play contrasting musical styles indicates that the marimba has the potential to be a clinically effective instrument when engaging children with ASD. For instance, the large size of the instrument can allow children to engage in sharing the instrument to develop social skills through reciprocal musical play. There is also a distinct timbre of the instrument due to the wooden keys that can allow children to have a new unique musical experience. While the marimba is a pitched percussion instrument, the keys also have the capacity to be played rhythmically, melodically, and harmonically at the same time. Additionally, there has been growth in the use of the instrument in schools and ensemble settings. This growth indicates that the instrument is becoming more popular and the potential for the use of the instrument in music therapy should be studied.

Autism Spectrum Disorder

About one in 59 children in the United States are diagnosed with Autism Spectrum Disorder (ASD). “Autism spectrum disorder is a developmental disability that can cause significant social, communication and behavioral challenges” (Center for Disease Control and Prevention, 2018, para.1). The American Music Therapy Association (AMTA) stated “Music therapy interventions focus on enhancing social, communicative, motor/sensory, emotional, and academic/cognitive functioning, or music skills in individuals with ASD” (2013, p.1).

Several musical techniques such as singing, vocalizing, instrumental play, movement, and musical improvisations are used in music therapy to engage children with ASD (AMTA,

2013, p. 1). Bruscia (2014) defined four main methods of music therapy that are used to engage clients. This includes re-creative music therapy, improvising, listening or receptive musical experiences, and compositional music therapy. Recreative music therapy is when a precomposed song is used in sessions to promote engagement. This can include a client performing a song or using a precomposed song to develop other musical skills such as rhythmic play or vocal expression. This differs from the free form musical experience that is created in the moment during improvisational music therapy. The third method discussed is receptive music therapy. This is when a client listens to a musical experience such as music imaging. The only expectation for the client is to engage in listening to an experience. Lastly, compositional music therapy is when the therapist assists clients in writing songs. This can be done through songwriting, instrumental pieces, and song transformation of an existing song (p. 140).

AMTA specifies several professional competencies that are required for music therapists to practice. One competency is the ability to “lead and accompany proficiently on instruments including, but not limited to, voice, piano, guitar, and percussion” (AMTA, 2013, para. 4.1.1). However, there is little specification on what percussion instruments are required or focused on in the AMTA competencies. Merriam-Webster (2018) defines percussion instrument as “a musical instrument (such as a drum, xylophone, or maraca) sounded by striking, shaking, or scraping”. This definition demonstrates how vast the area of percussion is.

Due to the broad range of percussion instruments including drums, mallet percussion, shakers, and many more, music therapists should be aware of the cultural implications the instruments might have on clients. The AMTA includes a professional competency stating that music therapists must “demonstrate knowledge of and respect for diverse cultural backgrounds”

(AMTA, 2013, para. 17.9). It should be noted that there is no discussion regarding the cultural heritage of percussion instruments in the AMTA competencies.

There is a need to look at how specific percussion instruments can be used in music therapy with individuals with ASD to determine the role of specific percussion instruments in music therapy. This study focuses on the use of marimba with individuals with ASD.

Context of the Researcher

My desire to conduct this study was sparked by my high school experience of playing mallet percussion in marching band and indoor percussion ensembles. My high school had a very competitive and established percussion program that I was very fortunate to be part of. I had gained a tremendous amount of musical knowledge and skills when learning how to play the marimba during my high school career. This largely influenced me getting into the field of music therapy as music became a passion of mine.

I continued to study percussion during my undergraduate studies in music therapy. I felt a personal disconnect between myself as a clinician and a musician as I began my clinical practicum hours. I was developing clinical skills on the guitar, piano, voice, and on several auxiliary or adapted percussion instruments. While learning these clinical skills, I was not being taught how to use the marimba, my primary instrument, in a clinical setting.

It was very difficult to apply the marimba to my clinical work during my undergraduate degree. I was required to learn several complex solo and orchestral pieces on marimba, vibraphone, and xylophone for my degree requirements, but these were not always applicable to my clinical work. Additionally, there was not typically a full-sized mallet percussion instrument in facilities that offered music therapy, making it difficult to use the marimba clinically.

Every supervisor or professor that I had encouraged me to use my primary instrument at some point in my career and appeared curious about the clinical implications. While I was always curious about this, I never had the opportunity to bring a marimba into the clinical setting because of the size of the instrument and the inability to transport it. I often had supervisors suggest using smaller adaptive percussion instruments, but I felt that these instruments did not have the same clinical capacity as a full-size marimba due to the limitation in size and timbre. After I completed my undergraduate degree, I had stopped playing marimba regularly as I was not on campus as frequently and did not have regular access to an instrument. I then purchased an instrument during my second year of graduate school to play for my own pleasure but had yet to use the marimba in a clinical setting.

Context of the Researcher in Nordoff Robbins Music Therapy

This section discusses the foundations of Nordoff Robbins music therapy in addition to how it influenced my desire to conduct this study. Nordoff Robbins music therapy is based on the theory of the music child, understood as “the individualized musicality inborn in every child” (Nordoff & Robbins, 2007, p. 3). Other aspects of Nordoff Robbins include improvisational music and a focus on the music as therapy as opposed to music in therapy (Aigen, 1996). Music as therapy is a belief that music can be used to develop an individual’s personality and inner being. This is a music centered and client led approach to music therapy meaning that music is being focused on to relate with the inner being of a client. This contrasts to domain-based models of music therapy where music is used as a tool to reach goals such as motor skills or speech (Aigen, 2014).

Training in Nordoff Robbins music therapy focuses on training in different musical idioms and the development of clinical improvisation skills in both role-playing scenarios with

peers and clinical settings with clients. An experienced Nordoff Robbins trained therapist provides supervision for trainees in addition to taking on the role of the trainee's co-therapist during sessions. The co-therapist is there to facilitate engagement and support the client while the primary therapist takes on the role of the music maker.

Another focus of Nordoff Robbins music therapy is a humanistic worldview. There is an emphasis on following the client's lead and provoking or challenging the client to assist them in reaching a point of self-actualization, or the emerging inner self of the child (Aigen, 1996). This is all done through the improvised musical experience. Aigen (2014) stated that "in music-centered music therapy, the mechanisms of music therapy process are located in the forces, experiences, processes, and structures of music". Therefore, there is an emphasis on being able to create unique music in the moment to meet each individual's needs.

I completed the Nordoff Robbins' Level One training at the Rebecca Center for Music Therapy at Molloy College during my graduate studies. Typically, a student focuses on the use of the piano or the guitar during this training depending on the student's primary instrument and what they are more proficient in playing. I had found myself split between playing the piano and guitar during the training and often used both instruments in sessions interchangeably. This sparked my curiosity to explore the clinical implications of the marimba in Nordoff Robbins music therapy with individuals with ASD as I had not utilized my primary instrument, and felt very comfortable with my musical skills on the marimba.

I was developing clinical improvisation skills on the piano and guitar during my training, but similarly to undergrad there was a disconnect as my primary instrument was not being focused on. I became more curious of the clinical implications of the marimba in music therapy after completing the training. I felt that I was learning how to be present and authentic with my

clients in order to foster a therapeutic relationship, but was being somewhat inauthentic by not introducing my primary instrument.

However, I was able to see how this improvisational creative approach had a positive impact on my clients. Throughout the clinical year I was able to see how my clients were able to develop the ability to create music with me and engage in musical play as I developed my clinical improvisational skills and my ability to support my clients musically.

After completing the training, I became curious about how I would approach a session as a therapist if I used my primary instrument, the marimba. I never felt inadequate as a guitar or piano player in a clinical sense but felt that I had musical and technical skills on the marimba that were not being applied, clinically. The question that arose for me was: “What are the clinical implications for the use of marimba in music therapy with children with ASD?”.

I was curious as to how this process-oriented, music-centered way of working would manifest in my work as I applied my primary instrument, and how using the marimba would influence the therapeutic relationship with my clients. I feel that if a clinician is working in such a music centered way it only makes sense that the clinician should use their primary instrument.

Research Question

This study explored the potential use of marimba in Nordoff-Robbins music therapy with children with ASD. The use of an inductive thematic analysis was chosen to leave room for themes to emerge during the review of the music therapy sessions as there were not preexisting codes for the data to fall into (Braun and Clark, 2006). This study intends to answer the following research question: “What occurs when using the marimba in Nordoff Robbins music therapy with children with Autism Spectrum Disorder?”.

Literature Review

This review of the literature includes a brief discussion on recent research focusing on music therapy with individuals who have ASD. Nordoff Robbins music therapy was reviewed regarding its history and use of different instruments in Nordoff Robbins Music Therapy. In addition, the use of percussion in music therapy was reviewed. Due to the lack of research on mallet percussion in music therapy, a review of mallet percussion in music education and musical ensembles is included.

Music Therapy and ASD

There is a vast amount of music therapy research focusing on ASD. In order to be concise in this literature review studies that addressed improvisation models of music therapy are discussed as they relate to Nordoff Robbins music therapy. A meta-analysis entitled music therapy for people with autism spectrum disorder (Geretsegger et al., 2014) examined music therapy and ASD. Ten randomized control trials (n=165) indicated that music therapy was superior to standard care when assessing social interactions, nonverbal and verbal communication skills, and social emotional reciprocity. In response to this meta-analysis a study focusing on improvisational models of music therapy was designed to be a guideline based on the most important common characteristics of improvisational music therapy with ASD (Geretsegger et al, 2015). This was done through sending a survey out to professional music therapists from ten countries. Results showed that there was an international consensus that noted several concepts such as musical engagement and creating a safe environment as important characteristics of improvisational music therapy (Geretsegger et al, 2015). One limitation is that there was only a limited number of surveys addresses from a certain number of countries.

Both of these studies (Geretsegger et al., 2014; Geretsegger et al., 2015) showed purpose and rationale for improvisational music therapy with individuals with ASD. Having a systematic guideline for facilitating improvisational music therapy can assist in researching the effectiveness of improvisational music therapy. The principles that were found to be specific to improvisational music therapy included facilitating musical and emotional attunement, scaffolding flow of interactions musically, and tapping into a shared history of musical interactions. These principles are not limited to one particular instrument but rather facilitate treatment through assessment and evaluation.

Several clinical trials have been conducted to assess the effects of improvisational music therapy with individuals with ASD. The International Multicentre Randomised Controlled Trial of Improvisational Music Therapy for Children with Autism Spectrum Disorder (TIME-A) studied how improvisational music therapy impacted social affect and parent assessed social responsiveness (Bieleninik et al., 2017). This was one of the only studies that did not show that improvisational music therapy had a positive impact on children with ASD, but lead to many other studies in the near future (Geretsegger et al., 2016; Kim, 2016; Kim, 2009). The TIME-A study had a sample size of 364 participants from nine countries. While this study had high generalizability there was little control on how the actual music therapy was applied. This was because there were no guidelines in place regarding how a music therapist practices improvisational music therapy. There also is a strong focus on symptom outcome in the assessment tool used, the ADOS. The ADOS is an assessment tool that has a strong focus on interactions and communication for individuals with ASD. It was noted that this may not be the most appropriate tool to assess musical interactions. This contradicts the social construct that this study and the other studies listed in this section were assessing.

The TIME-A (Bieleninik et al., 2017) study sparked several more studies looking at improvisational music therapy with ASD. Several sessions from the TIME-A study were reviewed with a focus on the therapeutic relationship developed between clients and therapist (Kim, 2016). Interviews with the therapists and parents were also completed and determined that therapists who followed their clients lead formed stronger attachment with clients. This focused on music therapist's individual and unique ways of working. Results showed that improvisational music therapy can lead to strong therapeutic relationships. Another review of sessions from the TIME-A study tested the study's feasibility. A subsample of fifteen was used and results showed that there is a need for further research on how to properly design studies with such large sample sizes to ensure feasibility (Geretsegger et al., 2016).

Kim et al. (2009) yielded similar results when assessing social and motivational aspects of improvisational music therapy by comparing music therapy with toy play sessions. Results indicated that there were more client compliant responses in music therapy than in play therapy. This showed a higher sense of motivation in clients. It should be noted that this had a small sample size of ten participants with ASD between ages three and five.

