SINGLE CASE EXAMPLE OF THE APPLICATION OF THE NOVEL USE OF THERAPEUTIC PERCUSSION LESSONS

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by

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DEDICATION

To my dad, who always pushed me to be better even when I did not want to hear it.

ABSTRACT

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Music therapists often address the social and physical domains in adolescents with Autism Spectrum Disorder (ASD). To address social and physical goals in children with ASD, music therapists use musical stimuli as a mechanism to enhance socialization skills and physical traits like gross motor coordination and peer interaction. In addition, the timing and melodic nature of music can facilitate movement patterns and be used within group sessions to structure peer interaction and apply learned concepts outside of therapy. This study describes the implementation of therapeutic percussion lessons to address gross motor coordination and social goals in an adolescent with ASD. A secondary focus was assisting the client in developing a path to social engagement through music, a common way adolescents engage. I analyzed sessions for the effect percussion lessons had on gross motor coordination, social skill improvements, and an efficient way of implementing percussion lesson protocols. The study results found that therapeutic drum set lessons did improve gross motor coordination for this client, increased the prominence of specific self-advocating behaviors, and found an efficient way to deliver the session protocol.

KEYWORDS: Autism spectrum disorder, Adolescent, Drum set, Music therapy, Scaffolding, Gross motor coordination, Social domain

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CHAPTER I

Introduction to the Case Example

Music therapists (MT) often use instrument playing as a treatment protocol with adolescents diagnosed with autism spectrum disorder (ASD). When treating adolescents with ASD, MTs address a range of goals and objectives, including motor, social, and educational goals. The focus of this thesis is to provide a clinical case example of the use of instrument playing, in the form of therapeutic drum set lessons, with an adolescent music therapy client diagnosed with ASD. In this chapter, I provide a brief overview of my background and experience, the client, and the context for our therapeutic relationship.

Therapist Background

I became board-certified as a music therapist and practicing since January of 2016. I completed my undergraduate training at Sam Houston State University and interned at Charlie Norwood VA Hospital in Augusta, Georgia. I returned to Sam Houston State University in 2019 to pursue my master's degree. In the years between 2015-2019, I worked with various populations, including adults with psychiatric diagnoses and individuals diagnosed with ASD, in private practice, primarily in-home health care populations. Many of these clients' primary treatment goals involved exploring and developing coping skills related to their diagnostic symptoms. After initial training, I also received specialized training in Neurologic Music Therapy (NMT).

I began training as a percussionist during grade school. My musical training continued as a vocalist during my undergraduate years. After my undergraduate training, I taught grade school percussion for three years at Danbury Independent School District.

The percussion syllabus mainly consisted of teaching basic percussion techniques, including reading music.

Client Description

At the time of this study, the client was a fourteen-year-old male diagnosed with ASD and attention-deficit hyperactivity disorder (ADHD). He also presented certain behaviors attributed to his developmental entry into adolescence: decreased motor coordination, increase ADHD symptoms, self-stimulatory behaviors such as self-biting and tightening of muscles, and moaning while playing drums. The client's mother stated that the client's gross motor coordination often causes him to run into stationary objects while walking. Additionally, she reported that the client's ADHD manifests in several ways, including off-task behavior, out-of-context or off-topic questions, and reduced engagement with tasks he perceived as too easy or, conversely, too challenging. The client's self-biting and tightening of muscles often happened in response to excitement. The client will bite his wrist more than any other part of his body. The client's tightening of muscles usually occurs in the face and arms. When tightening the facial muscles, the client would clench his teeth together. When tightening his arms, the client brings his elbows to his side and raises his shoulders to his ears. The client's moaning often occurred when the client played more complex rhythms and most likely occurred as a natural focusing technique. I will describe these behaviors more in-depth in future chapters.

The client had music experience before implementing the current treatment protocol described in this manuscript, including piano lessons and a learned ability to read music notation from his mother. Preferred music, motivated by music?

From the ages of two to four, the client's mother enrolled him in speech therapy, occupational therapy, play therapy, and applied behavior analysis (ABA). From the ages of four to eight, the client's therapies included ABA, speech therapy, and music therapy. Two years ago, the client began working with a reading specialist and restarted ABA therapy at fourteen.

When entering the study, the client was a music therapy clinic client at the Sam Houston State University and working with music therapy students supervised by an MT-BC. At the clinic, previous student treatment plans focused on educational/developmental goals with the client based on parent requests. After ten years of education-focused music therapy, the client was unmotivated to continue with the therapy. This aversion to music therapy delayed initial rapport-building with me.

The client's immediate family consists of a father, mother, older brother, and two highly present grandparents. The client's brother is a male in his mid-twenties and would watch sports and other events with the client to facilitate sibling bonding. The client's grandparents frequently provided care during the music therapy sessions, which occurred while his mother was at work. The client's parents are currently separated, but he lives with and spends most of his time with his mother. The client's mother has a doctorate in music performance and has taught her son fundamentals of music, including reading music notation. The client has also participated in piano lessons for the past several years. The mother also requested having a male therapist for her son, as she felt that having a male therapist allowed the client to have an outlet to discuss topics he would be uncomfortable doing with his mother. All music therapy sessions occurred over a

telehealth platform while the client was at his mother's house and the therapist was at his private apartment.

Music Therapy Context

The client and I were brought together originally for a graduate music therapy practicum class. Sessions originally started in person and then moved to virtual due to the need to socially distance due to the COVID-19 pandemic. As treatment progressed and innovations implemented, I decided to make the treatment experience the client of my thesis. The client experienced twelve one-hour music therapy sessions from September 9th, 2020, to December 9th, 2020. I canceled one session due to the Thanksgiving holiday. Sessions were held at 1:30 P.M. on Wednesday at the family's request due to the client participating in homeschool on that day. Each session consisted of an assessment pre/post-test, in which I counted the number of times the client successfully read and played an unknown drum rhythm and an intervention stage where the client rehearsed drum patterns and techniques. I analyzed each session video to note prominent behaviors and any causal relationships between facilitation and behavior to provide a detailed description of the therapeutic process. The description then aided in the understanding of the results of pre/post-testing. I used personal journals to memo about the sessions and explore my perceptions and experiences.

Thesis Language

Throughout this manuscript, I use clinical language, as opposed to research-based language, to reflect the environmental context of the treatment protocol. The clinical language will include terms like the client, the target of treatment, and the therapist, who

provides the treatment. The therapist is the person implementing the treatment protocol. When discussing myself as the therapist, I will use the first-personal language.

CHAPTER II

Literature Review

Music lessons are the most common way people develop their music ability. In the traditional sense, music lessons, adapted or otherwise, focus on expanding and improving a player's musical ability. Music therapy groups can provide these adapted lessons and focus on improving musical ability and use different interventions to address other domains like the physical, cognitive, and psychological. However, music therapists could also use music lessons to focus on other domains and teach valuable skills to clients. This project uses a case example in its critical examination of drum set music lessons in music therapy treatment of adolescents with Autism Spectrum Disorder. In this section, I present reviewed literature to help inform my practice with the client and the various approaches and techniques I utilized during our work together.

Autism Spectrum Disorder

According to the latest Center for Diseases Control (CDC) statistics, Autism Spectrum Disorder (ASD) affects one in fifty-four children, with boys being four times more likely to be diagnosed than girls. ASD is unique because it affects all races and socioeconomic groups. ASD also has no medical testing procedures, like blood tests or scans. When examining and testing for ASD, doctors do not look for a single disorder but rather a spectrum of characteristics and behaviors that affect each child at varying intensity levels (Autism Statistics and Facts, 2021). In recent years ASD has become an umbrella term to include diagnoses like Autism, Asperger Syndrome, childhood disintegrative disorder, and pervasive developmental disorder. ASD commonly includes specific challenges related to social skills, communication, and neuro regulation to

incoming stimuli. Individuals with autism may also exhibit specialized interest in various topics that usually involve repetitive behaviors like music or video games. The traits of autism occur in several different ways, including difficulty communicating needs, unresponsiveness to directions, difficulty with peer interaction, resistance to change, or echolalia which is the repeating of heard phrases continuously. Many repetitive movements like rocking, biting, and fidgeting with objects are all used as self-stimulation to help cope with overstimulation (Autism Society of America, 2010).

In rare cases, those with ASD have become proficient enough at coping skills to no longer be diagnosed. However, due to the traits mentioned earlier associated with ASD, adolescents require specialized care. Specialists who work with ASD design treatment to help them connect with the world and people around them but sometimes fail to teach clients to transfer therapy learned skills to their daily lives. Psychopharmacology and its use of certain medications provide treatment for specific aspects of ASD but usually has more negative side effects than positive (Sanchack, K. E., 2016). Other than medications, effective treatments of ASD include early intervention and cognitive behavioral therapy (CBT). Early intervention and CBT focus on addressing ASD-associated behaviors from a young age and making them more prominent or reducing their prevalence. Other interventions include alternative forms of therapy like equine and massage.

Connection Between Early Motor Development and Adolescent Social Skills Development

Development during early childhood is foundational for the more advanced skills developed during adolescents (Black et al., 2017). The progression of physical milestones achieved before age and ten can influence long-term physical ability in adolescents. Around 10 to 12 years of age, gross motor coordination is in a period of refinement. Physical refinement begins with puberty and the development of skills, muscle mass, and physical endurance (Brown K., Dilip P., Darmawan D. 2017). Physical development during puberty leads to clumsiness, but like with any movement, time and practice are what leads to proficiency (D'Hondt, E. et al., 2011). The practice and refinement of physical abilities can occur through many school programs, including after-school sports or band, which also supports social skills development. Motor difficulties can cause social and emotional distress as adolescents may not feel as willing or comfortable participating in movement situations like sports and recess (D'Hondt, E et al., 2011).

Many of the most significant developments within the adolescent age group are more social than physical. There are many theories and beliefs about adolescents, but they mainly focus on sexual development. Adolescence is an age when the focus is on developing a personal identity. The ages of 10 to 15 years of age are also a critical age of social development because it is the age in which social learning occurs through the modeling of their peers (Spano, 2004). However, both the social and physical domains can develop concurrently with each other.

Physical activities provide a beneficial environment for social skill development. Physical activities, specifically those that involve groups of peers, facilitate a learning technique in which groups of peers work together to achieve a goal called cooperative learning. Cooperative learning improves self-esteem, promotes socialization, and can positively affect many different educational environments (Gillies, R. M. 2007). Within a physical activity, cooperative learning takes place due to the multiple and diverse interactions that take place (Goudas, M., Magotiou, E., 2009). Cooperative learning requires the environment or activity high levels of structure for practical application. Activities like team dance competitions in which the team comes up with the moves together or peers working together to turn individual musical parts into a fully realized piece of music can do this.

