THESIS

CLIENTS' PREFERENCE FOR CUEING INSTRUMENT AND STYLE IN MUSIC THERAPY

Submitted by

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ABSTRACT

CLIENTS' PREFERENCE FOR CUEING INSTRUMENT AND STYLE IN MUSIC THERAPY

Music therapists use different types of cueing instruments (piano, guitar, or autoharp) to facilitate functional outcomes. However, no research has been done to investigate client preference for the facilitation instrument. This study investigated clients' preference for cueing instrument and their perception of how well the music helped them move. The 15 participants were all adults aged 50 and older who participate in music therapy motor rehabilitation groups. Participants completed the responsive survey with some quasi-convenience sampling, and the researcher played six videos that demonstrated cueing with three different instruments (piano, guitar, and autoharp) in two different styles: patterned sensory enhancement (PSE) cueing and simple accompaniment cueing. In the videos, the researcher demonstrated a simple motor movement that is cued with music played on one of the three instruments and in one of the two styles (a total of six conditions). Participants were asked to follow the movements and then answered questions about their instrument preference and their perception of how well the music helped them move. Fifteen participants completed the survey. Based on the data collected, the researcher found that most participants indicated that they felt that the music helped them to move. This may be because different instruments and cueing styles have similar effects on participants or some participants may not perceive any differences between different instruments and cueing styles. Therefore, music was generally acceptable for these participants; however, music therapists should consult with the individual client to learn more about their perception of

the music and how they feel it is helping to facilitate their outcomes. Further recommendations include recruiting a larger sample size, counterbalancing the order of the videos, and collecting data on measures of motor movement.

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CHAPTER I – INTRODUCTION

Purpose

The purpose of this research project was to determine individual preferences and perceived improvements for different music therapy accompaniment instruments and cueing styles. To determine individuals' preferences, music therapy group members were asked to complete a survey of preference for various accompaniment instruments and styles that are illustrated in video examples. The individuals were asked to complete the movement exercises to accompaniment on the piano, guitar, and autoharp. Participants were also exposed to two types of music accompaniment styles: simple accompaniment cueing and patterned sensory enhancement (PSE), a technique from the neurologic music therapy (NMT) approach. Participants were asked to rate how much they like the instruments and their style and how helpful they believed the music is for facilitating their movement.

Background and Rationale

Movement disorders occur as a result of neurological conditions and cause difficulties with movement processes including gait deficits, hand shaking/tremor, and/or muscle rigidity. These movement differences can occur due to Parkinson's disease, stroke, essential tremor, and other neurological diseases (American Association of Neurological Surgeons, n.d.). In the United States, an increasing number of people have movement disorders, and this population will increase from 46 million to more than 98 million by 2060, with the majority of individuals between the ages of 50 and 70 (Mather, 2016). This increased population requires services focused on rehabilitation training to regain or maintain motor abilities and independence.

Many people with movement disorders receive physical therapy (PT); however, less than half of patients with movement disorders receive PT and many patients report that they dislike PT or reject the treatment directly (Klepps, 2015). Research has demonstrated that music therapy may be an effective treatment to improve movement skills and can motivate people to engage in physical therapy, which may enhance outcomes (Rice & Johnson, 2013). NMT features techniques specific to motor rehabilitation, including PSE and rhythmic auditory stimulation (RAS). These techniques can be used and to facilitate motor outcomes, including improved or maintained gait in people with Parkinson's disease (Arias & Cudeiro, 2008; Lee, Yoo, Ryu, Park, & Chung, 2012; Thaut et al., 1996), traumatic brain injury (TBI) (Hurt, McIntosh, and Thaut, 1998; Street, 2012), and cerebral palsy (Baram & Lenger, 2012; Kim et al., 2011). Researchers have also indicated that music therapy can have a positive influence on upper motor movement (Freeman, Cody, & Schady, 1993; Georgiou et al., 1993, Whitall & Waller, 2013). Additionally, NMT has been demonstrated to improve clients' positive experience, emotional control, and stress reduction during and after the sessions (Clark, Baker, & Taylor, 2012; Paul & Ramsey, 2000).

Need/Problem

Although the literature indicates that music therapy can improve movement skills and emotional state in rehabilitation treatment, a lack of research exists on the accompaniment instrument and style of the music provided by the music therapist. No known studies have investigated individual preference of musical styles or facilitating instruments as well as the impact of preference on perceived benefit.

Research Questions

The purpose of this research project was to determine individual preferences and perceived improvement for various music therapy accompaniment instruments and cueing styles. Specific research questions will include:

1: Do different instruments impact the individuals' musical preference and perceived improvement in music therapy?

2: Do different cueing styles impact the individuals' musical preference and perceived improvement in music therapy?

CHAPTER II: LITERATURE REVIEW

Movement Disorders

Prevalence

Movement disorders are a group of neurological conditions that affect the nervous system. The Mayo Clinic (2017) reported that movement disorders may impact voluntary movements (e.g., partial paralysis) or cause involuntary movements (e.g., tremor, choreic movement, or myoclonus). Two broad types of movement disorders, hyperkinetic and hypokinetic, manifest as unwanted movements and slow movements, respectively (Fancini, n.d.). With the rising aging population, an increasing number of individuals may experience motor disabilities that affect their everyday lives.

Researchers have projected that the number of people aged 50 to 70 will increase from 46 million to more than 98 million by 2060, and the percentage of older adults in the U.S. population will increase from 15% to 24%. Due to the aging of the baby boom generation, older adults who need nursing home care will increase 75%, from 1.3 million in 2010 to 2.3 million in 2030 (Mather, 2016). These statistics indicate that the population in the United States is aging, and a growing number of older adults will need care in the future. Some older adults will be diagnosed with movement disorders, such as Parkinson's disease, stroke, or others that could impact movement. Experts from the World Health Organization stated in the DSM-IV that approximately 10-20% of people suffer from movement disorders, and approximately 2% of these individuals have a severe disability (Nordqvist, 2017).

In the United States, an estimated 42 million people suffer from movement disorders, according to data provided by Michigan Medicine of the University of Michigan (Albin et al.,

n.d.; Fancini, n.d.). These movement disorders—including Parkinson's disease, stroke, and traumatic brain injury—deeply impact movement abilities as well as quality of life in older adults, resulting in a need for long-term treatment and rehabilitation.

Parkinson's disease is considered one of the most chronic degenerative diseases, affecting approximately 1 million people. The Parkinson's Disease Foundation estimated that 60,000 new patients are diagnosed with Parkinson's disease every year (American Association of Neurological Surgeons, n.d.; Florida Hospital, n.d.). Traumatic brain injury is also one of the most common movement disorders. A total of 1.7 million people is diagnosed with a TBI every year, and approximately 5.3 million people live in the United States with disability due to TBI (American Association of Neurological Surgeons, n.d.). The U.S. National Library of Medicine estimated that 5 million people suffer from essential tremor and that most of these patients are older than 65 (American Association of Neurological Surgeons, n.d.).

Another highly prevalent disorder that affects long-term movement for older adults is a stroke (also known as cerebral vascular accident). Approximately 795,000 people have suffered a stroke, with about 610,000 of these accounting for first-time stroke patients and the remainder recurrent stroke patients. Of the population affected by stroke, the Centers for Disease Control and Prevention (CDC) estimated that three-fourths of the patients are older than 65 (Fairley, 2009). These statistics indicate that a significant number of people are affected by motor diseases and disability, requiring rehabilitative services to regain function and improve their quality of life.

Individuals who have motor diseases and disability require ongoing treatment to recover skills and/or develop compensatory skills. According to the American Association of Neurological Surgeons, approximately 60% of stroke patients could experience recovery of skills

with rehabilitative services (American Association of Neurological Surgeons, n.d.). Furthermore, approximately 35% of stroke patients experience close to a full recovery. Therefore, movement rehabilitation can be beneficial for patients, and with the rising number of aging Americans, these services will be essential to ongoing healthcare (Delgado, 2018; Madeline, 2016).

Services provided for people with motor disability and disease include occupational therapy (OT) and physical therapy (PT). Occupational therapists aim to help people develop, recover, and improve physical, sensory, and/or cognitive skills. Occupational therapists have many ways to rehabilitate individuals with movement disorders, including the use of exercises, accommodations (i.e., modified utensil handles), and active-passive training (Ford-Lanza, 2017). There is no known research indicating how many people engage in OT services; however, Solomon (2017) reported that OT is the fifth fastest-growing job and the number of occupational therapists will increase by 27% in 10 years.

A physical therapist's primary role is to help individuals who are injured or have movement disorders improve their motor skills. PT is the most direct service to help with movement disorders. According to Klepps (2015), in the United States alone, about half of the population over aged 18 (just over 100 million) had a musculoskeletal injury that lasted longer than three months. However, only 11.7 million of these people received PT in 2011, and only 30% of individuals received outpatient PT service (Klepps, 2015). These statistics illustrate that fewer than 15% of injured individuals receive PT services, and an even smaller percentage opt out of continuing treatment post-discharge from a medical center, which may limit their ability to potentially regain skills lost due to injury or neurologic disorder. Therefore, more research is needed on what is causing the lack of motivation for receiving services and how to design effective and motivating treatments for movement rehabilitation.

Related Diseases and Causes

As discussed previously, several diseases cause movement dysfunction, including Parkinson's disease, stroke, and TBI. Some of these diseases and disorders affect primarily the older adult population, including Parkinson's and stroke. Although TBI may affect individuals of all age groups, this review will focus on individuals who are over 60 years of age (Madeline, 2016). In the next section, motor aspects of common disorders are examined.

