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THE EFFECTS OF MUSIC THERAPY ON STUTTERING

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Abstract

Across time and culture, music has been used to augment and treat a variety of psychological and physical diseases. The current study therefore aims to identify the effects of music on stuttering. For this study, one individual was selected to participate for a total of five weeks. The procedure included documenting the participant's percentages of syllables stuttered in monologues and structured reading passages as well as completing pre and post mindfulness assessments during the course of the study. Results indicate that music positively affects percentages of syllables stuttered in reading passages, the types of disfluencies and overall mindfulness levels of the individual.

Introduction

Throughout history, music has been an integrated and fundamental aspect of every civilization and culture across the globe. As long as humans have existed, people have used music for multiple recreational and employment purposes. In today's society, music therapy has gained popularity and recognition and is now being utilized in a variety of clinical settings. From psychological problems ranging from depression and stress to physical problems in the field of Speech Language Pathology, music therapy has provided an alternative treatment for many individuals. However, relatively little research has been performed in the field of Speech Language Pathology and therefore more research must be conducted in order to fully understand the benefits of music therapy. Thus the current research article will most assuredly provide more insight and clarification on the benefits or disadvantages for these patients. The hypothesis of this article states that individuals who stutter can benefit from the advantages of music incorporated into therapy by analyzing indirectly the effects of dopamine on motor control. In order to fully understand the hypothesis, it is necessary to conduct a review of the previous literature that supports this idea.

Literature Review

The History of Music as Therapy

It is safe to say that using music for therapeutic purposes is a common practice in many cultures throughout history. Some of the most ancient healing ceremonies in Egypt, Peru and Africa incorporated chanting or percussion to enhance healing (Thompson & Schlaug, 2015). In biblical times, the first king of Israel, King Saul, was plagued with an evil spirit and was only comforted when his servant David played the harp for him (Babikian, 2013). After reading the

account several centuries later, King George I, plagued by memory loss and poor stress management, requested Handel to compose a special piece to soothe him (Yehuda, 2011). In early Islam, music began to take on a more practical role as a treatment for patients with mental disorders (Babikian, 2013). The father of Greek medicine, Hippocrates, played music for his patients. Likewise, in the sixth century B.C., Pythagoras, said to be the father of music therapy, used music to heal physical and psychological diseases. Renowned philosophers such as Aristotle believed that music was “a force that purify[ed] emotions” (Babikian, 2013, p.252). In more recent years, music was used to assist depressed Jews in concentration camps during World War II. (Babikian, 2013). Music therapy has had a long history of use although it has only recently begun to be used in the clinical setting.

Recent Therapeutic Practice of Music

As music therapy has gained respect and momentum, clinicians have begun to use music to treat a variety of psychological and physical problems. An article written by Nechama Yehuda in 2011 called Music and Stress, examines the role of music as treatment for stress. In his article, Yehuda cites a report given by Nilsson over 42 randomized control experiments testing the reduction of stress and anxiety by musical intervention. From his results, Nilsson discovered that in over half of the trials music had beneficial effects. Additionally, Yehuda’s meta-analysis of studies conducted on the effect of music on stress revealed that music improves the development and activity of the hypothalamus which is an important structure in controlling the hormones secreted in the body’s response to stress. One of the main hormones elevated in stressful conditions is cortisol. Through various experiments, several types of music were found to decrease levels of cortisol although major music was concluded to lower levels more than minor music. Aside from hormones, Yehuda reports that music modifies other immunological components that act as stress markers such as cytokine IL-6, IL-10 and natural killer cells.

Moreover, the ability of music to match the rate of other physiological processes thus acting as a synchronizer aids in the reduction of stress by decreasing heartbeat, respiration and blood pressure. This phenomenon, according to Yehuda, is possible due to a concept that is known as entrainment stating that objects vibrating at similar frequencies will influence each other to vibrate at the same frequency. As a result of the vibrations in periodic oscillations, these physiological processes can be affected by entrainment. Throughout the article and in a majority of the studies examined, Yehuda remarks that preference plays a vital role in determining the effects of music and states that the experience is unique for every individual.

Apart from stress, music has also been determined to benefit patients with depression. In an article written in 2012 by Kristen J. Eckhardt and Julie A. Dinsmore titled *Mindful Music Listening as a Potential Treatment for Depression*, an in-depth look at a technique that combines the benefits of music with mindfulness skills was proposed. This therapy relies on the notion that music provokes emotions and thus can aid in putting emotions into words, a task that is often difficult for patients suffering from depression. Eckhardt and Dinsmore explain that this technique can help facilitate the communication between counselor and patient and help foster a more intimate relationship. According to the authors, one musical intervention that is highly organized and effective is known as *Guided Imagery and Music*. In this therapy patients begin by listening to rhythmic music and practicing rhythmic breathing exercises. Once the patient is relaxed, the counselor selects a piece of music and asks the patient to relate the images that the music evokes in order to gain insight into the patient's mind. On the other hand, mindfulness practice allows the patient to concentrate on the present moment and detach themselves from their emotions. Thus, a new method known as *Mindful Music Listening* is derived from the combined therapies of *Guided Imagery and Music* therapy and mindfulness practice. As

Eckhardt and Dinsmore note, the two approaches are effective on their own and therefore are suspected to be successful combined although further research is needed to see whether or not this particular type of music therapy is more promising than others. Regardless of the method, it is clear from the article that the ability of music to stimulate emotions and provide beneficial detachment performs an important role in treating depression.

In addition to managing stress and depression, music also helps individuals regain memory and judgement in disorders such as Alzheimer's and dementia. In a report written in 2015 by William Forde Thompson and Gottfried Schlaug titled *The Healine Power of Music*, Thompson and Schlaug highlight different studies conducted on the effect of music in many disorders and situations. One of the subtopics is associated with patients suffering from dementia and Alzheimer's and how music has impacted them. The first experiment in this subtopic was a study conducted in 2009 by psychologist Lise Gagnon. The study aimed to test the judgement of 12 patients with Alzheimer's through the discernment of the emotional connotations of several musical pieces. In order to get a complete understanding of their behavior, 12 normal individuals were also tested to act as a control group. The results revealed that the individuals with Alzheimer's were as accurate as the control group in differentiating the emotions even though they physically had impairments in the areas of the brain associated with judgement. Aside from the experiment, Thompson and Schlaug also recount a case study of an 89 year old women with dementia. The elderly women was reported to be nonresponsive a majority of the time yet, when her daughter sang to her she came alive and would smile, tap her leg and laugh. Christmas songs were her favorite and whenever he daughter would sing them the women would occasionally blurt out the words she remembered. Her reaction and the results of the previous study indicate the influence of music in respect to cognitive disorders such as Alzheimer's and dementia.

In the same article as mentioned above, Thompson and Schlaug explored the relationship between music and motor ability. Due to the synchronizing nature previously discussed, music helps alleviate problems with coordination, timing and initiation seen in individuals with strokes and Parkinson's disease. One study published in 2007 by Eckard Altenmueller and Sabine Schneider tested the motor ability of stroke patients. The researchers asked the patients to participate in a technique known as music-supported training that consists of playing a melody on the piano or taping a rhythm on the drums while using their impaired hand. Even though the control group was given conventional therapy, the patients engaging in the music therapy demonstrated larger improvements in their timing, precision, and fluidity of their motor skills. Other patients with Parkinson's disease benefited from the establishment of rhythm in motor therapy with the introduction of rhythmic auditory stimulation therapy or RAS. This therapy first has patients walking at a comfortable speed and then adds a rhythm to accompany their movement. Advantages from this method were much greater when patients were pushed slightly beyond their limits. Although many questions remain unanswered about the reasoning behind the benefits, it is evident that music positively affects the motor capabilities of individuals with Parkinson's disease and stroke survivors. In addition to the various psychological and physical diseases examined above, music therapy is also employed in the field of Speech Language Pathology and Audiology.