Motor Development and ASD

Delays in motor development are common among individuals with ASD. An estimated 87 percent of those with ASD have some kind of motor development difficulty (*Motor Difficulties in Autism, Explained*, 2020). Motor difficulties can include reduced coordination, stamina, and postural instability. While adolescents with ASD can function physically without targeted therapy, engaging in activities known to impact physical development may benefit multiple developmental domains. Therapies that provide opportunities for motor development in the context of social activities such as music or equine therapy may not only increase physical stamina, coordination, and core strength but simultaneously provide adolescents with ASD opportunities for peer engagement

Musical Development

Similar to other developmental domains, milestones related to musical ability also occur at predictable and regular intervals. Each music milestone is a necessary building block to the next. Infants and toddlers begin to demonstrate the ability to move rhythmically with music, and by two to six years of age, children demonstrate the ability to maintain a steady beat. The ability to perform more complex rhythmic patterns emerges around age seven to nine, when many children begin taking music lessons (University of North Carolina, 2010). Motor difficulties may interrupt the development of specific musical skills, such as moving in time to music or maintaining a steady beat. For individuals with ASD, difficulty with music milestones may present a barrier to engaging in music ensembles or music lessons without specialized help. Specialized help can usually come in adaptive music lessons that help develop skills or musical groups that work with those who do not develop as fast as other students. This specialized help requires resources that are not available to every person.

In physical therapy, music may be beneficial for the development of many gross motor skills. Music can support physical therapy through the idea of audio motor coupling and integration. When playing an instrument like guitar, piano, or drums, there is immediate auditory feedback. The auditory feedback given by the music creates connections in the brain, reinforced by the precise timing of the music. This whole process of tying movements to music is called audio-motor coupling (Rodriguez-Fornells et al., 2012).

Music's ability to impact movement coordination is related to rhythm entrainment and the spinal cord's Central Pattern Generators (CPG). Rhythm entrainment is the body's

natural tendency to synchronize with an external rhythmic auditory stimulus. The CPG are circuits of the spinal cord that interpret incoming sensory information and move it to the correct motor neurons, which allows for limb coordination with no effort by the brain. Essentially the CPG is what allows the body to entrain to the external stimuli that music provides. An example of rhythm entrainment and the CPG is the human ability to keep a song's beat by tapping the foot (Clayton, M., 2012). The musical element of rhythm acts as an external cue, which can also be beneficial in the development of movement fluidity (Thaut, M. Rice, R., 2016).

Entrainment and audio-motor coupling appear when people listen to music or when someone plays an instrument. Playing a musical instrument requires specific motor skills that develop over time with repetition and practice. Learning an instrument like the drum set may aid in the development of coordination because both upper and lower body limbs are required to play the rhythmic patterns. Similarly, learning piano can benefit fine motor control development by using individual fingers in rhythm to press the keys. The guitar is another instrument that may provide a means for motor development through rhythmic strumming patterns. Many instruments primarily require upper body involvement, whereas the drum set engages upper and lower body motor development and coordination. Another possible benefit of the drum set in impacting motor development is the repetition of rhythmic patterns. A song may require the drummer to play a single rhythmic pattern for several minutes. The player also coordinates between left and right hands within the rhythmic patterns to develop efficient "sticking." Sticking is the designation of what hand (left or right) plays the drum and usually repeat throughout different styles and rhythms. Sticking patterns can appear in various

combinations, including Right (R), Left (L) RL, RLRR, or LRLL, across any number of rhythmic variations. The constant repetition helps players engrain the movements into muscle memory. Muscle memory development is due to procedural memory in the brain. Procedural memory is the brains' ability to store movements and habits without conscious thought. The strength with which the brain stores these movements and habits are connected to exposure frequency (Lam, M., 2020). As such, a musician gets better with practice.

Using client preferred music can help recall memories and elicit emotional responses, all of which may positively affect the body, including heart rate, muscle tone, and blood pressure (Nayak, Wheeler, Shiflett, & Agostinelli, 2000). An example of the motivation that preferred music provides is in music and exercise. A study testing the effects of warm-up music on 12 physically active people found that preferred music improved performance and motivation (Karow, M. C. et al., 2020). In the same sense, drum set lessons may motivate the client if a therapist implements preferred music in treatment. With preferred music, the client can be more invested in the process, perform better, and improve their skills faster.

Social Skills Development and Its Relation to Physical Ability

Adolescents develop social skills through involvement in activities with peers (Goudas, M., 2003). Playing in a band, participating in sports, or any group activities are examples of appropriate activities for adolescents. Many of these activities rely on continued refinement of physical ability, especially in adolescents. Motor delays or difficulty may make it difficult for someone not at the same level to participate. The importance of activities in social development and the varying effect levels of physical

abilities can have on a person's ability to participate suggest that both skills may be linked.

Behaviors associated with ASD, like social skills, develop on a spectrum and change when interacting with peers (Adamek, M.S., Thaut, M.H. and Furman, A.G. 2008). An example of how social skills can develop on a spectrum is that some diagnosed with ASD can be verbal and interact socially with peers, and around 40% of those diagnosed are entirely non-verbal (Autism Statistics and Facts, 2021). Interaction with peers is critical to allow adolescents to learn the skills needed in other facets of society like school or work. Adolescents with ASD may experience several factors that play a role in their social ability, language ability, and overall interactions with peers. Another way social skills are different in those diagnosed with ASD is communication and how they view friendships.

Perception of Friendship

A study that focused on developing friendships between adolescents with autism and their peers found that adolescents diagnosed with ASD perceive friendships differently than those undiagnosed (O'Hagan S, Hebron J 2017). There are many reasons why those with ASD perceive friendship differently. For example, factors that affect ASD perception of friendship include social interactions that grow more complex with age and the increased time spent with adults and paid professionals. (Kuo, M. H. et al., 2011).

The most effective way for those with ASD to form new friendships would be to participate in highly structured activities and relationship-based interventions to help develop an adolescent with ASDs social-emotional growth (Arbesman M, Case-Smith J,

2008). Those with ASD can form friendships, but it may be challenging to develop relationships with their peers. Factors that affect relationship formation in adolescents with ASD include difficulty interacting with others and fully understanding thoughts and feelings. Therapists studied how those diagnosed with ASD perceive friendship on nine total clients: three with ASD, three parents of those clients, and 3 of their teachers. Therapists found that those with ASD required activity with an above-average level of structure, like video games, to form said friendships (O'Hagan S, Hebron J 2017). This level of structure usually involves obstacles to overcome with peers, and every client is playing under the same parameters, for example, the same height and strength of their video game characters.

Relationship Between Motor Development and Bullying

Meaningful relationships are essential when it comes to preventing bullying among adolescents with ASD and their peers. Adolescents with ASD are twice as likely to be the target of peer bullying (Cappadocia M, Weiss J, Pepler D 2012). In addition, peer bullying can lead to an increased risk of psychological issues. If exposed to bullying for an extended period, psychological issues can be internalized and lead to depression, anxiety, and low social and emotional adjustment. Adolescents with ASD are more likely to be the target of bullying due to their behavior that is different from their peers and communication skills that are not as developed. Bullying intensifies during adolescents and often peaks during middle school (Cappadocia, M. C., Weiss, J. A., & Pepler, D., 2012). Studies have shown that facilitated groups, like gym team activities, can have both negative and positive implications on levels of bullying depending on the implementation. Facilitated groups help adolescents with ASD develop friendships, but

they need to limit the chances of persecution from peers. Limits could include teacher-assigned teams or even set rules that allow those with disabilities to be competitive with their peers.

People with disabilities are twice as likely to get bullied as people without disabilities, and people with visible or physical disabilities are at increased risk. Adolescents without disabilities tend to view those with physical disabilities as weak (Pinquart, M.,2017). Bullying may lead to depression, anxiety, and delays in social skill development. Psychological symptoms may cause adolescents to be perceived as even weaker before the bullying began, and the cycle continues. The most positive force behind bullying prevention is friends. To help connect with their peers, those with ASD often attend different therapies to learn different skills and abilities that might help them connect with their peers. Some treatment modalities that those with ASD might attend are Occupational Therapy (OT), Physical Therapy (PT), or Music Therapy (MT)

Common Therapies Targeting Motor Development

Occupational Therapy

Occupational Therapy uses therapeutic techniques to address activities of daily living throughout a person's life. Many often associate OT with the treatment of fine motor skills of the hands and feet when, in fact, the foundation of OT is the rehabilitation of movement essential to "occupational" tasks. OTs define an occupation as any activity performed in people's everyday lives with family, friends, or individually. For adolescents, an occupation might be those movements involved with the school, including writing, motor planning for sports, and backpack organization. Movement goals can include functional skills such as holding a pen or communication focused such

as using assistive technology. Individuals with ASD may benefit from OT that focuses on sensory integration, relationship-interactive interventions, social-cognitive skill training, parent direct, and intensive behavioral interventions. Occupational therapy is not the only treatment that focuses on the physical domain. An example of how different therapies might address the same domain are the treatment protocols within physical therapy.

Physical Therapy

Physical therapists use prescribed movement to improve movement for pain management, restore function to the body, and prevent further body degradation (Becoming a PT, 2021). These prescribed movements are body-specific movements chosen by a PT to address physical weaknesses in the client's physical ability. An example of a prescribed movement would be a patient stepping up on a stool to simulate walking upstairs. PTs often use exercise to help with many different diagnoses, including chronic pain, physical impairment, and physical recovery from surgery. PTs' focus on improving the entire body makes them uniquely qualified to work with the physical attributes of those diagnosed with ASD. When treating those diagnosed with ASD, physical therapists help develop motor coordination, improve play and acquire new motor skills. Research into physical therapy has also shown that strenuous exercise, like 20 minutes of jogging, can reduce behaviors, like being out of the seat and improving academic ability (Petrus, Adamson, Block, Einarson, Sharifnejad, Harris, Rarris, 2005).

Animal Assisted Intervention (AAI)

Animal Assisted Intervention is a goal-directed intervention in which an animal is part of the treatment process. A qualified human service professional with specialized

expertise and within the profession's scope of practice provides these services. (Fine, 2006)

Equine Assisted Therapy. Equine Assisted Therapy (EAT) is a type of AAI. EAT is used with various populations, including ASD, Attention Deficit Disorder, or Cerebral Palsy. Animal-assisted interventions, like EAT, are used to engage socially withdrawn individuals. Within EAT, the horse provides biofeedback in which the horse responds to the client's actions and changes its behavior appropriately. EAT can also have a range of effects on the client's physical and social domains (Borgi et al., 2015). EAT addresses emotional goals, like anxiety and depression, and physical goals, like body coordination and strength. Research involving EAT has shown improvement in gross motor skills and a positive impact on social skills. For example, increased strength and coordination may allow those with ASD an improved ability to engage in athletic and play activities with peers (Donaldson, M. 2014).

Art Therapy

Art Therapy is a mental health profession that aims to improve patient's wellbeing through active artmaking while applying psychological theory. Art therapists use a visual medium, created or shown, to address goals and objectives in communication, psychoeducation, socialization, sensory regulation, and in some cases, fine motor skills (Martin, 2009). Art therapists use tools to facilitate socialization and communication skills in adolescents with ASD. An example of some of the tools that art therapists may use is integrating socialization into a leisure activity like group painting. Integrating art into a leisure activity is beneficial because it provides an environmental structure that allows patients to utilize materials and interact with a group of peers. The art group

setting provides context and allows those with ASD to interact with peers in a shared experience to practice skills outside of therapy. Art therapy interventions can target specific physical goals as well. Art therapists may implement interventions such as painting or sculpting that require specific motor skills (Van Lith, Stallings, Harris, 2016).