Parkinson's Disease

Parkinson's disease, a chronic and degenerative neurological disorder, was first identified by an English doctor named James Parkinson in 1817. While the symptoms of dysfunction have been well-researched and documented, the etiology of Parkinson's is still wholly unknown (Brazier, 2018). Two main factors have been identified in Parkinson's disease: genetics and environment. The Mayo Clinic (n.d.) and the Michael J. Fox Foundation for Parkinson's Research report that researchers have identified that having a family member with Parkinson's only increases an individual's likelihood of acquiring the disease (Brazier, 2018). The other factor is the environment, with researchers suggesting that certain toxins or other environmental factors can increased risk of Parkinson's disease. These toxins or factors come from the food, water, or some chemical elements that can be absorbed by the body in daily life ([MJFF], n.d.). Several other risk factors can increase the likelihood of developing Parkinson's disease: age (60 years old or older), ethnicity (Caucasian), and gender (male) (Mayo Clinic, 2018).

Although the etiology of Parkinson's disease is unknown, people with Parkinson's disease have common symptoms including tremors, rigid muscles, and impaired balance. Researchers have identified differences in the brain among Parkinson's patients, including lower dopamine levels and lower norepinephrine levels, which are neurotransmitters that impact

movement. In particular, low levels of dopamine result in abnormal movements such as loss of balance, rigid muscles, tremor, and/or freezing (Mayo Clinic, 2018, and [MJFF], n.d.).

Not surprisingly, the primary symptoms of Parkinson's include bradykinesia, tremor, rigidity, and freezing (Delong, 1990). Bradykinesia means difficulty moving, such as slow or few movements. People with Parkinson's disease often have less facial expression, a decreased eye-blink rate, and difficulty with gait and volitional movements. Additionally, in Parkinson's, increased muscle tone causes involuntary rigidity, despite volitional intent of fluid movement that is occasionally relieved in states of relaxation. Tremor usually appears when people have emotional stress and declines during voluntary movements (Davis, Gfeller, & Thaut, 2008).

Stroke

Another disability that affects motor movement is cerebral vascular accident, more commonly known as stroke. Researchers have demonstrated that stroke occurs in all age groups; however, the probability of having a stroke increases after age 55 (McIntosh, 2017). The Mayo Clinic (2008) indicated that African Americans and people who have a familial history of stroke have a higher risk of stroke (McIntosh, 2017).

Stroke is a disorder that arises due to the deprivation of the oxygen in the brain. A stroke can occur when there is an interruption or reduced blood flow to the brain; in just a few minutes' time, this loss of oxygen results in the death of brain cells. Stroke is divided into three broad categories: ischemic stroke, hemorrhagic stroke, and transient ischemic attack (TIA). Approximately 80% of patients have an ischemic stroke, which is the result of a thrombus—a blood clot or an embolus in the blood vessel. Hemorrhagic stroke is caused by broken arteries or blood leaking in the brain. A hemorrhagic stroke could be caused by uncontrolled high blood pressure, trauma, aneurysms, or the ingestion of too many anticoagulants (Mayo Clinic, 2008;

McIntosh, 2017). The blood leak results in increased pressure and damages the brain cells (McIntosh, 2017). TIA is different from ischemic stroke and hemorrhagic stroke because the blood is interrupted for such a brief time that people may not have symptoms. However, those who experience a TIA should still seek treatment as it increases the risk of a major stroke occurring in the future (Centers for Disease Control and Prevention, 2018).

Following a stroke, many people will experience motor difficulties. The Mayo Clinic (2008) indicated that the main symptoms related to stroke include difficulties with gait, vision, and numbness in both upper and lower limbs. Individuals may also encounter difficulties with voluntary and involuntary movements. Four main involuntary abnormal movements could be caused by stroke—chorea, dystonia, tremor, and parkinsonism. Chorea describes the arrhythmic movements in which patients suddenly have unexpected movements. The lesion from the stroke also causes continuous contraction of muscles called dystonia, creating muscular tension and abnormal twisting. A stroke could also trigger vascular Parkinson's disease, causing the individual to have less and less control over his or her body due to muscular rigidity, resting tremor, and bradykinesia (Alarcón, Zijlmans, Dueñas, & Cevallos, 2004; Vega, 2017).

Other Diseases

Still other disorders impact movement, such as TBI and ataxia. TBI is a traumatic brain injury, which is caused by sudden damage to the brain through a car accident, fall, or gunshot wound. TBI is among the leading causes of death and movement disorder in the United States and the worldwide. People who suffer TBI usually experience headaches, memory loss, and convulsions (Nordqvist, 2018). In addition to these symptoms, individuals with TBI still have broad physical and psychological symptoms regarding their difficulties with movement, communication, and emotional stability. Different parts of the brain relate to different functions,

such as the frontal lobe relating to motor control and the parietal lobe relating to body awareness. The brain location where trauma occurred can result in various movement dysfunctions.

Tremor is rhythmic or regular shaking of various parts of the body. Tremor may be present as a complication of some diseases, such as Parkinson's disease, Huntington's disease, or alcohol and drug abuse. Individuals may also have "essential tremor" of unknown etiology (Kahn, 2015). Essential tremor is a neurological disorder that causes uncontrollable shaking of body parts, especially in the hands and forearms. Essential tremor often occurs when individuals are trying to complete voluntary movements, such as tying their shoes. Mayo Clinic (2019) indicated that risk factors for tremor include genetic mutation and aging. If one parent has the defective gene, this may increase the probability of their child developing the tremor. Essential tremor attacks individuals who are 40 years and older.

Ataxia is another disease that impacts people's muscle control or voluntary movements. According to the Mayo Clinic (2008), patients who have ataxia may have difficulty with movement coordination, imbalance, and/or fine motor skills. The most common symptoms include decreased balance, gait impairment, slurring of speech, and difficulty swallowing. The cause of ataxia is damage to certain parts of the brain, cerebellum, spinal cord, or other nerves. Therefore, people who have movement disorders could have similar symptoms and usually make a recovery with physical therapy and occupational therapy.

Treatment for Movement Disorders

According to Yale Medicine (2019), the prevalence of movement disorders indicates that a significant number of people throughout the world are suffering from movement-related complications. The most common treatment is physical therapy, which is a dynamic healthcare treatment provided in nursing homes, hospitals, rehabilitation centers, and other facilities

(Bowden, 2017). Physical therapists help patients who have movement dysfunction develop or maintain their maximum movement ability, such as gait training, strength training, and transitioning from a sitting position to a standing position. Physical therapists also help patients reduce their pain. Furthermore, physical therapists help patients enhance their quality of life during rehabilitation (World Confederation for Physical Therapy, 2017).

The PT process includes assessment of the client, designing the treatment plan, creating interventions, and providing recommendations for treatment (World Confederation for Physical Therapy, 2017). The physical therapists' main interventions include exercise repetitions, ultrasounds, electrical stimulation and TENS (transcutaneous electrical neuromuscular stimulation), joint mobilization, and massage (World Confederation for Physical Therapy, 2017). Rehabilitation sessions often include exercises to help the individual improve strength, range of motion, or flexibility. Both ultrasound and electrical stimulation are used with specific machines that heat or stimulate the body. Joint mobilization is a form of passive rehabilitation, where the therapists passively move the client's body to obtain better function. Massage may be used to help reduce pain and muscle tension in patients (Sears, 2018).

Williams, Smith, & Papathomas (2014) found that patients in physical therapy may encounter various barriers, including lack of motivation, feeling disappointment about the new lack of movement, and increased psychological distress. Those barriers could cause individuals to participate less in the process and may also cause complications due to degradation of motor skills. The safety precautions of a hospital's outpatient environment also prevent patients from maximizing results of their rehabilitation until they are discharged (Rice & Johnson, 2013). This is also the reason some patients refuse to accept PT after illness. However, a study by Krout (2001) revealed that music therapy can realize significant results in reducing pain and increasing

physical comfort and relaxation. Pre-test and post-test data indicate that pain control, physical comfort, and relaxation were significantly improved. Furthermore, in a concerning Parkinson's disease study (Pacchetti et al., 2000), researchers divided 32 participants into two groups that engaged in music therapy and physical therapy, respectively. The results demonstrated that participants in the music therapy group had improved movement and higher happiness levels. The physical therapy group had improved only rigidity. This study indicates that music therapy can work in conjunction with physical therapy to enhance PT outcomes, which may foster more desirable results or increase motivation in patients to continue treatment post-discharge. Music can also improve mood, decrease complications, and improve the quality of rehabilitation all by increasing patients' interests (Paul & Ramsey, 2000).

Researchers have indicated that PT could bring benefits to patients with movement disorders; however, gains may be limited due to pain or lack of interest. The incorporation of music therapy may improve treatment outcomes for individuals receiving rehabilitative services.

Music Therapy

Music therapy (MT) is an evidenced-based clinical discipline, and professional music therapists use music as a therapeutic tool to help clients achieve their individual goals. According to the American Music Therapy Association (AMTA, 2007), MT is quite broad, and therapists work with people who have behavioral and emotional disorders, developmental disabilities, medical/surgical needs, neurological disorders, and others. MTs work in many settings, including rehabilitation centers, psychiatric and medical hospitals, outpatient hospitals, community mental health centers, and schools. All board-certified music therapists must possess a bachelor's degree in music therapy from an accredited university, have completed 1,200 clinical training hours, and pass a board-certification exam for the credential music therapist-board certified. Music

therapists use many techniques and interventions, including singing, listening, composition, and improvisation (American Music Therapy Association, n.d.).