Music Therapy in the field of Speech Language Pathology

Several treatments of various pathological diseases in Speech Language Pathology and Audiology have begun to incorporate music therapy as well. As mentioned previously, the report written by William Forde Thompson and Gottfried Schlaug in 2015 explores the many ways music positively effects different disorders. Along with the psychical and psychological

problems mentioned above, Thompson and Schlaug discusses the influence of music on patients suffering from nonfluent aphasia. One case study stated in the article follows a young girl who suffered from a stroke and was given melodic intonation therapy to help treat her aphasia. This therapy technique, invented by Martin Albert, Robert Sparks, and Nancy Helm in the 1970s utilizes singing as the main aspect of the therapy. During a therapy session, patients will sing words or phrases to a simple melody while simultaneously tapping out the beat with their hand. As the treatment intensifies the length of the phrases also increase and become more complicated. The reasoning behind the therapy involves utilizing more areas of the brain such as the areas associated with perception and motor control in the right hemisphere that are said to have more lasting results than the areas in the left hemisphere. Thus, benefits from this therapy can be seen even after just one session and long term intervention eventually rewires the brain's connection network. As the therapy gained more popularity, more research was needed to test the validity of the technique. In an experiment published in 2004, conducted by one of the authors of this article, Gottfried Schlaug, 11 patients were tested with this therapy while 9 patients were given no treatment to act as a control group. The results revealed that the group who had music intonation therapy were able to form twice as many words together per minute as those who did not receive any treatment. Additionally, the MRIs of the group who received therapy illustrated the change that occurred in the rewiring of the brain as it was different from the imaging of the control group. Overall, the improvements generated by the therapy suggest that music is instrumental in helping stroke patients with aphasia.

Although great progress was made for individuals suffering from strokes, nonfluent aphasia is not the only communication disorders that is augmented by music. Through the research of Gottfried Schlaug, music was found to be highly beneficial in fostering

communication and social skills in children with autism (Thompson & Schlaug, 2015). Due to the intense focus on fine detail, children with autism have been known to be fascinated with music and some are even considered to be “musical savants” with precise abilities in pitch. The interest in music allows the opportunity for new skills to be taught to these individuals who otherwise would have difficulty learning or who would resist intervention. One benefit stems from the ability of music to activate the areas of the brain involved in social thinking. Additionally, music helps the listener understand the emotional state of the composer and musician which greatly aids in teaching different perspectives to children with autism. Along with social development, music can be used to aid in language development. The investigation on language acquisition by Schlaug’s team of researchers followed 6 completely nonverbal children who were given 40 sessions of auditory-motor mapping training. Developed by Schlaug, this therapy consisted of changing the pitch of one’s voice and tapping on drums while singing words to facilitate language. Remarkably, these children were able by the end of the study to produce some speech sounds and a few meaningful words even as long as eight weeks after the therapy. Therefore, it is evident that music positively impacts the development of children with autism and offers therapist another avenue to reach these individuals.

As seen in children with autism, people with Parkinson’s disease, too, can benefit from the positive outcomes of music therapy. In an article written in 2015 by Cochavit Elefant, Felicity Baker, Meir Lotan, Simen Krogstie, Lagesen, and Geir Olve Skeie Patients with Parkinson’s disease were tested to see the benefits of music on speech and voice quality and control. For the past ten years this concept has been explored by various researchers and has proven to produce good results. One control study conducted by Haneishi in 2001 tested ten individuals with Parkinson’s disease by providing them with eight sessions of Music Therapy

Voice Protocol. The results revealed significant increases in voice quality, range and intonation. Similarly, an experiment run by Di Benedetto and his team discovered that the participants experienced increases in the maximum duration of sustained phonemes and prosody when given music therapy and choral singing. Following these results and many parallel studies, the authors of this article tested ten patients who were split into two treatment groups. The groups were given twenty sessions of therapy consisting of breathing, vocal, and singing exercises. The conclusion of the study demonstrated improvements in vocal parameters related to singing, intensity of speech and degree of voiceless sounds. Although the study was limited and more research is need to test the effectiveness of music intervention on the speech aspects of patients with Parkinson's disease, the results still indicate the beneficial effect of music which can be used to further research in this area and others similar.

Switching directions from Speech-Language Pathology to Audiology, new research is emerging that supports music as a potential therapy for reducing the effects of tinnitus. In the same article as much of the previous information, Thompson and Schalug (2015) recount several therapies used to help minimize tinnitus. By using the idea that tinnitus is caused by changes in the neural activity of the central auditory system, music acts as a catalyst to change the circuitry of the brain. For one particular type of tinnitus, known as tonal tinnitus, patients are asked to listen to music where the frequency that matches the tinnitus is removed. This type of music is called notched music and was invented by neurophysiologist Christo Pantev and his colleagues. Pantev exclaims that this therapy reinforces the inhibition of the frequency band and reverses the discrepancy in the auditory cortex. Another method has patients vocally imitate a series of pitches played. The implications of this method force the patients to focus and not pay attention to irrelevant auditory information. By employing this tactic, the authors state that the extra

attention may rewire the brain to return to its natural physiological condition. All in all, the auditory nature of both tinnitus and music make it possible for the disorder to be treated using several different types of music stimulation.

Treatment and Techniques for Stuttering

Any review on the concept of music as a possible beneficial therapy for stuttering, however, would be insufficient without including the various ways in which stuttering is currently being treated. One approach in the textbook Working with People Who Stutter: A Lifespan Approach written by Ellen M. Bennett in 2006 shares similarities with the characteristics of music thus providing further support for the hypothesis of this research article. Within the chapters, Bennett discusses the findings of Mark Onslow and Ann Packman's clinical experience in relation to beneficial treatment options. In their method, they focus on prolonged speech through operant conditioning and work to control stuttered speech rather than eliminate it. After receiving either the intensive or individualized therapy, clients displayed positive results during a follow up report for as long as nine years post therapy. The auditory component of their treatment along with the change in rhythm produced by the prolonged speech gives additional support for the premise that music can be effective in treating patients who stutter. Following a similar model, there are many other treatment options that rely on adjusting rhythm.

Another treatment discussed in Bennett's textbook also contains components of rhythm connecting the concept to music. This integrated approach created by David Daly in 1988 is comprised of a motor training component and a mental shift component. The motor training aspect includes working on deliberate phonation, easy stretch and normal breathing. The first phase of deliberate phonation utilizes spondee words, single-words, word pairs and picture pairs in a process known as droning. After the first stage, the therapist helps the client adjust his or her

breathing which transitions smoothly into the last phase of easy stretch. Easy stretch is characterized by an even flow of speech as well as a seamless transition between words. All three of these phases have in some way aspects related to musical constituents. Additionally, this therapy also includes guided meditation in order to accomplish the second component of a mental shift. As mentioned in the abstract, part of this research's design includes mindfulness measurements to add another method of determining if music therapy truly benefits the individual who stutters. Likewise, Daly too values the cognitive aspect of stuttering. Thus, the second component contains four stages. The four phases, guided meditation, mental imagery, affirmation training, and self-talk strategies, and the focused placed on them are the features that make this treatment unique. This emphasis, therefore, assists clients in rewiring their thinking to positively assess their abilities and the mentality of stuttering in general.