Music Therapy

Music Therapy is the evidence-based use of music in interventions to address specific goals and objectives (*AMTA*, 2021). Music therapists work with various populations, including geriatrics, traumatic brain injury, and adolescents diagnosed with ASD. A music therapist may work with someone diagnosed with ASD to develop coping skills that help process becoming overstimulated or other environmental factors that might cause distress and teach skills to interact with the world. Music therapy and ASD treatment have shown to be influential in the development of communication and interpersonal skills (Whipple, 2012), improving gross and fine motor skills (LaGasse & Hardy, 2013), and improving family dynamics (Thompson, McFerran, & Gold, 2013). Music therapists sometimes use group sessions, which can be beneficial because adolescents with autism take cues to act from external stimuli (LeGasse, B 2017). External stimuli, in this case, could be a peer or therapist. However, the group sessions are used with families and are rarely used to improve peer relationships. Ironically, as beneficial as music therapy can be for those with ASD, music is rarely if ever, taught.

Neurologic Music Therapy (NMT). A subfield of music therapy, NMT is often utilized to treat the physical domain and is applicable with an ASD diagnosis. The *Handbook of Neurologic Music Therapy* outlines NMT specific techniques (Thaut, M. Rice, R., 2016). NMT techniques use the perception and production of music to make

changes to brain and behavior function. Traditionally NMT techniques mainly work with populations like traumatic brain injury (TBI), cerebral palsy, or any number of neurological traumas that can affect movement and speech. NMT techniques are standardized procedures that often address limb range of motion, speech production, motor coordination, and gait training.

All NMT techniques' can be applied effectively to clients when appropriate. However, interventions like Therapeutical Instrumental Music Performance (TIMP), Rhythmic Auditory Stimulation (RAS), and Patterned Sensory Enhancement (PSE) are effective when addressing the ASD physical domain. TIMP, RAS, and PSE are all applied to the physical domain with an ASD diagnosis and rely on external musical concepts to affect movement coordination, refinement of grip, and range of motion. TIMP specifically targets functional training movement by playing musical instruments configured spatially to address a specific movement. RAS addresses rhythmic physical movements, including gait, speed, and spacing of an individual step. NMTs implement RAS, which uses rhythm and its physical effects on the nervous system through entrainment. NMTs often implement RAS with Parkinson's patients, which often causes poor balance and lowered movement coordination. PSE uses musical elements to provide external cues to a client. These external cues can signal the direction, timing, and intensity of a movement. An example of this would be the client raising their arm while the MT pitch raises the pitch of an instrument.

Drum Set

Music Lessons

When teaching someone to play a musical instrument, there is no one set structure or pedagogy. However, there are usually three primary sections to a lesson, including the preliminary activity or warm-up, the main body of the lesson, and closing activities (Zhukov, 2004). These sections can be broken down even further into an 8-step process outlined by Frank Abrahams (Abrahams F., 2005). The first step, called Honoring their world, is when the teacher engages the student in the warm-up problem-solving technique in which the student uses their already learned skills on technically challenging rhythm patterns. The teacher then moves to the second step, sharing the experience, developing rapport, and discussing how they performed and processed the warm-up through conversation. Next, the lesson moves on to the main body fourth step that addresses the student's technical skills and new material. In the fifth step, the teacher allows the student to practice individually and work on the new material and musical repertoire. During the fifth step, the teacher will frequently move from music piece to piece to prevent boredom and continued interest. After the student has spent time learning the new material, the teacher will then move to the sixth step to connect what he has learned and apply it to other musical situations. The sixth step can include improvising the instrument or using the new material to create an entirely different piece.

The final section includes steps seven and eight, which involve conversation and review, including homework for practicing and discussing any vital issues. Step seven will have the student reviewing learned material, with the final step celebrating the student for their work and provide a final demonstration. Each lesson section builds

rapport, technique, and student ability, but each teacher approaches these steps differently.

No teacher is the same, and teaching styles reflect individual teachers' personal preferences and training backgrounds. Students may have to try multiple teachers before finding one that fits their own needs and musical goals. Different teaching styles include the Routine style, Disorganized style, and Imposing style. The Routine style of teaching involves teachers giving general directions and discussing student repertoire. The instructor uses commands to drive the lesson and a reduced focus on goal setting. The instructor includes all typical music lesson traits within the Routine teaching style, but there is little in discussing the student's future goals and objectives. Disorganized-styled teachers conduct shorter lessons than the Routine style and spend more time socially interacting with their students. The main focus of the lessons is the musicality of the students playing including dynamics, and musical expression. Due to the social nature of the Disorganized style, the teacher rarely gains enough momentum to make positive changes in their students' abilities. With the Imposing style, the teacher principally teaches through demonstration. Rather than using praise as a motivator, an Imposing style instructor maintains an uncompromising attitude with students. The most effective of the previously listed styles is the Routine style, which had more compliant student responses than the other two (Zhukov, 2004).

Teaching Drum Set

Teaching the drum set has a similar approach to any instrument but has different aspects that make it unique. The drum set has unique techniques and skills that require mastering before advancing to a more complex task.

Learning to play rhythmic patterns on the drum set involves learning to break down every note within the rhythm before application to the instrument. The student then notates sticking patterns, accents, crescendos, and musicality markings that indicate how to play the music. After the student analyzes the music, he will then clap rhythmic patterns, allowing the student to understand how the rhythm feels and sounds. However, the potential drawback is that clapping provides the student with a singular sound compared to the different pitches heard when playing the rhythm on the drum set.

The drum set's technique involves complex sticking rules to play music effectively. The process of learning complex sticking includes isolating the targeted rhythm, playing at an increasing tempo while focusing on accuracy and repetition. The student goes through this process first on a single drum before incorporating the entire drum set.

The final step of the rhythm learning process is to apply the newly learned rhythm to an appropriate song. Doing this allows the rhythm to be generalized by requiring the student to adjust how they play the rhythm by fitting it into the musical nuances of a song.

The Rationale for Drum Set Lessons to Target Motor Skills

Rhythm is a driving force when playing a drum set. However, rhythm also plays a significant role in many functional areas of our body's movement, including walking, talking even the coordination of our hands and feet. Patterns carried and processed through the spinal cord and brain stem allow humans to perform actions that many of us do without thinking (Chemin, B.,2014). People can develop these rhythmic skills in their bodies through repetition and an external cue (Thaut, M. Rice, R., 2016). Years of practice may allow someone to develop rhythmic accuracy and skill, but someone not on

the same trajectory may require more time or a different type of instruction. The drum set puts the player in a unique position. Many of the same rhythms and sticking used while playing one song can be applied to many different songs. The repetition used throughout different songs helps players develop coordination in their hands and feet. The drum set also provides an external cue through the sound that the drum makes itself. Every time the player hits a drum, it makes a correlating sound, and if the player is using multiple drums, the player can also hear how the sound fits in with the other drums' sounds.

When using a drum set with an adolescent diagnosed with ASD, it is essential to consider how it may affect the student. Traditionally speaking, the drum set is one of the loudest instruments ever created, evidenced by prolonged exposure causing hearing loss (Thom, J. et al., 2008). An aspect of ASD is sensitivity to external stimuli like loud noise; using drums with someone diagnosed with ASD should be a case-by-case basis. However, overstimulation can be limited as long as there is a structured lesson from week to week. Those with autism usually require structure and routine as part of their daily lives to prevent them from getting overstimulated. Music lessons for adolescents should follow the same consistent model, but the content should change to push the student along.

Playing drums can also have physiological effects on the human body. Playing drum sets has the exact metabolic requirements of several sports, including running up to 4 miles an hour (De La Rue, Draper, Potter, Smith 2013). Playing the drum set also provides a positive physical activity that can help reduce teacher perceived disruptive classroom behaviors.

Playing drums can also affect the social aspects of those diagnosed with ASD when applied to a social gathering like a band. Bands or performance groups have a set of strict roles that each person plays; the singer will play the melody, the piano player plays the chords, and the drummer will keep the rhythm. When each person follows the set rules, the band achieves its goal. This band structure could allow the learner diagnosed with ASD a setting in which he has a defined role making it easier to form social bonds within the band. However, a problematic aspect of this is ensuring that every band member can play at a high enough level to create a cohesive pleasing musical performance.

Summary of Clinical Implications

The literature used in this study informed how the treatment protocol evolved. Examples of how the research informed protocol development include how the music lesson research affected the overall treatment protocol approach. The music research informed that the routine music teaching style most effective, and the protocol reflected this. The protocol did not focus on long-term goals but established a consistent routine from week to week. Other developments include scaffolding to teach complex information, schedules to improve client engagement and possible applications of this protocol in a social context.

CHAPTER III

Treatment Outline and Approaches

Treatment Planning

Session Format

Each session lasted approximately 50 minutes with some variation from week to week depending on the client's specific needs. Sessions comprised of four main parts, and each part had additional smaller components. The main sections included the pre-test of rhythm accuracy and memory, introducing a new target rhythm broken down and addressed in six different sections throughout the session; a review section included three previously learned rhythms and a post-test of rhythm accuracy and memory.

Clinical Assessment

I developed four different assessments conceptualized as therapy pre and post-tests. I presented one of the developed pre and post-test combinations each week. The pre/post-tests were on a four-week cycle to lower the chance of memorization. The pre-test rhythm notation used the pictorial method, described further in the section of the visual aids, that was familiar to the client. I gave the client thirty seconds to read the pre-test and then played the given rhythm four times at the beginning of treatment but changed to thirty seconds to play it in later session formats. While the client played the post-test rhythm, I made notes based on rhythm accuracy, drum accuracy, and rhythm fluency. Finally, I gave the same testing rhythm again as a post-test at the end of the session and made notes based on rhythm accuracy, drum accuracy, and rhythm fluency. After the session was complete, the research compared the pre and post-tests as an

outcome indicator of the client's improvement in rhythm accuracy, drum accuracy, and fluency.

Weekly Target Rhythms

Each week the new target rhythm was broken down into six different parts. The sequencing of the individual parts used scaffolding to increase complexity from the most straightforward part of the rhythm to the most complex. Each part of the target rhythm was broken down even further in order for the rhythm to become engrained into the clients playing. The client was first required to read the rhythm, clap the rhythm, play the rhythm slowly, then play the rhythm up to tempo. Modifications were made to the learned rhythm to match the client's skill level and the difficulty of playing the rhythm at the tempo that matched the targeted song. The client was taught the rhythm at halftime, which slowed the rhythm down in order for it to match up with the music but still allowed the client to be successful. The drums used were the hi-hat, snare drum, and bass drum to simplify the teaching of rhythms. The client first used each drum individually, combined two drums, and finally combined all three drums. The final step was to combine the rhythm with the original recording of the song.