Seeing that all three studies (Geretsegger et al., 2016; Kim, 2016; Kim, 2009) yielded contrasting results to the TIME-A study shows that there is a need for music therapists to continue research on improvisational music therapy with individuals with ASD to have a better understanding of how to assess and structure improvisational music therapy.

Several assessment tools that have been developed to address individuals with ASD were synthesized in a metaanalysis (Cripps, Tsiris, & Spiro, 2016). Fourteen different assessment tools were analyzed, and the majority were using quantitative scales to measure behaviors and moments of interaction with the therapist. Several of the assessments had categories consisting

or relationship-based concepts and assessed client's individual needs. One thing that only seven of the fourteen assessments had was a focus on music. This looked at client's ability to match pitch and tempo to engage with the therapist musically. Assessments that did not have a focus on music looked at domain-based categories such as speech and language.

While there is ample research on music therapy with ASD there is still a need to determine how improvisational music therapy impacts clients with ASD, how it should be structured, and how this can be assessed. This is evident by research being published on improvisational music therapy that show contrasting results (Bieleninik et al., 2017; Geretsegger et al., 2016; Kim, 2016). It is difficult to research improvisational music therapy because each session may be drastically different as the music is made to address the client in the moment (Bruscia, 2014). There also are several different assessment tools that have been developed that look at contrasting goal areas (Cripps, Tsiris & Spiro, 2016). These contrasting assessment tools make it difficult to determine how improvisational music therapy impacts individuals with ASD because they address different goal areas.

This study contributes to these gaps in the literature by exploring how sessions were structured using a unique instrument that has not yet been researched in the field of music therapy, and by determining themes that occur in improvisational music therapy. By exploring how improvisational music therapy is structured on different instruments such as the marimba more generalized guidelines for improvisational music therapy can be created. This is because only using the guitar and piano can limit music therapy research.

Nordoff Robbins Music Therapy

Nordoff Robbins' music therapy is a specific approach to music therapy established by Paul Nordoff and Clive Robbins that focuses on the theory of the music child, understood as "the

individualized musicality inborn in every child” (Nordoff & Robbins, 2007, p. 3). This approach to music therapy began with the use of piano as Paul Nordoff was a classical composer before collaborating with Clive Robbins and developing the approach.

The primary focus of improvising in Nordoff Robbins music therapy is to engage the client in music making. Nordoff Robbins therapy also involves three interrelated levels of creative work:

First, the therapist creates and improvises the music that will be used as therapy. Second, the therapist uses the improvised music creatively within each session- to seek out, gain, and maintain contact with the client from moment to moment – to “create” the therapeutic experience. Third, the therapist also creates a progression of therapeutic experiences from session to session, supporting stages in the client’s development.

(Bruscia, 1987, p. 24)

These levels of creative work promote engagement and development in clients as the music changes and adapts to meet the client’s needs. The client’s emotional experience in the session remains in motion as the client engages in active music making. Therefore, the music is seen as therapy as opposed to music in therapy. Music is not used as part of the therapy, but the improvised music promotes the client’s growth and the therapeutic process (Bruscia, 2013, p. 45). The therapeutic relationship is also central to Nordoff Robbins music therapy (Aigen, 1996). This includes concepts of having fun in therapy; challenging clients; inviting clients to create music with the therapist; and teasing clients in order to assist the child in developing a sense of self.

The role of music is also a key concept in Nordoff Robbins music therapy. This includes the therapist’s musical ability and the client’s musical intelligence. Aigen (1996) discusses the

importance of clinical-musical interactions and tapping into a child's musical intelligence. The music therapist uses the musical strengths that they observe in the client to engage with them. This can include the client being a very rhythmic player or providing strong melodic phrases for the therapist to work with in the session. Musical intelligence is understood as "a constellation of perceptual, aesthetic and expressive abilities that can lead a child around the confines of his or her pathology by providing a motivation for interaction" (p.19).

Much of the research in Nordoff Robbins music therapy is based on qualitative case studies due to the qualitative nature of the themes discussed above (Aigen 1996; Aigen, 1997; Nordoff & Robbins, 2007). Nordoff and Robbins' early research was done through the process of indexing (Nordoff & Robbins, 2007), which involves the therapist listening to audio recorded and filmed sessions and documenting in detail what happens in the session from moment to moment within the music, clients' responses, and therapist/client interactions. Indexing continues to be taught in current Nordoff Robbins music therapy training as it correlates with the qualitative nature that the model was founded on.

The purpose of reviewing the filmed session is to remove the therapist from the session so they can objectively review the session. The therapist can then "(1) gain detailed clinical information and (2) acquire a deeper, more insightful impression of the child" (Nordoff & Robbins, 2007, p. 182). The child's characteristics, music making, and interactions with the therapist are studied to allow the therapist to self-educate. Due to the nature of indexing being a way for the therapist to self-educate, the therapist is taking a role of a researcher as well. While this is not research that is necessarily being published it is a way of reviewing the sessions a second time after they had already taken place. This assists the therapist in learning their own musical and therapeutic tendencies in addition to learning about how they interact with their

clients. This can lead to moments of countertransference that lead to greater self-awareness for the therapist.

Indexing was originally done in order to advocate for improvisational music therapy. The first Nordoff Robbins music therapy sessions consisted of Paul Nordoff being the primary music maker, creating the music using piano to match client's emotional quality and energy. Clive Robins was responsible for providing musical, physical, and sensory support in order to enhance musical engagement and relatedness (Bruscia, 1987). They would then present on their work by showing excerpts of sessions that they had previously reviewed and indexed.

This study is unique as it explores the use of marimba in Nordoff Robbins music therapy, contrasting to the original sessions that were indexed. Several studies have been conducted examining the use of other instrument in Nordoff Robbins music therapy. All three of these studies discussed below (Brady, 2016; Carpente, 2010; Soshensky, 2005) focus on a music centered approach and were qualitative in design.

Soshensky (2005) and Carpente (2010) discusses the use of guitar in Nordoff Robbins therapy. Soshensky included musical techniques on the guitar in addition to how the guitar was used in a single case study with a client diagnosed with pervasive developmental disorder. The study discussed several clinical implications on the guitar including musical styles and the ability to move around with the instrument, and why this was clinically effective when working with this client. Similarly, Carpente (2010) utilized the guitar in a single case study with a child with ASD. This differed from Soshensky's (2005) study in the sense that it focused on the therapeutic relationship and musical engagement. It did not have a strong focus on the use of guitar specifically. Brady (2016) conducted a study looking at the clinical use of bass guitar in Nordoff Robbins music therapy through the use of a thematic analysis. This was done in a school setting

with children with ASD. Three clients received four music therapy sessions to obtain data. Five themes that include the therapeutic relationship, grounding, client and therapist as a rhythm section, client/therapist as solo/accompanist, and co-creative thematic development were discussed.

It is important to note that Brady (2016) and Soshensky (2005) discussed that the instrument choice influenced how they chose to play. One limitation in all three studies is that the researcher and clinician were the same. This is reflexive of early Nordoff Robbins research. In addition, all had a small sample size.

These studies (Brady, 2016; Carpente, 2010; Soshensky, 2005) indicate the use of string instruments in Nordoff Robbins music therapy, but do not look at any other keyboard instruments. There is value in looking at keyboard instruments besides the piano. This can assist in determining and strengthening themes in Nordoff Robbins music therapy that apply to contrasting instruments, validating the clinical effectiveness of Nordoff Robbins music therapy.

Percussion in Music Therapy

While there are no studies on the use of mallet percussion in Nordoff Robbins music therapy, there are several studies describing the use of percussion in music therapy. Several survey studies were conducted to determine how approved universities were teaching and assessing percussive skills in music therapy students (Knight & Matney, 2012; Scheffel & Matney, 2014).

Knight and Matney (2012) contacted 45 AMTA approved universities and found that a majority of schools feel that there needs to be more of a pedagogical collaboration between music therapy faculty and percussion faculty. One significant limitation was that there was no

instrument validity. This survey only asked questions regarding attitudes of classes, opinions of percussion skills needed, and opinions of percussive skills.

Sheffel and Matney (2014) conducted a study showing that mallet percussion was not typically used in music therapy practice, and that there was a need for further education regarding mallet percussion. This survey was sent out to music therapy clinicians to assess how they were trained in percussion and if they had developed adequate clinical percussive skills. One in four clinicians stated that they were not required to take a percussion class during their educational career.

These studies yielded similar results saying that there is a need for music therapy students to receive additional assistance in learning percussion from percussion faculty. It was noted that there was a low response rate in both surveys. This study intends to provide insight on how music therapists can potentially use the marimba as a clinical instrument when conducting music therapy sessions.

Knight and Matney (2012) developed a pedagogical framework to create a guide on how to teach clinical percussive skills. One limitation was that there was no mention of teaching mallet percussion in this guide. This focused on smaller percussive instruments such as shakers and hand drums. It discussed four categories including instrumental skills, musical skills, therapeutic functions of percussion, and therapeutic applications of percussion. This was designed to break down how academic professors can teach more effectively.

A meta-analysis describing the use of mallet percussion showed that the majority of mallet percussion instruments used in music therapy are diatonic Orff instruments (Matney, 2016). The marimba was discussed in a category of instruments that included pitched percussion. This included xylophone, bell, Orff instruments, glockenspiel, and several other

mallet instruments. There was no discussion in the review on marimba specifically, but it was included in a section on mallets saying that similar instruments were used in medical settings to produce sedation. There was a big limitation in the study because the therapeutic function and therapeutic application of percussion was not discussed. The focus was on what instruments were used in specific populations. This emphasizes the need to conduct research studies on the use of mallet percussion and marimba in music therapy with children with ASD.

A limitation in all the above studies (Knight & Matney, 2012; Matney, 2016; Scheffel & Matney, 2014) is that there is no connection to how percussive instruments impact the clients. These studies focused on how student music therapists were taught how to use percussive instruments, and what percussion instruments are used in music therapy. The studies did not address the impact that instruments had on clients in sessions, and the role that percussion can have with children with ASD.

While research on the use of marimba in music therapy with individuals with ASD is scarce there were several outcome studies looking at the use of the instrument with other populations. Matney (2017) completed a study that showed that marimba had a similar effect on reducing anxiety when comparing it to orchestral string instruments and piano music. This was measured through pre and posttests after participants listened to prerecorded music using a Likert scale in classroom and individual settings with a nonclinical population. There was no significant differences found in the results when comparing the three instruments. Limitations included a lack of randomization and limited sample size. Additionally, the focus was on relaxation rather than on the marimba.

Similarly, Best (2014) utilized the behavioral indicators of self-esteem scale (BIOS) and found that the marimba can be used to increase self-esteem. This study was done in a classroom

setting and utilized several other instruments in addition to marimba. The BIOS scale was not able to be properly analyzed in the study due to the small sample size and time restraints of the study.

Both Best's (2014) and Matney's (2017) studies consisted of a small sample size and did not focus on clients with ASD. There was not a strong focus on the clinical and improvisational use of marimba because the focus was on precomposed music and the use of additional percussion instruments that were used.

Current Mallet Percussion Research and Clinical Implications

Due to the lack of research on the marimba in music therapy, it is important to note how mallet instruments have changed over time as that change influenced the growth and popularity of the instrument. Since the early uses of the instrument in the late 1800s, the marimba has expanded in tonal range and applications across musical genres (Garfias, 1983; Schutz, 2008). Early xylophone music included ragtime solo and ensemble music. The marimba repertoire has since expanded to more contemporary and symphonic music (Parker, 2010). Contrasting compositional choices had to be made between the marimba and the xylophone as the marimba consisted of a much lower register and tones that had continued sustain. This larger range of the marimba is important to note as it would offer different implications for clinical use when compared to the xylophone. A wider register and longer sustain may elicit different emotional and musical interactions.

In a reviewed of solo compositional literature for the marimba and xylophone it was found that xylophone solos in minor keys were very rare, but that marimba literature consisted of a wider use of major and minor keys (Schutz, 2008). This parallels to what Parker (2010) noted about how the marimba differs from the xylophone in its compositional choices. This has

clinical implications to the field of music therapy because it can influence a therapist's instrumental choice. There is a need to see how the contrasting timbre and range of the instrument impacts individuals. Researching mallet percussion instruments in music therapy can help indicate when it is appropriate to use specific mallet percussion instruments.

