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Benefits of Music Therapy When Used Collaboratively with Language Therapy

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Introduction

Music is a large aspect of every culture. Music can calm a child in distress, create friendships, give people a way to express themselves, and even define the differences between generations and cultures. Famous Danish author, Hans Christian Andersen once said, “Where words fail, music speaks.” (Spencer, 2017). Researchers have studied how music can influence a person’s ability to absorb knowledge, as well as induce fluent speech for a stutterer. However, the effects of music therapy in combination with language therapy for children with language delays have not been studied to their fullest extent.

For the past year and a half, I have been studying the existing research as well as interviewing speech language pathologists who have utilized music therapy. In this thesis paper, I will summarize the existing research, explain what I learned in my interviews, conclude how the information I gathered is useful, and formulate a plan for the next steps in my research. In each of these I will attempt to provide support for the benefits of using music therapy in combination with language therapy.

Previous Research

The History Of Music Therapy

Music has a prominent presence throughout history. Many indigenous people groups used music and dance in their healing ceremonies, and the ancient Greeks believed that music could restore peace and harmony to the body and soul (Howland, 2017). Charles Darwin even speculated that language came from a proto-music type of communication before semantic communication (Patel, 2011). Eventually, psychologists began researching the way music affects the brain.

The concept of music therapy has been around since the late 1700s. However, it didn't become a true profession until after World War II. Some musicians had the idea to visit veteran's hospitals around the country and play for injured veterans in hopes of somehow giving back to them for all that they had given for our country. The veterans, who suffered from physical and emotional trauma from the war, responded so well physically and emotionally that the doctors requested to hire musicians for the hospital (*History of Music Therapy*, 1998).

One of the most prominent names in music therapy is E. Thayer Gaston, known as the "father of music therapy." After a year of studying music in college, Gaston changed direction and pursued a degree in pre-medicine. However, he did not have the money to pay for medical school after college, so instead taught music for a period. Gaston went on to earn a doctoral degree in educational psychology in 1940. Though there were already some using music in hospitals when Gaston began his studies, they were not using it in a systematic and scientific way. Gaston dedicated years to creating a systematic body of research concerning music therapy. While focusing on the mental health benefits of music and other arts in regard to fighting anxiety, his research lead to crucial advancements in the field of music therapy (Gracida, 2019).

Music's Effect On The Brain

Music involves more parts of the brain than any other stimuli processed by the brain (Maines, 2011). Specifically, the parts affected include the motor cortex, cerebellum, auditory cortex, prefrontal cortex, hippocampus, sensory cortex, visual cortex, nucleus accumbens, and amygdala (McCollum, 2019). Each part of the brain is affected differently by various aspects of music.

Rhythm activates the motor cortex and cerebellum when we demonstrate any kind of physical reaction to rhythm, such as tapping our feet or fingers, or dancing. The belt and parabelt of the auditory cortex are also activated by figuring out a song's rhythm. The auditory complex is also used to recognize and understand pitch and tone in addition to analyzing the melody and harmony of a song. Research also implicates the involvement of the cerebellum and prefrontal cortex in this process. The prefrontal cortex is activated by the analysis our brain does to attempt to predict the beat or melody of a song. (McCollum, 2019)

The hippocampus has the ability to store the lyrics and melody of a surprising number of lyrics and melodies (McCollum, 2019). Most people are more likely to remember a song they love before being able to recall something they spent days trying to memorize (Foo, 2017, 5). Clive Wearing, musician and musicologist, suffered a brain infection called herpes encephalitis, and it left him with a memory span of mere seconds. Moreover, he forgot his entire past due to retrograde amnesia. Despite forgetting everything around him, he was, as Dr. Oliver Sacks wrote in *The New Yorker*, "acutely, continually, agonizingly conscious that something bizarre, something awful, was the matter" (Sacks 2020). Clive was deprived of life despite technically being alive.

After twenty years of communicating with Deborah Wearing about her husband, Dr. Sacks finally met Clive Wearing in 2005. Dr. Sacks noted that Wearing could only remember things if he was physically experiencing them, and then immediately forgot it all if he thought too much about it. One of the most bizarre characteristics of Wearing's condition was despite the loss of his past memories and the inability to create new memories, he still possessed an outstanding knowledge of music, and he was able to sight-read, play piano and organ, sing, and conduct a choir as if nothing had happened. As soon as he began playing or singing, he seemed wholly himself again. He could anticipate where the piece was going and execute it with more than just mechanical muscle memory, but also with artistry and emotion. (Sacks, 2020).