Learned Rhythm Review

The primary function of the rhythm review was to aid in keeping the client engaged throughout the session. Going back to practice rhythms learned in previous sessions provided an alternate focus that allowed the client to develop mastery of previously learned rhythms through repetition. Rhythm review sections were placed between each part of the targeted rhythm sections and lasted no more than five minutes. Each review section consisted of a previously learned rhythm implemented in two

different ways. First, the client worked on the rhythm independently and then played the rhythm along with a song recording.

Facilitation Strategies

Move to Zoom

When treatment began, the world was undergoing a pandemic. Isolation procedures, limited contact, and I performed treatment virtually. I moved a drum set to the client's private residence, and all sessions were remote. Using zoom caused challenges that affected all aspects of the therapeutic process. Many therapeutic strategies were no longer available in the virtual space, including physical touch, proximity, and practical real-time examples of certain rhythms on the drum set. Some adaptations and changes to the lesson structure emerged over time as the virtual sessions continued.

Focus on Fewer Drums

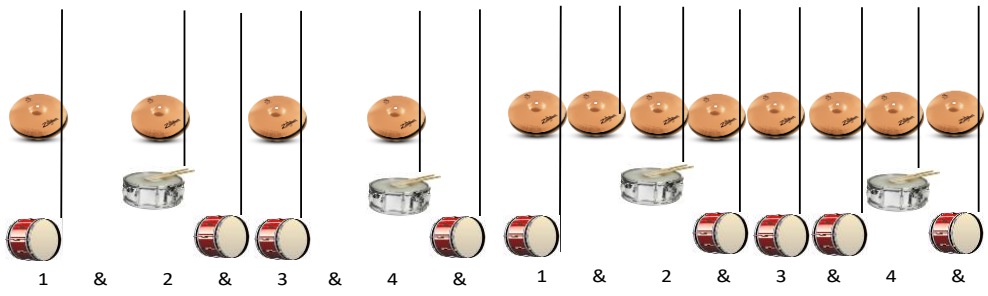
Focusing on fewer drums became necessary as a result of the shift to the virtual session. In an in-person therapeutic drum session, the goal would be to teach the entire drum set. However, due to the logistical difficulty of getting the entire drum set within the camera shot and not having I present, it was easier to focus on the high-hat, bass drum, and snare drum. These three contrasting drums were selected because they allowed the client to learn complex drum set skills without dealing with the logistical hurdles that playing the entire instrument would cause. Even with the limited number of drums due to the video quality and virtual delays, it was difficult to determine if the client played on the correct drum. In addition to video quality, sound overloading the microphone made discriminating the drum sounds difficult when evaluating pre/post-tests.

Visual Aids

During virtual instruction, live demonstrations were not practical due to visual and auditory delay limitations. I needed a way to convey complex music information, but the client struggled to read traditional music notation. Additionally, traditional drum set music notation would have been too complex for me to teach and the client to learn in the virtual setting. I created a new form of music notation to compensate for the lack of physical presence and hands-on demonstrations. The new notation style used a pictographic representation of each drum. The pictures were able to be lined up with the exact beat that represented the appropriate drum. The rhythms and subdivisions used typical music notation due to the client's past music learning experience. Setting up the visual aid allowed the client to easily read and reproduce the targeted rhythm on the correct drum (Figure 1).

Figure 1

New Musical Notation



Schedule Creation

During the process of developing the treatment process, treatment became more effective when a schedule was used and presented to the client at the beginning of each session. The rationale for the schedule was that the client would often find it challenging to complete the session's tasks and frequently ask what was next. In addition, a schedule is a valuable tool for individuals with ASD as it provides a more defined structure for a series of events. For every session, I created a schedule that allowed the client to preview all session components. The schedule was referred to after each part for the client to track his progress through the session.

Scaffolding

Scaffolding was the basis for teaching the client new rhythms and what drums to play on. I broke down targeted rhythms into simpler chunks, and then the complexity was increased slowly throughout the session. Scaffolding steps for a session would be to teach the hi-hat alone, bass drum alone, snare drum alone, bass drum and hi-hat, bass drum and snare drum, then bass drum hi-hat and snare drum played together.

Tracking Progress

Session Recording

As I implemented treatment, he took advantage of the zoom technology and recorded every session for future review. Unfortunately, the recording would be unreliable due to the internet dropping the zoom calls or other technical difficulties that prevented sessions from being recorded in their entirety.

Journaling

After every session, I journaled on the session and how the client reacted to the various sessions' adaptations. The journal's statements included rhythms covered during the session, how the client responded and reacted to treatment, and a final section on how the session would change in the next week to better address goals and objectives.

Chapter IV

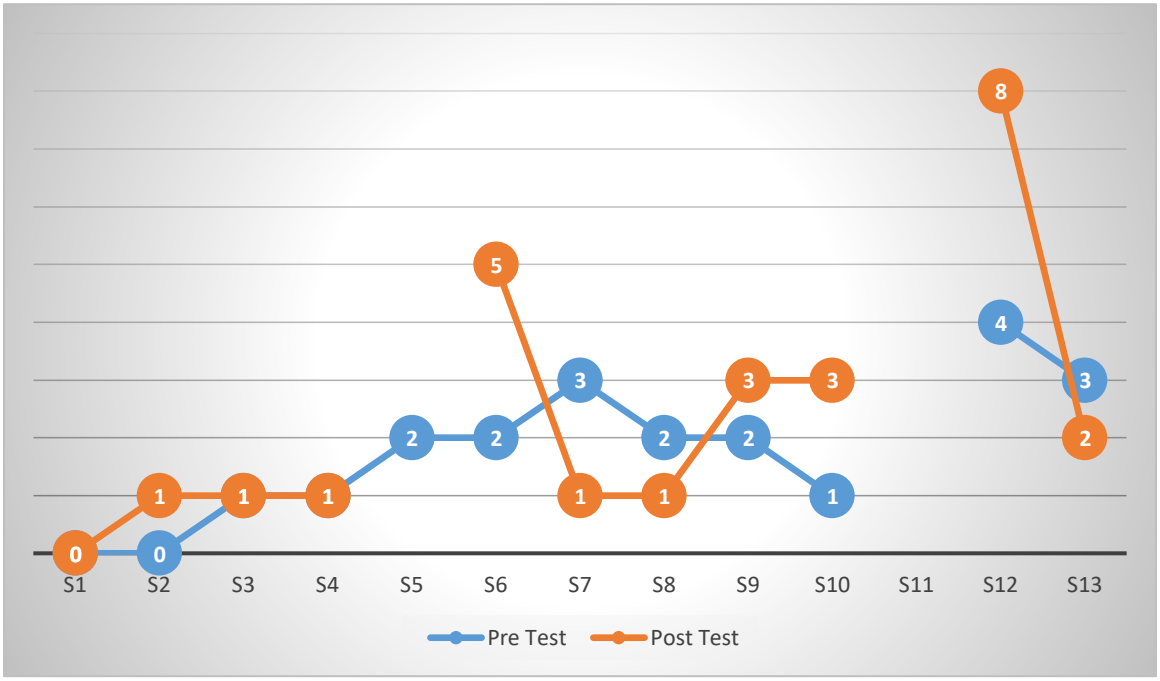
Therapeutic Outcomes

Motor Coordination Assessment

This study analyzed the effects of this music therapy technique on motor coordination skills. I implemented a motor coordination task using the drum set at the beginning and end of 11 of the 12 sessions. In the pre/post-test rhythms, I counted the number of times the client could play the rhythms correctly. Rhythm play-throughs did not count if the client started over, played an incorrect rhythm, played on the incorrect drum, or used incorrect drumming technique. Throughout the treatment, the client showed growth in his ability to perform the pre/post-test rhythm. At the beginning of treatment, the client was unable to perform pre/post-test rhythm. As treatment progressed, the client's pre/post-test scores elevated to a pre-test score of four at the height and eight for the post-test. The client also improved his overall playing ability, including playing more complex rhythms as time progressed. Table 1 shows the number of times the client was able to play through the tested rhythm correctly during the pre/post-test.

Table 1

Number of Times Played Through Tests



Client Behavioral Development

This study primarily focused on gross motor coordination, but several different behaviors were also present during treatment. The client's unexpected behaviors could have been in response to the drum set playing or an unknown environmental factor. These behaviors include the production of nonverbal sounds while playing and self-biting. The production of nonverbal sounds is often associated with an unintentional verbal thinking process similar to “um” or “like.” Self-biting behavior often occurs when someone diagnosed with ASD has become overstimulated. Usually, therapists try to limit biting to help prevent injury. I did not target the nonverbal sound or the self-biting during treatment. The nonverbal sound was not hampering his ability, and the self-biting behavior happened on rare occurrences. Behaviors that became the focus of the study were the increase of self-advocation and a decrease in off-topic questions.

The client presented unexpected behaviors like self-advocating behaviors. Self-advocating behaviors present in the study included the client asking for less complicated rhythms, asking for more time to work on a specific rhythm, and asking his mother or grandparent to leave. As treatment progressed, these self-advocacy behaviors became more prominent. These self-advocating behaviors often appear around the teen years and often mean the development of a unique personality. The self-advocating behaviors may also be a reaction to the self-directed practice times.

A prominent behavior that was present at the beginning of treatment was off-topic conversations. Throughout sessions, the client would ask conversational questions that had no relation to the drum set. Questions included “where are your glasses?”, “Why are you wearing that?” or “are you in your dorm?” Off-topic questions would often transpire during the sessions, including when I taught a drumming technique, provide an assignment, or pulled up the visual for the next activity. I would often give generic short answers not to promote conversation and quickly prompt the client back to the task at hand. As treatment progressed, these behaviors became less prominent. By the end of treatment were only present once per session. This reduction in off-topic questions could mean that the client had become stimulated enough not to feel the need to talk or that the session format kept him busy enough not to have the time to ask questions. The increase in self-advocating behaviors and reduction in off-topic questions could mean that this protocol could have social benefits if the client learns how to apply them outside the session. For a further breakdown of the client’s behaviors within each session, please refer to appendix D.

Session Adaptations

During treatment, I made a total of twenty-six adaptations to the session format. Session adaptations targeted improving techniques for teaching the client-specific music, rhythms, and limitations of the virtual environment. Adaptations included focusing on specific rhythms, using timers, hand signals, and self-directed practice time.

The music therapist began focusing on specific rhythms during sessions after a failed attempt to teach the client a drum fill. Before the study started, I would teach these drum fills by rote and hand-over-hand techniques. Teaching drum fills via a virtual platform added an increased level of difficulty. When teaching the drum fills, the client had to take his eyes off I, which lowered engagement, and drum fills required a level of coordination that the client was not ready to learn without significant therapist assistance.

The use of hand signals came out of necessity when using the virtual platform. When treatment first began virtually, I had not considered the level of sound that the drum set would make. When the client played the drum set, he could not hear I's instructions. At one point, I had to jump up and down to get the client's attention. The hand signals created a common language between the client and I, allowing the client to know precisely when to stop.