Other treatments for stuttering for adults includes a method by Barry Guitar discussed about in his textbook *Stuttering: An Integrated Approach to its Nature and Treatment* (2006). In his textbook, Guitar focuses on a technique called controlled fluency that contains three components: flexible rate, easy onsets and light contacts. According to Guitar, flexible rate is defined as a reduced rate of syllable construction. Often, the first and second phoneme in the syllable or word are the ones that are reduced in speed. This method is different from simply slowing down one's speech in the respect that only some phonemes are lengthened while others are spoken at a normal rate. The idea behind the technique is that the reduction of speed on certain syllables will give more time for motor planning and execution. As Guitar states in his textbook, the treatment can be generalized to children as well as adults and is taught through the clinician's modeling of the technique. The next portion of the treatment denotes the gentle initiation of voicing. Often times, the rapid onset of voicing can cause an individual who stutters

to be locked into that position thus, starting the vocal fold vibration more gently helps to prevent this issue and can assist in the transition between phonemes as well. As seen in the flexible rate concept, easy onset is demonstrated by the clinician and rewarded for any approximations. The last component consists of relaxed articulators and a continuous flow of air in order to prevent the voicing or stoppage of air flow that often triggers stuttering. This portion, known as light contact, distorts plosives and affricatives to make them appear as fricatives while still maintaining intelligibility. Yet again, this technique is modeled by the clinician and helps the client replace his or her stuttering with controlled fluency. Once all three components are integrated the individual strives to utilize them simultaneously to produce conversational speech that sounds natural.

Along with his own techniques, Guitar also mentions in his textbook a method by Hugo Gregory that combines integrated stuttering modification and fluency-shaping therapies. The first two areas of the technique analyze the psychological effect of stuttering and aim to improve attitudes and perceptions about stuttering as well as relaxing muscular tension. By tensing and relaxing the muscles associated with speech, Gregory affirms that the individual who stutters can consciously reduce the tension and voluntarily relax those muscles for more fluent speech. Another aspect of his therapy is analyzing the speech itself by using audio and video recordings. Through the recordings the clients are able to be conscious of patterns such as rate, phrasing and prosody. Central to this phase in Gregory's technique is a method known as ERA-SM that emphasizes smooth and relaxed speech movements. The method builds on previous skills by beginning at the single word level and then moving on to phrases and eventually conversational speech. Throughout this process pausing is encouraged in order to allow time for sufficient cognitive, motor and linguistic planning. The various different aspects of his theory relate to the

hypothesis posed by the researchers in this article and provide more support for the beneficial outcomes of using music in therapy for individuals who stutter. While there are numerous more therapies devoted to adults who stutter, the limited review on some of these methods offers adequate support for the purpose of this article.

Methods

In order to test the hypothesis for this study that music benefits a person who stutters, a case study was conducted. The current research project indirectly examines the outward effects of dopamine on muscle and motor control specifically related to speech and how long the dopamine remains present in the body as stated by the hypothesis. The research is limited in that medical equipment is unavailable to test the actual presence of dopamine and is therefore measured by testing the fluency of speech.

For this IRB approved research project, one individual who stutters was selected to participate in the experiment. The participant was a 33 year old male enrolled in the University of Akron. The duration of the research spanned five weeks. Before the initiation of the study, the participant chose a favorite song from a genre that he preferred. During the therapy sessions the participant listened to the selected music before testing on Weeks 2, 3 and 4 and after the testing process the remaining weeks. The examination occurred once a week for the duration of the study. Additionally, the participant was asked to listen to the chosen song a minimum of once a day, every day during the five week duration, which was logged by the participant. Testing included measuring physical severity of stuttering with: the Stuttering Severity Index-4 (SSI-4) along with monologues and reading passages to measure percent syllabus stuttered. The data was collected using these observations and video recording.

Psychological and attitudinal measures were also administered before the beginning and after the end of the whole testing process. The testing process included the Mindfulness Attention Awareness Scale (MAAS), the Kentucky Inventory of Mindfulness Skills (KIMS), the Modified Stuttering Cognitive Fusion Questionnaire 13 (Modified Stuttering CFQ13), the Acceptance and Action Questionnaire-II (AAQ-II), and the Thought Control Questionnaire

(TCQ). These psychological and attitudinal focused on mindfulness, thought control of negative thoughts, fusing to thoughts, and how stuttering might be effecting everyday speech for that given week. The step by step process is described in detail in the following section.

Week 1

The first session began with the participant completing the consent form and additional questionnaires. Before the participant listened to the song, he began his monologue and structured reading passage. Directly following the monologue and reading passage, the participant listened to the song chosen for the study. The song that the participant selected was Man of Sorrows by Hillsong Worship. The song is in the genre of gospel music and is roughly five minutes long. Chosen from Fairbanks' Voice and Articulation Drillbook of 1960, the participant read the second portion of the rainbow passage. This passage is as follows:

Others have tried to explain the phenomenon physically. Aristotle thought that the rainbow was caused by the reflection of the sun's rays by the rain. Since then physicists have found that it is not a reflection, but a refraction by the raindrops which causes the rainbows.

Many complicated ideas about the rainbow have been formed. The difference in the rainbow depends considerably upon the size of the drops, and the width of the colored band increases as the size of the drops increases. The actual primary rainbow observed is said to be the effect of the super-imposition of a number of bows. If the red of second bow falls upon the green of the first, the result is to give a bow with an abnormally wide yellow band, since red and green light when

mixed form yellow. This is a very common type of bow, one showing mainly red and yellow, with little or no green or blue.

Once the data were recorded using the speech disfluency count sheets from the Stuttering Center of Western Pennsylvania, the participant completed the mindfulness surveys mentioned above in order to achieve a baseline measurement thus ending the first session.

Week 2

Before the data collection, the participant listened to his song as the session began. The second session started with the presentation of the song as the consent forms and questionnaires were only necessary for the start of the study. Similar to the consent form, the mindfulness measurements were not necessary for Week 2 and were only given at the beginning and end of the study to test for baseline and post intervention results. After the music was administered the participant produced a speech sample from a monologue and a structured reading passage. Due to the participant's interest, he read the entire selection of Comma Gets a Coma written by Jill McCullough and Barbara Somerville taken from A Diagnostic Passage for Accent Study in 2000 for his reading passage. The following is the copyright information:

Comma Gets a Cure and derivative works may be used freely for any purpose without special permission, provided the present sentence and the following copyright notification accompany the passage in print, if reproduced in print, and in audio format in the case of a sound recording: Copyright 2000 Douglas N. Honorof, Jill McCullough & Barbara Somerville. All rights reserved.

The passage reads as follows:

Well, here's a story for you: Sarah Perry was a veterinary nurse who had been working daily at an old zoo in a deserted district of the territory, so she was very happy to start a new job at a superb private practice in the north square near the Duke Street Tower. That area was much nearer for her and more to her liking. / Even so, on her first morning, she felt stressed. She ate a bowl of porridge, checked herself in the mirror and washed her face in a hurry. Then she put on a plain yellow dress and a fleece jacket, picked up her kit and headed for work. When she got there, there was a woman with a goose waiting for her. The woman gave Sarah an official letter from the vet. The letter implied that the animal could be suffering from a rare form of foot and mouth disease, which was surprising, because normally you would only expect to see it in a dog or a goat. Sarah was sentimental, so this made her feel sorry for the beautiful bird.

