Harmonizing Voices: Exploring the Integration of Music and Speech Therapy in Enhancing Communication Skills in Children with ASD

A research paper by: Isabella Rodriguez-Kong

Undergraduate Thesis
Department of Communication Disorders
SUNY New Paltz
In Fulfillment of the Requirements for the Honors Program
May 2024

Abstract

This research paper examines the impact of music and music therapy techniques in enhancing the communication and social skills of children with Autism Spectrum Disorder (ASD). The studies addressed in this paper demonstrate how music therapy, such as Improvisational Music Therapy (IMT), has been shown to help improve non-verbal communication behaviors such as joint attention and turn-taking in children with ASD. This paper also discusses evidence supporting the idea that children with ASD who engage in music therapy demonstrate great improvements in verbal communication and social skills, such as understanding and perspective-taking. This research reveals that music is beneficial in enhancing sensory and emotional regulation, creating an environment conducive to effective communication. Overall findings support the idea that music therapy can be used in collaboration with speech therapy to help improve the communication skills of children with ASD.

Keywords: Communication disorders, music therapy, autism spectrum disorder, vocal communication, joint attention, social skills, sensory integration, emotional regulation

Many individuals enjoy listening to music, singing, or playing an instrument as a relaxing and entertaining hobby. While some might think of music as being primarily for fun and enjoyment, engaging in music is also beneficial when it comes to activating some of the most extensive networks of the brain, including the brain regions commonly involved in language and communication. Speech is predominately processed in the left hemisphere of the brain, while music is processed in all areas, such as those crucial for speech like Brocas and Wernike's area. Research shows an anatomical overlap of activity when it comes to understanding musical and linguistic syntax and that the brain processing mechanisms for these cognitive domains interact in the left inferior frontal gyrus of Broca's area (Kunert et al., 2015). The interaction between these two areas is a significant reason why musical training and music therapy are so beneficial in improving linguistic and communicative skills.

Music therapy is "an established health profession in which music is used within a therapeutic relationship to address physical, emotional, cognitive, and social needs of individuals" (AMTA, n.d.). In this type of therapy, a trained music therapist first assesses the client's goals, musical taste, and background before initiating treatment. This allows them to tailor each session based on their needs and provide treatment through activities such as creating music, singing or rapping, playing an instrument, moving/dancing to music, listening to music, talking about music and the emotions brought out by it, and more (Cleveland Clinic, 2023). Music therapy can be used to address many different healthcare and educational objectives, including promoting wellness, managing stress, expressing feelings, regulating behavior, and improving social skills. There are a variety of populations that can benefit from music therapy, from those with physical chronic, and acute pain to those with developmental and learning disabilities (AMTA, n.d.). Music therapy is often used to help provide an outlet for

communication for those who have difficulty expressing themselves verbally. One population in which the significant communicative benefits of music therapy techniques have been evident is children with Autism Spectrum Disorder (ASD).

Autism Spectrum Disorder, a complex neurodevelopmental disorder, involves challenges with cognitive development, socialization skills, and sensory development. Children with ASD often attempt to avoid social contact and have difficulty interpreting social cues. They commonly demonstrate challenges with non-verbal communication behaviors important for fostering relationships, specifically when it comes to acquiring joint attention and turn-taking skills. Joint attention involves "directly engaging and sharing experiences with others through eye contact, pointing, listening, and sustained focus," skills that children with ASD struggle with beginning at six months of age (Swoish, n.d.). They also face difficulty grasping the reciprocity and social timing involved in turn-taking interactions (initiating communication with two or more people and responding). Along with these nonverbal challenges, children with ASD also demonstrate verbal communication difficulties, including delays in language development, limited vocabulary, and trouble articulating sounds (School of Education and Human Sciences KU, 2023). While these challenges can impede effective socialization, engaging in musical activities can provide an outlet for communication and self-expression for children with ASD. Research shows that the use of music therapy techniques, such as Improvisational Music Therapy (IMT), is effective in improving communicative behaviors including joint attention, vocalizations, and prosocial behaviors in children with ASD.