Stevens (2005) created a unique mallet grasp in order to allow contemporary music to be played on the marimba by holding four mallets at a time. This was similar to vibraphone techniques (Cheeseman, 2013) that were used in jazz, although Stevens' mallet grip had been adapted to make interval changing easier between the two mallets in each hand. These grips offer different ways for therapists to use the marimba as a primary instrument in music therapy.

The marimba has since been used in high school marching bands and drum corps (Lucas, 2017). This has expanded the exposure of the instrument to students at a younger age. High schools and universities have increased their number of percussion ensembles since the creation of the percussion ensemble during second world war (Parker, 2010). As high school students are exposed to mallet instruments at a young age there may be a growing interest for students to learn how the instrument can be used clinically when studying music therapy in college.

Several studies outside of the field of music therapy addressed the use of mallet percussion in music education. Buchan (2015) studied the use of marimba in a four-day music making program with twelve nine-year-old school students. Students processed their feelings regarding learning the instrument through several different art modalities including poetry and drawing. Through interviews themes such as student's emotional expression and musical "knowing", which was described as the way students experience the instrument were assessed qualitatively in narrative form. Limitations included the time limitation and the wide range of interventions including musical play, art, and interviews.

Buchan (2015) and Best (2014) both determined that group marimba playing could increase self-esteem. While these studies were not conducted by music therapists it indicates potential in meeting social and emotional goals.

Conclusion

The presented research indicates several gaps in the literature. While there have been several studies looking at improvisational music therapy with children with ASD there have been conflicting results. While the TIME-A study (Bieleninik et al., 2017) did not show positive results when focusing on musical engagement there were several studies that did (Bieleninik, et al., 2017; Geretsegger et al., 2016; Kim, 2016), indicating that there is a need for further research in improvisational music therapy in order to determine its clinical effectiveness.

There is a similar need to explore the use of other instruments in Nordoff Robbins music therapy as this can add to the literature regarding how different instruments are used in improvisational music therapy. Where there were three studies looking at the use of guitar or bass in Nordoff Robbins music therapy (Brady, 2016; Carpena, 2010; Soshensky, 2005) there have been no studies looking at keyboard instruments besides the piano. This study contributes to a gap in the literature regarding keyboard instruments in Nordoff Robbins music therapy by exploring clinical techniques that were effective on the marimba and exploring the potential use of the marimba in Nordoff Robbins music therapy.

This study also contributes to the use of percussion in music therapy. The literature on mallet percussion currently discusses the use of the instruments in ensembles and school settings (Buchan, 2015; Lucas, 2017; Parker, 2010). This indicates growth in the use of the instrument but shows a gap in the literature when discussing mallet percussion in music therapy. The current literature on percussion in music therapy focuses on what instruments are used and how

music therapy educators teach percussion (Knight & Matney, 2012; Matney, 2016; Scheffel & Matney, 2014). As more music therapists and music therapy students are introduced to the marimba it is important to explore the clinical potential of the instrument to add to the literature regarding percussion in music therapy.

Method

This study explored the use of marimba in Nordoff Robbins music therapy with children with ASD. Data consisted of videotaped music therapy sessions, index sheets from the music therapy sessions, and detailed narratives of clinical excerpts. A thematic analysis was completed to determine trends that occurred in the sessions.

A thematic analysis was chosen based on its qualitative nature. The earliest Nordoff and Robbins research was done through the process of indexing (Nordoff & Robbins, 2007) that focuses on the client's interactions with the therapist and the clinical use of music. An inductive analytic approach to a thematic analysis is a qualitative way to look at patterns that develop in research without a preexisting theory that the researcher had (Braun & Clarke, 2006). This was chosen because it parallels well with the nature of Nordoff Robbins music therapy (Aigen, 1996; Nordoff & Robbins, 2007) as both look at what is emerging within the data after it is collected. There are no preexisting codes or concepts that a researcher or therapist is attempting to fit preexisting data into.

Three clients each received two individual 30 to 45-minute music therapy sessions over the course of three weeks. Each client received two sessions to allow them to be introduced to the instrument and to provide an opportunity for themes to reoccur after they were familiar with the instrument.

As the clinician- researcher, I reviewed the filmed sessions to note the client's interactions and musical responses. A thematic analysis was conducted to synthesize musical interactions that occurred with the use of marimba in improvisational music therapy. Detailed narratives of clinical excerpts were also included. In addition, I listed my own experience as a therapist and investigator through private journaling to establish trustworthiness during the study.

The process of indexing in Nordoff Robbins music therapy was completed to remove myself from the session while I reviewed the filmed sessions. There is no way to be completely removed from the sessions in the process of indexing, but it is done to allow the clinician-researcher to develop an awareness of themselves and the session. In order to attempt to become aware of any bias, I had journaled during this process of indexing. Approval from the Molloy College Institutional Review Board was obtained prior to beginning this research (see Appendix A).

Participants

Using a convenience sampling strategy, three clients were chosen from my current place of employment, MarbleJam Kids. All participants required the following inclusion criteria: (a) a diagnosis of ASD; (b) be between the ages of 10 and 28 years old; (c) have the physical capability to grasp and utilize marimba mallets, and; (d) have the capacity to stand at the marimba to utilize the instrument. Inclusion criteria (c) and (d) are important due to the large size of the instrument. This assessment was based on reviewing client's files. As the clinician-researcher I already had access to these files as an employed therapist at MarbleJam Kids. In the event that there were more than three participants who fit the above criteria, clients who were within five years of age were going to be chosen in a tie breaking scenario, but this was not required in this study.

A detailed information form was provided to all parents whose children meet the above criteria (see Appendix B). The information form listed the topic of investigation, purpose of the study, and the procedure. This was provided in person by myself, the researcher, to provide opportunity for participants and parents to ask questions. The information form also included a consent form to provide a means of informed consent for parents and caregivers.

Materials

A 4.3 octave marimba was used in all study sessions. 4.3 octave refers to the range and size of the instrument. This is a midsized instrument that offers enough space for the therapist and client to use the instrument simultaneously. This is the typical size instrument that you would see in high school and ensemble settings although marimbas with larger and smaller ranges exist. The instrument consists of keys made of padauk wood. She-e Wu-4 signature series marimba mallets manufactured by innovative percussion were provided for the participants to use in addition to the therapist. This is a yarn marimba mallet with a medium sound.

In addition to the marimba, clients were provided with instrument choices including hand drums, percussive shakers, tambourines, an ocean drum, and a tom drum and a cymbal. This was done to provide the clients with opportunities to explore several different instruments as I supported them clinically using the marimba. This provided opportunities for the therapist to use the marimba as an accompanying instrument as the participants explore other instruments, and as an instrument that the therapist and client can use together.

A Samsung SC-DC173U camcorder was used to record the sessions. The filmed sessions were stored and reviewed using a password-protected computer only accessible by the researcher and clinical director of MarbleJam Kids.

Clinical Procedure

This study took place in the music therapy treatment room at MarbleJam Kids. Each of the three participants received two individual music therapy sessions ranging from 30 to 45 minutes over the course of four weeks. Each client received two sessions to allow them to be introduced to the instrument and to provide an opportunity for themes to reoccur.

The marimba was used as the music therapist's primary instrument while participants had access to the other instruments including hand drums, percussive shakers, tambourines, an ocean drum, and a tom drum and a cymbal. This gave participants the choice to either share the marimba with the therapist or utilize other instruments. This was done to ensure that clients had the opportunity to be autonomous and ensure that clients were not being forced to play the marimba. Following standard ethical and clinical practices, clients were able to choose whatever instrument(s) they want to play at all times, and were also able to choose to not play any instrument at all. Clients were not coerced into playing the marimba. Instead, it was presented in the room and played by myself, the therapist-researcher. This was done to explore the potential of the marimba as an accompanying instrument and an instrument that participants were able to play.

Nordoff and Robbins (2007) procedural phases of creative music therapy were used to structure each session. This included:

1. Meeting the Client Musically: The therapist improvised music using the marimba that matched the clients emotional state and open channels of communication.
2. Evoking Musical Responses: Techniques include presenting short melodic motifs, imitating client's vocal sounds, and singing melodic word phrases to match the mood state of the session or describe what the client is doing.
3. Developing Musical Skills, Expressive Freedom, and Unresponsiveness: This was done to develop in the child a reliable body of experience and skill with which s/he can identify, and to make the child expressively aware and responsive to others (p. 51).

Additional clinical techniques were used in sessions to shape the client's experience (Bruscia, 1987). Techniques of empathy, elicitation, intimacy, structuring, redirection, and emotional exploration were used as appropriately needed to treat the responses of each participant and to engage the clients in reciprocal music play. Other principles of improvisational music therapy that were focused on in sessions included building and maintaining a positive therapeutic relationship, providing a secure environment, and facilitating enjoyment (Geretsegger et al., 2015).

Data Analysis

Filmed sessions were reviewed and coded using an inductive thematic analysis. An inductive thematic analysis is described as a "bottom up" form of analysis where there are not preexisting coding frames that the researcher is trying to fit the data in (Braun & Clarke, 2006). Braun and Clarke's (2006) six phase framework were used to guide the process. This includes:

1. Familiarizing yourself with the data- This includes immersing yourself with the data by reviewing it several times in an active way. For this study filmed sessions were watched and indexed more than one time before themes and original codes were developed.
2. Generating initial codes- These initial codes are different than the themes. These codes were ideas that occurred and were listed in the narrative section of the index sheets. This is a way to organize data before themes are formed.
3. Searching for themes- Once a list of codes was formed, they were analyzed and combined to form overarching themes. Some initial codes became themes or sub themes in this process.
4. Reviewing themes- This phase refines themes. First the original coded data were sorted into themes and reviewed to determine if there was a coherent pattern. If there was not

enough data in a theme it may have been combined with another. Additionally, this process assisted in breaking apart large themes into clearer subthemes.

5. Defining and naming themes- This phase allowed the researcher to identify the essence or point of each theme. It is important that themes don't try to tell too much or too little and that each theme can be described in a few sentences to address its purpose.
6. And producing a scholarly report- This is the final phase of a thematic analysis and was done to tell the story of the data. This included evidence of themes with details and examples (Braun & Clarke, 2006).

A thematic analysis is based on a constructivist worldview where the research questions emerge during the coding process (Braun & Clarke, 2006). The therapist indexed (Nordoff & Robbins, 2007) the sessions to determine important moments that occur. This process of indexing focused on musical interactions and musical choices that were made. Index sheets in this study included, but were not limited to compositional musical choices, instrument choices for clients, how the therapist articulated the music that was being played, and what was done harmonically in the music. This was noted in real time from moment to moment while reviewing the filmed sessions. Narrative descriptions of the sessions and key moments were also included in the index sheets. These functioned as the initial codes that Braun and Clark (2006) discussed.

Narratives and index sheets were then compared and contrasted to determine themes. Themes were discussed in a narrative form and clinical excerpts were described to discuss the clinical implication of the themes. This emphasized the client's experiences in music and began to determine the clinical use of marimba in Nordoff Robbins music therapy.

Protection of Human Subjects

The participants were already receiving music therapy with the therapist and had a sense of familiarity with the therapist. Parents of subjects were provided with in depth descriptions of the procedure and purpose of the study. This included a consent form for the parents to sign indicating the sessions will be filmed and reviewed to complete the study (see Appendix B).

The use of providing instruments for clients to use in addition to the marimba was done to ensure that the client had ample opportunities to engage in therapy. There would have been limited opportunities for clients to engage musically without having a variety of instruments to engage with.

Clients also had the opportunity to withdraw from the study at any time if they needed to without any negative consequences in regard to their services at MarbleJam Kids. This was done to ensure that client's participation in music therapy and at MarbleJam kids was not impacted by the study. Additionally, all of client's names were withheld in the study to ensure privacy in the publication of the research. This study was approved by Molloy College's Institutional Review Board prior to beginning the study (see appendix A).

Reliability, Validity, and Trustworthiness

I have played the marimba for several years and have a strong affiliation with the instrument. This bias is partially why I chose to conduct an inductive thematic analysis. This qualitative method provided room for me to answer the research question without trying to fit the results into a preexisting code. A thematic analysis also allowed me to explore how the instrument is used in Nordoff Robbins music therapy and not at quantitative effectiveness.

