THESIS

THE EFFECTS OF MUSICAL ATTENTION CONTROL TRAINING ON ATTENTIONAL IMPAIRMENTS OF SCHIZOPHRENIA

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ABSTRACT

THE EFFECTS OF MUSICAL ATTENTION CONTROL TRAINING ON ATTENTIONAL IMPAIRMENTS OF SCHIZOPHRENIA

Schizophrenia is a severe mental illness characterized by complex symptomatology and disabling psychotic symptoms including disturbing hallucinations and bizarre delusional ideation. Individuals with chronic schizophrenia also experience impairment of cognition. The impact of impaired cognitive functioning is significant in individuals with schizophrenia. Cognitive deficits such as attentional impairments are likely to persist even after treatment with medication and may be the primary cause of negative emotion, social dysfunction, and the inability to attain full and functional recovery. While research indicates that remediation of attentional impairments is difficult but possible, little is known about which methods of remediation are most effective.

Music therapy has been determined to be a cost-effective and successful means of decreasing negative symptoms, psychosocial deficits, and promoting improvements in executive function related to schizophrenia. Additionally, some research indicates it may be effective in remediation of attentional impairment. Musical Attention Control Training (MACT) is a specific music therapy protocol which has been utilized to effectively train attention after traumatic brain injury, stroke, as well as with autism and dementia, and is thought to be likely to be helpful with other neurological disorders including schizophrenia. However, a limited amount of research has been published regarding the efficacy of therapeutic music in treating attention, and no research yet exists exploring the potential effect of MACT with individuals with schizophrenia.

The purpose of this study was to gather initial data regarding the efficacy of MACT in improving attentional deficits of persons with schizophrenia through a pre- and post-test design. In addition, the researcher sought to answer the following research questions: 1) what are the effects of MACT on the attentional impairments of schizophrenia and 2) how do these structured therapeutic music experiences impact individual outlook and perception of the recovery process.

Participants in this study were male adults with schizophrenia recruited from three forensic units of an inpatient psychiatric facility and who were randomly assigned to one of two groups: an experimental group (MACT, $n = 9$) and a control group (Treatment as Usual, $n = 10$). Participants assigned to the experimental group participated in five 30-minutes sessions occurring over a period of five consecutive days. Music interventions include structured improvisational and receptive exercises designed to target sustained attention. Data were collected both pre- and post-intervention through a questionnaire prepared by the researcher as well as through administration of the Montreal Cognitive Assessment (MoCA) by a licensed psychologist. An independent *t*-test of difference scores was conducted to compare the effect of MACT on attention. The results indicated no significant result of music on attention at the $p < .05$ level for the two conditions. Findings and application for future research is discussed.

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CHAPTER 1: INTRODUCTION

Mental illness can disrupt thought processes, impair ability to manage emotions, impact one's ability to relate to others, and reduce one's ability to cope effectively with the demands of daily life (National Alliance on Mental Illness, 2014). Mental illness is commonly diagnosed, with a prevalence of 18.6% among American adults, and impacts all in different yet significant ways (National Institute of Mental Health, 2014). The symptoms of mental illness can range in terms of both severity and impact. Diagnoses that result in the most severe functional impairment are categorized as a Serious Mental Illness (SMI), a diagnosis affecting 4.1% of the U.S. population (National Institute of Mental Health, 2014). Schizophrenia is one such disease, considered a SMI due to its long duration, chronically progressive course, high rates of relapse, and the disabling and multifarious nature of its symptoms (De Sousa & De Sousa, 2010; Kwon, Gang, & Oh, 2013).

Schizophrenia is a profoundly disruptive mental illness. It is identified among the top debilitating conditions for young adults and affects more than 21 million adults worldwide (Green, 2016; Centers for Disease Control and Prevention, 2014; National Institute of Mental Health, 2014; Peng, Koo, & Kuo, 2010; Velligan & Alphs, 2008). Age of onset is one aspect of the illness that makes it so devastating. The symptoms of schizophrenia begin to appear between ages 16-25 in men and around age 25 in women, wreaking havoc on personality, perception, social functioning, and cognition at the exact moment the individual reaches adulthood and would begin the typical journey of self-exploration (Grohol, 2013). Furthermore, due to the age of onset and severity of symptoms, normal development is disrupted and individuals with schizophrenia tend to miss out on the job and functional skill training typically common at that age.