Improvisational Music Therapy (also referred to as Creative Music Therapy) is a type of music therapy in which therapists and clients use various instruments to create melodies while improvising with one another. Studies have recognized that engaging in musical activities

through IMT provides children with ASD an alternative means of expressing themselves, interacting socially, and communicating, which enhances their ability to engage in behaviors like joint attention and turn-taking (Swoish, n.d.) A study examining the effects of IMT on joint attention behaviors in preschool children with ASD showed that IMT was more effective than play therapy in promoting joint attention and non-verbal social communication. 10 Preschool children with ASD between 3 and 5 years old were recruited to participate in this study. Each participant had 12 weekly 30-minute IMT sessions, which were compared with a control condition of 12 weekly 30-minute play sessions with toys. Participants were randomly assigned to one of two groups. Group one (five children) received 12 music therapy sessions, each session consisting of 15 minutes of child-led activities, and 15 minutes of clinician-directed activities that introduced modeling and turn-taking. Group two (five children) received 12 play therapy sessions with the same conditions. The ESCS, a structured play-based assessment measuring non-verbal social communication skills in infants ages 6-30 months, was used to evaluate Initiation of Joint Attention (IJA) (eye contact, pointing, and gesturing) and Response to Joint Attention (RJA) (following a point or gesture). ESCS results depicted that most participants showed greater improvements in the frequency and duration of eye contact and turn-taking after the music therapy condition than after the play condition. This improvement in joint visual attention skills helps show the significant effects of IMT on nonverbal communication (Kim, et al., 2008).

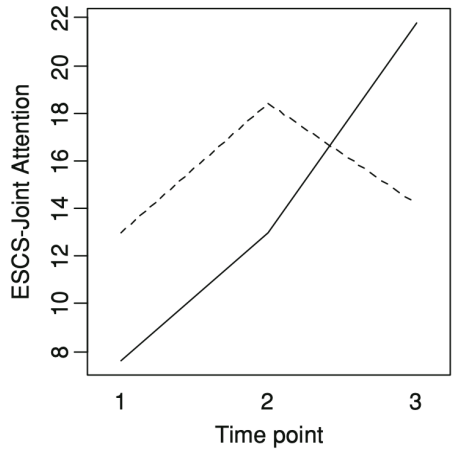

Fig. 2 Pooled scores of joint attention—ESCS

Studies have also shown that Improvisational Music Therapy has a significant effect on the enhancement of vocalizations and communication interaction in children with ASD. Researcher Cindy Lu Edgerton conducted a study on the communicative behaviors of autistic children before and following Nordoff-Robbin's music therapy intervention, which is a type of Improvisational Music Therapy in which the therapist uses the client's actions as a guide for their improvisation. 11 Children diagnosed with ASD, ages 6-9, were recruited for this study, 5 of whom were nonverbal, and 4 with minimal functional language skills. Each child participated in individual music therapy sessions 30 minutes a week for 10 weeks. The musical materials that were used during treatment included a piano, a snare drum, and a 16-inch symbol. During each session, the therapist created music by playing the piano and/or singing, and each child had an opportunity to sing or play one of the instruments back. Communication responses, including speech production (verbal/vocal), gestural, and instrumental behaviors were measured before and after the ten therapy sessions using the Checklist of Communicative Responses/Acts Score Sheet (CRASS) (Edgerton, 1994). The overall scores on their scale for all subjects put together had an increase in communicative responses from 15 responses per session to about 50. Their

verbalizations also increased by 5 responses on average. Each of the children demonstrated gains in verbal, vocal, and instrumental behaviors influenced by the therapists' improvisation, including matching a beat, imitating a rhythm, melodic give-and-take, etc (Edgerton, 1994). This study depicts how improvisational music therapy, specifically using the Nordoff-Robbins method, can help lead to significant increases in the vocal and interactive communication behavior of autistic children.

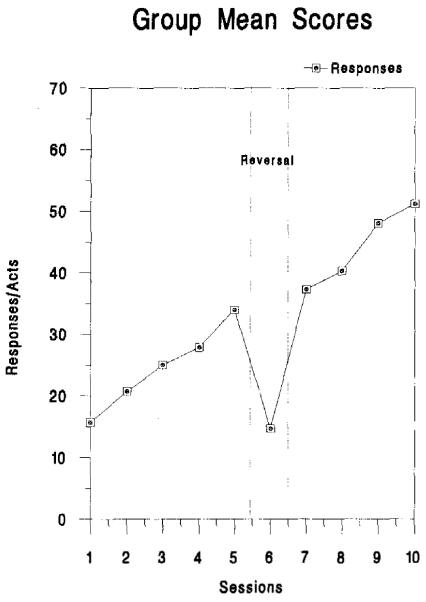

FIGURE 1.
Group Mean Communicative Responses/Acts across 10 Sessions.