Braun and Clark's (2006) six-phase framework was used to guide the process to ensure that the study was structured. An inductive thematic analysis was chosen to allow themes to

emerge upon review after data was collected. This leaves room for freedom as there are not preexisting codes that the researcher is trying to fit the data into.

Sessions followed Bruscia's (1987) procedural phrases to structure the sessions and ensure continuity and dependability. Providing a framework for each session indicated that the themes that occur were accurate and transferable. Clinical techniques (Bruscia, 1987; Geretsegger et al., 2015) used were listed to ensure transferability as these techniques are used in improvisational music therapy regularly.

Data for this study consisted of videotaped music therapy sessions, index sheets from reviewing the music therapy sessions, and detailed narratives of clinical excerpts written by the clinician- researcher. A narrative summary was also written after reviewing each session to summarize the clinical use of marimba. In order to establish trustworthiness bracketing was done through the therapist- researcher keeping a reflexive journal regarding their feelings of how the use of marimba impacted the sessions prior to the start of the study and throughout the study. Prior to the study any preconceived notions regarding why the marimba would be clinically effective were listed to note bias. This included the size, range, and timbre of the instrument. Memos were then taken in narrative form when conducting research that described observations regarding the therapist's feelings when reviewing the sessions, and to reveal biases that occurred (Tufford & Newman, 2012). A thematic analysis was completed to determine trends that occurred in the sessions based on the index sheets and narrative write ups.

Presentation of Findings

Findings are presented in narrative form that describe themes and patterns that occurred in therapy. Clinical excerpts are described in detail to provide a clear understanding of the

themes with musical examples included. Limitations and possible biases based on the journaling that took place during the study are presented in narrative form in the Discussion.

Results

This study explored the potential use of marimba in Nordoff Robbins music therapy with children with ASD. Three clients received two music therapy sessions ranging from 30-45 minutes where I was facilitating the sessions as the therapist using the marimba. After conducting an inductive thematic analysis, five themes were found. These themes were found through analyzing the filmed sessions and using the process of indexing.

Participant Descriptions

Participant A. Participant A was a 24- year- old male who had been receiving music therapy for one year. His parents were supportive of music therapy and both his mother and father brought him to sessions. He also had three other siblings who appeared eager and willing to take their brother on outings and assisted his parents in taking him to and from his music therapy sessions when available. Participant A was often eager to enter the music therapy room and appeared comfortable with me in sessions as evidenced by his willingness to engage in musical play. Participant A has received group and individual music therapy with me for one year. He has a primary diagnosis of ASD. He presented by having difficulty engaging with peers in group setting. He often covered his ears when overstimulated, but was generally pleasant in music therapy.

This participant had no severe physical limitations that impacted his participation in music therapy. He was verbal with limited language and often needs prompting to express simple wants and needs. In past sessions he was able to respond with simple one-word answers. For example, when asked what instrument he wanted to use he often said “drum” or “guitar” in response after taking several seconds to process the question. Participant A demonstrated the capacity to sing short phrases of familiar songs. This was often done by filling in a lyrical

prompt that I presented to him in sessions. His long-term music therapy goals were (a) to increase expressive language through musical play, (b) to improve emotional wellbeing through musical interactions, and (c) to develop autonomy through musical experiences.

Participant B. Participant B was a 23-year-old female who had been receiving individual music therapy for 11 months. She had one younger brother who was developmentally delayed. Both her father and mother were actively involved in her care. She participated in many extracurricular activities including respite and day habilitation programs. She presented with a lot of energy in music and often beat the drum at a loud dynamic volume. She sang familiar songs with confidence and requested preferred music experiences at times. She was active in music therapy and I allowed her to choose instruments to use around the room in order to provide her with a sense of autonomy. She demonstrated the ability to sing familiar songs but often had difficulty processing one step directions. She expressed herself in short phrases such as “music fun!”, “drum fun!”, or “music time”. She often needed assistance to regulate her playing and had difficulty singing or playing at softer dynamic levels.

She was diagnosed with ASD and Unspecified Pervasive Developmental Delays. Her music therapy goals included (a) increasing expressive language through vocal and instrumental play, (b) developing receptive language skills through musical interactions, (c) to develop a sense of autonomy through musical interactions, and (d) to increase the ability to regulate through musical play.

Participant C. Participant C was a high functioning child. He was a 12-year-old male who had been receiving music therapy for one year and eight months. He came from a supportive family with one younger brother and both his parents were highly involved in his care. He had perfect pitch and often Participant C and I would create musical games where we

repeated what each other played on the piano or other melodic instruments. Participant C was more of a melodic player and had more difficulty repeating rhythmic patterns and deciphering harmonies.

At times Participant C had difficulty getting motivated to engage in musical play and I would request his assistance by playing a familiar melody incorrectly. This motivated Participant C to correct my playing and engage. I often played a familiar experience in different keys from session to session. Participant C would play the experience in the familiar key to provide himself with a sense of familiarity and comfort. He had difficulty accepting change and was rigid at times. He preferred not to share things about his home or school with me and sessions revolved around musical play. His goals included (a) adapting to musical changes that the therapist presents, (b) engaging in reciprocal musical play, (c) and increasing independence through musical improvisations and novel musical experiences.

Thematic Results

Theme #1: Sharing the marimba to strengthen the therapeutic and musical relationship. There were several instances where the marimba was shared between participants and me. Depending on the client's cognitive, physical, and musical abilities there were several different uses of the instrument when sharing it. In some cases, clients appeared interested in the instrument due to the novelty of the new instrument in the room. This may be due to the large size of the instrument or timbre of the instrument. This led Participant A and Participant B to explore the instrument with no prompting as they entered the room. They then allowed me to join them in playing. Participant C shared the marimba with me once he discovered that he could use it as a melodic instrument. These moments of sharing came authentically in the session as I was conscious not to coerce participants in playing the instrument.

Based on my examination of the sessions I found that the use of sharing the instrument assisted in strengthening the therapeutic relationship with the participants. Sharing the instrument allowed participants to engage in creating a joint musical experience with myself. Due to the large size and range of the instrument clients were able to be autonomous when playing the instrument while I had the musical range to support the participants musically.

Example 1: Participant A session #1. In Participant A's first session he entered the room and willingly went to the Marimba once I began to play. There is a sense of novelty when seeing a large new instrument in the room that may have influenced his choice to begin exploring the instrument. The participant began to explore the upper register of the instrument softly. I matched his tempo in order to empathize with him. I played a familiar hello experience (see Theme #4) to provide familiarity when using the new instrument. When singing the familiar B section of the experience consisting of the lyric "What should we do today?" the participant made eye contact with me and requested to use the drum. This indicated that the participant was engaged in the familiar experience and listening to the lyrical prompt.

Example 2: Participant A session #2. This session was spent entirely at the marimba. Participant A began to explore the instrument without prompting before I began to play. Participant A played the marimba very rhythmically, similarly to how he had played the tom drum in past sessions. Participant A would play a single tone on the marimba for several minutes and I would harmonize around the tone in contrasting ways. For instance, when Participant A was consistently playing a D natural, I responded by harmonizing using D Lydian (see Figure 1). I soon transitioned to A major - a subtle change - but my participant noticed and stopped playing in response to the change. This suggests that there was a musical connection between me and my client that he was aware of.

The image shows a musical score for a D Lydian mode exercise. It consists of two staves: a treble clef staff for 'Participant A' and a bass clef staff for 'Therapist'. The key signature has one sharp (F#). The score is divided into three measures. In the first measure, the treble staff has a chromatic eighth-note pattern (D, D#, E, E#, F, F#, G, G#), and the bass staff has a block of chords. The second measure continues the chromatic pattern in the treble staff and the chord block in the bass staff. The third measure shows the final note of the chromatic pattern in the treble staff and the final chord in the bass staff.

Figure 1. D Lydian.

Example 3: Participant B session #1. Participant B began to explore the marimba when it was first presented to her. I began to sing a familiar experience and the participant began to say “Music!” with an excited timbre in her voice while playing the marimba at a loud dynamic volume in the lower register. She held one mallet in each hand as I was harmonizing using four mallets (two in each hand). There was a sense of freedom in her playing as she constantly moved between playing naturals and accidentals on the instrument. I began to sing “we’re in music” reflecting her exciting and chaotic playing by using a chromatic pattern, moving major triads up by half steps. This was done to reflect the freedom in exploring the instrument as she pleases. I then began to resolve a C # major chord down by half step repeatedly, using the tritone substitution of a V chord in C major to create a sense of structure while supporting her chromatic playing. She soon began to explore the upper register of the instrument and I began to play softer arpeggios in C major to reflect her softer playing.

Participant B has limited verbalizations and will often express herself with one-word statements. My interpretation of her saying “music!” in an excited manner was that she enjoyed the experience of using the instrument and was trying to communicate that experience with me. The fact that she allowed me to continue playing the unfamiliar instrument and that she continued to play with me suggests that she felt supported when playing the new instrument and wanted to communicate with me vocally and musically.

Example 4: Participant C sessions 1 and 2. Participant C shared the marimba during the hello and goodbye experiences in both sessions. These were familiar musical experiences from past sessions but were typically played on the piano. The experience of the participant sharing the marimba with me was similar to the experience of Participant C sharing the piano with me in the past. This is not surprising because he favors familiarity and will typically request familiar experiences in music.

Participant C was able to play the bass note of the hello experience on the marimba as I played the familiar melody. Participant C then played the melody of the goodbye experience while I harmonized the experience in the lower register of the marimba (see Theme #4, Figure 12). This was done to support the client in playing the melody of the experience while enhancing the experience musically. This is explained more in depth in theme #4 as both the greeting experience and goodbye song are from Nordoff Robbins literature.

The similarity of Participant C's experience on the marimba and the piano does not indicate whether the marimba is more or less beneficial than the piano, but does demonstrate the capacity for a therapist to use the marimba to develop a therapeutic and musical relationship with a client in a similar way that the piano is used. This parallel between the marimba and the piano also indicates that the musical relationship that was developed in past sessions was not hindered by the introduction of the marimba.

Theme# 2: The use of marimba as an accompanying instrument. The marimba was used as an accompanying instrument several times throughout the study. Participants had the freedom to choose several contrasting instruments to explore during the study. This included hand drums, percussive shakers, tambourines, an ocean drum, a tom drum, and a cymbal.

Example 1: Participant A explored the ocean drum in several different ways. He began by playing it slowly creating a wavelike sound as the instrument is intended to do. I accompanied this sonic texture by playing ripple rolls, a type of roll where I have each of my four mallets hit independently, similarly to rolling an arpeggio on the piano, and singing “listen to the ocean” at a legato tempo. A pentatonic scale was used to create a calm environment. Participant A began to tap the bottom of the ocean drum to make a snare drum like sound. I adapted my accompanying style by playing staccato rhythms. I moved back and forth between the two contrasting styles of playing following my clients lead while continuing to use the pentatonic scale. The use of playing rolls that do not have a steady rhythmic pattern and the contrasting staccato playing were used to accompany the two contrasting ways Participant A played the ocean drum.

Example 2: Participant B chose to play the jingle bells in each session and began to sing the song *Jingle Bells* independently. This could have been due to the Christmas holiday soon approaching as the session was conducted in mid-December. Participant B was playing the melodic rhythm of the song when shaking the bells. I used the entire range of the instrument by playing the melody in octaves using my right hand. I played a conventional I-IV-V progression to harmonize the experience (see Figure 2).



Figure 2. Jingle Bells.

I then adjusted the melodic rhythm of the experience making it more syncopated using dotted quarter notes in order to challenge my client musically (see Figure 3). She did not play the presented syncopated pattern but demonstrated an awareness of the change by playing the shakers in an unstructured way by shaking them constantly similarly to a role.



Figure 3. Jingle Bells Variation.

Example 3: The tambourine was chosen by Participant C and an improvisational rhythmic game was facilitated. Similar games had been played in the past without the use of the marimba. The game began with simple rhythms and then gradually became more complicated over time. The basic structure of the experience is outlined below. Participant C appeared very engaged in the piece. He displayed a positive affect and was focused on the experience. A brief one measure A section was presented and then a rhythmic pattern would be played for him to respond to (see Figure 4)

Figure 4. Tambourine Improvisation.