The self-directed practice times were implemented near the end of treatment and used as a way for the client to begin to take over his learning process. This dedicated practice time within the context of the session allowed the client to take ownership of his learning and provide opportunities for success with limited therapist corrections. I implemented the self-directed practice times, telling the client to practice a specific

rhythm for five minutes in any way he chose. Most often, the client would practice the rhythm until he became physically tired.

The use of timers provided two benefits for me and the client. The timers provided an exact time to start and stop. With the timer signaling when to start and stop, the client had beneficial structure throughout every session. The timer helped the client see an end raising his level of engagement. The timers also benefited me. Using specific time structures allowed me to time out each element of the sessions. Timing sections of the sessions helped with the overall flow, which kept the client engaged. Based on the objective data collected, session 12, which included all of the adaptions acquired throughout the clinical process, seemed the most effective. The changes implemented during the twelfth session included a five-minute timer on targeted rhythms and letting the client use self-directed practice to play review rhythms. A list of all session changes is in appendix E.

CHAPTER V

Discussion

Gross Motor Development

Based on the data collected during the pre/post-tests, there is an indication that playing the drum set can improve gross motor coordination. The inconsistencies and limitations of the study prevent any definite conclusions from being made.

Throughout the study, the client made strides in his ability to play specific rhythms. An example of the client's growth is his ability to play the rhythm developed to go along with the song *Africa* by Toto. Unlike other rhythms in this study, this rhythm consisted of two hands playing the high hat rather than the right-hand snare left-hand high-hat technique he had learned in previous sessions. The *Arica* rhythm was also designed to be more complex and required more physical coordination than others. The first time I presented the rhythm, the client had difficulty with coordinating the physical movements to play. The client tried but could not play it as fluidly as other rhythms. I made comments about the *Africa* rhythm, expressing struggle in teaching it to the client. By the last session, the client successfully played the *Africa* rhythm accurately at an adapted slow tempo.

The client's drum set playing areas that require the most improvement to support motor development are technique development and playing with fluidity. Fluidity, as it applies to drum set playing, is often used as a blanket term when discussing drum accuracy, correct tempo playing, and the absence of hesitation when moving on to different rhythms. One possible reason the client had difficulty progressing in his ability to play rhythms smoothly was his excitement. The client often became excited when

playing full rhythms, and his arms and face tightened. The behavior occurred more often when he played targeted rhythm with their original recording. He expressed excitement by tightening muscles in his limbs and face, which impacted his ability. These tightening behaviors would appear in the extended shrugging of shoulders or a visible clenching of teeth, which would eventually affect the client's ability to play rhythms faster. Staying loose is a foundational tenet of playing the drum set with better speed and efficiency. Since the client tightened his limbs, it became difficult for him to play. The client also struggled to repeat rhythms. During sessions, the client would play a rhythm then pause for two to three seconds before starting over.

A second area of the physical domain that the client never seemed to gain proficiency with was technique. I corrected the client’s stick grip, body posture, or playing technique within every session recording. There could be many reasons why the client never seemed to develop his technique at the same pace as his playing ability. The second reason why the client might not have been able to develop his technique was boredom. To effectively teach the client any targeted rhythm, I broke every rhythm down to its fundamental components. These rudimentary components often meant that the client would play a single drum two times across four beats. When the client seemed to get bored, he seemed to have a lackadaisical attitude, including slouching in his chair, playing drums with the wrong hands, or even using his entire body to play the bass drum. The boredom could also explain behaviors like him taking certain sections of targeted rhythm faster than I directed and then proceeding to speed up. A possible explanation for the client's increasing playing speed was to make the rhythm more challenging for himself.

Client Behaviors

Many of the client's behaviors often require context to understand, like the client's moaning while playing a rhythm or self-biting. The moaning while playing would often appear when the client had to play a rhythm that he might have perceived as hard. It seems that the more complex the rhythm, the louder the moaning would be. The humming could serve several functions for the client but was probably an involuntary focusing technique.

During sessions, the client would seem to get excited about playing a particular rhythm or song and, at times, bite his wrist. The most likely reason for this behavior was most likely due to overstimulation. The self-biting behavior was not frequent but would often coincide with the tightening of his shoulders and arms.

The client's behaviors in the social domain showed growth. The reduction of off-topic questions seemed to help out session flow immensely. As the client began asking fewer questions throughout the session, I could cover more material. The reduction of off-topic questions most likely stems from when the session began alternating target rhythm and rhythm review sections. The session format required the client to change his focus constantly. For five minutes, the client focused on a particular rhythm, and then he was playing a different rhythm with a different song. This constant stimulation most likely reduced the client's need to ask those off-topic questions or limited his opportunity to ask them.

The client also started presenting more self-advocating behaviors. These behaviors did not become noticeable until closer to the end of treatment. During the second half of treatment, I gave the client more time to play the drums and more time for

self-determination. I would encourage this behavior, not out of a need to increase these self-advocating behaviors but training him to practice independently. It shows that there is a connection between unsupervised practice and the development of more self-advocating behaviors.

Changes in the Session

There are several possible reasons for the success of the twelfth session. Giving the client five minutes to work on the directed rhythm provided structure and motivation to practice rhythms that might perceive as boring or too easy. The self-directed portion of the time gave the client the freedom to play the drum set, creating opportunities for success, which helped promote self-advocating behaviors

Every one of the session changes had varying levels of success. One of the first breakthroughs that I had during sessions was the use of hand signals. During the first session, I did not account for the client's inability to hear instructions over the drum set. To overcome this hurdle, I used hand signals as a visual representation of stop. I also made changes so that the client could play more fluidly, including putting arrows and repeat signs in all of the visuals, using the scaffolding technique, or isolating sections of rhythm with a blacked-out text box. The client's response to these changes often showed increased rhythm accuracy, playing fluidity, and reduced expressed frustration. However, since the session changes came on an almost weekly basis, it is hard to pinpoint the exact effects of changes. One aspect of the study that is especially hard to track is the effects of the timer during sessions. I was inconsistent in using the timer. Timer use varied from a five-minute timer, or in other sessions, a three-minute timer which most likely lowered its effectiveness.

Environmental Context

The most significant environmental context was the COVID pandemic, which limited social interaction with peers and raised anxiety levels. The pandemic also required treatment to move to a virtual environment limiting peer interaction. The treatment process became an outlet for the client to express and cope with anxiety and other significant life events. The client's mother perceived the treatment using the drum set as highly effective due to his increased independence. The client's mother even began to refer to his music therapy sessions as "guy time."

Strengths and Limitations

The strengths of this study include the personalized nature of the treatment protocol. I designed every aspect of this study to keep the client engaged and interested. This continued engagement prevented me from having to deal with a lack of motivation from the client. The use of recorded videos allowed me to review and report the data as accurately as possible. The research reviewed and analyzed the clinical videos as many times as necessary to retrieve accurate data. Since much of the data was qualitative, the research was given flexibility in its collection and was not limited to what data counted as it would in quantitative research.

A weakness of this study is its individualized nature, so findings cannot be generalized beyond the individual client. As a result of collecting data in the clinical context, unavoidable conflicts resulted in technological hindrances, inconsistent pre/post-testing, and an evolving treatment protocol all affected the results. In addition, the protocol was tailored for the client and, as such, cannot be generalized. This tailoring included the use of 80's rock music, or how much time the client and I spent on counting.

Technological limitations often hampered the study. These limitations were more pronounced while the client was playing the drum set due to the sound limitations of the virtual platform. When the client played the drum set, often the sound did not transfer through the system, if at all. In addition, the camera of the zoom program would not point at the client as he played. With no audible sound and no visual of the client, it became difficult for me to track behaviors. These technological limitations made it difficult to accurately track behaviors and how well the client improved over time. These limitations also affected the pre/post-test since the sound quality was inconsistent. I had to rely on visual tracking to count the number of times the client performed the test successfully.

The implementation of the pre/post-test was also a limitation. Throughout the study, I required the client to play a test rhythm four times to a timed system. He made this change to give the client more chances for success and failure but skewed the results because now the question will always be asked if the client could have done better or worse under the timed pre/post-test system from the beginning.

The evolving treatment protocol also affected the results of the study. I changed the treatment protocol from week to week. Changing the treatment protocol is a good practice when performing clinical work but makes it hard to generalize to other clients. I would have had to keep to the same treatment protocol throughout the entire study to eliminate this limitation.

Future

This study is a foundational study that highlights the feasibility of the approach in the clinical context. Future studies could focus on the following expansions. The first way would be to focus on generalizing the treatment protocol. A therapist would have to

go to the beginning and implement the final treatment protocol with multiple clients. Due to the very nature of this music therapy protocol, it cannot ever be completely generalized. A second avenue is a continuation of this study but altering it to focus on improving social skills for the client. I stated that his overall goal would be to allow the client to apply what he has learned to a group band setting. The group setting would allow the client to apply his knowledge and develop social skills through peer interaction.

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APPENDIX A

Africa Schedule

1. Pre-test
2. *Africa* Pt. 1
3. Billie Jean Review
4. *Africa* Pt. 2
5. *Sweet Child o' Mine* Review
6. Africa Pt. 3
7. *Take On Me* Review
8. Africa Pt. 4
9. Africa Full Rhythm
10. Song
11. Post-test

Billie Jean Schedule

1. Pre-test
2. *Billie Jean* Pt. 1
3. *Sweet Child O' Mine* Review
4. *Billie Jean* Pt. 2
5. *Take On Me* Review
6. *Billie Jean* Pt. 3
7. *Africa* Review
8. *Billie Jean* Pt. 4
9. *Billie Jean* Full Rhythm
10. Song
11. Post-test

Sweet Child O'Mine Schedule

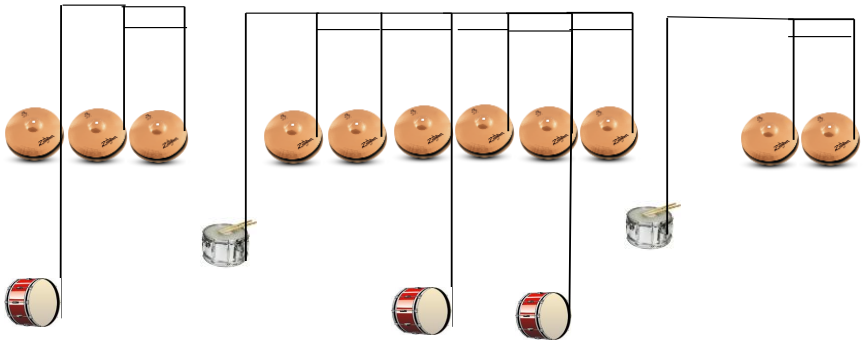
1. Pre-test
2. *Sweet Child O' Mine* Pt. 1
3. *Billie Jean* Review
4. *Sweet Child O' Mine* Pt. 2
5. *Take On Me* Review
6. *Sweet Child O' Mine* Pt. 3
7. *Africa* Review
8. *Sweet Child O' Mine* Pt. 4
9. *Sweet Child O' Mine* Full Rhythm
10. Song
11. Post-test