Wearing's ability to seemingly transcend his amnesia while performing musical acts could be due to the fact that any music act engages the cerebellum, motor cortex, sensory cortex, and visual cortex. Music, in that sense, could be said to not be a memory task at all because it is not set in the past. Everything about music is in the present. Even the emotions that music triggers become something present, even if they were felt decades before. The brain areas most responsible for the emotional responses music elicits in a listener or a player are the nucleus accumbens, amygdala, and cerebellum.

Music and Language: The Similarities and Overlaps

In the past, music and language were thought to be two different neurologic stimuli. It was believed the brain processed speech and language in the left hemisphere, while music was processed in the right hemisphere. With the advancements scientists have made in brain imaging technology, it has become clear that music and language have many similarities.

In terms of structure, both music and language are made of a sequence of digitalized sounds with rhythm, pitch, and some kind of structure. Dr. Aniruddh Patel, a professor of

Psychology at Tufts University, has spent his career studying music cognition. One of his specific areas of interest is the relationship between music and language. In his study of the overlap of linguistic syntax and musical syntax in their cognitive processing, Patel (2003) describes the relationship between the two syntaxes as "paradoxical". Neuropsychology has shown through ample research and documentation that there are differences in the processing of the syntaxes. However, neuroimaging shows evidence that the two overlap in their processing. To solve this dilemma, Patel (2003) proposes the overlap in linguistic and musical syntax is at the processing level instead of the representational level.

Neurologically, music and language share many areas of the brain. According to a study by Brown, Martinez, and Parsons (2006), the bilateral Supplementary Motor Area, left Primary Motor Cortex, bilateral Premotor Cortex, left Pars Triangularis, left Primary Auditory Cortex, bilateral Secondary Auditory Cortex, Anterior Insula, and left Anterior Cingulate Cortex are all activated during both melody generation and sentence generation. In his research, Dr. Patel (2006) found fMRIs that showed activation of the areas of the brain used to process language during the musical syntactic processing. He also discovered an fMRI showing the inclusion of Broca's and Wernicke's areas in the processing of harmonics, which are traditionally considered designated language areas.

How Music Has Previously Been Used With Speech Therapy

Music therapy has most notably been used collaboratively with language therapy for treatment of language delays in children with autism spectrum disorder. In her article entitled "Why Does Music Therapy Help in Autism?", Neha Khetrapal (2009) details a theory on why music therapy is an effective intervention method for emotional recognition in Autism Spectrum Disorder (ASD). She proposes that the encoding of tonal pitch is the underlying mechanism that

explains how autistic individuals who are unable to perceive and interpret social emotional cues can process emotional cues in music.

When used to treat language delays in children with ASD, a study showed that music therapy proved more beneficial than other types of therapies in the remediation of some of the core problems with ASD such as social interaction and communication (Geretsegger 2014). In another research study, Hayoung Audrey Lim explored how the perception of musical stimuli would impact the perception and production of speech and language in children with ASD. She found that music therapy can be more effective than traditional speech therapy for speech production in children with low functioning ASD. This led to her conclusion that children with ASD perceive important linguistic information embedded in musical stimuli and can verbally produce the words as functional speech, thus proving that music is an effective way to enhance speech production in children with ASD (Lim 2010).

Furthermore, a team of researchers found that music therapy could be utilized as an effective treatment method for all types of developmental delays. The changes they observed in their patients were found to be clinically significant. Music therapy appeared to facilitate and enhance the rate of development in children who were in some way delayed (Aldridge et. al., 1995)

The combination of music therapy and language therapy has also been heavily researched in the treatment of children with severe communication impairments. In their study “Integrating Music Therapy Services and Speech-Language Therapy Services for Children with Severe Communication Impairments: A Co-Treatment Model,” researchers found their case study indicated increased engagement in the classroom after integrating music therapy and speech therapy treatment strategies (Geist, 2008).

Another type of language disorder where music therapy and language therapy has been thoroughly researched is aphasia due to stroke or brain injury. The idea of using music therapy with post-stroke aphasia patients was developed when rehabilitative practitioners like SLPs realized that their patients could sing phrases that they couldn't say. This led to patients being able to speak/sing phrases to the tune of familiar songs. By frequently repeating phrases in song, patients are able to gradually move from singing the phrases to saying the phrases in normal speech (*The Power of Music*, 2018). In 2008, Kim and Tomaino also found that persons with aphasia show improved articulation and prosody of speech in musically.

In 2013, a group of researchers studied the effect of neurologic music therapy on patients with aphasia after suffering from strokes. Their research determined that while both types of therapy were effective in improving the aphasia quotient in chronic stroke patients, only neurologic music therapy was effective in improving the aphasia quotient in subacute stroke patients (Lim et. al., 2013).