Before long, that itchy goose began to strut around the office like a lunatic, which made an unsanitary mess. The goose's owner, Mary Harrison, kept calling "Comma, comma." Which Sarah thought was an odd choice for a name. Comma was strong and huge, so it would take some force to trap her, but Sarah had a different idea. First she tried gently stroking the goose's lower back with her palm, then singing a tune to her. Finally, she administered ether. Her efforts were not futile. In no time, the goose began to tire, so Sarah was able to hold onto Comma and give her a relaxing bath.

Once Sarah had managed to bathe the goose, she wiped her off with a cloth and laid her on her right side. Then Sarah confirmed the vet's diagnose. Almost immediately, she remembered an effective treatment that required her to measure

out a lot of medicine. Sarah warned that this course of treatment might be expensive-either five or six times the cost of penicillin. I can't imagine paying so much, But Mrs. Harrison-a millionaire lawyer-thought it was a fair price for a cure.

Week 3

The third session was very similar to the previous session in Week 2 with the exception of the topic of the monologue and the passage selected. As in the second session, the song occurred before the monologue and reading passage. Week 3 concluded the reading of the Rainbow Passage as the participant read the first half of the selection. The rest of the passage is as follows:

When the sunlight strikes raindrops in the air, they act as a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

Throughout the centuries people have explained the rainbow in various ways. Some have accepted it as a miracle without physical explanation. To the Hebrews it was a token that there would be no more universal floods. The Greeks used to imagine that it was a sign from the gods to foretell war or heavy rain. The

Norseman considered the rainbow as a bridge over which the gods passed from earth to their home in the sky.

Week 4

The fourth session concluded similar to Week 2 and 3 with the song coming before the testing process. Following to the song, the participant engaged in a monologue and read a structured passage which was recorded by the researcher using the same forms as mentioned above. The structured passage came from an article about Liverpool and the first portion reads as follows:

A theme is developing at Liverpool, one where Jürgen Klopp enters the press room having watched his team crush the opposition in a snappier frame of mind than you might imagine; the other where he takes the same walk having not achieved the result he desires but instead, you find him as charming and hospitable as an old count at the top table of a banquet hall.

Saturday's win over Sunderland arrived at a cost. Perhaps injuries to Philippe Coutinho and Roberto Firmino explained Klopp's state. With Adam Lallana and Daniel Sturridge also unavailable to him, he issued a debut to 17-year-old Ben Woodburn in the closing minutes, who in turn became the third youngest player in the club's history. Depending on who you listen to, Woodburn could be the next Robbie Fowler or the next Michael Owen. Lucas Leiva later used social media to congratulate him, describing the forward as a 'top young player.' It would be understandable, though, if Klopp was concerned by his present options, for he is likely to be without the experience of five attacking players for Tuesday's League

Cup quarter-final against Leeds United, when you add Danny Ings to the list of the fallen. Perhaps Klopp is just trying to meet glory and disappointment by treating them equally as imposters. Seventeen of Liverpool's goals at home prior to Sunderland's visit had arrived across just four games and their success and the style with which it has been delivered has led to unrealistic expectations; that Liverpool can slaughter opponents every week.

Week 5

The last session ended with the participant listening to the selected song for the final time. The song was preceded by a monologue and reading passages that were recorded using the same methods as all of the previous sessions. As Week 5 was the last session of the study, the participant completed the mindfulness questionnaires for the one more time in order to provide a post intervention measurement. Using the same article as Week 4, the participant read the second portion of the Liverpool article mentioned above. The rest of the article is as follows:

At 0-0, Anfield was quiet until Klopp twice flew into a rage, screaming at supporters to raise the level of noise. What followed was two goals from Divock Origi and James Milner. Later, with the result settled in his favour, it would be understandable if Klopp was drained. He was also involved in touchline arguments with David Moyes and his assistant, Paul Bracewell. Some managers coldly deploy tactics to try and achieve their aims. Klopp uses emotion to shake the buttresses of entire stadiums.

It was significant that more than one Liverpool fan website proposed Klopp as an option for the man of the match award on Saturday night because it shows he is

getting somewhere when he says things like, “We all need to handle situations like this. I believe in atmosphere. I think it's a big part of the game.”

Klopp, indeed, has identified many problems at Liverpool and has not been afraid to challenge them, even if they are accepted norms considered widely as positives: like the one about the Anfield crowd being the most vociferous in the country when really it only applies on special occasion, considering it has long suffered from a sense of entitlement, and more recently - like every other Premier League ground - from the era of the selfie, when some spectators on day trips complain of the mood not meeting expectations, overlooking the notion they might even be taking the place of someone who would increase that sense of time and place if they could afford it.

It also says much about the job Klopp has done when the first question asked of him relates to the challenge of keeping top quality players like Origi happy when they are not selected. The Belgian has not started a league fixture this season and had Sturridge been named as a substitute here, it is likely he would have replaced Coutinho instead.

“That’s up to the players. I’m not a magician-that’s the character of the boys,” he refuted. “The job is still nice even on the harder days, doing what you love. It’s not a big challenge. I handle all the boys exactly the same. If you play 90 mins I like you as much as when you don’t play a second. If you want to be happy in this squad it’s very easy to be happy.”

Results

Demographic Instrument and Music Related Questions

During Week 1, the participant signed a consent form which also included demographic questions. The participant reported to be a 33 year old male. He also self-reported being a mild to moderate person who stutters with a perspective of mild emotional stuttering. The participant further reported that his general level of mindfulness was a 7 which is defined as always present in the moment. In addition to the general questions, the participant also answered questions relating to his experience with music. He reports that the physical benefits from listening to music shape his life style positively and the emotional benefits for him are happiness. Gospel music is his musical preference which he enjoys for its reverence and the mindfulness of doing good and not hurting people. Although he enjoys music, he has never had music incorporated into his previous therapy sessions.

Physical Behaviors and SSI-4 data for all Five Sessions

The Stuttering Severity Index -4(SSI-4) was conducted for each week (session). Frequency, duration, and physical concomitants were assessed and thus developed a severity and percentile rank.

SSI-4 Behavior Results. See Table 1, SSI-4 Behavior Results. On Week 1, the participant had a frequency of 8.4% syllables stuttered during his monologue, which equals a task score of 7, and 4.8% syllables stuttered during his reading passage thus earning a task score of 6. This added up to a total frequency task score of 13 on the SSI-4. Average duration for the participant's reading and monologue disfluency was between 0.5-0.9 seconds, which was a 4 scaled score on the SSI-4. Physical concomitants produced task scores of 2 for facial grimaces, 1

for head movements, and 1 for movements of extremities, which was a total task score of 4. By adding up the total frequency, duration, and physical concomitants, the participant performed a total score of 21, which equates to a percentile rank of 24-40 and a mild severity.

During Week 2, the participant had a frequency of 4.75% of syllables stuttered during his reading passage which correlates to a task score of 6 and 9% syllables stuttered for his monologue which correlates to a task score of 7. These scores added up to equal a total frequency task score of 13 on the SSI-4. Average duration was the same as the previous week with an average length of 0.5-0.9 seconds and a scale score of 4 on the SSI-4. The Physical Concomitants total task score was a 4 which included task scores of 2 for facial grimaces, 1 for head movements and a 1 for movements of the extremities. When combining the scores for frequency, duration, and physical concomitants, the total score is 21. This score correlates to a 24-40 percentile rank and a mild severity on the SSI-4.