The symptoms of schizophrenia are complex and are grouped into three distinct categories: Positive symptoms, or the presence of something such as hallucinations; negative symptoms, or the absence of normal function; and cognitive symptoms (Gold et al., 2012; National Institute of Mental Health, 2014). Whether on their own or in conjunction with one another, these symptoms are capable of disrupting typical thought and behavior, providing barriers to engaging in treatment, and leading to high rates of unemployment, decreased productivity, and an increase in morbidity and mortality (Centers for Disease Control and Prevention, 2014; National Institute of Mental Health, 2014). Although positive symptoms such as hallucinations and delusional ideation may appear more urgent and are often the central target of psychiatric treatment, cognitive symptoms may be the largest predictor of full recovery and functionality (Silverstein et al., 1998).

Cognitive dysfunction has long been considered to be a core characteristic of schizophrenia (Ceccato, Caneva, & Lamonaca, 2006). Complications with memory, difficulty making decisions, trouble with organized and goal-directed thinking, and difficulty paying attention are all common cognitive impairments observable in individuals with schizophrenia (National Institute of Mental Health, 2014). Over the last century, researchers studying schizophrenia have shown that individuals with this diagnosis exhibit low IQ and under-average cognitive performance up to several years before any evidence of psychosis is observed (Schulz & Murry, 2016). As such, below-average cognitive function may indeed be an early indicator of the illness.

Cognitive deficits such as these are subtle and can be difficult to detect. In turn, they are more difficult to treat, can significantly impact the ability to engage in psychosocial treatments, and can make it challenging for an individual to lead a normal life (Ceccato et al., 2006; National

Institute of Mental Health, 2014). As these symptoms are generally not responsive to medication, they can persist throughout the full course of the illness, remaining present during periods of active psychosis or while in remission (Ceccato et al., 2006; Medalia, Aluma, Tryon, & Merriam, 1998). Until recently, it was believed that impaired neural and cognitive functioning among individuals with schizophrenia was not reversible, but modern research has indicated this belief is no longer fully accurate (Vinogradov & Schulz, 2016).

Attentional impairment is a prevailing subcategory of cognitive dysfunction among individuals with schizophrenia. Attentional skills are considered by many to be the basis of all other cognitive skills and, thus, deficits in this area can lead to many life-altering impairments in overall functioning (Medalia et al., 1998). Additionally, attentional impairment is one of the primary complaints of individuals with schizophrenia and is considered one of the dominant barriers to attaining full and functional recovery as it impedes the ability to learn, practice and implement functional skills (Best et al., 2014; Lopez-Luengo & Vazquez, 2003; Kwon et al., 2013). Given that cognitive symptoms, including attentional impairment, are generally not addressed by traditional pharmacological or psychosocial treatments, significant long-term impairment in this realm of functioning is likely to persist even after clinical stabilization of other symptoms occurs (Schulz & Murray, 2016; Best et al., 2014). As a result, individuals with schizophrenia typically have lasting serious dysfunction in self-management and social activities, making engagement in treatment difficult and full recovery less likely (Lopez-Luengo et al., 2003; National Institute of Mental Health, 2014).

While the effects of the illness are widely known, the etiology of schizophrenia remains evasive (Mohammadi, Minhas, Haidari, & Panah, 2012). Although a large body of research has been conducted on the nature of schizophrenia, the true origin remains difficult to identify as the

course of the disease is so unique in each affected individual (National Alliance on Mental Illness, 2014). Recent research has, however, linked schizophrenia to a wide variety of possible causes, including biological and environmental factors. The medial anterior prefrontal cortex, thalamus, and cerebellum have been found to be less functional among individuals diagnosed with schizophrenia than in healthy controls (Simons, Davis, Gilbert, Frith, & Burgess, 2006).