The use of music therapy with language therapy has also been researched as a treatment plan for patients with cochlear implants and acquired brain injury (Gfeller et. al., 2011 & Kennelly et. al., 2001). In each of these areas, music therapy proved useful.

Interviews

In order to better understand the realistic applications of music therapy in relation to speech therapy, I interviewed three SLPs who have used music in some capacity within their therapy sessions. Their use of music ranged from formal music therapy to simply using songs to engage clients.

Gina Murray

I first interviewed Gina Murray. Mrs. Murray has used music with a variety of different clients, though her only formal training is in Interactive Metronome, a training and assessment tool used in multiple disciplines. She has noticed that music is slightly more effective with her younger clients. One way in which she incorporates music into her treatment is with fluency clients, where she has them sing words they are stuck on (instead of saying them). With a voice client who needed therapy after having a brain tumor removed, she has utilized the Audacity recording software and instructional singing videos to help him improve his pitch and resonance. Her client can now produce eight notes after initially being able to produce only one.

Mrs. Murray also uses music frequently in her sessions with clients on the autism spectrum. She stated, “They just seem to hear music better.” Not only is music useful in teaching language concepts, she notes that her clients respond better to questions like, “What is your name?” when she adds a melody to it. Music simply seems to get through to her clients better than speaking. One interesting observation she made is how the clients seem to teach themselves language by listening to music. As a possible explanation for what she observed, she proposed the idea that attaching a melody may help them recall the concepts better. She told me that therapists must be creative when working with a child whose processing system is impaired

because they don't learn like others. If they were going to learn these concepts the neurotypical way, they already would have.

When asked how she decides whether to use music with a client, Mrs. Murray stated that she is "more of a right brained person." She explained how small children simply learn things more effectively when music is involved. This is why we teach children important concepts like the ABC's, days of the week, and so many other things through songs. She specifically mentioned the Hap Palmer series, which has been a beneficial tool in her therapy. Hap Palmer writes educational children's music and "pioneered the integration of music and movement in the area of early childhood education." (*About Hap Palmer,* 2021). Mrs. Murray said, "It just seems like when you teach through the music, they retain the information better."

Before my conversation with Mrs. Murray ended, I asked if there was anything else she thought I should know. She told me it is important to think outside the box with clients who do not think the way most children do. Music can be an amazing tool to use for that. She also said she wished more people would use music in therapy because of how helpful it can be for these children in learning how to communicate with the world.

Becky Mitchum

The second SLP I interviewed was Becky Mitchum. Mrs. Mitchum was a professional violinist in Europe and the Arkansas Symphony, started the string program at Tuft University, and was trained in Suzuki pedagogy to teach violin to children as young as age two. She eventually returned to school and became an SLP and certified brain injury specialist. Now, she works as a SLP on the rehab team at the White River Medical Center Outpatient Clinic in Batesville.

Though her patients are primarily adults, Mrs. Mitchum currently works with a four-year-old girl diagnosed with HIST1H1E Syndrome. HIST1H1E Syndrome is a recently discovered, extremely rare diagnosis. As of December 3, 2020, only 47 individuals have been identified with this variant gene. Its characteristics include intellectual disability, ranging from mild to severe, and distinctive facial gestalt. Individuals with this syndrome also display these issues: delays in cognitive and motor development; abnormal brain MRIs; and behavioral issues such as anxiety, phobias, obsessive behaviors, ADD, aggression, auditory hypersensitivity, and ASD traits (Burkardt & Tatton-Brown, 2020).

When Mrs. Mitchum first began treating the little girl, she worked on syllables in isolation, but has now worked up to whole words and sometimes two-word phrases. Mrs. Mitchum achieved this progress by matching music to speech and speech to melody. She stated, “Music is the modality for everything.” Her hope is the auditory/sound discrimination training will carry over into the client’s articulation of speech sounds.

Not only has she targeted speech and articulation goals, but she has also used music to target language objectives such as prepositions, turn taking, and so many more areas in which Mrs. Mitchum has seen great improvement. The little girl started with a pretend violin made out of a macaroni and cheese box with a paint stir stick as the neck. Now that the little girl has learned to take care of her pretend violin, the parents decided to rent a violin so that Mrs. Mitchum can teach her to play while she works on her therapy objectives.

Mrs. Mitchum believes that through the combined efforts of music therapy and speech therapy, she can help her client communicate with the world more effectively. In order to continue in her efforts to do this to the best of her abilities, Mrs. Mitchum has signed up for

Neurologic Music Therapy training. She pointed me toward many authors and professors in this field who became beneficial in my research, namely Dr. Aniruddh Patel.