In music therapy, clients are treated for social, cognitive, sensory, motor, and emotional needs. Once a client is referred to a music therapist, the therapist will assess the client to determine eligibility. The music therapist will then build and implement the treatment plan, including goals, objectives, and methods for evaluation within the plan (Hanser, 1999). A music therapist can also collaborate with the client's doctors, physical therapists, occupational therapists, and other treatment team members in a multidisciplinary effort to help the client. Team members can discuss and build the most suitable treatment plan, solve problems together, and ensure consistency across disciplines.

Music therapists assess clients' different need areas, including social, cognitive, motor, and emotional domains. This assessment will generate more information for the treatment team, especially if some skills are more stimulated and better assessed through music. Furthermore, this assessment pertains to the treatment team because music therapists can work with other therapists to improve outcomes. Music therapists may also improve the effectiveness of protocols or treatments, including gait training and upper limb rehabilitation, as a result of the ways in which music can help with movement timing and repetition. Sometimes, music can bring benefits to clients who have different cultural backgrounds because music is a carrier of culture, which may improve treatment efficiency because of the relevance to the clients (Davis, Gfeller, & Thaut, 2008). Therefore, music therapists can often build a positive relationship and experience for the clients, which will benefit the treatment team's overall rehabilitation efforts.

Several different approaches can be found in music therapy, and one widely used approach is neurologic music therapy (NMT). It is based on the theory of the human brain's

function as well as evidence-based research on how to develop and/or maintain functional skills (Pasiali, 2018). NMT uses a rational scientific mediating model (R-SMM) to build the connection between music and therapy. It also uses research in neuroscience to investigate where musical functions occur in the brain, discover where music aligns to certain non-musical functions in a shared network, and where music solely occurs in an extended network. This information helps music therapists using NMT to design better interventions to optimize treatment results. A wide range of functional skills can be targeted using NMT techniques, including language, communication, movement, and cognition. A wide body of research in NMT exists, with specific emphasis on motor rehabilitation.

In terms of movement disorders, NMT has a particularly large body of research with promising results in regard to gait training and voluntary movement rehabilitation. More than 20 techniques comprise NMT with three specifics to movement: rhythmic auditory stimulation, patterned sensory enhancement, and therapeutic music instrument performance (Davis, Gfeller, & Thaut, 2008). For the purpose of the current study, I will focus on patterned sensory enhancement.

Rhythmic auditory stimulation (RAS) is an NMT technique to improve or maintain movements that are intrinsically biologically rhythmic; it is most commonly used in gait training (Thaut & Hoemberg, 2016). RAS has been researched in people with Parkinson's disease, TBI, stroke, and multiple sclerosis (Lim et al., 2005, Rochester et al., 2005; Thaut & Hoemberg, 2016; Thaut et al., 1996). RAS is used to stimulate the clients' gait pattern through external auditory rhythm. This external cueing can improve walking tempo, balance, and muscle control. Seven protocol steps comprise RAS: the assessment of current gait parameters, resonant frequency entrainment, pre-gait exercises, frequency modulation at increments of 5-10%, advanced gait

exercises, fading of musical stimulus, and reassessment of gait parameters (Thaut & Hoemberg, 2016).

Patterned sensory enhancement (PSE) is another NMT technique to provide temporal, spatial, and force cues for fundamental movements that are not rhythmic, such as arm and hand movements. In PSE, the music therapist facilitates movement by "sonifying" the movement into a musical pattern. PSE does not have defined steps within the protocol; instead, the music therapist watches the movement exercise and then provides musical cues to best facilitate the exercise, with the goal of improving the quality of movement.

Research on Music Therapy in Rehabilitation

Several studies have indicated that rhythm can affect movement, including the quality of gait and gait-related activities. Lee et al. (2012) found that music therapy interventions including rhythmic cueing improved the gait of people with Parkinson's disease. The research revealed a reduction in freezing gait and hypokinetic gait patterns with the aid of visual and auditory cues from the music therapists. Researchers have also indicated that auditory cues are more successful in impacting gait than visual cues (Arias & Cudeiro, 2008), suggesting the existence of an auditory-motor coupling that may be useful in rehabilitation. Thaut et al. (1996) studied the impact of rhythm on gait in people with Parkinson's disease, demonstrating that participants who received the rhythmic cueing intervention improved gait velocity, stride length, and step cadence as compared to those who had no intervention. These studies indicate that music therapy can improve gait training in people with Parkinson's disease.

Rhythmic cueing has also been used for gait training in people with other motor disorders, with initial evidence of efficacy. Hurt, McIntosh, and Thaut (1998) studied five TBI patients who had a gait deficiency. Following gait training, all of the participants had an

increased mean velocity of 51% and improvements in their cadence and stride length. A study by Street (2012) found that participants with TBI who received gait training demonstrated significant improvements in velocity and stride length during a six-week period (Street, 2012). Rhythmic cueing interventions have also been shown to improve the overall gait of people with cerebral palsy (Baram & Lenger, 2012; 56 Kim et al., 2011) and patients with spinal cord injury (de l'Etoile, 2008). Initial research reveals that rhythmic intervention may help patients with multiple sclerosis walk safely and improve their walking speed (Baram & Miller, 2007; Conklyn et al., 2010). These studies reveal that rhythm is a powerful tool to help regulate motor movement patterns.

Rhythmic interventions have also been studied for upper body movement in people with Parkinson's and stroke. Thaut, Schleiffers, and Davis (1991) demonstrated that auditory rhythm improved the number of repetitions completed as well as consistency of bicep and tricep movements. Because the hand and arm tremors of Parkinson's patients influence their daily functional movements, Freeman, Cody, & Schady (1993) and Georgiou et al. (1993) studied whether music could improve arm and hand movements of participants with Parkinson's disease. Their results revealed a positive impact of music on tremor during volitional motor movements. More specifically, participants demonstrated more accurate and regular rhythm when they did a finger-tapping test after the music intervention (Freeman, Cody, & Schady 1993). In the study by Georgiou et al. (1993), participants had better self-control and more accurate body responses to a button-press task with rhythmic stimulation.

Music has also been shown to improve volitional movements in people with stroke. Street, Magee, Odell-Miller, Bateman, & Fachner (2015) studied whether music therapy can improve upper limb rehabilitation in people who suffered stroke hemiparesis. They implemented

the intervention twice a week over six weeks and measured the quantitative outcome before and after each intervention. The results revealed that participants' arm and finger dexterity had been improved after the intervention by organized rhythmic prompting (Street et al., 2015). Whitall and Waller (2013) also demonstrated, through a 15-year research program, that music is useful to control and improve the upper extremity movements for individuals after stroke. They measured the height and frequency of participants' arm-stretching exercises with the results indicating that rhythmic auditory cueing can reduce motion deviation and improve consistency and stability of movements (Whitall & Waller, 2013).

The above studies demonstrate that rhythmic cueing can impact motor movement. Studies have also revealed the impact of harmonic cueing in PSE. Hong (2011) conducted a study of whether PSE improves upper motor movement skills for stroke patients. The results established that the function of participants' grasping power and finger manipulation was better in PSE than for other participants who were not participating in PSE. Hong (2011) also found that participants' depression levels were decreasing and they had more motivation after joining PSE training.

Peng et al. (2011) studied the effects of music on sit-to-stand transitions among children with spastic diplegia and obtained positive results. The researchers revealed that PSE can improve muscle power and movement control even after music therapy. Peng et al. (2013) also conducted a home-based study to investigate the effects of PSE treatment on motor function in children with cerebral palsy. The results indicated that PSE, which is the technique of NMT, may improve the gross motor capacity of children with cerebral palsy.

Although many studies have focused on the impact of rhythmic cueing and musical cueing on the quality of motor movement in people with rehabilitative needs, few studies have

investigated the impact of music on clients' motivation. Clark, Baker, & Taylor (2012) compared the outcomes and participants' moods between exercise instruction and live-PSE instruction in a rehabilitation facility. The results revealed no significant difference between those two instructions except for more confusion in PSE instruction. However, the feedback from the participants' responses indicated that they had a more positive experience in the PSE interventions. This study indicated that PSE instruction may facilitate a more positive mood even when the participants feel confused by the instructions. Although this study indicates that music may be beneficial for mood, there is no known research on clients' perception of and preferences for music used to facilitate motor movement. While motivation is an element that promotes motor rehabilitation, my survey will focus on the types of cueing and instrumentation.

Although few people have studied it, individuals' preference is an indispensable element in music therapy. Lai (2004) indicated that the heart rates and respiratory rates were decreased when people listened to their preferred music. Jiang et al. (2013) studied the effects of different types of music on stress reduction. The results revealed that people can reduce their stress by listening to sedative music instead of stimulative music. However, stimulative music can have the same effect when the music is an individual's preference (Jiang et al., 2013). The results of these studies indicate that preferred music can reduce stress, and it may be helpful in the clinical aspects of music therapy. Additional research has been conducted on the impact of music on attention.

Gfeller and Thaut (2008) reported that music can help people maintain their attention to a given task. Meanwhile, music therapists can help patients focus and enjoy reduced pain by playing their preferred music during movement rehabilitation treatment. Sung et al. (2010) also

suggested that preferred music can bring positive effects to older adults with dementia by reducing their anxiety levels.