During Week 3, the participant had a frequency of 8% syllables stuttered during his monologue, which equals a task score of 7, and 3.8% syllables stuttered during his reading passage correlating to a task score of 5. The total frequency task score of the combined tasks was 12 on the SSI-4. As in the previous sessions, the average duration for the participant's reading and monologue disfluency was between 0.5-0.9 seconds, which was a 4 scaled score on the SSI-4. Physical concomitants produced task scores of 2 for facial grimaces, 2 for head movements, and 1 for movements of extremities, which was a total task score of 5. By adding up the total frequency, duration, and physical concomitants, the participant performed a total score of 21, which equates to a percentile rank of 24-40 and a mild severity.

During Week 4, the participant had a frequency of 3% of syllables stuttered during his reading passage which correlates to a task score of 5 and 8.5% syllables stuttered for his

monologue which correlates to a task score of 7. These scores added up to equal a total frequency task score of 12 on the SSI-4. Average duration was the same as the previous weeks with an average length of 0.5-0.9 seconds and a scale score of 4 on the SSI-4. The Physical Concomitants total task score was a 4 which included task scores of 2 for facial grimaces, 1 for head movements and a 1 for movements of the extremities. When combining the scores for frequency, duration, and physical concomitants, the total score is 20. This score correlates to a 12-23 percentile rank and a mild severity on the SSI-4.

During Week 5, the participant scored a frequency of 9.7% syllables stuttered during his monologue which equates to a task score of 7 and a 3.25% of syllables stuttered during the reading passage earning a task score of 5. The two scores combined equal a total task score of 12 for frequency on the SSI-4. The average duration score was a 4 that averaged to a length of 0.5-0.9 seconds. Calculating the task scores of all the components of physical concomitants, the total score was a 4. This score was based on adding a 2 for facial grimaces, 1 for head movements and 1 for movement of the extremities. The total score when adding frequency, duration, and physical concomitants equals an overall score of 20 which correlates to a 12-23 percentile rank and a mild severity.

SSI-4 Data	SSI-4 Data Across Study				
	Week 1: Music Last	Week 2: Music First	Week 3: Music First	Week 4: Music First	Week 5: Music Last
Total Frequency Score	13	13	12	12	12
Total Duration Score	4	4	4	4	4
Total Physical Concomitants Score	4	4	5	4	4
Total SSI-4 Score	21	21	21	20	20
Percentile Rank	24-40	24-40	24-40	12--23	12--23
Severity	Mild	Mild	Mild	Mild	Mild

Dysfluency Behaviors. See Table 1, Dysfluency Behaviors. During Week 1, the participant produced a total of 8.4 % syllables stuttered for his monologue (26/311). Of the 26 total disfluencies, 38% were Interjections, 8% were Revisions, 4% were Phrase Repetitions, 19% were Word Repetitions, 12% were Sound/Syllable Repetitions, 4% were Prolongations, and 15% were Blocks. Also on Week 1, the participant produced 4.8% syllables stuttered for his reading passage (11/230). Of these 11 total disfluencies, 27% were Interjections, 18% were Revisions, 18% were Phrase Repetitions, 27% were Sound/Syllable Repetitions, and 10% were Blockages.

During Week 2, the participant produced a total of 4.75% syllables stuttered during his reading passage (19/400). Of those 19 total disfluencies, 5% were Revisions, 21% were Phrase Repetitions, 16% were Word Repetitions, 32% were Sound/Syllable Repetition and 26% were Blockages. During that same therapy session the participant produced 9% syllables stuttered for his monologue (37/400). Out of the 37 total disfluencies, 44% were Interjections, 5% were Revisions, 5% were Phrase Repetitions, 16% were Word Repetitions, 27% were Sound/Syllable Repetitions and 3% were Prolongations.

During Week 3, the participant produced a total of 8 % syllables stuttered for his monologue (32/400). Of the 32 total disfluencies, 28% were Interjections, 3% were Revisions, 16% were Phrase Repetitions, 31% were Word Repetitions, 19% were Sound/Syllable Repetitions, and 3% were Prolongations. Also on Week 3, the participant produced 3.8% syllables stuttered for his reading passage (9/234). Of these 9 total disfluencies, 11% were Revisions, 22% were Phrase Repetitions, 56% were Sound/Syllable Repetitions, and 11% were Prolongations.

During Week 4, the participant produced a total of 3% syllables stuttered during his reading passage (12/400). Of those 12 total disfluencies, 33% were Phrase Repetitions, 17%

were Word Repetitions, 25% were Sound/Syllable Repetition, 17% were Prolongations and 8% were Blockages. During that same therapy session the participant produced 8.5% syllables stuttered for his monologue (34/400). Out of the 34 total disfluencies, 32% were Interjections, 3% were Revisions, 21% were Phrase Repetitions, 15% were Word Repetitions, 26% were Sound/Syllable Repetitions and 3% were Prolongations.

During Week 5, the participant produced 3.25% total syllables stuttered for his reading passage (13/400). Of these 13 total disfluencies, 15% were Revisions, 38% were Phrase Repetitions, 31% were Word Repetitions, 8% were Sound/Syllable Repetitions, and 8% were Prolongations. In addition to the reading passage, the participant also produced a monologue where he scored a total of 9.7% syllables stuttered (39/400). Out of the 39 total disfluencies, 23% were Interjections, 5% were Revisions, 18% were Phrase Repetitions, 25% were Word Repetitions, 23% were Sound/Syllable Repetitions, 3% were Prolongations and 3% were Blockages.

Types of Disfluencies	Monologue Types of Disfluencies				
	Week 1: Music Last	Week 2: Music First	Week 3: Music First	Week 4: Music First	Week 5: Music Last
Interjections	38%	44%	28%	32%	23%
Revisions	8%	5%	3%	3%	5%
Phrase Repetitions	4%	5%	16%	21%	18%
Word Repetitions	19%	16%	31%	15%	25%
Sound/Syllable Repetitions	12%	27%	19%	26%	23%
Prolongations	4%	3%	3%	3%	3%
Blocks	15%	0%	0%	0%	3%
Total # of Disfluencies/Total Syllables	26/311	37/400	32/400	34/400	39/400

Types of Disfluencies	Reading Passage Types of Disfluncies				
	Week 1: Music Last	Week 2: Music First	Week 3: Music First	Week 4: Music First	Week 5: Music Last
Interjections	27%	0%	0%	0%	0%
Revisions	18%	5%	11%	0%	15%
Phrase Repetitions	18%	21%	22%	33%	38%
Word Repetitions	0%	16%	0%	17%	31%
Sound/Syllable Repetions	27%	32%	56%	25%	8%
Prolongations	0%	0%	11%	17%	8%
Blocks	10%	26%	0%	8%	0%
Total # of Disfluncies/Total Syllables	11/230	19/400	9/234	12/400	13/400

Pre/Post Attitude Scales

As mentioned previously, attitude and mindfulness measures were gathered during the testing process before music was played on the first week for a baseline and then after the study was completed on the last week for a post intervention assessment. The results are discussed in the next paragraph as well as in Table 1, Pre/Post Attitude Scales.

For the baseline data collection the participant completed the MAAS. A mean of 60 divided by the number of items on the scale that was 15 yielded a score of 4. Additionally, the participant completed the Thought Control Questionnaire. This questionnaire was separated into five categories. The participant earned a score of 24 for the Distraction category, 14 for Social Control, 7 for Worry, 13 for Punishment and 10 for Re-appraisal. Similarly to the TCQ, the KIMS separated the responses into four groups. After categorizing the answers, the participant received a score of 42 for Observe, 33 for Describe, 47 for Act with Awareness, and 16 for Accept without Judgement. The last two tests simply use an overall score. For the AAQ-II he received a 64 and for the Modified Stuttering CFQ13 he scored a 36.