Take On Me Schedule

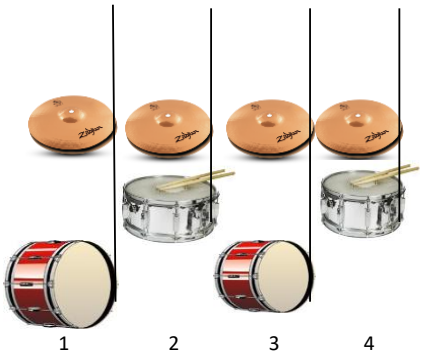
1. Pre-test
2. *Take On Me* Pt. 1
3. *Billie Jean* Review
4. *Take On Me* Pt. 2
5. *Sweet Child O' Mine* Review
6. *Take On Me* Pt. 3
7. *Africa* Review
8. *Take On Me* Pt. 4
9. *Take On Me* Pt. 5
10. *Take On Me* Full Rhythm
11. Song
12. Post-test

APPENDIX B

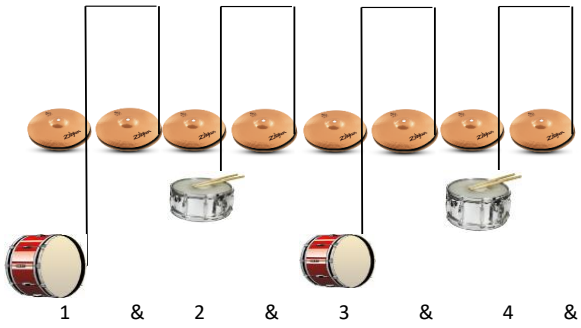
Africa Pattern



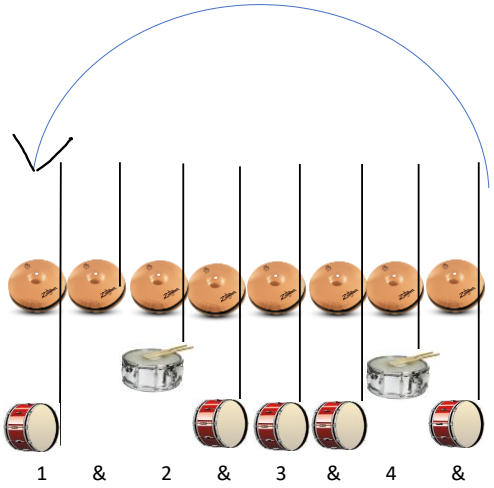
Billie Jean Easy Pattern



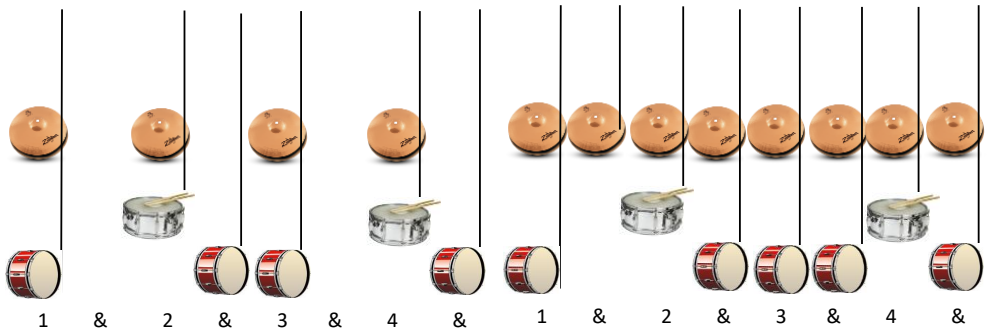
Billie Jean Medium Pattern



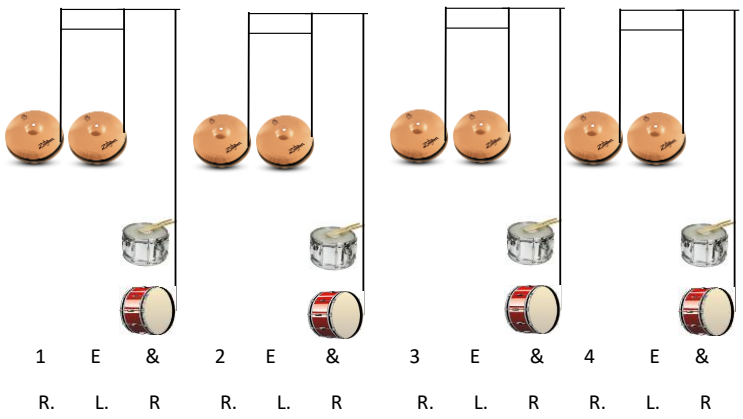
Sweet Child O'Mine Easy Pattern



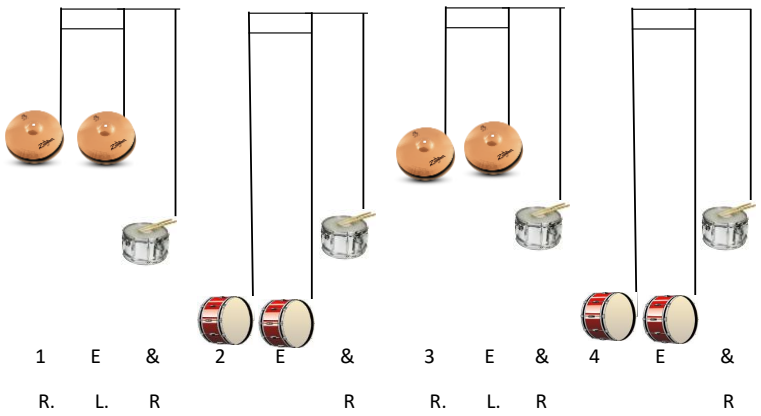
Sweet Child O'Mine Medium Pattern



Take On Me Easy Pattern

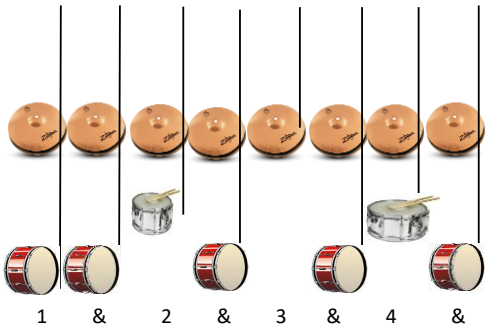


Take On Me Medium Pattern

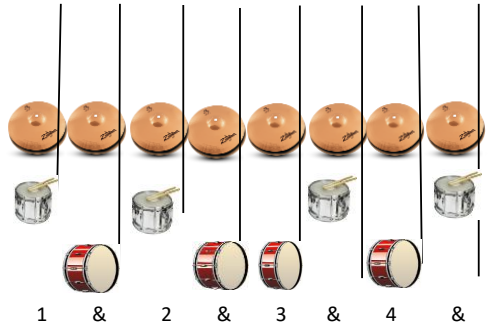


APPENDIX C

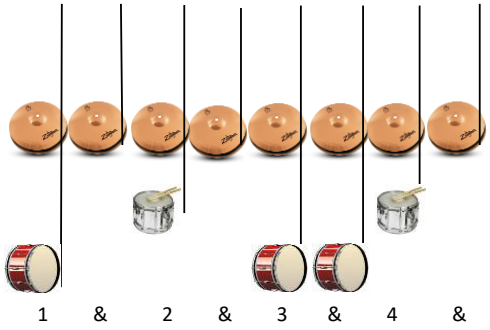
Test Pattern 1



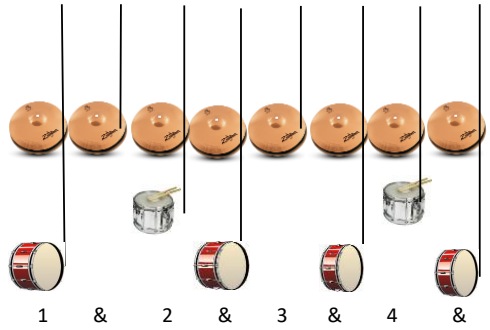
Test Pattern 2



Test Pattern 3



Test Pattern 4



APPENDIX D

	Stimulating Context	Client Behavior	Reasoning
Session 1 (09/09/2020)	The client played drums with sticks.	Arm tightening	Most likely excited to playing the drums again.
	I was trying to get the client to perform a learned rhythm with a drum fill.	Client biting	The client most likely was becoming frustrated and struggled to understand what I wanted him to do.
	Client playing learned rhythm with the specified song.	The client produced non-verbal sounds while playing drums.	The client was probably excited to be playing a learned rhythm with a song. The client might also be trying harder than usual to perform the task assigned to him, and that is a sound he makes as he thinks.
	The Client played drums out of turn.	Client crossing arms.	Probably a defensive posture due to a perceived belief that he is doing something wrong.
	I gave the client new instruction.	The client used a drumstick to hit his neck.	Most likely did not fully understand the instructions.
	1.I prompted the client to play one drum while counting from one to four repeatedly. 2.I prompted the client to play the learned rhythm with the song. 3.I did not specify what drum the client needed to play. 4.I prompted the client to play two different rhythms on two different drums.	The client did not follow the instructions 1.A consistent increase in playing speed 2.The client played the correct rhythm but not in time with the music video 3.The client played on the incorrect drum. 4.Unable to play two different rhythms on two different drums.	1.Possible reasoning could perceive the task as too simple and sped up to create more personal interest 2.It was unlikely that the client heard the song play over the electronic device he was streaming on and played the rhythm as best he knew how. 3.Since the drum was not specified, the

			client most likely reasoned that it was not necessary. 4.The client probably did not understand that the objective was to play two different rhythms simultaneously and only focused on one rhythm.
	1.I broke down when to play the correct drum in three permutations.	The client followed the instructions 1.The client played the correct drum at the correct times.	1.The breakdown of how to count and prompting when to play gave the client context. This help made the permutations easier to process than others.
	The client began to become proficient at prompted tasks.	Use of the incorrect technique •Relaxed grip. •The client used the stick with two hands rather than one. •The client leaned back against the wall. •The client crossed his legs while playing. •Uncrossing of the right and left hand while playing.	As the client's skill level rose, he probably stopped seeing the need for the same attention level that it initially required.