The results indicated that the rating anxiety in dementia questionnaire, which is used at the beginning and end of each session, showed a significant reduction in six weeks by comparing the pre-test and post-test of 23 participants. Through the above studies, a better understanding of the perception of the musical cues can help music therapists make better choices for clinical facilitation of movement.

Specific Cueing in Music Therapy

Music Accompaniment in Music Therapy

Music is a highly powerful tool and can be used to facilitate outcomes in music therapy. Music, therapy, and clients are three component elements for the therapeutic process (American Music Therapy Association, 2016). The music therapists primarily provide the musical stimuli for motor rehabilitation in the music therapy process. This may include playing an accompanying instrument while singing the client's preferred music. This playing is typically matched to the tempo of the movement being performed (Thaut & Hoemberg, 2016). In this way, the music can provide a motivator and an external pacing cue for the client's movements (Thaut & Hoemberg, 2016).

Music therapists often use an instrument for accompaniment when leading movement groups, typically the piano, autoharp, or guitar. Piano is commonly used as a facilitation instrument in music therapy because of its many functions, including engaging and multisensory experience (Matney, Camilli, & Meyer, 2018). In movement rehabilitation, the harmonic accompaniment is used to cue the clients to move through the prescribed movement. The piano is an ideal instrument because the music therapist can use a wide range of harmonic and rhythmic

cues to help facilitate the nature of the movements. For example, the music therapist could play a motivating song, where the piano provides temporal cues for the movement (Figure 1). The music therapist could also play chords to show emphasis within the movement (i.e., playing a chord when the clients move their arm up in a bicep curl; Figure 2) or sing the client's preferred songs for motivation when the client performs the exercises. In this way, the piano provides the client with timing cues for movement and also can help with motivation to complete the exercises. The piano, in particular, can illustrate the spatial cues of movements due to its large range. However, one limitation with the piano is that it is less portable and the therapist must sit at the piano, without the ability to move around the treatment room.

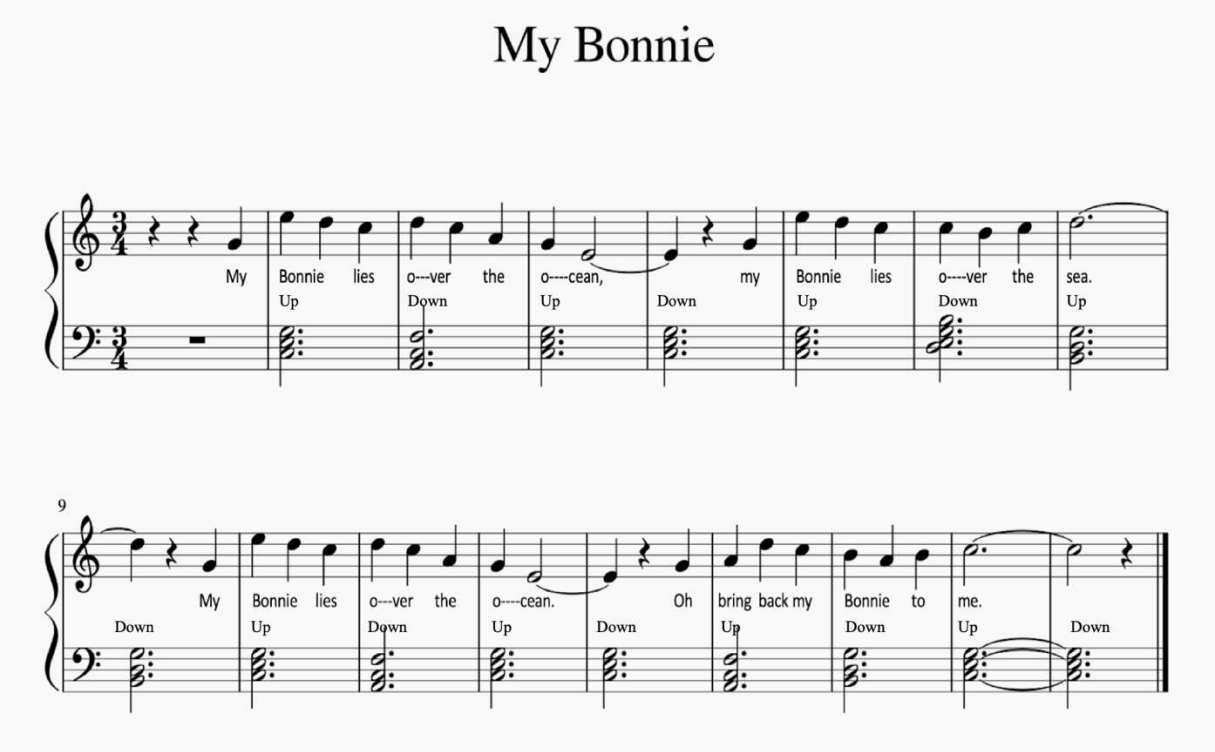

Figure 1. Example of musical cueing for bicep curls where up = flexion and down = extension

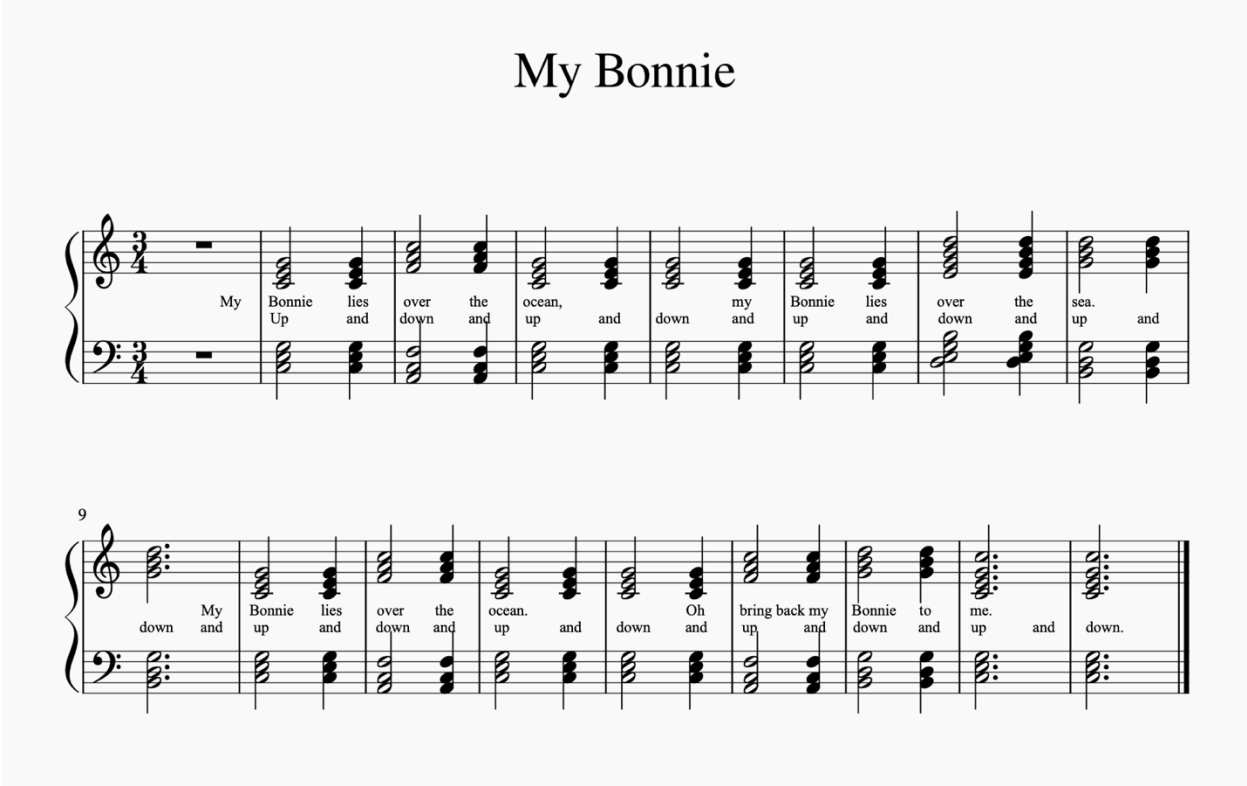

Figure 2. Example of musical cueing for bicep curls where up = flexion and down = extension

A guitar is also commonly used in motor cueing. Therapists can play and provide rhythmic and harmonic chords to accompany movement patterns. For example, the music therapist may strum the chords of the client's favorite song, pacing the tempo to match the movement that the client is completing. The guitar has some limitations when compared to the piano, primarily that the melody is not typically played, only the chords for the selected song. Furthermore, the guitar is limited in range with only six strings and the common use of open chords. One advantage of the guitar is portability; it is easy for the music therapist to move around while playing in the treatment room.

Autoharp is a less common instrument in music therapy; however, it is used for accompaniment in motor rehabilitation. Autoharp has been popularized by clinicians working in the NMT approach. The autoharp is a musical instrument in the chorded zither family and can

produce rhythmic and harmonic chords. Advantages of the autoharp are its portability and its broad range. The autoharp can be held against the chest, which allows the music therapist to move easily around the treatment room. The sound of the autoharp, with its extended range, allows for cues that can be sustained. For example, the broad range of the autoharp can provide a cue for a longer-lasting movement such as sit-to-stand, lunge, and body rotation in motor rehabilitation. One disadvantage to the autoharp is that it can be difficult to maintain correct tuning of the instrument's 32 strings.

Music therapists have several choices of instruments for music facilitation, all with their advantages and disadvantages. Musical accompaniment is crucial to help clients attain their treatment goals. Although some anecdotal reports discuss how musical cueing should be performed, there is no known research investigating the clients' preference of cueing instrument or style.