After the study was completed, further testing was administrated to assess progress and to collect post-intervention data. The MAAS was given again for a new score of 6 when using a

mean of 90. Following the MAAS, the participant completed the TCQ, earning a score of 24 for the Distraction category, 18 for Social Control, 13 for Worry, 8 for Punishment and 13 for Re-appraisal. After categorizing the answers for the KIMS, the participant received a score of 40 for Observe, 32 for Describe, 44 for Act with Awareness, and 26 for Accept without Judgement. The overall score for the AAQ-II was a 60 and a 19 for the Modified Stuttering CFQ13.

	Names of Mindfulness Tests				
	TCQ	AAQ-II	KIMS	MAAS	Modified Stuttering
Baseline	Distraction = 24	64	Observe = 42	4	36
	Social Control = 14		Describe = 33		
	Worry = 7		Act with Awareness = 47		
	Punishment = 13		Accept without Judgement = 16		
	Re-appraisal = 10				
Post-therapy	Distraction = 24	60	Observe = 40	6	19
	Social Control = 18		Describe = 32		
	Worry = 13		Act with Awareness = 44		
	Punishment = 8		Accept without Judgement = 26		
	Re-appraisal = 13				

Discussion

When analyzing the results, it is possible to examine the data by separating it into three different categories. The first way to evaluate the data is by looking at the trends from the beginning of the study to the end in chronological order. From the data described above, the participant maintained a mild severity throughout the study. Additionally, his duration remained the same as well as his task score for the monologues, indicating no improvement and therefore no effect in these areas. On the other hand, the participant's task score for the reading passages increased from Week 2 to Week 3 and then remained at the new score. This increase suggests an improvement in the participant's structured reading tasks and reveals a positive effect of music on this area. Unfortunately, the indirect way of measuring allows for other variables to contribute to this improvement and the extent of this potential effect is discussed in the limitation section below. The physical concomitants likewise showed a change although only on Week 3 with an increase in head movement. This change is not significant to indicate any effect however it is important to note that other exceptions have been seen during this session which will be explained further in the limitations section of this article.

Continuing with the idea of a chronological examination, it is important to evaluate the individual components and numbers of the participant's reading passages and monologues. The overall trend in the percentages of syllables stuttered for the reading passage showed a decrease which reinforces the theory that music might have positively impacted his performance in this area. Furthermore, when looking at the types of disfluencies, there was a decrease in the percentage of Interjections throughout the sessions. More specifically, interjections were not present in the participant's speaking sample after the first session. This observation therefore indicates that music positively influenced the participant's types of disfluencies. Although

Interjections decreased, no other trend was noted in other types of disfluencies except for an increase in the percentages of word repetitions. Examining the disfluencies in his monologue also revealed an overall decrease in the presence of Interjections as well as Prolongations and Blocks. An increase was noted in Revisions and Phrase Repetitions in addition to no trends in the other disfluencies. The results thus conclude that music has minimal effect on the types of disfluencies in a structured reading passage and extemporaneous monologues.

Another way of viewing the data is by dividing them into groups of when music was administered. On Week 1 and 5 music was presented last and presented first in the other sessions. The overall percentage of syllables stuttered decreased when music was administered first yet increased when given last. During the monologue, Interjections, Revisions, Blocks, and Prolongations decreased when music was presented last. The individual types of disfluencies such as Interjections, Revisions and Blocks also decreased in the reading passages when music was last. When music was played first there was only a decrease in Interjections and Revisions during his monologues. These results therefore insinuate that the timing of music minimally effects disfluencies.

The final way of evaluating the effectiveness of music is to examine the participant's level of mindfulness by looking at the trends between the post and pre-test evaluations. An increase in the score of both the AAQ-II and the MAAS reveal better psychological flexibility and higher levels of dispositional mindfulness from the beginning of the study to the end. A decrease in scores for the Modified Stuttering CFQ13 suggests lower levels of mindfulness. For both the KIMS and the TCQ, lower scores are better indicators of mindfulness thus the participant's reduced score for the KIMS in the first three categories of Observe, Describe, and Act with Awareness reflects a positive change. Conversely, the groups of Distraction and

Punishment were the only categories that decreased and therefore the only groups that experienced a beneficial change. Overall, these results imply that the participant's mindfulness increased as a result of the study.

Limitations

Although the results mentioned in the previous section suggest improvements, there are some limitations to the study which may also help explain the lack of improvement. As mentioned earlier, the lack of an objective measure plays a significant role in the ambiguity of the results. With that said, the next largest limitation lies within the selection of the song. When asked to listen to the song at least once a day the participant responded that he already listens to the song multiple times a day. The excessive familiarity with the song may have affected the results as any benefit or increase that may have been seen already occurred and now has plateaued.

Another limitation that should be noted is the participant's familiarity with the English language. As an international student, it was difficult to determine if the participant's disfluencies were a result of stuttering or a byproduct of simply not knowing the language in its entirety. This limitation may have skewed the results, particularly in the type of disfluencies recorded. The actuality that the study only includes one participant is an important limitation to mention.

An additional limitation that may not be evident from the data is the participant's current therapy goals. Although a clear decrease in the amount of Interjections in the participant's speech is evident, it is unclear whether those results occurred as a result of the effectiveness of music or simply due to the clinician working with him on that goal in therapy. Lastly, as mentioned in the analysis of results, Week 3 showed some abnormalities that skewed the data

results. The abnormalities may have been due to the participant's excitement in his monologue when discussing what he did over the weekend which may have caused the increase in his head movements and certain types of disfluencies.

Future Research

In order to fully test the effectiveness or lack thereof of music on stuttering, it is important to conduct further research. Primarily, a large sample size is needed to account for any personal variations in the data. A randomized control study would be ideal when moving forward however if this is not feasible, a larger sample size will suffice. Moreover, additional research is needed to determine whether or not the benefits were as a result of the music or the current therapy. To accomplish this distinction, the future study must examine different areas than what is currently being addressed in therapy.

Conclusion

In conclusion, although music has been present throughout history, not until recently has music therapy been utilized in the clinical setting for medical treatment. From renowned philosophers and rulers to everyday individuals, music in the past aided in healing in both secular and religious situations. In today's society, music therapy is utilized to treat a variety of physical and psychological diseases. The use of music therapy is gradually increasing as a treatment in the field of Speech Language Pathology and therefore this research study most assuredly provided more insight and clarification on the benefits or disadvantages for these patients. Although the study revealed that music effected the fluency of the participant's reading passages, the use of interjections and his mindfulness positively, minimal results have been observed and even less that can be determined as a direct result of the music. With that said, the ideas of further research mentioned above will surely help to establish a greater understanding of the influence of music on stuttering and how therapists can potentially include music into their intervention plans to better serve their clients in the future.