Session 2 (09/09/2020)	1.I showed a visual of the learned drum rhythm. 2.Rhythm visuals included numbers for client count.	The client followed the instruction 1.The client played the correct rhythm and drum. 2.The client counted the rhythm.	1.The client played the rhythm with no prompting from me. 2.Since I included counting in the visuals, the client might have naturally picked it up.
	1.The client clapped the bass drum rhythm.	The client did not follow the instructions	1.It seemed that the client was trying to maintain the speed at

	2.I copied and pasted the rhythm so that the client saw the rhythm twice. 3.I prompted the client to clap the bass visual. 4.I prompted the client to repeat the rhythm and allowed him to continue with limited therapist direction. 5.I directed the client to play only half of the rhythm that was on the screen.	1.The client playing when the music says stop. 2.The client started to play the bass drum rhythm correctly and repeat it. 3.The client made playing errors at the end of a measure. 4.The client stopped playing before prompted. 5.The client kept playing after directed to stop.	which he had played and learned the high-hat part. 2.Having the entire rhythm laid out before him. 3.Most likely due to the lack of proficiency with the new visual system. 4.After repeating the rhythm correctly several times, the client most likely became bored, or tired as he expressed earlier in the session, and his desire to stop became more irresistible than his desire to play. 5.The Client expressed that he was excited and wanted to keep playing.
	1.The client yawned 2.The client played the directed rhythm correctly without music therapist interaction.	The client used an incorrect technique 1.The client did not maintain a good seated posture. 2.The client used his entire body to play the bass drum.	1.The client expressed that the session at that point was tiring. 2.The client probably got excited to play the drum correctly and got carried away.
	The client played a new bass drum pattern.	The client expressed frustration while playing the bass drum rhythm.	The client probably felt uncomfortable with the new session format. The client also moved his entire body to play the bass drum exerting more energy than necessary and thus tiring him.
	I asked the client to clarify his answer on the difficulty of the rhythm.	The client changed his answer to agree with me.	The client most likely changed his answer not because he believed it, but he

			thought I was the "correct" answer.
	The client asked what was hard about playing a particular rhythm.	The client gave delayed/nonsensical answers to question.	The client most likely did not fully understand the question.

Session 3 (09/23/2020)	The client was sitting while I brought out the next activity.	The client performed context laughing.	Unknown
	The client was sitting while the music therapist had to update rhythm visuals.	The client grunted while playing.	The client most likely getting frustrated and bored with having to sit without interaction.
	I asked the client asked to play the entire targeted rhythm.	The client expressed a desire for a more manageable rhythm.	The client most likely became frustrated because he struggled with the targeted rhythm for the entire session.
	1.I tasked the client with playing a snare part perceived as easy. 2.I played the fully targeted rhythm for the client.	The client became less engaged with the session 1.The client looked around and yawning. 2.The client looked around, slouched his body posture, and yawned.	1.The client most likely bored of the snare part because he could play it on the first try. 2.The client most likely became bored because all he was getting to do was watch and not actively engage with the instrument.
	1.I tasked the client with playing a new rhythm on the high-hat. 2.I prompted the client to play the snare/bass part of the rhythm. 3.I prompted the client to play the snare/bass part of the rhythm. 4.I prompted the client to play the targeted rhythm slowly.	The client used an incorrect technique 1.The client did not use proper grip. 2.The client played the snare drum with the left hand. 3.The client moved his entire body to play the bass drum.	1.The client most likely did not focus on using the proper technique because he was more focused on playing the rhythm correctly. 2.The client most likely perceived the assigned rhythm as

		4.The client used only his hand for the targeted high-hat rhythm.	too easy and was getting bored of it. 3.The client's entire body movement slowed his playing down, and he expressed drowsiness 4.The client most likely used only his hand because he did not engage with the session and did not fully pay attention to the instruction.
	1.I prompted the client to play the high-hat part while counting. 2.I prompted the client to play the targeted rhythm with the song recording.	The client did not follow the instructions 1.The client was unable to play the high-hat part. 2.The client played incorrect rhythm when playing with the song.	1.The client probably struggled due to having to perform multiple tasks at one time. 2.The client most likely became frustrated with the targeted rhythm, so he made his own up.
	1.I prompted the client to play only a small section of the high-hat rhythm. 2.I asked the client to play the high-hat rhythm three times.	The client followed the instructions 1.The client played the last beat of the high-hat rhythm. 2.The client played high-hat rhythm with increased proficiency.	1.The client most likely succeeded in the task due to how little of the rhythm he had to play. 2.The client played the rhythm with each playthrough

Session 4 (10/10/2020)	I tasked the client to play Africa rhythm.	The client grunting while playing.	The client struggled to play the tasked rhythm and expressed that it was too hard.
	1.I prompted the client to play a targeted rhythm with the original song.	The client's face tightened and made what looks like a smile, and he showed his teeth.	1.The client became excited to play the drums to an actual song. Unfortunately, the client's

			tightening of his body slowed downplaying and not in time with the song.
	1.I tasked the client with playing the high-hat portion of *Take On Me*. 2.The client asked the client to count the bass drum part of Take On Me.	The client said stop every time one appeared in the visual.	The client naturally filled in the silent space since he was supposed to count or play at those particular parts.
	1.I tasked the client to play *Africa* rhythm. 2.I tasked the client with playing Take On Me high-hat part.	The client used an incorrect technique 1.Laid index finger across the spine of the stick. 2.The client used an incorrect grip and leaned against the wall.	1.The client seemed to be focusing so much on playing the rhythm correctly that he became relaxed on his grip technique. 2.The client likely was already bored of the instruction and wanted to move on.
	1.I prompted the client to count the whole rhythm of Take On Me. 2.I tasked the client with playing the snare part of Take On Me.	The client followed the instructions 1.The client counted the rhythm correctly. 2.The client played the isolated snare part steadily and correctly.	1.The client struggled at first but quickly corrected himself after I used his body to inflect the downbeat of the rhythm and prompted him to count slower. 2.I spent more time on this section of rhythm than he had in the past. I prompted the client to count the rhythm and prompted him to say the correct sticking in time.
	1.I prompted the client to count only the high-hat drum part.	The client did not follow the instructions	1.Most likely, the client only added the extra syllabic

	2.I prompted the client to play the target rhythm multiple times until prompted to stop. 3.I prompted the client to count the post-test for 30 seconds.	1.The client counted the entire rhythm rather than excluding the directed section of the beat. 2.The client stopped playing before prompted. 3.The client consistently increases in counting speed.	words to the rhythm because they were written out even though the drum part called for silence. 2.This rhythm did not include an arrow or multiple measures of the rhythm written out, most likely why the client kept stopping. 3.The client most likely ready to be done with the session and found the task to be simple.

Session 5 (10/14/2020)	1.I prompted the client to count pre-test rhythm. 2.I prompted the client to count pre-test rhythm.	The client did not follow the instructions 1.A consistent increase in counting speed. 2.The client mumbled while counting.	1.The client most likely found the rhythm too easy to count. However, as the client became more confident in his skill, he increased his counting speed. 2.The client most likely found the rhythm too easy to count.
	1.I tasked the client with playing the *Sweet Child O'Mine* pattern four times. 2.I prompted the client to say the sticking pattern of *Africa* slower than usual.	The client followed the instructions 1.The client played reviewed patterns with a high level of accuracy. 2.The client counted the correct sticking pattern.	1.The client played this rhythm with little to no interaction from me and played almost flawlessly. 2.The client approached the rhythm slower than usual, increasing accuracy, but the client also became less engaged.

	1.I tasked the client with playing the entire *Africa* pattern at "turtle speed."	The client used an incorrect technique 1.The client stood up while playing the drums.	1.The client most likely struggling and uncomfortable with playing the full rhythmic pattern and felt like standing up would help him play it better.
	1.I tasked the client with playing the *Sweet Child O'Mine* and *Take On Me Pattern* faster than his original tempo. 2.I tasked the client with playing the whole rhythm of *Africa.*	The client moaning while playing.	1.The client most likely struggling with the new rhythm tempo and had to work harder to play the new tempo. The client expressed that playing it faster was hard. 2.The client most likely struggling with playing the *Africa* pattern and had to work harder than usual.
	1.I tasked the client to play the *Africa* pattern during his self-directed practice time.	The client mumbling to himself.	1.The client most likely struggling with playing the *Africa* pattern and had to work harder than usual.
	I asked the client to practice at targeted rhythm over the week.	The client hopped in his chair and shook his hands left and right.	The client had played the *Africa* rhythm for the first after three weeks of work.

Session 6 (10/21/2020)	1.I tasked the client with playing the easy version of the *Billie Jean* pattern. 2.I tasked the client with counting the snare/bass drum part of the *Billie Jean* pattern.	The client did not follow the instructions 1.The client played straight eight notes on the high-hat. 2.The client increased his counting speed consistently.	1.Before being prompted to play the easy version of the *Billie Jean* pattern, the high-hat part of the hard *Billie Jean* pattern showed. 2.The client most likely found the task too simple, and the

			more comfortable he got with the rhythm, the faster he would go.
	1.I tasked the client with counting the high-hat rhythm. 2.I tasked the client with playing the bass drum part of the *Billie Jean* pattern. 3.I tasked the client with playing the snare drum part.	The client used an incorrect technique 1.The client did not look at the music while he was counting it. 2.The client leaning head on fist 3.The client played the snare drum with the incorrect hand.	1.The client most likely found the task too simple and did not think that he needed to focus as much. 2.The client most likely found the task too simple and did not think that he needed to focus as much. 3.The client most likely found the task too simple and did not think that he needed to focus as much.
	The client waited while I pulled up the next activity.	Client self-biting	The client most likely became excited that he had played a previously learned rhythm with a high level of accuracy.
	The client sat while I brought out the next activity.	The client performed out of context, laughing.	Unknown
	1.I prompted the client to play the *Africa* pattern.	The client moaning while playing	1.The client most likely struggled with the new rhythm tempo and had to work harder to play the new tempo. The client expressed that playing it faster was hard.

Session 7 (10/28/20)	1.I tasked the client with playing the high-hat	The client used an incorrect technique	1.The client most likely has not

	pattern of *Sweet Child O'Mine.*	1.The client moved his whole arm to play rather than bending his wrist.	internalized the proper technique, and since the focus is on gross motor coordination, I did not emphasize it.
	1.I tasked the client with playing the high-hat part. 2.I tasked the client with playing Billie Jean with no warmup.	The client followed the instructions 1.The client repeated the high-hat part with no visual direction. 2.The client played *Billie Jean* Rhythm with little to no errors.	1.The client might be gaining a better understanding of how the music works and naturally knew the rhythm needed to continue. 2.The client's ability could be increasing, and since the rhythm is one of the easier ones, he might be learning it faster than the other targeted rhythms.
	I prompted the client to play the snare part of the S*weet Child O'Mine.*	The client corrected his technique.	The client became used to playing the "correct" way through the constant correction from I
	I tasked the client with playing the *Africa* pattern.	The client moaning while playing rhythm.	The rhythm most likely required more focus than previous rhythms.
	I tasked the client with playing the combined snare/ bass part of *Sweet Child O'Mine.*	The client asked me to repeat an exercise.	The client might be becoming more comfortable within the session and becoming more self-advocating in how he wants to do things.

Session 8 (11/04/2020)	I directed the client to read the post-test.	The client did not read the screen.	The client most likely found that the counting portion was too easy, and he did not need to focus on it.

	1.I tasked the client with playing the pre-test. 2.I tasked the client with playing *Africa* rhythm review.	The client moaning while playing.	1.The client most likely uncomfortable with playing the prescribed rhythm and was having to put more effort than usual into it. 2.The client struggled with the *Africa* rhythm and used more concentration than usual to perform it.
	I prompted the client to count the bass drum section of the Take On Me rhythm.	The client slowly sped up of counting rhythm.	The client counted this rhythm throughout the entire session and most likely thought it was easy and required less focus.
	The client waited for me to pull up the next activity.	The client performed out of context, laughing.	The client could be laughing at how I messed up.