The use of anything evidence-based as a treatment tool in therapy is something Mrs. Mitchum is extremely passionate about. She firmly believes that if something is useful in therapy and has evidence proving its benefits, we as SLPs should be willing to consider the benefits it could bring to our clients. She explained, “If you have the experience and you understand the why and the how behind what you’re doing, I don’t see any reason not to do it.” Music and language are dual hemisphere skills, and using one to help remediate the shortcomings of the other is worthwhile.

Similar to Mrs. Murray, Mrs. Mitchum’s final piece of advice for me was to think outside the box. She stated, “In my opinion, whether it is speech pathology or anything else, I think our main focus should be to teach our patients how to be their own speech therapists.” What she meant by this was the importance of helping our clients be able to gauge where they are in terms of attention or whatever it is that they struggle with. In addition, we must help them find strategies to cope when their performance is low so that they can help themselves be more successful. As Mrs. Mitchum said, “The best therapy isn’t cookie cutter.”

Hope Wofford

Finally, I interviewed Hope Wofford, who currently works with children ages birth to six, but has worked with almost all ages in the past. She has never used formal music therapy with her clients, but she frequently incorporates music into her therapy with pediatric and adult clients. With her adult clients, she has seen music improve their performance on memory tasks, whether the task directly relates to the song or not. One client she specifically mentioned was a

woman in long-term care who refused to get out of bed or even eat. Mrs. Wofford started using some music tasks with the client, and she got up and started dancing in her room.

Mrs. Wofford has also been able to utilize music in her sessions with non-verbal or minimally-verbal children in many different ways. Because she is able to play guitar, she has had the opportunity to bring her guitar, and bring a box drum for the client, in order for them to be able to join in as she plays. She uses this to work on joint attention and as a reinforcement. Another pediatric client refused to label objects but loved nursery rhymes. Mrs. Wofford took the child's interests and began to use nursery rhyme songs to make the child want to participate in labeling objects.

Mrs. Wofford has been able to incorporate music into her therapy with most of her clients. When asked what made her decide to use music in therapy with some clients versus other clients, she said, "I feel like I naturally incorporated it with a lot of kids and then when I saw their interest peak, I would try and find ways to use it more frequently." She mentioned one client who was hyperactive and "extremely verbal." Mrs. Wofford explained that when she discovered how motivating music was for him, he became more attentive. She brought her guitar with her if he had a great week, and they would work on body control, requesting, and other similar things.

While music has been beneficial with a significant number of clients, Mrs. Wofford noted that it was not motivating to all of her clients. Some clients covered their ears when music was introduced or simply did not care about it at all. With those clients, she stops trying to incorporate music for a while. She may reintroduce it later to see if their reactions change, but she doesn't force it.

The final question I asked Mrs. Wofford was if there was anything else I should know. She told me not to be afraid to use music in therapy, whether you feel naturally inclined or not. People are hesitant to use music with clients if it doesn't come naturally. However, especially with children, it's a resource therapists can use regardless of their personal musical abilities.

Why Does It Matter?

One of the pitfalls with any type of therapy is finding a reliable method and never deviating from it even when other, more unfamiliar methods may be more beneficial to the client. While there are versatile therapeutic methods that work in many scenarios, there is no cookie cutter method that works on every single client or with every disorder. It is important to be willing to try new things in order to find the best strategy for each client and his or her individual needs. Using only one intervention strategy or technique likely puts both the client and clinician at a disadvantage.

Music therapy can be another tool in the belt of SLPs who are willing to step outside of their comfort zones and learn something new. Though it is easy to continue doing the things we have already mastered, it is not always practical or ethical. The American Speech-Language-Hearing Association's vision is "making effective communication, a human right, accessible and achievable for all." To be able to fulfill this goal, SLPs must be constantly learning and growing in our approach to therapy.

Conclusion

All the research I outlined and the interviews I conducted demonstrate the benefits of music therapy when used collaboratively with language therapy. Previous research clearly states the many areas of language disorders which music therapy can be used to effectively treat. The three SLPs I interviewed proved the real-life applications of music therapy. In addition, they revealed how much improvement is often seen in clients when music is used in language therapy in any capacity.

Many aspects of music therapy must still be researched. Like many things, the ways in which music and language can be connected and researched are endless. Even with all the current research on music in language therapy, there will always remain more to learn about its uses. I plan to continue researching the benefits of music in therapy. When beneficial, I will be open and try new ways of utilizing music in my therapy.

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