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APPENDIX A

Stuttering Severity Index -4 Form

Stuttering Severity Instrument-4
SSI-4
 Examiner Record Form
 Glyndon D. Riley

Identifying Information

Name _____ Female Male
 Grade _____ Date of Birth _____
 Date of testing _____ Age _____
 School _____ Examiner _____
 Preschool School Age Adult Reader Nonreader

Frequency (Use Readers Table or Nonreaders Table, not both)

Readers Table		Nonreaders Table			
1. Reading Task		2. Speaking Task		3. Speaking Task	
%SS	Task Score	%SS	Task Score	%SS	Task Score
1	2	1	2	1	4
2	4	2	3	2	6
3-4	5	3	4	3	8
5-7	6	4-5	5	4-5	10
8-12	7	6-7	6	6-7	12
13-20	8	8-11	7	8-11	14
21 & up	9	12-21	8	12-21	16
		22 & up	9	22 & up	18

Frequency Score (use 1 + 2 or 3)

Duration

Average length of three longest stuttering events timed to the nearest 1/10th second	Scale Score
Fleeting (.5 sec or less)	2
Half-second (.5-.9 sec)	4
1 full second (1.0-1.9 sec)	6
2 seconds (2.0-2.9 sec)	8
3 seconds (3.0-4.9 sec)	10
5 seconds (5.0-9.9 sec)	12
10 seconds (10.0-29.9 sec)	14
30 seconds (30.0-59.9 sec)	16
1 minute (60 sec or more)	18

Duration Score

Physical Concomitants

<p>Evaluating Scale</p> <p>0 = none 1 = not noticeable unless looking for it 2 = barely noticeable to casual observer 3 = distracting 4 = very distracting 5 = severe and painful looking</p>	<p>Distracting Sounds: Noisy breathing, whistling, sniffing, blowing, clicking sounds 0 1 2 3 4 5 _____</p> <p>Facial Grimaces: Jaw jerking, tongue protruding, lip pressing, jaw muscles tense 0 1 2 3 4 5 _____</p> <p>Head Movements: Back, forward, turning away, poor eye contact, constant looking around 0 1 2 3 4 5 _____</p> <p>Movements of the Extremities: Arm and hand movement, hands about face, torso movement, leg movements, foot-tapping, or swinging 0 1 2 3 4 5 _____</p>
---	--

Physical Concomitants Score

Total Score

Frequency _____ + Duration _____ + Physical Concomitants _____ = Percentile _____ Severity _____

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 4 5 6 7 8 9 10 17 16 15 14 13 12 11 10

APENDIX B

Mindfulness Attention Awareness Scale

Day-to-Day Experiences

Instructions: Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

	1	2	3	4	5	6
	Almost Always	Very Frequently	Somewhat Frequently	Somewhat Infrequently	Very Infrequently	Almost Never
I could be experiencing some emotion and not be conscious of it until some time later.	1	2	3	4	5	6
I break or spill things because of carelessness, not paying attention, or thinking of something else.	1	2	3	4	5	6
I find it difficult to stay focused on what's happening in the present.	1	2	3	4	5	6
I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.	1	2	3	4	5	6
I tend not to notice feelings of physical tension or discomfort until they really grab my attention.	1	2	3	4	5	6
I forget a person's name almost as soon as I've been told it for the first time.	1	2	3	4	5	6
It seems I am "running on automatic," without much awareness of what I'm doing.	1	2	3	4	5	6
I rush through activities without being really attentive to them.	1	2	3	4	5	6
I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.	1	2	3	4	5	6
I do jobs or tasks automatically, without being aware of what I'm doing.	1	2	3	4	5	6
I find myself listening to someone with one ear, doing something else at the same time.	1	2	3	4	5	6

1	2	3	4	5	6
Almost Always	Very Frequently	Somewhat Frequently	Somewhat Infrequently	Very Infrequently	Almost Never

I drive places on 'automatic pilot' and then wonder why I went there.

1 2 3 4 5 6

I find myself preoccupied with the future or the past.

1 2 3 4 5 6

I find myself doing things without paying attention.

1 2 3 4 5 6

I snack without being aware that I'm eating.

1 2 3 4 5 6

APENDIX C

Kentucky Inventory of Mindfulness Skills

Kentucky Inventory of Mindfulness Skills

Ruth A. Baer, Ph.D. University of Kentucky

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes your own opinion of what is generally true for you.

1	2	3	4	5
Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true

____ 1. I notice changes in my body, such as whether my breathing slows down or speeds up.

____ 2. I'm good at finding the words to describe my feelings.

____ 3. When I do things, my mind wanders off and I'm easily distracted.

____ 4. I criticize myself for having irrational or inappropriate emotions.

____ 5. I pay attention to whether my muscles are tense or relaxed.

____ 6. I can easily put my beliefs, opinions, and expectations into words.

____ 7. When I'm doing something, I'm only focused on what I'm doing, nothing else.

____ 8. I tend to evaluate whether my perceptions are right or wrong.

____ 9. When I'm walking, I deliberately notice the sensations of my body moving. ____ 10.

I'm good at thinking of words to express my perceptions, such as how things taste, smell, or sound.

____ 11. I drive on "automatic pilot" without paying attention to what I'm doing.

____ 12. I tell myself that I shouldn't be feeling the way I'm feeling.

____ 13. When I take a shower or bath, I stay alert to the sensations of water on my body.

____ 14. It's hard for me to find the words to describe what I'm thinking.

____ 15. When I'm reading, I focus all my attention on what I'm reading.

____ 16. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.

____ 17. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.

____ 18. I have trouble thinking of the right words to express how I feel about things.

____ 19. When I do things, I get totally wrapped up in them and don't think about anything else.

____ 20. I make judgments about whether my thoughts are good or bad.

____ 21. I pay attention to sensations, such as the wind in my hair or sun on my face.

1	2	3	4	5
Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true

____ 22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.

____ 23. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.

____ 24. I tend to make judgments about how worthwhile or worthless my experiences are.

____ 25. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.

____ 26. Even when I'm feeling terribly upset, I can find a way to put it into words. ____ 27. When I'm doing chores, such as cleaning or laundry, I tend to daydream or think of other things.

____ 28. I tell myself that I shouldn't be thinking the way I'm thinking.

____ 29. I notice the smells and aromas of things.

____ 30. I intentionally stay aware of my feelings.

____ 31. I tend to do several things at once rather than focusing on one thing at a time.

____ 32. I think some of my emotions are bad or inappropriate and I shouldn't feel them.

____ 33. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.

____ 34. My natural tendency is to put my experiences into words.

____ 35. When I'm working on something, part of my mind is occupied with other topics, such as what I'll be doing later, or things I'd rather be doing.

____ 36. I disapprove of myself when I have irrational ideas.

____ 37. I pay attention to how my emotions affect my thoughts and behavior.

____ 38. I get completely absorbed in what I'm doing, so that all my attention is focused on it.

____ 39. I notice when my moods begin to change.

APPENDIX D

Modified Stuttering Cognitive Fusion Questionnaire 13

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
Never True	Very Seldom True	Seldom True	Sometimes True	Frequently True	Almost Always True	Always True

- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. My thoughts about stuttering cause me distress or emotional pain | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. I get so caught up in thoughts about my stuttering that I am unable to do the things that I want to do | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Even when I am having distressing thoughts about stuttering, I know that they may become less important eventually | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. I over-analyze situations about stuttering to the point where it's unhelpful to me | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. I struggle with my thoughts about stuttering | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. Even when I am having upsetting thoughts about stuttering, I can see that those thoughts may not literally be true | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. I get upset with myself for having certain thoughts about stuttering | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. I need to control the thoughts about stuttering that come into my head | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. I find it easy to view my thoughts about stuttering from a different perspective | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. I tend to get very entangled in my thoughts about stuttering | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. I tend to react very strongly to my thoughts about stuttering | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. It's possible for me to have negative thoughts about my stuttering and still know that I am an OK person | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 13. It's such a struggle to let go of upsetting thoughts about stuttering even when I know that letting go would be helpful | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Thank you for completing this questionnaire