Session 9 (11/11/2020)	1.I tasked the client with reading Pre-tests. 2.The client waited for me to pull up Take On Me review.	The client performed out of context, laughing.	Possible reason unknown.
	1.I tasked the client with playing the pre-test. 2.I tasked the client to play *Billie Jean* pattern at "Cheetah Speed." 3.I tasked the client with playing the whole *Africa* rhythm	The client moaning while playing the drums.	1. The client seemed uncomfortable with playing the rhythm. 2. The client seemed comfortable with going at a faster tempo. The client traditionally struggled to play the *Africa* pattern and is the most

			likely cause of the behavior.
	1.I prompted the client to play the *Billie Jean* pattern at "cheetah speed." 2.I tasked the client with reading the bass drum section of *Africa*.	The client unable to follow instructions 1.The client played the *Billie Jean* pattern slower than I prompted. 2.The client spoke the high-hat part rather than the bass drum pattern.	1.The client is most likely not comfortable with going at a faster tempo. 2.The client most likely used to count the high-hat and assumed the counts would be the same.
	1.I prompted the client to play the *Africa* snare drum pattern. 2.I prompted the client to play the high-hat part of the whole *Africa* rhythm.	The client did not use the correct technique 1.The client played the snare drum part with the incorrect hand. 2.The client played the high-hat part with only one hand rather than two.	1.The client most likely thought that the pattern did not require the same concentration level as the rest of the session. 2.For most targeted rhythms, the client used only the right hand might have forgotten to use two hands.
	I tasked the client to play the *Africa* snare drum pattern.	The client repeatedly rubbed his head while playing the *Africa* snare drum part.	Most likely, the client's head itched and felt the need to do two different activities at one time.
	1.I tasked the client to play the whole *Africa* rhythm as slow as possible.	The client followed the instructions 1.The client played the full *Africa* pattern six times.	1.Having the client play the targeted rhythm slower gave him more time to think of the timing and specific drum to play.

Session 10 (11/18/2020)	1.I prompted the client to play the high-hat part of the *Billie Jean* rhythm for 5 minutes.	Client unable to use correct technique 1.The client moved his whole arm to play rather than bending his wrist to play high-hat.	1.The client was most likely expressing his freedom in that I allowed him to play in any way he wanted.

	1.I prompted the client to play the high-hat *Billie Jean* rhythm for 5 minutes. 2.I prompted the client to play the high-hat *Billie Jean* rhythm for 5 minutes.	The Client able to use the correct technique 1.The Client bent his wrist to play the high-hat part. 2.The client corrected his grip.	1.The Client had been using his whole arm to play the rhythm. However, over time the time began to use the wrist. It seems that as he became more tired using his whole arm, he naturally started to use his wrist more. 2.It is unknown what could have prompted this behavior, but a likely scenario would be that his grip was coming loose, and he had to adjust it to hold onto the stick.
	I tasked the client with playing the bass drum section of the *Billie Jean* pattern.	The client timing fluctuated when playing the bass drum pattern.	The client started quickly but slowed down over time and eventually stopped playing. The client most likely got physically tired of playing the drum.
	1.I tasked the client to play the *Take On Me* pattern.	The client followed the instructions 1.The client played Take On Me correctly.	The client played rhythm fluently and had no tempo fluctuations.
	I tasked the client with playing the *Take On Me* pattern.	The client not focused on playing the drum	The client most likely had become comfortable playing the rhythm and did not think he needed to pay as much attention as when he first learned the pattern.

Session 11 (11/25/20)	N/A	N/A	N/A

Session 12 (12/02/2020)	I prompted the client to play *Billie Jean* rhythm until he was ready to move on.	The client ended the review section.	The client plays until he seemed to be physically tired.
	1.I prompted the client to play the *Sweet Child O'Mine* bass drum pattern.	The client unable to use the correct technique 1.The client leaned on his leg that played the bass drum. 2.The client played rhythms faster than usual.	1.The client seemed to become tired quickly. Most likely because of the resistance pushing against his leg.
	I prompted the client to play the *Sweet Child O'Mine* bass drum pattern.	Shaking of arms	The client became excited that he was playing the bass drum correctly.
	1.The client waited for me to pull up the following rhythm. 2.I prompted the client to play the *Sweet Child O'Mine* snare drum part.	Scrunching of shoulders.	1.No known reason why. 2.The client became excited about what he played. However, the client could also have become overstimulated but less likely.
	I tasked the client with playing the *Africa* pattern.	The client moaning while playing.	The client has struggled with this pattern for most sessions and is most likely taking a significant amount of effort to play it.

Session 13 (12/09/2020)	I directed the client to play the high-hat rhythm.	The client stopped playing 2 minutes after playing.	The client most likely struggled with the rhythm, and since he could stop at any time, he decided to end it earlier than usual.

	I prompted the client to play the *Billie Jean* rhythm.	The client decided on a tempo that he could play.	The client stated that he chose that tempo so he would not make it too hard on himself.
	1.I tasked the client with playing the *Sweet Child O'Mine* review. 2.I tasked the client with playing the *Africa* snare/bass drum pattern.	The client bit himself.	1.The client most likely was getting excited about how well he was playing the rhythm. 2.The client became excited about playing the drum set.
	I tasked the client with playing the Take On Me rhythm.	The client moaned while playing.	The client was probably struggling with playing the rhythm of the song.

APPENDIX E

Session #	Session Changes	Client Response
1 (09/09/2020)	First Virtual Session	• Client lack of focus • Reduced drum technique

2 (09/16/2020)	• Focus only on specific rhythms
	• Having the client play a specific rhythm at halftime
	• Use of visuals to teach rhythms
	• Use of scaffolding for learned rhythms
	• Repeating Rhythm Strategies
	  ○ Writing out multiple measures of the same rhythm
	  ○ Using an arrow to direct the client to the beginning of the rhythm
	• Use of timer in session
	• Use of hand signals.
		• Increased rhythm accuracy
		• Increased speed in learning rhythm
		• Increase fluidity of multiple measures of the same rhythm
		• Reduction in biting himself
		• Reduced expression of frustration
		• lack concentration during timed sections of the session
		• The hand signals allowed me to communicate with the client while he was playing.

3 (09/23/2020)	• Addition of Pre/Post-test Visuals ○ Given 30 secs to read • Review of learned drum patterns • Introduction of 16^{th} notes in playing and new syllable in subdivision • Inclusion of sticking within visuals • Use of black text box to hide sections of the targeted rhythm	• First successful playthrough of pre-test • The client was showed more fluidity with play the previously learned patterns. • The client struggled with counting and playing the new subdivision/ counting syllable • Sticking seemed to make the playing of the rhythm even more difficult rather than a helpful tool.

4 (10/10/2020	• Switching from a drum numbering system to saying the actual names of the drums • Having client play finalized rhythm slowly	• It allowed the client to identify the correct drums better to play. • The naming system allowed the client to have proper labels for its pictographic representation. • Improved client initial rhythm accuracy
5 (10/14/2020	• Increased the number of times the client played through pre/post-test to four times • I implemented self-directed practice time.	• Gave client more chances to play the pre/post-test correctly
6 (10/21/2020)	• Rewrote targeted rhythms to be more difficult for the client • Did not give the client a specific number of tries to play the pre/post-test. • Added session schedule • I reformatted the session schedule to target rhythm and review rhythm alternates. ○ I referred back to the schedule at the end of each task.	• Improved client engagement • Increased speed in learning rhythms • Client presenting less distracted behavior • The client's playing of target rhythm was not accurate. • Less accurate playing targeted rhythm with a song recording.
7 (10/28/2020)	No changes made	No changes made
8 (11/04/2020)	• Use of a shoe as a physical example • Use of animals as a representation of different speeds of drum patterns	• The client's bass drum rhythm became smoother than he had previously played. • The client adjusted his tempo more accurately when given the context.
9 (11/11/2020)	• Switch to 30 seconds to perform pre/post-test	• The change gave the client more opportunities to

		fail/succeed at testing procedures.

10 (11/18/2020)	• Start of the move to client-directed session
	  ○ Move to all session portions on a timer
	  ▪ 5 minutes
		• More frequent technique errors
		• The client corrected the technique without prompting
		• The client did not improve how fast he was able to play rhythms

11 (11/25/2020)	N/A	N/A
12 (12/02/2020)	• Moved to 5 minutes focused work on target rhythm sections with the self-directed amount of time on review sections	• Reduced amount of time spent on review sections • The client plays till he is tired when he gets to choose when to stop practicing. • Increased rhythm accuracy of more difficult rhythms
13 (12/09/2020)	• I Moved to a completely self-direct session	• Shorter practice times of targeted rhythms • Practicing unprompted rhythms.

VITA

Therapy Experience

Sun Behavioral Houston- October 2017-June 2019

Planning, implementing, and notating music therapy to address multiple needs, including teaching coping skills within a psychiatric hospital setting. Populations include kids anger management disorders to geriatrics.

Therapeutic Services of the Southwest- Contract Music Therapist in the Houston Area-June-October 2016, May 2017 to June 2019

Planning, implementing, and notating music therapy to address multiple needs, including teaching coping skills to clients between the age of 15-27 years of age with intellectual, and/ or physical disabilities like cerebral palsy, blindness, deafness, and autism.

Scoggins- Contract Music Therapist in the Houston Area-June-September 2018 to June 2019

Planning, implementing, and notating music therapy to address multiple needs, including teaching coping skills to clients between the age of 15-27 years of age with intellectual, and/ or physical disabilities like cerebral palsy, blindness, deafness, and autism.

Dunn Therapeutic Services- Contract Music Therapist in the Houston Area-June-September 2018 -June 2019

Planning, implementing, and notating music therapy to address multiple needs, including teaching coping skills to clients between the age of 15-27 years of age with intellectual, and/ or physical disabilities like cerebral palsy, blindness, deafness, and autism.

Internship: Veteran Adults within a Hospital-Charlie Norwood VA Hospital Augusta, GA Setting June-December 2015

Using music to address multiple needs across multiple populations, including teaching coping skills to substance abuse client's, teaching music skills and writing music with client's diagnosed with PTSD, and other psychological disorders, stimulating social interaction between veterans and 4-year-old, and co-treatment with a Speech and Language Pathologist

Adults Recovering from Surgery and Physical Trauma - Huntsville Memorial Hospital Huntsville, TX - Fall 2014

Using interventions like PSE and TIMP to address gross and fine motor movement in the arms and legs, arm strength, and using music to address pain perception.

Children with Speech Delays - SHSU Clinic Huntsville, TX - Spring 2014

Addressing voluntary auditory speech production issues through interventions like client song creation and vocal warm-ups sung on targeted letter sounds.

Pre-K Children - Summit Christian Academy Huntsville, TX - Fall 2013

Teaching basic academic knowledge; letters, numbers, and behavior modification

Certification

Music Therapy Board Certified-2021-2026

Education

Sam Houston State

Master's in music therapy **May 2021**

Bachelor's in music therapy **December 2015**

Minor in Psychology

Alvin Community College

Associate of Health Science **October 2016**

Associate of Arts in General Studies **May 2012**