Neurologic Music Therapy Cueing

In NMT, cueing begins with rhythm. For example, in rhythmic auditory stimulation (RAS), the therapist uses a metronome or other instrumental accompaniment to play music in the same tempo as the client's steps and uses rhythmic verbal prompts to continue cueing the movement; this step allows the clients to improve his or her gait. In RAS, the rhythm is the primary facilitator of change and drives the client's gait pattern. During the treatment, a music therapist plays simple rhythms and sings some of the client's familiar songs at the same time. The rhythm and pitch, combined with a simple repeated melody, help provide support to the client's gait pattern. This combination of auditory support helps optimize the client's ability to control gait (Krumhansl, 2000; Fritz et al., 2009).

Musical cues in patterned sensory enhancement (PSE) are more complex. In PSE, the music therapist provides temporal, spatial, and force cues for fundamental movements that are not rhythmic in nature, such as arm and hand movements. Additionally, the music therapist facilitates movement by playing rhythmic, melodic, harmonic, and dynamics/force cues (Thaut & Hoemberg, 2016). Sometimes, RAS and PSE are combined by a music therapist to lead to richer and clearer cues. For example, PSE can help a client when he or she needs to lift a foot and start walking during gait training. This is the reason why PSE can be used as a motor movement technique.

Thaut (2016) suggested that three types of cues are used in PSE: spatial cues, temporal cues, and dynamics/force cues. In PSE, therapists can change the pitch, dynamics, sound duration, and harmonic elements of music to match and prompt the movements.

Spatial cues are an important factor for cueing the spatial composition of movement. When the pitch goes up, the movement will go up; when the pitch goes down, then the movement will go down. For example, when a client does a shoulder flexion exercise, the therapist will play an ascending musical pattern when the arms go up and play a descending pattern when the arms go back down. However, some movements cannot be matched with the pitch, such as arms moving away from the body and back toward the body, so the therapist uses dynamics to prompt movements. The therapist then plays two different chords when arms are out and in.

Temporal cues are important to use in PSE because the therapist can change the tempo, meter, rhythmic pattern, and form in music to prompt the temporal nature of movements. The therapist can use the most effective tempo with verbal cueing (such as “go up and down” or “go in and out”), duple or triple meters, and rhythmic patterns to match the movements. Furthermore,

some movements have a particular form. For example, when a client raises his leg, he needs four beats; when he puts it back down, he needs two beats. At this time, four beats up and two beats down are the forms.

The last cueing type is muscular dynamics/force, and it includes tempo, dynamics, and harmonic elements. When a client's movement needs more force, the music therapist can increase the tempo or add a crescendo; when the movement needs less force, the therapist can decrease the tempo or add decrescendos. Additionally, harmony is highly effective because it can prompt muscle tension through the use of dissonance and resolution. The therapist can play certain harmonies when the movement needs more force through the use of harmonic tendency.

As outlined above, music therapists make calculated and strategic decisions about how to play music to best facilitate movement patterns. Music therapists may play simple accompaniment styles or use the core elements of PSE (including spatial, temporal, and force cues). Thaut (2016) intended for PSE to better facilitate the movement pattern, and although he stated that PSE can improve movement outcomes, limited research has been conducted on the efficacy of PSE in music therapy. Furthermore, no research has been conducted to study patient preference for the instrument used or the cueing style (PSE or simple cueing). In the therapeutic relationship, the client is a primary focus and the client's preference for both instrument and style may impact the clinical decision-making or outcome. Therefore, the client's preferences for the instrument and cueing style should be considered by the music therapist for motor facilitation.

Summary and Purpose Statement

Music therapists working in rehabilitation use music to stimulate and prompt a particular motor movement. Some approaches, including NMT, have specific ways in which music is used to cue movement. For example, music therapists may manipulate melodic, rhythmic, and

harmonic cues to best help clients perform the motor movement. Melodic cues can be utilized to demonstrate the directional nature of a movement. For example, when a movement is ascending, the melody can be a reflection of that. Rhythmic and harmonic cues can indicate force and/or duration of a motor task, which can help clients maintain or stop their movements. However, harmony can also be used to induce different emotions due to the variability in keys, mainly major verses minor. Usually, major keys and chords can generate positive associations, such as sunshine and happiness, whereas typically minor keys and dissonant chords may instill a sense of negativity, including dull, uneasy, and unhappy feelings. When the therapists play different keys or chords, those musical elements could evoke various emotions or behaviors in the clients.

Musical accompaniment can be used everywhere in music therapy, especially in rehabilitation. It can engage and motivate clients and enhance physical outcomes. Furthermore, NMT has some specific techniques, including rhythmic auditory stimulation (RAS) and patterned sensory enhancement (PSE), to cue and improve movement. Many researchers have studied the effect of music therapy on movement disorders; however, no studies have examined the effect of individuals' preferences for the accompaniment instrument and style on their perceived outcomes. Therefore, more research is needed to investigate the clients' preferences for cueing instruments and styles in music therapy.

The purpose of this research project is to determine individual preferences and perceived improvement for various music therapy accompaniment instruments and cueing styles. Specific research questions include:

1: Do different instruments impact the individuals' musical preference and perceived improvement in music therapy?

2: Do different cueing styles impact the individuals' musical preference and perceived improvement in music therapy?

CHAPTER III: METHOD

Research Design

The purpose of this study was to survey the clients' preferences of various music cueing instruments and styles in their movement rehabilitation music therapy. Participants completed a survey by watching videos that illustrated cueing with three different instruments (piano, guitar, and autoharp) in two different styles (PSE cueing style and simple accompaniment cueing style). Participants were required to answer questions about their instrument preference and their perception about how well the music helped them move.

Participants

Participants were adults over the age of 50 who were participating in any music therapy motor rehabilitation groups. Inclusion criteria were adults with a motor disability or disease who were participating in music therapy motor rehabilitation groups. Fifteen participants started the survey and all of them completed the survey.

Measures

Survey

The survey was the first to investigate this phenomenon and was created by the researcher. The full survey is shown in Appendix A. Participants first responded to demographic questions, including age, gender, diagnosis, the length of illness, and involvement with music therapy rehabilitation groups. Participants were then shown six videos of the researcher leading a bicep curl exercise and were instructed to complete the exercise to the best of their ability. Each

video featured a different music cueing style and instrument combination (autoharp, guitar, or piano in the style of simple accompaniment or PSE cueing). Six total videos were screened, each lasting 45 seconds, for a total of 4 minutes, 30 seconds. All participants then answered questions related to their preferences about musical instrumentation and style, as illustrated in Appendix A. With each question, the participant was provided with a Likert Scale ranging from "disagree" to "strongly agree" if they liked the music or if they believed the music helped them complete the movements. Table 1 and Table 2 represent different scores for different answers in two survey questions. All of the data were recorded by score, based on the group of different instruments and cueing styles.

Table 1

Survey Question 1:

Question	I liked the music in the video				
Answer	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
Rating	5	4	3	2	1

Table 2

Survey Question 2:

Questions	I feel the music helped me complete the movement				
Answer	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
Rating	5	4	3	2	1

Video

The survey presented six embedded videos of equal length (45 seconds). In the videos, the researcher led the specific movement—bicep curl—and showed a combination of accompaniment style and instrumentation. All six videos combined three different instruments (guitar, piano, and autoharp) and two different cueing styles (simple accompaniment cueing and PSE cueing). In the videos, the researcher played the music in a slow tempo, approximating a natural speed for movement rehabilitation based on the researcher's clinical experience. Wilhelm and Cevasco-Trotter (2018) suggested that the natural tempo for the movement can be used in the older adults' music therapy movement rehabilitation groups.

After each video, the researcher asked participants to answer two questions. After all participants completed the questions, they continued to watch the next video. Here are all of the clips of the music.

Video	Instrument	Cueing style
1	Guitar	Simple accompaniment cueing
2	Guitar	PSE cueing
3	Piano	Simple accompaniment cueing
4	Piano	PSE cueing
5	Autoharp	Simple accompaniment cueing
6	Autoharp	PSE cueing

Procedure

The researcher attended some music therapy movement groups, after gaining permission from the group leader. The researcher introduced the entire survey with instructions and completed consenting procedures. The researcher then distributed paper-based consent forms and

questionnaires to all participants, who indicated their consent to complete the study by entering the study. All of the participants were permitted to complete the survey with help if they needed assistance, such as having a research assistant read them the questions, enter their responses, or help them to do the movements (if they typically received help from the group leaders or volunteers). The researcher played six videos in order on the screen and directed all participants to answer two questions after each video. Sato, Morimoto, and Ota (2011) indicated that between 65 and 80 dB is the suitable range for older adults or people with hearing impairment; there is no research about the best decibel level for older adults' movement rehabilitation in music therapy. Therefore, the researcher controlled the decibel level to 75 dB in the survey. All of the questionnaires were collected by the researcher after all six videos were screened and questions were completed.

Data Analysis

All of the data were collected and analyzed by the researcher, who used descriptive statistics to illustrate the results of the survey.

CHAPTER IV: RESULTS

Fifteen people (7 women and 8 men) participated in this survey. One of the participants was 52 years old, 3 were between 55 and 59, 2 were between 60 and 64, 1 was between 65 and 70, and 8 were 71 years or older. For the years of diagnosis, 5 people were diagnosed within the past 1 to 4 years, 6 were diagnosed in the past 5 to 9 years, and 4 were diagnosed more than 10 years ago. All of them were attending weekly music therapy groups.