APENDIX E

Acceptance and Action Questionnaire II

AAQ-II

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1. It's OK if I remember something unpleasant.	1	2	3	4	5	6	7
2. My painful experiences and memories make it difficult for me to live a life that I would value.	1	2	3	4	5	6	7
3. I'm afraid of my feelings.	1	2	3	4	5	6	7
4. I worry about not being able to control my worries and feelings.	1	2	3	4	5	6	7
5. My painful memories prevent me from having a fulfilling life.	1	2	3	4	5	6	7
6. I am in control of my life.	1	2	3	4	5	6	7
7. Emotions cause problems in my life.	1	2	3	4	5	6	7
8. It seems like most people are handling their lives better than I am.	1	2	3	4	5	6	7
9. Worries get in the way of my success.	1	2	3	4	5	6	7
10. My thoughts and feelings do not get in the way of how I want to live my life.	1	2	3	4	5	6	7

APENDIX F

Thought Control Questionnaire

THOUGHT CONTROL QUESTIONNAIR (TCQ)

Most people experience unpleasant and/or unwanted thoughts (in verbal and/or picture form). Which can be difficult to control. We are interested in the techniques that you *generally* use to control such thoughts. Below are a number of things that people do to control these thoughts. Please read each statement carefully, and indicate how often you use each technique by *circling* the appropriate number. There are no right or wrong answers. Do not spend too much time thinking about each one.

When I experience an unpleasant / unwanted thought:

		Never	Sometimes	Often	Almost always
1	I call to mind positive images instead	1	2	3	4
2	I tell myself not to be so stupid	1	2	3	4
3	I focus on the thought	1	2	3	4
4	I replace the thought with a more trivial bad thought	1	2	3	4
5	I don't talk about the thought to anyone	1	2	3	4
6	I punish myself for thinking the thought	1	2	3	4
7	I dwell on other worries	1	2	3	4
8	I keep the thought to myself	1	2	3	4
9	I occupy myself with work instead	1	2	3	4
10	I challenge the thought's validity	1	2	3	4
11	I get angry at myself for having the thought	1	2	3	4
12	I avoid discussing the thought	1	2	3	4
13	I shout at myself for having the thought	1	2	3	4
14	I analyse the thought rationally	1	2	3	4
15	I slap or pinch myself to stop the thought	1	2	3	4
16	I think pleasant thoughts instead	1	2	3	4
17	I find out how my friends deal with these thoughts	1	2	3	4
18	I worry about more minor things instead	1	2	3	4
19	I do something that I enjoy	1	2	3	4
20	I try to reinterpret the thought	1	2	3	4
21	I think about something else	1	2	3	4
22	I think more about the more minor problems I have	1	2	3	4
23	I try a different way of thinking about it	1	2	3	4
24	I think about past worries instead	1	2	3	4
25	I ask my friends if they have similar thoughts	1	2	3	4
26	I focus on different negative thoughts	1	2	3	4
27	I question the reasons for having the thought	1	2	3	4
28	I tell myself that something bad will happen if I think the thought	1	2	3	4
29	I talk to a friend about the thought	1	2	3	4
30	I keep myself busy	1	2	3	4

APPENDIX G

Consent form with questionnaire

The Effects of Music Therapy on Stuttering

INFORMED CONSENT

Introduction: You are being invited to participate in a study pertaining to stuttering and music therapy. This study will be conducted by undergraduate student Nicole Baumann, under the advising of Dr. Scott Palasik this fall in the Department of Speech-Language Pathology and Audiology at The University of Akron. The goal of the study is to determine the effects of music therapy on stuttering and whether or not the timing of the therapy is important.

Participants: Any person who stutters.

Exclusionary Criteria: Participants must be diagnosed as a person who stutters.

Procedures: This study will involve selecting a song from a predetermined genre. Participants will listen to the chosen song at least once a day for the entire duration of the study. During/before the therapy sessions, the researchers will play the song while administering test to evaluate mindfulness and fluency.

The study will last approximately six weeks. If you choose to participate, please sign this form below and return it to the researcher.

Contact: For any questions or concerns regarding this questionnaire, please e-mail Scott Palasik at: spalasuk@uakron.edu or Nicole Baumann at: nab89@zip.uakron.edu

Risks and Benefits: There only anticipated risk to participation in this study is an aversion to a song once considered pleasurable however the probability is low and mild. You can benefit by adding to our research pertaining to music therapy and stuttering and may even experience a positive change in fluency.

Payment / Costs: Participation in this study is voluntary; there will be no financial payment for participating.

Confidentiality: Your personal information will be kept confidential. No identifying information besides your age and gender will be collected. Results will be reported, but your name and identifying information will not be reported.

Questions: If you have any questions you can contact **Scott Palasik** at 330-972-8185 (spalasuk@uakron.edu). This project has been reviewed and approved by The University of Akron Institutional Review Board. If you have any questions about your rights as a research participant, you may call the IRB at (330) 972-7666.

Consent: I understand that this study is being conducted for the purpose for an undergraduate research honor's project at The University of Akron. Through this document the researcher has explained how the study will be completed, what I will have to do, and how long my participation is required. I am aware that my full participation in this study is voluntary. I am fully aware that identifying information of myself will **not** be released or used in any manner. I am aware that no compensation will be provided for completing this study. By signing this form I consent my participation in the study and will participate to the best of my ability.

Participant Signature (Consent to Participate)

Date

The Effects of Music Therapy on Stuttering

GENERAL QUESTIONS

Gender (please check one): Male Female

Age: _____

- Please rate how you perceive the severity of your physically stuttering. Example - types of disfluencies, tension, physical body responses (please circle one):

Mild Mild to Moderate Moderate Moderate to Severe Severe

- Please rate how you perceive the severity of your mental stuttering. Examples – feeling, attitudes, emotions, thoughts (please circle one):

Mild Mild to Moderate Moderate Moderate to Severe Severe

- How would you rate your general level of mindfulness (1=never present in the moment, 7=always present in the moment)?

1 2 3 4 5 6 7

Never Present in the Moment

Always Present in the Moment

MUSIC QUESTIONS

- What physical benefits have you experienced from listening to music?
(Please explain in as much detail as possible)
- What emotional and/or mental benefits have you experienced from listening to music?
(Please explain in as much detail as possible)
- What is your musical preference (s) (styles, genres, etc)? What is it about these preferences that you enjoy?
- Have you ever had music incorporated into your therapy sessions for your speech or any other therapy?

APENDIX H

Speech Disfluency Count Sheet



Speech Disfluency Count Sheet

2/19/2020

Name: _____ Overall Frequency / Severity: _____
 DOB: _____ DOE: _____ Age: _____ Stuttered Disfl. %: _____ Types: _____
 Situation: _____ Clinician: _____ Non-stutt. Disfl. %: _____ Types: _____

Type	#
I	
Rv	
Rp	
Rw	
Rs	
P	
B	
O	
%	

Type	#
I	
Rv	
Rp	
Rw	
Rs	
P	
B	
O	
%	

Type	#
I	
Rv	
Rp	
Rw	
Rs	
P	
B	
O	
%	

Type	#
I	
Rv	
Rp	
Rw	
Rs	
P	
B	
O	
%	

Notes: _____

"Nonstutt." Disfl.		"Stuttered" Disfl.		#	NonStutt	Stutt
I	Interjection	Rw	Word rep.	1		
Rv	Revision	Rs	Sound/syllable rep.	2		
Rp	Phrase rep.	P	Prolongation	3		
O	Other (Specif	B	Block	4		

Adapted from Yaruss (1998) and other sources. This form Copyright © 2014. All Rights Reserved. The Stuttering Center of Western Pennsylvania. www.StutteringCenter.org