Theme # 3: Rhythmic structuring. There were several contrasting ways that the marimba was used to create a clear rhythmic structure. This is an important theme because the marimba is a percussive instrument but has contrasting capabilities to other percussive instruments due to its chromatic structure. The marimba contrasts to other percussive instruments as it has the capability for ostinato patterns in addition to melodic and harmonic patterns in order to create rhythmic structures. There is also a distinct timbre and sustain to the keys of the marimba that allow it to provide rhythmic structuring. There is not a long sustain after striking the bars of the instrument but there is a clear impact that allows for clear rhythms. There is less sustain in the higher register of the instrument that allows for clear melodic patterns to be heard. The examples below describe the use of rhythmic structuring in order to assist clients in maintaining a basic beat and in order to repeat rhythmic patterns. Examples of ostinato patterns to create structured improvisations are also described.

Example 1: Participant A chose to explore the drum in his first session. I decided to use the precomposed song *Charlie Knows How to Beat that Drum* by Paul Nordoff (1962). This song allowed Participant A to maintain a basic beat as it is intended to do (see Theme #4).

I then then transitioned to the Key of D minor and began an improvisation to facilitate the participant in exploring the drum. In order to reflect the low tone of the tom drum that the client was playing I played large intervals using the wide range of the keyboard. The use of arpeggios was done to indicate a clear downbeat in the bass of the marimba while adding harmonic structure (see Figure 5).



Figure 5. D Minor Improvisation.

Example 2: An improvisation using E mixolydian was used to create a structured drum experience. I played quarter notes using a fifth in my left hand to reflect the steady beating that Participant B was playing (see Theme #3). Participant B played confidently at a loud dynamic volume as she typically does in music. The use of the mixolydian mode appeared appropriate as there is a powerful feeling that is created by the flat seventh of the scale. Additionally, the use of playing fifths in the bass provides a sense of grounding to enhance and reflect the steady rhythm from participant B. I then was able to syncopate my playing and Participant B was able to adjust and fill in musical space after several repetitions and prompting (see Figure 6).

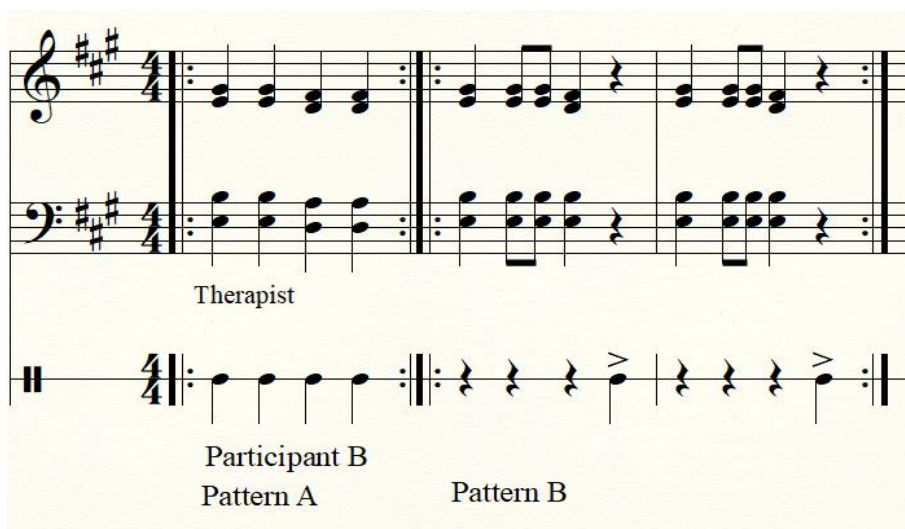


Figure 6. E Mixolydian Improvisation.

Example 3: Participant C had engaged in a musical game where he would repeat musical patterns on the piano that I would present on the marimba. I chose to use this opportunity to expose Participant C to intervals and chord structures. Participant C had already demonstrated the ability to repeat melodies when sharing the instrument in the hello experiences. The game began by exposing Participant C to intervals of a third (see Figure 7).

Figure 7. Improvisation Using Major Thirds.

I began to play triads using block chords at one point in the experience and Participant C played the top note of the chord after hearing it. I then played arpeggios in order to introduce him to chords in a more gradual way where he can succeed in repeating the chords. Some arpeggios had to be repeated but the basic structure of the experience is notated below (see Figure 8).

Figure 8. Arpeggio Repetition Game.

Example 4: The use of ostinato patterns was present when working with Participant A. The use of straight eighth notes in the left hand was used to create an ostinato in a middle eastern improvisation. I then improvised using the middle eastern scale while playing the ostinato pattern in my left hand. This scale consists of several half steps and can create tension. This reflected a moment where the participant was freely exploring the marimba and playing several half steps (see Figure 9).



Figure 9. Middle Eastern Ostinato Pattern.

The same rhythmic ostinato pattern was used to transition to a D Lydian improvisation (see Figure 10). The use of steady eighth notes in the left hand continued to allow for Participant A to organize their playing.



Figure 10. D Lydian Ostinato Pattern.

The use of ostinato patterns in my left hand was also used in order to facilitate an improvisation on the ocean drum with Participant A (see Theme #2 Example 1). This improvisation used an E major pentatonic scale and the same similar eight note ostinato pattern as in the example above. The harmony consisted of an E major and A major chord to harmonize with the pentatonic scale.

The B section of the experience used a different ostinato pattern consisting of quarter notes using chords. This change in the ostinato pattern was reflective of my client tapping the bottom of the ocean drum in order to create a more staccato percussive sound. I was then able to

alternate between the two contrasting patterns during the experience (see Figure 11).



Figure 11. E Pentatonic Left-Hand Patterns.

Theme # 4- The use of Nordoff Robbins repertoire on marimba. There were several pieces from Nordoff Robbins musical literature that were used in the session. These songs had to be adapted for the use of the marimba and were not played exactly as they were published due to the nature of the marimba being played with four mallets unlike a piano. I was attempting to capture the authenticity of the pieces when using them. The pieces were not arranged for the marimba prior to the study as this could have led to bias in me using the pieces in the study.

This theme was important because there is a lot of published music in Nordoff Robbins music therapy that is focused on during the training. There are compositional choices that are made in this literature that are designed to meet specific music therapy goals. For instance, the bass line in *Charlie Knows How to Beat that Drum* (Nordoff & Robbins, 1962) is designed to promote basic beating. This was able to be reproduced on the marimba in order to meet the original goal of the song. Compositional choices like this are imperative in Nordoff Robbins therapy so seeing how these compositions translated to the marimba was important to me.

Example 1: Hello. This piece was familiar to Participant C and Participant B prior to the study. Participant C used the piece to engage with me when sharing the marimba. The use of the familiar piece of music allowed for the client to use the marimba in a purposeful familiar way. The participant played the bass note of the piece without any prompting.

Participant B used the familiar piece as a vocal experience. She was able to sing the familiar lyrics and chose what instrument to play when the B section was played. While this was a vocal experience for her, she was able to be introduced to the marimba simultaneously as she explored playing the instrument during the experience. This forced there to be some freedom in the experience as there was a need for improvisation in the experience.

This experience was able to be musically replicated on the marimba by having me play the melody and the bass note on the instrument. The original piece is written using a distinct major fourth to begin the melody. There is also a clear bass note placed on the downbeat that was replicated on the marimba by myself or Participant C depending on the session. While not all of the harmonies of the original piece were included in this study the melodic theme was prominent (see Figure 12).

The image shows a musical score for the piece 'Hello' by Paul Nordoff. It consists of two staves. The top staff is labeled 'Therapist' and is in treble clef. The bottom staff is labeled 'Client' and is in bass clef. Both staves are in 6/8 time and have a key signature of two flats (B-flat and E-flat). The melody for the Therapist starts on a quarter rest, followed by a quarter note G4, a quarter note A4, a quarter note B4, a quarter note C5, a quarter note B4, a quarter note A4, a quarter note G4, and a half note F4. The bass line for the Client starts on a whole rest, followed by a quarter note G2, a quarter note A2, a quarter note B2, a quarter note C3, a quarter note B2, a quarter note A2, a quarter note G2, and a half note F2.

Figure 12. Hello- Paul Nordoff.

Example: Charlie Knows how to Beat That Drum. *Charlie Knows How to Beat that Drum* (Nordoff & Robbins, 1962) was used for Participant A and Participant C. There is a clear objective in this piece to provide clients with a basic beat in order to structure their playing. This was done by playing a similar ostinato pattern in my left on the marimba that is played on the piano in the original composition (see Figure 13). The melody of the original composition was played in octaves on the marimba using my right hand.

When playing the B section of the piece on the marimba I used hand to hand rolls to reflect the client's faster and slower playing. This section of the piece is very playful and incorporates an accelerando. When using the piano, a clinician might use the pedal to sustain notes in the B section during the accelerando. In order to mimic this effect on the marimba I adjusted the speed of my roll while playing.

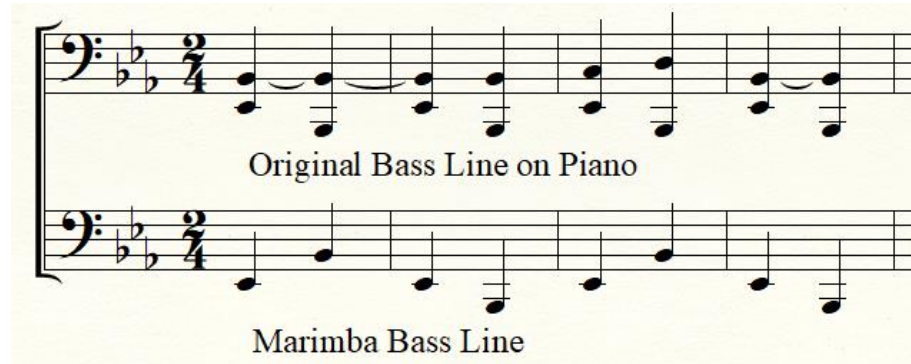


Figure 13. Charlie Knows How to Beat that Drum Bass Lines.

Example: Let's Sing a Song. This piece was used with Participant B loosely. I was reflecting the harmonic progression of the piece on the marimba while incorporating a walking bass line similarly to the original composition. I used open voicing to harmonize as in the original composition, but the voicings were not identical to the original composition. When playing the B section, I played the melody notes that I was intending my client to sing in the upper range of the marimba. I would then leave musical space for her to repeat the melody I played. This was done in order to introduce her to the vocal part similarly to the original composition.

Example: We Just Want to Say Goodbye. This composition was played in an untraditional way as I did not play the melody at all in this study. Participant C is very melodic and will often engage in playing melodies on the piano. This paralleled to the marimba quite easily. At times it seemed that it was even easier for Participant C to play melodies on the

marimba because he did not have to decide what fingers to use. He often used one mallet in his right hand in order to play melodies.

I facilitated this experience by rolling chords using four mallets to outline the harmonic progression. The bassline written in the original composition was not incorporated in the marimba. The use of rolling chords was done in order to ensure that the melody my client was playing was clearly heard. Additionally, when rolling chords there is not as structured of a tempo for my client to follow. This is important when exploring the new instrument because I can take liberties in following any rubatoes or tempo fluctuations that Participant C would play when learning how to navigate the new instrument melodically.

Theme #5: The use of mallet techniques to reflect emotional qualities of the music.

There were several different mallet strokes I used in order to reflect and match my clients throughout this study. This is important to note as an important concept in Nordoff Robbins therapy is matching the emotional quality of our clients. While the mallet techniques described below are not music therapy techniques, they indicate that the marimba has the potential to be played in contrasting ways in order to meet client's needs. Throughout the study I was typically supporting my clients while playing with four mallets (two in each hand). The left most mallet, or bass mallet is typically referred to as mallet number one, and the right most mallet playing the highest pitched note is referred to as the four mallet. Different mallet stroke types will be described prior to each example in order to provide an understanding of how I was playing.