Music Preference of Different Instruments

All participants were exposed to the same order of instruments, where guitar was presented first, piano second, and autoharp third. The mean ratings and frequency distribution of the 15 participants' preference for each instrument (Question 1: "I liked the music in the video") were calculated using Excel (see Table 3, Figure 3, and Figure 4). The median and mode for all instruments was 4 (agree). A visual analysis of the average guitar (M = 3.90, SD = 0.69), piano (M = 3.53, SD = 0.85), and autoharp (M = 3.57, SD = 0.86) ratings showed that participants rated guitar the highest. The guitar was rated 3 or higher by all participates, whereas one participant selected 2 (disagree) for the piano and autoharp (see Figure 4).

Table 3

Means, Standard Deviations, and Median for Musical Preference for Different Instruments

	Guitar	Piano	Autoharp
Mean	3.90	3.53	3.57
SD	0.69	0.85	0.86
Median	4.00	4.00	4.00

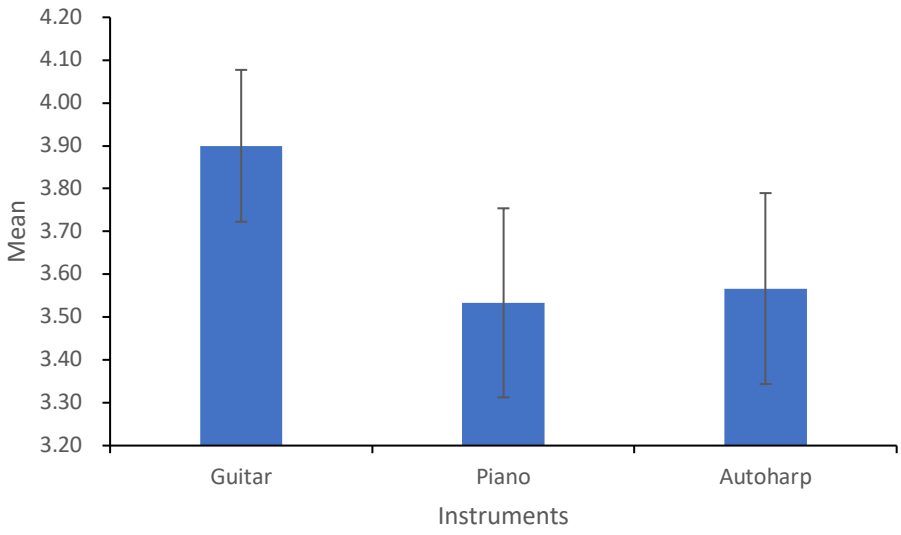

Figure 3. Means (and standard error) for musical preference for different instruments.

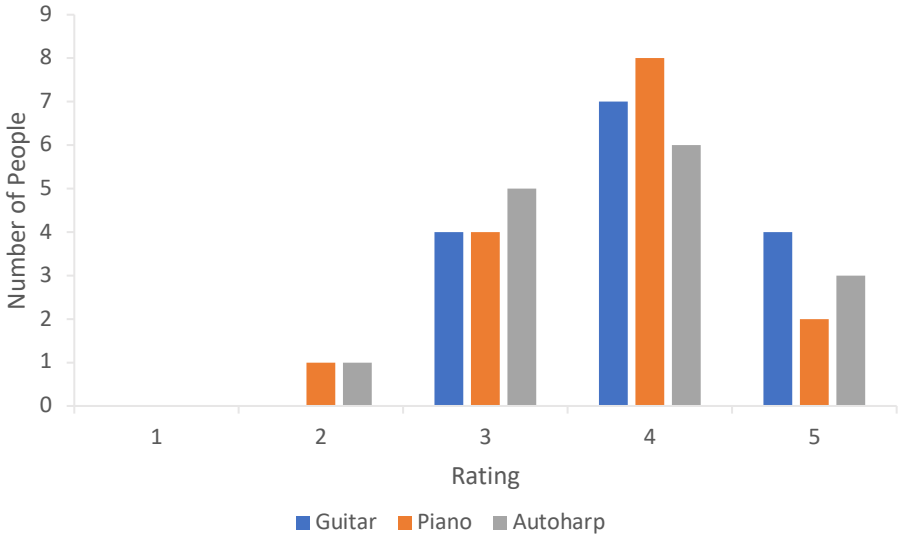

Figure 4. Frequency Distribution for Musical Preference for Different Instruments

Perceived Motor Improvement with Different Instrumentation

The means and frequency distribution of these participants' perceived motor improvement with different instrumentation (Question 2: "I feel the music helped me complete the movement") were calculated using Excel (see Table 4, Figure 5, and Figure 6). Visual

comparison of the means of guitar (M = 3.70, SD = 0.92), piano (M = 3.53, SD = 0.69), and autoharp (M = 3.53, SD = 1.04) revealed that participants rated the guitar slightly higher. The median rating for the piano was 3.5 and the autoharp was 4. The mode for the piano was the lowest, with six people indicating that they neither agreed nor disagreed that the piano helped them complete the movement. This is compared to the guitar and autoharp, which both had a mode of 4 (agree). One of the participants chose a rating of 2 (disagree) for guitar and autoharp (see Figure 6).

Table 4

Means, Standard Deviations, and Median for the Perceived Improvement for Different Instruments

	Guitar	Piano	Autoharp
Mean	3.70	3.53	3.53
SD	0.92	0.69	1.04
Median	4.00	3.50	4.00

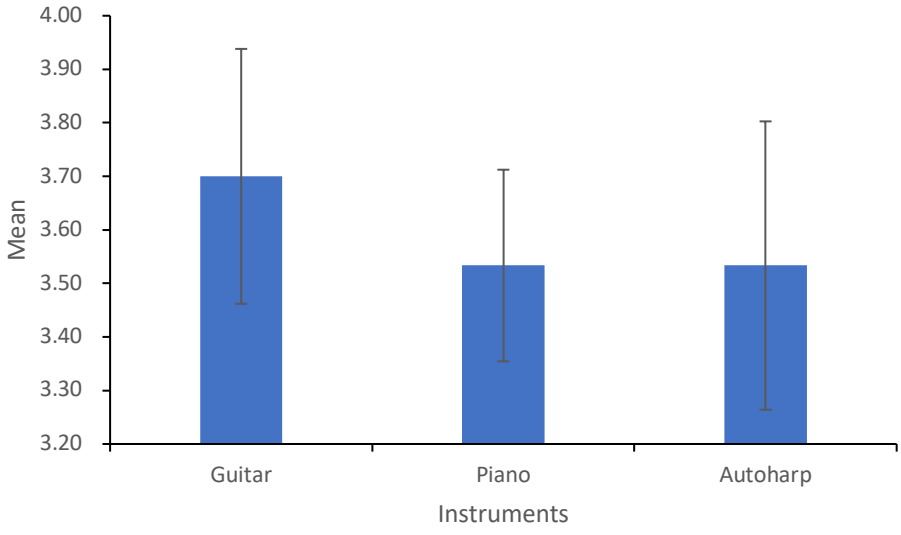

Figure 5. Means (and Standard Error) for the Perceived Improvement for Different Instruments

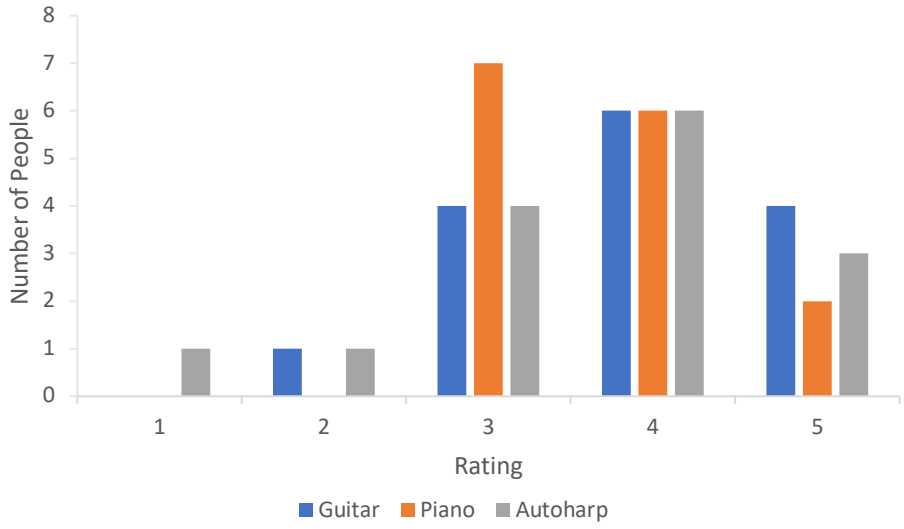

Figure 6. Frequency Distribution for the Perceived Improvement for Different Instruments

Music Preference of Different Cueing Styles

The composite scores of the 15 participants' preference for each cueing style (Question 1: "I liked the music in the video") were calculated using Excel (see Table 5, Figure 7, and Figure 8). The median score for the two cueing styles for all instruments was 4. The mean and SD were higher for the simple cueing style for guitar (M = 4.00, SD= 0.76) and piano (M = 3.73, SD = 0.88) and the PSE score was higher for the autoharp (M = 3.60, SD= 0.91) (see Table 5, Figure 7). The median and mode for all instruments for two cueing styles were all 4, with most of these participants indicating that they agreed that they liked the music in the six videos.