IMT has also been shown to improve the development of prosocial behavior, such as understanding/perspective-taking, and initiating and maintaining interactions, in children with ASD. One study by Bharathi and colleagues focused on whether IMT could lead to enhancements in the social skills of autistic children. This study was a pre-test/post-test design and follow-up among 52 children ages 6-12 years old with mild to severe ASD. They were assigned to two groups: active and passive. The active group engaged in singing, dancing, and playing with the musical instruments while listening to the music, while the passive (placebo) group listened to music alone without any social interaction. Each group received three

35-minute sessions a week for three months. Four songs of different genres were played during each session, one being religious, one instrumental, one folk song, and one western pop song. The TRIAD social skills assessment (TSSA) was used to evaluate the social skills of both groups of children before and following the MT intervention. Results showed a significant increase in total social skill ability, including understanding/perspective-taking capability and the ability to respond and maintain interactions with others, among the active group compared with the passive MT intervention group (Bharathi et al., 2019). This goes to show how IMT and music therapy techniques can be advantageous to the development of social skills in children with ASD.

Table 4 Result for understanding/perspective taking assessment between the two intervention groups

Source	Sum of squares	df	Mean square	*F*	Significance	Partial eta squared
Pre-test	401.047	1	401.047	6.976	0.01	0.125
Group	327.790	1	327.790	5.702	0.02	0.104
Error	2816.799	49	57.486			
Total	21,200.000	52				

With pre-test data as covariates, this table shows the analysis of understanding/perspective taking assessment between the two groups. There is a significant increase in this ability among the active group when compared to passive group

Another way in which music and music therapy can be used to help improve the communicative behaviors of children with ASD is through its use during sensory integration therapy (SIT). Sensory integration is a very powerful tool for communication in those who have difficulty expressing themselves verbally, such as individuals with ASD. In order to effectively communicate, we have to process many non-verbal, sensory clues that aid in understanding one another. These clues, which include the tone of someone's voice, facial expressions, and body language, are important in conveying and comprehending spoken messages. Individuals with

ASD who experience sensory processing challenges may experience increased stress, hindering their ability to communicate properly (Riggs, 2024). Sensory integration helps a person to feel safe and comfortable in their communication environment, and to sustain an ideal state of alertness and focus through managing and structuring the sensory input they are receiving. Furthermore, it helps to promote emotional control, which assists in creating a beneficial environment for complex and meaningful communication. Sensory regulation also has a significant impact on attention and focus, which are both essential elements for communication and social interaction. When individuals are dysregulated, they have difficulty attending to and focusing on communication activities, and the person with whom they speak. Individuals with ASD may struggle to separate background noise and sensory stimuli from the voice they are trying to focus on, thus impacting their ability to concentrate on their social partner and activities.

The sensory integration approach to music therapy aids children with ASD who experience heightened sensitivity to stimuli, are under-responsive, or exhibit sensory-seeking behaviors to regulate their physical responses. Music therapy offers a valuable approach to addressing sensory sensitivities by providing a controlled and organized sensory environment. Music therapists conducting sensory integration therapy carefully select and tailor their techniques to meet the needs of the individuals they treat. The rhythmic arrangements, melodic sounds, and repetitious elements of music can assist in regulating their sensory mechanisms and help increase focus in various settings (Moller, 2023). For example, therapeutic listening, which is one type of music therapy intervention, can aid in desensitizing individuals with ASD to particular sounds and help them develop coping mechanisms for sensory overload. The Therapeutic Listening program entails a child listening to individualized music selections two

times a day, 30 minutes a day, each day of the week. The child can either engage in play or sensory activities while listening or listen quietly. Depending on the child's particular goals and needs, participation in this program can last from 8 weeks to several months. By using therapeutic listening with music to address sensory sensitivities, children with ASD can experience enhanced focus and attention, self-regulation, oral motor skills/motor planning, and social skills and communication (Cleveland Clinic, n.d.).

In addition to therapeutic listening, another type of sensory integration therapy with music that can be used to help improve communication behaviors in children with ASD is the Integrated Listening Systems Program. This program is a type of music therapy in which a child uses headphones to listen to classical music while participating in multisensory movement activities, including balance, coordination, and visual exercises. Specific sound vibration frequencies and patterns are delivered through specialized headphones that conduct sound through both bone and air. This therapy aims to help enhance the neurological basis for processing sensory information by employing these particular sound frequencies and patterns to activate the brain. The Integrated Listening Systems program is typically conducted for 30-60 minute sessions 2-5 times a week for up to 6 months, but shorter versions are also available. This program has been found to help reduce children with ASD's sensitivity to certain sounds and improve their ability to process sounds and regulate their emotions. In addition, ILS also helps to improve overall behavior, social skill abilities, and concentration in children with developmental disorders (STAR Institute, n.d.).