Double vertical strokes. Double vertical strokes are when both mallets hit the keyboard at the same time. This can be used to play an interval if one hand is playing a double vertical stroke independently, or a chord if each hand is playing the double vertical stroke at once. This would allow me to play four notes at a time. This is beneficial when playing block chords.

Double vertical strokes were used when supporting Participant A in theme one example two. This was done in order to provide a clear rhythmic pattern and tempo to follow. In this example there was a clear rhythmic pattern that my client was playing. I was able to expand on what my client was playing by adding harmony while mirroring his rhythmic pattern.

Double vertical strokes were also used to accompany drum play in theme two example two. The use of playing four notes at a time to create a driving supportive sound was paired with the mixolydian mode discussed above to support Participant B. Mixolydian can be a powerful mode and reflects the forward motion and loud confident playing that Participant A presented with.

Dead strokes. Dead strokes are a technique that is used when playing the marimba where you use your mallet to mute the sustain of the note that you play. This is done by keeping the mallet on the bars of the marimba after you strike them in order to dampen the sustain of the notes. This creates a staccato effect that is similar to a palm mute on the guitar or letting go of the sustain pedal on the piano. This can be beneficial when trying to present a clear rhythm without having any sustain or for a contrasting musical effect.

Theme two example one was a very prominent use of dead strokes. This was when Participant B played the ocean drum by tapping the bottom of the instrument. This was done to reflect the staccato playing that my client was engaging in by tapping the bottom of the ocean drum. This staccato effect was playful and reflected the exploratory way that Participant B was playing the ocean drum. This is a more rhythmic way of playing the marimba because there is less sustain. Participant B was also dampening the sustain of the ocean drum by tapping the bottom of the drum and not rolling the beads on the inside of the drum.

Hand to hand rolls. Hand to hand rolls are used to create a meter less effect like a snare drum roll. This specific type of roll is done by playing alternating double vertical strokes in each hand quickly. Hand to hand rolls were used to provide harmony without a clear rhythmic structure. I did not incorporate melody on the instrument when using rolls although it is commonly done in the top note of the chord.

When using hand to hand rolls to harmonize “we just want to say goodbye”, the melody was being played on the instrument by Participant C. Participant C is very melodic and, to support him, hand to hand rolls allowed the melody to be heard while creating a fuller harmonic sound. There are also some liberties that can be taken when playing hand to hand rolls because there is no melodic rhythm being played. This allowed me to follow the melody that Participant C was playing.

Hand to hand rolls were also used in the B section of “Charlie Knows how to Beat that Drum”. This is a section where clients are instructed to play quickly or slowly. This includes a slow *accelerando*. Due to the rhythmic freedom of hand to hand rolls there is an opportunity for me to facilitate the *accelerando* and playful emotion of the B section by using this technique.

Ripple rolls. Ripple rolls create a similar effect as hand to hand rolls but do not use any form of a double vertical stroke. Here four mallets are played independently and hit the instrument at a different time. This creates a freer flow sound than a hand to hand roll. This is beneficial when creating a meter less sound consisting of arpeggios. This creates a soundscape similar to an ocean drum, but I am able to add harmony.

The most prominent use of ripple rolls was when Participant B used the ocean drum. This is because the ocean drum is a flowing instrument. There is no melody played on the instrument and it creates a blanket of sound throughout the room, similar to the use of hand to

hand rolls. Ripple rolls did not feel appropriate when my client began tapping the ocean drum because there was a clear rhythmic pattern that was being played, causing me to play the dead strokes described above.

Ripple rolls were also used to facilitate an experience where Participant B was playing the windchimes. I chose to play major seven chords with open voicings (fifths in each hand) in order to create a calming and soothing experience. Similar to the ocean drum, the windchimes create a blanket of sound. I also used my voice to accompany the experience by singing “listen to the wind”. Because there was no melody being played on the marimba when using the ripple roles, it seemed appropriate to incorporate my voice at times to create a simple melodic structure.

Permutations. Permutations refer to the order in which the player plays the four mallets that are being used. Mallet players typically refer to their left most, or bass mallet as mallet number one and their right most mallet as mallet number four. There are many different orders that a player can use permutations in order to create contrasting musical experiences. The player can also combine different mallet strokes within their playing in order to create different experiences. This can mean that the player can play four mallets separately (ie: 1234) or any mallet combination together (ie: 1&4, 2&3).

Theme three example one used a 1234 permutation in order to play arpeggios when Participant A was playing the drum. I played these arpeggios to provide forward momentum to the improvisation. Accenting beats one and three help provide clear rhythmic structure without using block chords. This is similar to finger plucking on the guitar or arpeggiating chords on the piano to create a calmer mood.

Arpeggios were also played in theme three example three when introducing Participant C to chords. This was done to break down each chord in order for him to hear each individual

pitch. Participant C was not able to decipher harmony when triads were being played. These arpeggios were played using a 12324 permutation. This creates a less stressful auditory experience for my client as there is a breakdown of what is being heard that was not there when playing block chords.

Melody. The marimba also has the capability to play melody as it is a keyboard instrument. This can be done with any mallet, but typically the melody is played in the four, or right most mallet, putting the melody in the highest register of the instrument. In order to make the melody more prominent, two mallets were used instead of four at times in order to ensure that the melody is clear and heard. There is also potential for another player to provide melody as the marimba is large enough for two people to play at once.

Melody was played on the marimba when Participant C was engaging in plying familiar experiences. This included the hello and goodbye experiences (See Theme #4). In the hello song the melody was played by me using two mallets and Participant C played the bass note. During the goodbye experience Participant C played the melody while I was harmonizing the experience using hand to hand rolls. Participant C played the melody with two mallets in the goodbye experience but primarily used his right hand as it is his dominant hand.

The melody was played in the B section of “Let’s Sing a Song” when Participant B was singing. This was done to provide my client with an auditory prompt in order to allow her to successfully sing. Placing the melody in the upper register of the marimba made it clear for her to hear while matching her upbeat energy when singing the song. Here the melody was played in octaves using my right hand. There is an altered octave grip that I used to facilitate this that allowed me to sustain the interval of an octave when holding two mallets in my right hand.

Lastly when accompanying Participant C in playing the tambourine (Theme 2, Example 3) the melody was played in the top note of the A section. The melody was being sung as well and harmonized in thirds on the marimba. This was a brief example of a one measure melody that was used in a repetitive form to create a predictable pattern. This was primarily a rhythmic experience, but the melody provided an A, B structure.

Discussion

In the exploration of the marimba's clinical potential with children with ASD, the following themes were constructed: *(a) sharing the marimba to strengthen the therapeutic relationship, (b) the use of marimba as an accompanying instrument, (c) rhythmic structuring, (d) the use of Nordoff Robbins repertoire on marimba, and (e) the use of mallet techniques to reflect emotional qualities of the music.* In order to reflect the improvisational model used in Nordoff Robbins music therapy, there were no preexisting sets of songs or musical experiences for each client.

Theme one - *sharing the marimba to strengthen the therapeutic and musical relationship* - correlates with the theory of the music child. This is an inborn sense of musicality that our clients have within themselves (Nordoff & Robbins, 2007). The therapeutic relationship is discussed thoroughly in Nordoff Robbins music therapy as it develops through engaging with the child in joint music making experiences (Aigen, 1996; Nordoff & Robbins, 2007). In this study, analysis of the data suggests that the act of sharing the marimba with clients strengthened the musical and therapeutic relationship, due to the size, range, and timbre of the instrument.

When sharing the instrument, the therapeutic relationship was the vehicle used to empathize with my clients musically (i.e., Theme #1, Example #2). Empathy was established by harmonizing the pitch that Participant A was playing in contrasting ways (Bruscia, 1987). Similarly, techniques of empathy were used to engaged with Participant B (Theme #1, Example #3) when she began to explore the instrument in her first session. Participant C used the instrument to play familiar musical experiences melodically with me, but the use of sharing the instrument was important in order to create a joint musical experience. This was showcasing my client's musical strengths as he is a very melodic player, and I was able to support him

harmonically. Focusing on client's musical strengths is a concept in Nordoff Robbins music therapy that can strengthen the therapeutic relationship (Aigen, 1996).

Past studies that incorporated improvisational music therapy had a similar focus on the therapeutic relationship (Brady, 2016; Carpente, 2010; Kim, 2009; Kim, 2016). While Carpente (2010) and Brady (2016) discuss the use of the therapeutic relationship when using string instruments, there was not a focus on sharing the instruments clinically. Randomized control trials (Kim, 2009; Kim, 2016) assessed social and motivational aspects of improvisational music therapy impacting the therapeutic relationship but did not discuss the clinical potential of sharing an instrument. The large size of the marimba and the unique ability to have multiple people play at once are unique to this study.

Nordoff Robbins music therapy prioritizes engaging the client in music making (Bruscia, 1987). This was evident in theme two- *using the marimba as an accompanying instrument*. When Participant A was exploring the ocean drum, I moved between two contrasting ways of supporting Participant A, and he was able to follow my changes (Theme #2, Example #1). His ability to musically adapt indicated that he was musically engaged in my marimba playing when exploring the ocean drum. Similarly, Participant C was engaged in repeating rhythmic patterns when playing the tambourine. This sense of musical engagement was listed as common characteristic of improvisational music therapy (Geretsegger et al., 2015). The use of contrasting accompaniment patterns was a way to tap into the participant's musical intelligence to promote interactions (Aigen, 1996).

Using the marimba in theme three- *rhythmic structuring* was similar to Brady's (2016) theme of grounding when using the bass guitar in Nordoff Robbins music therapy. Additionally,

this is done in order to develop client's musical skills (Nordoff & Robbins, 2007) as they learn how to organize themselves in a basic beat and follow musical cues and tempo.

When using the marimba to provide rhythmic grounding Participant C was repeating melodic and rhythmic patterns (Theme #3, Examples #1 and #2). Similarly, participant B was engaged in active music making when using the familiar song *Jingle Bells* (Theme #2, Example #2). The use of the alternative rhythm (see Figure 3) in this experience was used to challenge the client and expand on her musical skills as well (Aigen, 1996).

Concepts of rhythm or tempo were incorporated in several assessment tools (Cripps, Tsiris, and Spiro, 2016). This indicates that tempo and rhythmic grounding are important concepts in improvisational music therapy as they can assess growth in clients towards reaching clinical goals. As rhythm is a music centered concept it was categorized under musical attention, relatedness, and engagement in some assessment tools. There is also a need to focus on rhythmic grounding when training music therapists (Knight and Matney, 2012). When framing how to use percussive instruments clinically, instrumental skills, musical skills, therapeutic functions of percussion, and therapeutic applications of percussion were listed. The ability to provide rhythmic grounding parallels to Knight and Matney's (2012) discussion of the therapeutic functions of percussion. Knight and Matney (2012) did not solely discuss the clinical use of the marimba, but rather focused on percussion as a whole. This suggests that there is value in discussing the theme of *rhythmic grounding* when using the marimba specifically.

Nordoff Robbins repertoire was able to be adapted from the piano to the marimba because of the changes made in the range and timbre of the marimba since the origin of mallet percussion (Garfias, 1983; Schutz, 2008). Additionally, there have been many compositional contributions to the marimba that have introduced players to different bass lines and ostinato

patterns (Parker, 2010). Historically, the xylophone was used primarily for ragtime music and music in major keys. Mallet percussion repertoire was then expanded to include more pieces in minor keys with the development of the marimba (parker, 2010). Theme #4 - *the use of Nordoff Robbins repertoire on marimba* was impacted by these evolvments on the marimba. With the expansion of the use of marimba in schools and ensembles (Lucas, 2017), and the development of different mallet grips (Cheeseman, 2013; Stevens, 2005), a clinical expansion should be studied. As mallet players develop different techniques there are more clinical possibilities for arranging Nordoff Robbins compositions for the marimba.

The sustain of the notes of the marimba also allowed me to provide a fuller sounding and more supportive harmony when my clients were playing the melody in *Hello* and *We Just Want to Say Goodbye*. The use of the descending bassline in *Let's Sing a Song* is also evident of how the marimba contrasts to early xylophone music (Shultz, 2008). This was due to the larger range of the instrument and contrasting timbres between the upper and lower register. The bassline in *Charlie Knows how to Beat that Drum* is an example of how the marimba is used to create a supportive musical experience for a client in a similar way to the piano. This was also possible due to advances in mallet technique and grip allowing me to play a fluid ostinato pattern (Cheeseman, 2013; Stevens, 2005).