Table 5

Means, Standard Deviations, and Median for Musical Preference for Different Cueing Styles

	Guitar		Piano		Autoharp	
	Simple	PSE	Simple	PSE	Simple	PSE
Mean	4.00	3.80	3.73	3.33	3.53	3.60
SD	0.76	0.68	0.88	1.05	0.99	0.91

Median	4.00	4.00	4.00	4.00	4.00	4.00

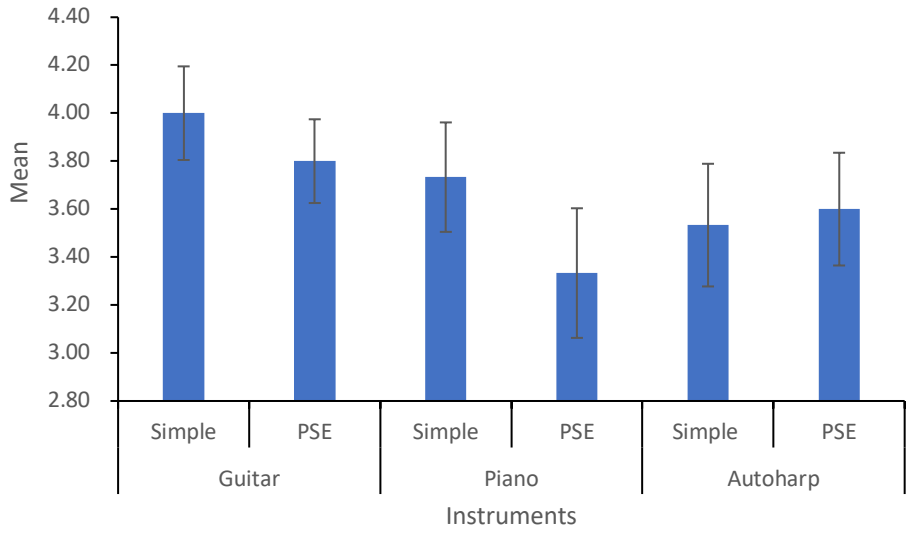

Figure 7. Means (and Standard Error) for Musical Preference for Different Cueing Styles

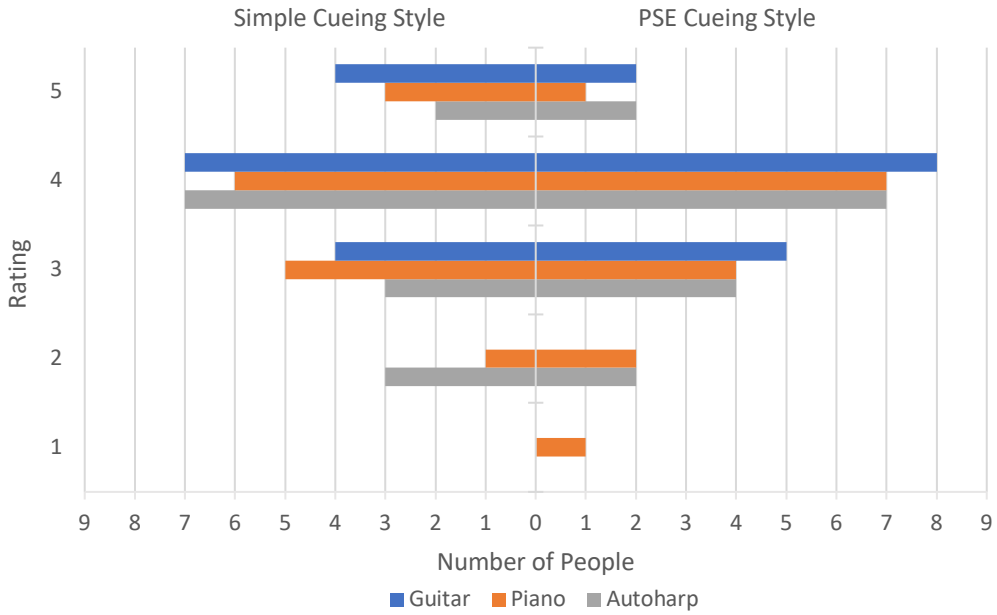

Figure 8. Frequency Distribution for Musical Preference for Different Cueing Styles

Furthermore, the overall mean and standard deviation values of people preferring two cueing styles were illustrated for three instruments (see Table 6). The means were compared for

the simple cueing style of three instruments (M = 3.76, SD = 0.88) and for the PSE cueing style of three instruments (M = 3.58, SD = 0.89). The mean for participants in the simple cueing style was slightly higher than the mean rating in the PSE cueing style.

Table 6

Overall Mean and Standard Deviation of Musical Preference for Different Cueing Styles in Three Instruments

	Simple	PSE
Mean	3.76	3.58
SD	0.88	0.89

Perceived Motor Improvement with Different Cueing Styles

The ratings of the 15 participants' perceived motor improvement with different cueing styles (Question 2: "I feel the music helped me complete the movement") were calculated by Excel (see Table 7, Figure 9, and Figure 10). The mean ratings for guitar in the simple cueing style (M = 3.73, SD = 1.03) can be compared with those in the PSE cueing style (M = 3.67, SD = 0.90). The mean ratings for piano in the simple cueing style (M = 3.67, SD = 0.72) can be compared with those in the PSE cueing style (M = 3.40, SD = 0.83). The mean ratings for the autoharp in the simple cueing style (M = 3.60, SD = 1.12) can be compared with those in the PSE cueing style (M = 3.47, SD = 1.06). From the means for these three instruments illustrated in the table, the 15 participants rated the sample cueing style higher than the PSE cueing style. For the simple cueing style, most of the participants chose a rating of 4 (agree) for guitar and autoharp and a rating of 3 (neutral) for piano (see Figure 10). For the PSE cueing style, most of the participants chose a rating of 3 (neutral) for guitar, 4 (agree) for the autoharp, and 3 and 4 (tied) for the piano.

Table 7

Means, Standard Deviations, and Median for the Perceived Improvement for Different Cueing Styles

	Guitar		Piano		Autoharp	
	Simple	PSE	Simple	PSE	Simple	PSE
Mean	3.73	3.67	3.67	3.40	3.60	3.47
SD	1.03	0.90	0.72	0.83	1.12	1.06
Median	4.00	4.00	4.00	3.00	4.00	4.00

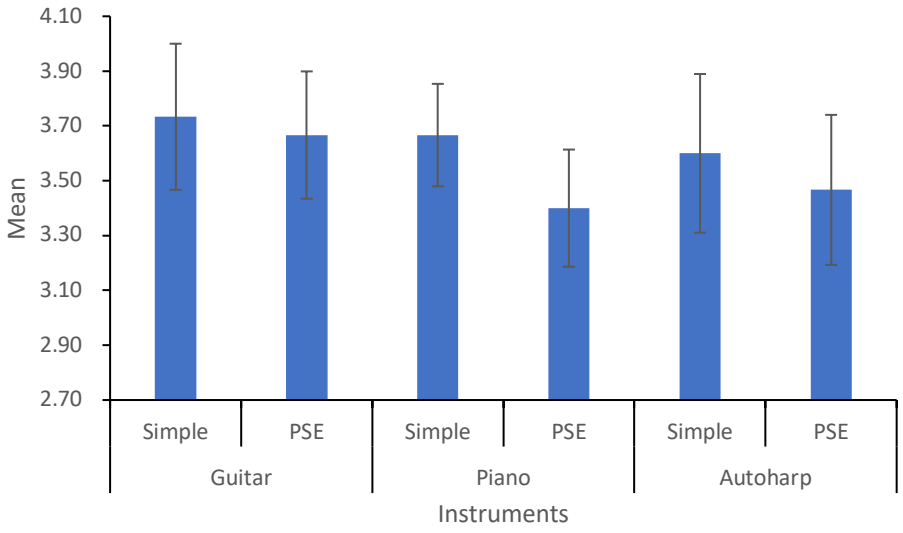

Figure 9. Mean (and Standard Error) for the Perceived Improvement for Different Cueing Styles

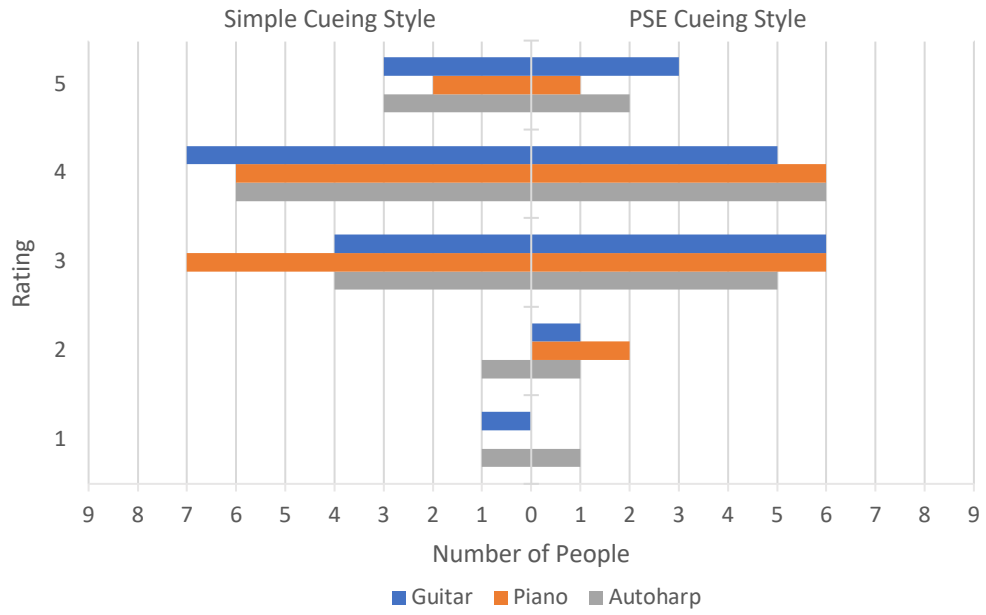

Figure 10. Frequency Distribution for the Perceived Improvement for Different Cueing Styles

The combined mean and standard deviation for perceived motor improvement for the two cueing styles (for all instruments) are illustrated in Table 8. The combined score for the simple cueing style ($M = 3.67$, $SD = 0.95$) and for the PSE cueing style ($M = 3.51$, $SD = 0.92$) indicated that participants scored simple cueing higher than PSE cueing.