The Alert Program (AP), also known as "How Does Your Engine Run?" is an additional program that utilizes music for sensory integration and self-regulation. This specifically designed program is intended for preschool-age children or older with attention and learning difficulties,

including children with ASD. The Alert Program helps these children understand self-regulation related to arousal states and includes clearly defined steps to help teach them how to be more aware of their sensory states. It uses the analogy of a car engine to refer to the child's level of alertness and arousal. For example, if a child's engine is running high, this might mean they are feeling very hyper, angry, or upset and need to calm their mind and body down. If their engine is running low, they might be feeling sleepy, sick, or tired and have trouble focusing because they need more energy. The goal of this program is to help children become aware of their own emotions and be able to self-regulate through the use of music. If a child needs to slow down their "engine" and calm down, they are exposed to slow, steady rhythmic music, such as classical music or nature sounds. Music with a repeated, predictable input can help to achieve this, such as the sound of steady drums. If a child needs to speed up their "engine," or become more alert, they might listen to fast-paced music, with rapidly changing or irregular beats. This might include rap, jazz, or rock music with quick tempos. This helps children to monitor, maintain, or change their level of alertness based on the task at hand and self-regulate, which is very important for effective communication (Pt4kids, n.d.).

Overall, engaging in music and music therapy techniques can be extremely beneficial in helping children with ASD experiencing communication challenges improve their language and social skills and behaviors. Music provides them with an alternative means of communication, giving them an outlet to communicate and express themselves in a new way. Along with helping to enhance their non-verbal communication skills such as joint attention and turn-taking, the use of music in a therapeutic context has been found to help significantly increase the production of speech sounds/vocalizations and social interaction skills in children with ASD. Furthermore, music can help with sensory and emotional regulation, helping children with ASD to improve

their emotional control, and ability to focus and process linguistic information. The ability of music to help individuals sustain focus and feel safe helps create a beneficial environment for complex and meaningful communication. These findings support the idea that music is a very advantageous tool that can be used in collaboration with speech intervention strategies to help improve and develop the communication skills and behaviors of children with ASD.

References

American Music Therapy Association (AMTA). (n.d.). *About Music Therapy and AMTA*. American Music Therapy Association (AMTA). https://www.musictherapy.org/about/

Bharathi, G., Venugopal, A., & Vellingiri, B. (2019). Music therapy as a therapeutic tool in improving the social skills of autistic children. *The Egyptian Journal of Neurology, Psychiatry and Neurosurgery*, *55*, 1-6.

Cleveland Clinic. (2023, July 18). *Music Therapy*. Cleveland Clinic. https://my.clevelandclinic.org/health/treatments/8817-music-therapy

Cleveland Clinic Children's. (n.d.). *Therapeutic Listening*. Cleveland Clinic. https://my.clevelandclinic.org/pediatrics/departments/therapeutic-listening

Edgerton, C. (1994). The Effect of Improvisational Music Therapy on the Communicative Behaviors of Autistic Children1. Journal of Music Therapy, 31(1), 31-62.

Kim, J., Wigram, T., & Gold, C. (2008). The effects of improvisational music therapy on joint attention behaviors in autistic children: a randomized controlled study. *Journal of autism and developmental disorders*, *38*, 1758-1766.

Kunert, R., Willems, R. M., Casasanto, D., Patel, A. D., & Hagoort, P. (2015). Music and Language Syntax Interact in Broca's Area: An fMRI Study. *PloS one*, *10*(11), e0141069. https://doi.org/10.1371/journal.pone.0141069

Moller, R. (2023, November 10). *Music Therapy and Autism*. Above & Beyond ABA Therapy. https://www.abtaba.com/blog/music-therapy-and-autism#:~:text=Managing%20Sensory%20Sensitivities,-Sensory%20sensitivities%20are&text=Music%20therapists%20carefully%20select%20and,autism%20regulate%20their%20sensory%20systems.

Riggs, C. (2024, February 2). *The power of sensory integration: Enhancing communication for non-speaking individuals*. Autism Spectrum News.

https://autismspectrumnews.org/the-power-of-sensory-integration-enhancing-communication-for-non-speaking-individuals/

School of Education and Human Sciences, University of Kansas. (2023, December 26). *Social Difficulties in Autism Spectrum Disorder*. KU SOE. https://educationonline.ku.edu/community/social-difficulties-in-autism-spectrum-disorder

Swoish, A. (n.d.). *Effects of Improvisational Music Therapy on Children with ASD*. Applied Psychology OPUS. Salomon-Gimmon, M., & Elefant, C. (2019). Development of vocal communication in children with autism spectrum disorder during improvisational music therapy. *Nordic Journal of Music Therapy*, *28*(3), 174–192. https://doi-org.libdatabase.newpaltz.edu/10.1080/08098131.2018.1529698

STAR Institute. (n.d.). *Integrated listening therapy*. Sensory Health. https://sensoryhealth.org/basic/integrated-listening-therapy