Soshensky (2005) arranged Simon's Bells for the guitar when studying the application of guitar in Nordoff Robbins music therapy. He had changed the key of the original song in order to adapt it on the guitar and focused on the harmony and movement of the piece. This was similar to how I utilized *Hello* and *We Just Want to Say Goodbye* on the marimba. Focusing on the harmony was key as I was using four mallet marimba technique in this study and could not play the pieces as originally written for piano.

Theme #5 - *the use of mallet techniques to reflect the emotional qualities of the music*, parallels to uses of marimba to promote relaxation (Matney, 2017) or self-esteem (Best, 2014). While marimba was not the sole focus in either study, pre- and post-tests indicated that the marimba promoted change in emotional states. Buchan (2015) found that the marimba can promote “musical knowing,” or a way that students experience the instrument. These results suggest that the marimba can be used to reflect emotional qualities as it is eliciting an emotional experience. While these studies (Best, 2014; Buchan, 2015; Matney, 2017) indicate clinical use of the marimba, there was no discussion regarding the musical techniques used on the instrument.

Stevens (2005) published in depth methods on how to use mallet grips when playing the marimba as a performer. Due to publications regarding how to play the marimba, and the increase in percussion ensembles in high schools (Lucas, 2017), theme #5 is useful in addressing how to apply musical skills clinically. As more individuals learn how to play the marimba, there should be more research on what different emotional responses may be elicited by the marimba. The musical techniques discussed include, but are not limited to staccato, legato, melodic, or harmonic playing. When engaging clients in improvisational music therapy there is a need for guidelines and structure (Geretsegger et al., 2014; Geretsegger et al., 2015), in addition to the therapist being musically capable of supporting their client (Aigen, 1996; Nordoff & Robbins, 2007).

By addressing the use of playing different arpeggios, permutations, melodies, and rolls on marimba, the data indicates that the marimba can be used to elicit different emotional qualities from clients. For example, playing arpeggios provided a challenging structure for Participant C (i.e., Theme #3, Example #3). By providing him with short arpeggiated themes to repeat, I was

able to match his energy as an explorative playful client while challenging him through asking him to mirror what I was playing. Participant C was attempting to repeat what I was playing in a playful way, but was having difficulty deciphering block chords. I accommodated him by simplifying chords to arpeggios and introducing him to a simpler form of harmony, while engaging with his playful manner.

Contrasting mallet techniques were used when supporting the playing of the ocean drum. The use of ripple rolls to reflect the gentle playing of the ocean drum and using dead strokes to create a more powerful sound (Theme #2, Example #1) indicates that the marimba can be used to empathize with clients musically, and to elicit contrasting playing styles (Bruscia, 1987). The ability to utilize clinical techniques on the marimba indicates that there is clinical rationale for the use of marimba in Nordoff Robbins music therapy.

Implications for Clinical Practice

The results of this study indicate that the marimba can be used in Nordoff Robbins music therapy. There are several musical implications discussed such as rhythmic grounding and the use of Nordoff Robbins repertoire on marimba. Additionally, examples with musical descriptions included were discussed in order to indicate that the marimba benefitted participants.

There have been expansions in Nordoff Robbins music therapy with the use of guitar (Carpente, 2010; Sochensky, 2005) and bass (Brady, 2016) indicating that the Nordoff Robbins worldview is applicable to other instruments. Nordoff Robbins research focuses with the use of the piano, but there is potential for other instruments to be explored. There is a focus on how the range and timber of the marimba was used clinically in this study. There may be similar potential when looking at other instruments such as woodwinds or brass instruments. This

parallels to the expansion of the use of marimbas in schools and orchestras (Garfias, 1983; Lucas, 2017; Schutz, 2008). As the marimba continues to be used in schools, it should be addressed that the marimba has clinical implications in music therapy. While the AMTA states that music therapists must “lead and accompany proficiently on instruments including, but not limited to, voice, piano, guitar, and percussion” (AMTA, 2013, para. 4.1.1) the research on using other instruments clinically is scarce.

Limitations

These results are not meant to be a prescriptive set of guidelines for how to use the marimba in Nordoff Robbins music therapy, but rather an indicator that the marimba has unique qualities to offer clients. There were several limitations in this study. This was not a longitudinal study as it only occurred over several weeks. This did not allow for long term effects of the marimba in Nordoff Robbins music therapy to be studied. Additionally, there were only three participants. This is a small sample size and does not properly represent the autism population. A larger sample size and longer study would increase trustworthiness and credibility.

The fact that I was the researcher and therapist is a significant limitation. This is common in Nordoff Robbins music therapy as it allows the therapist to review their sessions (Nordoff & Robbins, 2007). To increase trustworthiness, I kept personal journals in order to reflect on the study and address any countertransference’s that occurred (see example below).

I found it hard to be so physically distant from Participant C at times when he was at the piano. This was a time where a co therapist would have been ideal. There were also moments where I felt he did not want to share with me, but this is present without marimba as well. He often does not want to play music and recalls video games, but musical games are born from this. I am wondering if he feels more comfortable being at

the piano as I am at the marimba, where I feel more comfortable sharing the same instrument with Participant C.

The use of a co-therapist was also not possible for this study. In the original Nordoff Robbins' model there was always a second therapist in the room assisting clients in engaging musically while the primary therapist created music at the piano (Nordoff & Robbins, 2007). This was not implemented in this study as I did not have a co-therapist present.

Recommendations for Further Research

There is a need for further research as there are no other studies on the use of marimba in Nordoff Robbins music therapy. If the study was recreated, I would suggest a larger number of participants and an increase to the amount of sessions each client received. This would improve trustworthiness and allow for long term effects to be studied. In addition, a co-therapist would allow for further support for clients. A co-therapist could also assist in indexing the sessions and may notice different themes.

Having a second Nordoff Robbins music therapist who is familiar in playing the marimba would be beneficial for further research. This would allow for more music therapists to implement their own authenticity and stylistic playing into the sessions. This could then be compared and contrasted to this and other studies. Additionally, another researcher or therapist would most likely adapt Nordoff Robbins repertoire differently or might choose to not incorporate it at all.

There is a need to know how the marimba is used clinically with other populations and in other settings as well. While this study focused on the use of marimba with children with ASD in a private clinic, but there are many other populations that music therapists work with. There is a need to explore how the marimba impacts clients who do not have a capacity to physically

explore the instrument themselves as it was part of the inclusion criteria for this study. It may also be beneficial to study what using a larger or smaller marimba would be like. The marimba in this study was a mid sized instrument but smaller and larger models do exist. There are also different mallet options such as harder and softer mallets that change the timber of the instrument that were not discussed in this study.

Studies that discuss the use of other percussion instruments can also assist in contributing to music therapy. The vibraphone and xylophone are mallet percussion instruments not discussed in this study. Percussion instruments such as hand drums, shakers, and bells were also not included in this study as it solely focused on the marimba. The majority of music therapy research that focuses on percussion looks at all percussion instruments as a whole. When looking at the differences between individual percussion instruments contrasting clinical implications may be discovered.

Conclusion

This study explored the use of marimba in Nordoff Robbins music therapy with children with ASD. Three participants received two individual music therapy sessions ranging from 30-45 minutes. Five themes were found using an inductive thematic analysis and the use of indexing to review sessions. These themes were: (a) sharing the marimba to strengthen the therapeutic relationship, (b) the use of marimba as an accompanying instrument, (c) rhythmic structuring, (d) the use of Nordoff Robbins repertoire on marimba, and (e) the use of mallet techniques to reflect emotional qualities of the music. The use of mallet techniques in addition to the timbre and range of the instrument allowed for it to be used clinically to engage clients in musical interactions. The examples included in the study indicate that the musical qualities of the marimba can be used to engage clients with ASD.

References

- Aigen, K. (1996). *Being in music: Foundations of Nordoff-Robbins music therapy*. Gilsum, NH: Barcelona.
- Aigen, K. (1997). *Here we are in music: One year with an adolescent creative music therapy group*. Gilsum, NH: Barcelona.
- Aigen, K. (2014). Music-centered dimensions of Nordoff-Robbins music therapy. *Music Therapy Perspectives*, 32(1), 18-29. doi:10.1093/mtp/miu006.
- American Music Therapy Association. (2013). *American music therapy association professional competencies*. Retrieved from <https://www.musictherapy.org/about/competencies/>
- Bieleninik, L., Geretsegger, M., Mössler, K., et al. (2017). Effects of improvisational music therapy vs enhanced standard care on symptom severity among children with autism spectrum disorder: The TIME-A randomized clinical trial. *Journal of the American Medical Association*, 318(6). 525–535, doi:10.1001/jama.2017.9478
- Best, H. (2014). *Group music therapy utilizing marimba playing for children with low self esteem* (Masters thesis). Retrieved from University of Pretoria research output. (accession no. 201502231009)
- Brady, M. (2016). *Exploring the use of the bass guitar as a clinical instrument within music-centered practice* (Masters thesis. Retrieved from Molloy College Digital Commons. (accession no. 5)
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 2(2), 77-101. doi: 10.1191/1478088706qp063oa
- Bruscia, K. (1987). *Improvisational models of music therapy*. Springfield, IL: Charles C. Thomas.
- Bruscia, K. (2014). *Defining music therapy* (3rd ed.). Gilsum, NH: Barcelona.
- Buchan, S. (2015). "It was the right beat": Children's need for immediately accessible music. *Australian Journal of Music Education*, 1, 13-28.

- Carpente, J. A. (2010). Addressing core features of autism: Integrating nordoff -robbins music therapy within the developmental, individual- difference, relationship bases dir floortime model. In A. Meadows (Ed.), *Developments in music therapy practice: Case study perspectives* (pp.134-149). Retrieved from <https://ebookcentral.proquest.com>
- Cathro, M., & Devine, A. (2012). Music therapy and social inclusion. *Mental Health Practice, 16*(1), 33-36. Retrieved from <http://molloy.idm.oclc.org/login?url=https://search-proquest-com.molloy.idm.oclc.org/docview/1080532486?accountid=28076>
- Center for Disease Control and Prevention. (2018). *Autism spectrum disorder*. Retrieved from: <https://www.cdc.gov/ncbddd/autism/facts.html>
- Cheesman, B. S. (2012). *An introductory guide to vibraphone: Four idiomatic practices and a survey of pedagogical material and solo literature* (Doctoral dissertation). Retrieved from The University of Southern Mississippi Aquila Digital Community. (accession no. 539)
- Coleman, S. N. (1930) *The marimba book: How to make marimbas and how to play them*. New York, NY: The John Day Company.
- Cripps, C., Tsiris, G., & Spiro, N. (Eds.). (2016). *Outcome measures in music therapy: A resource developed by the Nordoff Robbins research team*. Retrieved from: www.nordoff-robbins.org.uk
- Eyler, D. P. (1985). *The history and development of the marimba ensemble in the united states and its current status in college and university percussion programs* (Doctoral dissertation). Retrieved from Louisiana State University Digital Commons. (accession no. 409)
- Garfias, R. (1983). The Marimba of Mexico and Central America. *Latin American Music Review/Revista de Musica Latinoamericana, 4*(2), pp. 203-228. doi:10.2307/780267
- Geretsegger M, Elefant C, Mössler K, & Gold C. (2014). Music therapy for people with autism spectrum disorder. *Cochrane Database of Systematic Reviews, 2014*(6), 1-64. doi:

10.1002/14651858.CD004381.pub3

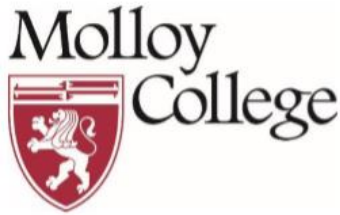
- Geretsegger, M., Holck, U., Bieleninik, Ł., & Gold, C. (2016). Feasibility of a trial on improvisational music therapy for children with autism spectrum disorder. *Journal of Music Therapy*, 53(2), 93–120. doi: 10.1093/jmt/thv038
- Geretsegger, M., Holck, U., Carpente, J. A., Elefant, C., Kim, J., & Gold, C. (2015). Common characteristics of improvisational approaches in music therapy for children with autism spectrum disorder: Developing treatment guidelines. *Journal of Music Therapy*, 52(2), 258-281. doi: 10.1093/jmt/thv005
- Geretsegger, M., Holck, U., & Gold, C. (2012). Randomized controlled trial of improvisational music therapy's effectiveness for children with autism spectrum disorders (TIME-A): Study protocol. *BMC Pediatrics*, 12, 2. doi: 10.1186/1471-2431-12-2
- Guzic, B.L, Tonkin, K., Roberts, J. B., & Demuth, B. (2011). Using percussion to improve attention-to-tasks in children with autism. *The Exceptional Parent*, 41, 18-20. doi: 867093439?accountid=28076
- Hamdan, S., Wahid, H. A., Musoddiq, I. A., & Nyawai, Y. (2018). Marimba instrument construction from Kayu Malam wood. *Bioresources*, 13(1), 43-52. doi:10.15376/biores.13.1.43-52
- Kastner, K. S. (1989). *The emergence and evolution of a generalized marimba technique* (Doctoral dissertation). Retrieved from percussion arts society. (accession no. AAI8916268)
- Kennedy, M., & Kennedy, J. (Ed.). (2012). *The Oxford dictionary of music* (6th ed.). Retrieved from <http://www.oxfordreference.com/molloy.idm.oclc.org/view/10.1093/acref/9780199578108.001.0001/acref-9780199578108-e-5818>.
- Kim, J. (2016). Shaping the therapeutic relationship with the child with autism spectrum disorder in improvisational music therapy. *Nordic Journal of Music Therapy*, 25(1) , 38-39. Doi: 10.1080/08098131.2016.1179937

- Kim, J., Wigram, T., & Gold, C. (2009). Emotional, motivational and interpersonal responsiveness of children with autism in improvisational music therapy. *Autism, 13*(4), 389-409. doi:10.1177/1362361309105660
- Kinsbruner, J. & Langer, E. D. (2008). *Encyclopedia of Latin American history and culture*. Detroit, MI: Charles Scribner's Sons.
- Knight, A., & Matney, B. (2012). Music therapy pedagogy: Teaching functional percussion skills. *Music Therapy Perspectives, 30*(1), 83-88. Doi: 10.1093/mtp/30.1.83
- Knight, A., & Matney, B. (2014). Percussion pedagogy: A survey of music therapy faculty. *Music Therapy Perspectives, 32*(1), 109-115. doi: 10.1093/mtp/miu010
- Lucas, K. (2017). The art of percussion. *School Band Percussion, 19*(7), 34-36.
- Marcus, D. & Turry, A. (2003). We just want to say...goodbye. In M. Ritholz & C. Robbin (Eds.). *More themes for therapy: From the Nordoff Robbins center for music therapy at New York University* (pp.). New York, NY: Carl Fisher.
- Matney, B. (2017). The effect of specific music instrumentation on anxiety reduction in university music students: A feasibility study. *The Arts in Psychotherapy, 54*, 47-55. doi:10.1016/j.aip.2017.02.006
- Matney, B. (2016). The use of percussion in therapy: A content analysis of the literature. *Nordic Journal of Music Therapy, 25*(4), 372-403. doi:10.1080/08098131.2015.1084027
- Millican, J. P. (2013). Contemporary marimba: Trends in composition. *Undergraduate Research Journal for the Human Sciences, 12*(1), 25-26. Retrieved from http://urc.kon.org/2013/01/contemporary_marimba_trends_in/
- Nordoff, P. & Robbins, C. (1962). Charlie knows how to beat that drum. In P. Nordoff & C. Robbins (Eds). *The first book of children's play songs* (pp.15). King of Prussia, PA: Theodore Presser.
- Nordoff, P. & Robbins, C. (1962). Hello!. In P. Nordoff & C. Robbins, C (Eds). *The first book of children's play songs* (pp.1). King of Prussia, PA: Theodore Presser.
- Nordoff, P. & Robbins, C. (2007). *Creative music therapy: A guide to fostering clinical musicianship* (2nd ed). Gilsum, NH: Barcelona.

- Parker, W. (2010). *The history and development of the percussion orchestra* (Doctoral dissertation). Retrieved from The Florida State University Diginole Commons. (accession no. 2216)
- Perez, F. S. (2018). *An analysis and performance guide of steve reich's mallet quartet* (Doctoral Dissertation). Retrieved from University of Kentucky Uknowledge. (accession no. 109)
- Rager, D. (2008). *The history of the marimba* (Doctoral publication). Retrieved from Cleveland State University Music Faculty Publications. (accession no.CFAMU767)
- Scheffel, S., & Matney, B. (2014). Percussion use and training: A survey of music therapy clinicians. *Journal of Music Therapy*, 51(1), 39-63. doi:1627711715?accountid=28076
- Schutz, M. (2008). The happy xylophone: Acoustics affordances restrict an emotional palate. *Empirical Musicology Review*, 3(3), 126-135. doi:10.18061/1811/34103
- Schweitzer, V. (2008). The marimba, rich and warm, makes itself heard. *The New York Times*. Retrieved from <https://www.nytimes.com/2008/06/29/arts/music/29schw.html>
- Stevens, L. H. (2005). *Method of movement for marimba with 590 exercises*. Voorhees Township, NJ: Charles Dumont and Sons.
- Soshensky, R. (2005). Developing a guitar-based approach in Nordoff-Robbins music therapy. *Music Therapy Perspectives*, 23(2), 111-117. Doi: [199509834?accountid=28076](https://doi.org/10.1080/09593840500046116)
- Summerlin, L. W. (2016). *The history and development of the front ensemble in drum corps International* (Doctoral dissertation). Retrieved from Ohio State University Ohiolink. (accession no. osu1461167753)
- Turry, A. (1999). Let's sing a song. In M. Ritholz & C. Robbins (Eds.). *Themes for therapy: From the Nordoff Robbins center for music therapy at New York University* (pp.44). New York, NY: Carl Fisher.

Appendix A

IRB Approval

**Institutional Review Board**

1000 Hempstead Avenue
Rockville Centre, NY 11571
www.molloy.edu

Tel. 516.323.3711

Date: December 13, 2018
To: Dr. Yasmine Iliya and Lucas McCarren
From: Patricia Eckardt, Ph.D., RN, FAAN
Chair, Molloy College Institutional Review Board
SUBJECT: **MOLLOY IRB REVIEW AND DETERMINATION OF EXEMPT STATUS**
Study Title: **Exploring the Use of Marimba in Nordoff-Robbins Music Therapy with Children on the Autism Spectrum**
Approved: **December 13, 2018 – December 13, 2019**
Approval No: **12130301-1213**

Dear Dr. Iliya and Mr. McCarren:

The Institutional Review Board (IRB) of Molloy College has reviewed the above-mentioned research proposal and determined that this proposal is approved by the committee.

It is considered an **EXEMPT** review per the requirements of Department of Health and Human Services (DHHS) regulations for the protection of human subjects (45 CFR 46.101(b)(4)).

Please note that as Principal Investigator (PI), it is your responsibility to be CITI Certified in both the Responsible Conduct of Research and Human Subjects Research and to submit the evidence in order to conduct your research.

You may proceed with your research. Please submit a report to the committee at the conclusion of your project. Your project is approved for ONE YEAR.

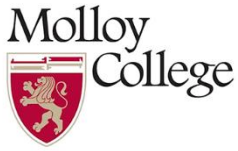
Changes to the Research: It is the responsibility of the Principal Investigator to inform the Molloy College IRB of any changes to this research.

A change in the research may change the project from EXEMPT status that would require communication with the IRB.

Sincerely,

Patricia Eckardt, Ph.D., RN, FAAN

Appendix B
Consent Form



Graduate Music Therapy Program

Music Department

Molloy College
1000 Hempstead Ave
Rockville Centre, NY 11570
(516)- 323-3000

Exploring the Use of Marimba in Nordoff Robbins Music Therapy with
Children on the Autism Spectrum

Dear Parent or Guardian,

Your child is being invited to participate in a research study looking at the use of marimba in Nordoff Robbins Music Therapy. This study is being conducted as part of the completion of my master's degree in music therapy at Molloy College. The marimba is a large keyboard instrument with wooden keys that are struck with a yarn mallet. Nordoff Robbins music therapy is a model of music therapy that uses improvised music created from moment to moment to meet individual's needs. Typically, the guitar or piano are used in Nordoff Robbins music therapy, but I was curious to study the clinical use of marimba in this model because it was my primary instrument during my undergraduate studies in music therapy and I had not had the opportunity to use it clinically. There are many unique qualities to the marimba that could make it an effective instrument to use when engaging children with autism spectrum disorder. For instance, the large size of the instrument can allow children to engage in sharing the instrument to develop social skills through reciprocal musical play. There is also a distinct timbre of the instrument, due to the wooden keys, that can allow children to have a new musical experience. While the marimba is a percussion instrument that is easy to play, the keys are tuned, giving it a unique ability to be played melodically and harmonically at the same time. This allows the instrument to potentially have many uses to help children reach their therapeutic goals. There is currently no published or unpublished research on the use of the marimba in

music therapy. I would like to add to the literature on this topic by completing this research study.

Your child is being invited to participate in this study because they are currently engaging in music therapy with me at MarbleJam Kids, Suite 204, 214 State St, Hackensack, NJ 07601. This study will be taking place during your child's regularly scheduled sessions with me in the music therapy treatment room. Two sessions will be reviewed by me for themes in order to have a clear understanding of how the marimba is used in music therapy with children with Autism Spectrum Disorder. Sessions will be structured in a similar way to their current treatment with the addition of the use of marimba. The research I am requesting permission for your child to participate in is to explore the use of marimba in Nordoff Robbins music therapy. Sessions will continue to be filmed as they currently are at MarbleJam Kids. Your child will continue to be able to choose whatever instrument(s) they want to play at all times, and can also choose to not play any instrument at all. Clients will be not coerced into playing the marimba. Instead, it will be present in the room and played by the therapist-researcher. Additional instruments such as small percussive shakers, hand drums, bells, and other adaptive instruments will be provided as options for your child to engage with. The research will be focusing on how the marimba is used by clients and myself in music therapy. The only change to the sessions that your child is already receiving is the that marimba will be presented in the music therapy treatment room. This is done in order to provide clients with the opportunity to explore the instrument and to allow myself to use the instrument.

Giving consent will not affect your child's services at MarbleJam. Your child will continue to receive music therapy whether or not consent to participate in the study is granted, and there will be no ramifications. If you do provide consent, this gives permission for data from the video recordings of sessions to be collected and analyzed. Videos will not be available to anyone besides me and the clinical director of MarbleJam Kids. Narrative descriptions of excerpts will be included in the research study but pseudonyms will be used to protect participant's identity. All personal information will be kept completely anonymous so that children's identities will be protected. Video data will be double-password protected and deleted after completion of the study. There are no direct benefits or foreseen risks to participating in this research, but potential benefits may include an increase in participation in music therapy and sustained engagement in instrumental play. You may withdraw your child from the study at any time.

If you have any questions, you can contact me, Lucas McCarren, by phone or email, lmccarren@lions.molloy.edu, (201)-566-0094, or my thesis advisor, Dr. Yasmine Iliya, at yiliya@molloy.edu, (631)-974-0971

You have 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 your rights and welfare. If you have questions about your rights, an unresolved question, a concern or complaint

about this research you may contact the IRB contact the Molloy IRB office at irb@molloy.edu or call 516 323 3000.

Documentation of Informed Consent*:

You are freely making a decision whether to be in this research study. Signing this form means that you have (a) read and understood this consent form, (b) had your questions answered, and (c) had sufficient time to make your choice and decided to have your child participate in the study.

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

I agree to have my child, _____, participate in this research study and be video recorded during the course of the study. I understand that this documentation will be used for research. His/her name will be changed in the thesis to protect confidentiality. All recordings will be kept safe and confidential. Only the therapist-researcher and the clinical director of MarbleJam Kids will have access to the data. Data will be deleted after the completion of the study.

Your signature

Date

Your printed name

Signature of researcher explaining study

Date

Printed name of researcher explaining study