Table 8

Overall Points of Perceived Improvement for Different Cueing Styles in Three Instruments

	Simple	PSE
Mean	3.67	3.51
SD	0.95	0.92

CHAPTER V: DISCUSSION

Discussion

The purpose of this research project was to determine individual preferences and perceived improvement for various music therapy accompaniment instruments and cueing styles among aging music therapy participants in the United States.

A closer look at the data revealed that two participants chose the same rating scores for all of the questions. One person chose a rating of 3 for all questions and the other chose a rating of 5 for all questions, perhaps indicating there was no difference between the various conditions. Additionally, another participant rated all questions 3 or below, which seems to indicate that the two cueing styles and three instruments might be not well-liked or not considered helpful for this individual.

For the first research question, whether the instruments can impact the individuals' musical preference, the data indicated that participants may have a preference for some instruments over others. Table 3 illustrated that participants scored the guitar higher than piano and autoharp, and Figure 4 revealed that no participant scored guitar below 3 (neutral). Some of the participants mentioned to the researcher that they could play the guitar and loved it. A higher score for the guitar may be due to the general familiarity of that instrument over the other two instruments, which was derived from the feedback from the participants. When comparing the medians and frequency distribution across all instruments, the data indicated that more than half of the participants chose ratings of 4 (agree) or 5 (strongly agree). A closer look at those data revealed that some participants' ratings were generally high and some participants' ratings were

generally low. These data may indicate that all instruments were acceptable and that the participants, generally, liked or disliked the music no matter the instrument.

For perceived improvement, data in Table 4 revealed that the mean for the guitar was higher than the mean for the other two instruments, potentially indicating that these 15 participants believed the guitar could help them move better than the piano and autoharp. Although the means of piano and autoharp were the same in Table 4, the standard deviation showed less variability across these participants for the piano. However, the mean and standard deviation of the guitar were both higher than those of the piano. The guitar and autoharp had a median and mode of 4 (agree). However, the median of the piano was 3.5, and the mode of the piano was 3, which were the lowest compared to the other instruments. Collectively, these data indicate that the guitar was likely to be perceived by these individuals to be the most helpful, followed by the autoharp, and then piano. Although there were differences, the data indicate that all of the instruments were perceived as helpful to their movement. Interestingly, though lower in mean and median, piano was the only instrument that had no ratings below 3 (neutral).

For the second research question, the first aim was to determine whether the cueing style could impact the individual's musical preference. The data indicated that different cueing styles were rated differently by individuals in this group. Table 5 illustrated that the PSE cueing style was rated higher only when the music therapist was playing the autoharp. For the guitar and piano, participants gave higher ratings to the simple cueing style. However, the median scores for the preference of cueing style were the same across all instruments, which was 4 (agree). The frequency distribution indicated that most people chose the rating of 4 (agree) for both cueing styles for all instruments. Although there were some differences, the mean and median were all above the rating of 3, which may indicate that participants similarly liked both cueing styles. At

the same time, some of these 15 participants chose ratings below 3 (neutral), so whether the cueing styles can impact musical preference should be considered individually.

The second aim of the second research question was to determine whether different cueing styles impact individuals' perceived improvement. Table 7 illustrated that the mean of perceived improvement for the simple cueing style was higher than the PSE cueing style for the participants. However, these means were quite close. Comparing the medians across all instruments for the two cueing styles, more than half of these participants chose a rating of 4 (agree) with the exception of the PSE cueing for piano. The frequency distribution in Figure 10 illustrated that more than half of participants believed that the two cueing styles for the three instruments could help them complete the movement. As discussed before, some participants rated all of the choices the same, so the perceived improvement of cueing style varies from person to person. Therefore, the perceive helpfulness of each cueing style needs to be considered for each individual.

The simple cueing style is the use of harmonic and rhythmic cues by the therapist to help the clients during the treatment. Similarly, the therapist played simple cueing (Figure 1 and Figure 2) using different chords to accompany the melody of the song. The simple cueing style is most similar to typical accompaniment heard for music. Consequently, the PSE cueing style may be less familiar to these participants. Therefore, the familiarity of the music may be preferable to music that is created for movement patterns.

In the PSE cueing style, therapists provide temporal, spatial, and force cues for fundamental movements (Thaut & Hoemberg, 2016). Thaut (2016) suggested that, during the treatment, music therapists employing PSE give clients powerful and clear musical cues to facilitate movement. The music therapist would change rhythmic, melodic, harmonic, and

dynamics/force cues based on the needs of clients (Thaut & Hoemberg, 2016). Therefore, the music played in PSE would be different than a typical music accompaniment. Since client populations may be more familiar with traditional accompaniment, the PSE cueing style would be unfamiliar or novel. This novelty in the PSE cueing may be the reason why the PSE cueing style ratings were lower than the simple cueing style.

Visual analysis of individual data showed that some participants selected the same rating for every instrument and style. For example, one participant rated 5 (strongly agree) to one question, and rated the rest 4 (agree). Those results may indicate that the clients found the music similarly effective no matter the instrument or cueing style. Furthermore, when analyzing the survey data, the researcher saw that some participants chose the same ratings for all questions. Some participants generally chose high scores and some generally chose low scores, which may indicate that they did not perceive any differences between the conditions. Taken together, these data may indicate that music was generally acceptable. However, the music therapist should consult with the individual clients to learn more about their perception of the music and how they believe it is helping to facilitate their outcomes.

Limitation

This survey included some difficulties and limitations. The most prominent difficulty was the lack of participants. In the processing of the survey, the researcher attempted to attract as many participants as possible. However, only 15 people from the four music therapy groups met the criteria and agreed to participate in the survey. The results from these 15 participants are not broadly representative of all older people with movement disabilities and can only reflect these participants' results.

During the data collection period, the videos viewed by the 15 participants were presented in the same order (guitar, piano, and autoharp). Changing the order of the instruments would help ensure that ratings were due to fatigue in the task. Some participants commented that they believed the task was too long. One participant stopped following the movement in the video and simply watched the video. Another participant remarked that there were too many videos. Repeating the same action multiple times in the same song can result in fatigue; if the videos could be segmented for the participants it might also impact the results.

Although the researcher used different accompaniment styles in simple cueing versus PSE cueing conditions, it is possible that participants simply did not hear a difference. One of the participants was overheard stating that the music in the six videos was the same, and another participant remarked that the two cueing styles were similar for him. Therefore, some participants may have scored the different excerpts the same since they did not perceive a difference.

Due to these limitations and the low number of participants, the researcher recommends conducting a study that involves more participants. Another possibility for future research would be to complete a more sophisticated analysis of the data using regression and/or non-parametric analyses of the data. Furthermore, researchers are suggested to change the order of the videos for each group and reduce the number of movement repetitions/ length of excerpts to avoid the participant fatigue.

With regard to the perceived improvement of movement, the survey only collected participant's perceptual ratings. The researcher did not collect objective data of participant movements. In future research, researchers could measure participant's motor movements including the range of motion, the number of repetitions, and other movement factors to

determine if there are any objective changes of motor performance with the different instruments and cueing styles. This objective data could be compared with participant perceptions to determine if there is any relationship between perception and objective motor data.

Conclusion

This survey is an early exploration of music therapy participants' musical preferences and perceived improvements in movement with different instruments and cueing styles. The data collected from 15 participants indicated that most participants found all facilitating instrument types and styles acceptable for cueing motor movement. However, there were individual differences observed in participant perceptions, ranging from individuals who rated all instruments/styles the same, to others who showed a clear preference. In this case, music therapists need to determine the instrument and cueing style to be used according to individual's preference. These data also indicate that more research is needed on patient perception of music in motor rehabilitation groups. Through the participants' language and physical feedback, as well as expanding the sample size, it is hoped that music therapists can gain a better understanding of the effectiveness of the two cueing styles for use in movement groups.

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Appendix A

Demographic Questions

1. Please indicate your age:

   50 ~ 54 55 ~ 59 60 ~ 64 65 ~ 70 71+

2. Gender:

   Male Female Other Prefer not to answer

3. How many years since you received your diagnosis?

   1 ~ 4 5 ~ 9 10+

4. Are you currently attending rehabilitation groups with music therapy?

- Attending Weekly Groups
- Attending Monthly Groups
- Not currently attending groups with music therapy, but have in the past
- Never attended groups with music therapy

Appendix B

Questions After Each Video

1. I liked the music in the video.

Strongly Agree	---	Agree	---	Neither	---	Disagree	---	Strongly Disagree

2. I feel the music helped me complete the movement.

Strongly Agree	---	Agree	---	Neither	---	Disagree	---	Strongly Disagree