With its etiology unknown, complex symptomatology, and high rates of relapse, schizophrenia is often mischaracterized as an untreatable illness (National Alliance on Mental Illness, 2014). In truth, it is possible to manage schizophrenia, but only if effective treatment is provided and maintained over time (Grohol, 2013; National Institute of Mental Health, 2014). Antipsychotic medication is currently the primary form of treatment for schizophrenia and aims to decrease or eliminate positive symptoms including hallucinations and delusional beliefs (National Institute of Mental Health, 2014). Although medication is considered critical in the treatment and maintenance of this disease and may help minimize the impact of such positive symptoms, many symptoms remain residual (De Sousa et al., 2010). For example, impaired cognitive and social dysfunction occurs even during and after pharmacological treatment. Therefore, it has been found that a combination of pharmacological and non-pharmacological treatments is the best method of rehabilitation in chronic schizophrenia and may be an effective means of preventing relapse (Vinogradov & Schulz, 2016; De Sousa et al., 2010).

Unfortunately, for an individual with severe attentional deficits, participation and benefit from traditional or complimentary psychosocial therapies may be impossible. Best, Gupta, Bowie, and Harvey (2014) estimated that 15-20% of all individuals diagnosed with schizophrenia experience treatment-resistant cognitive symptoms associated with poor functional outcomes (Best et al., 2014). These symptoms prevent an individual from fully participating in or

benefiting from traditional psychotherapy. The inability to sustain or alternate attention creates a significant obstacle in problem solving, listening, or skill acquisition (Hahn et al., 2012). Therefore, it may be necessary to complement or even precede traditional pharmacological and psychotherapeutic treatments with complimentary interventions, especially those which might have a more powerful impact in treating persistent negative and cognitive symptoms (Kwon et al., 2013).

Several non-pharmacological forms of therapy have been successfully utilized in the rehabilitation or improvement of symptoms not responding to medication (De Sousa et al., 2010). In a recent Cochrane review of 28 non-medication-based psychotherapeutic and creative interventions for schizophrenia, four interventions were found to have strong support and merit application (Jung & Newton, 2009). Assertive Community Treatment, crisis intervention, psychoeducation, and music therapy were determined effective in improving social functioning, quality of life, reducing length of hospitalization and preventing relapse, and increasing insight and knowledge of coping skills (Jung et al., 2009). When these treatments are used in conjunction with medication, an individual with schizophrenia may see vast improvement in positive and negative symptoms, as well as in social functioning (Jung et al., 2009). However, significant cognitive and attentional impairments inhibit the ability to participate in and benefit from these treatments (Ceccato et al., 2006; Kwon et al., 2013). Therefore, if engagement in treatment and full functional recovery is the ultimate goal, it is necessary to examine effective ways to remediate attentional deficits in schizophrenia.

Researchers have demonstrated that remediation of cognitive deficits in adults with neurological brain disorders is possible (Silverstein et al., 2014; Silverstein et al., 1998; Silverstein, Menditto, & Stuve, 2001). Unfortunately, very little research has explored the

feasibility and effectiveness of practicing attention control and cognitive remediation specifically in adults with schizophrenia. While this literature base is fairly small, the majority has focused on the use of computer training to remediate attention. While determined to be mildly to moderately effective, the use of computer-based cognitive remediation can be quite costly (Benedict et al., 1994). In contrast, music therapy has been shown effective in the treatment of schizophrenia and is considered a cost-effective alternative to traditional psychotherapy (Talwar et al., 2006). Ceccato, Caneva, and Lamonaca (2006) designed a protocol which improved some cognitive functioning in clients with schizophrenia. Furthermore, specific Neurologic Music Therapy attention-training protocols have been effectively used to remediate attentional impairments with similar populations (Thaut & Gardiner, 2014). Little research, however, yet exists exploring the effectiveness of music therapy in training attention with schizophrenia, and no studies have yet explored the impact of Neurologic Music Therapy and, specifically, Musical Attention Control Training (MACT) in schizophrenia.

Statement of Problem

The purpose of this study was to determine whether targeting attentional deficits with MACT can improve overall attention functioning among individuals with chronic schizophrenia. In addition, this study sought to assess any impact of structured therapeutic music experiences on individual outlook and perception of the recovery process.

Hypothesis

Participation in Musical Attention Control Training will have a positive effect on attention control, with the most benefit being observed after five consecutive thirty-minute sessions.

Limitations and Assumptions

Participants demonstrated varying degrees of symptomatology, differences in responsiveness to medications and overall clinical stability, and disparities in previous participation in therapy, including previous exposure to music therapy. For these reasons, external validity was not strong. Also, participants had access to and were not discouraged from utilizing other forms of mental health treatment which may have affected outcomes and internal validity. It was assumed that all participants responded truthfully and accurately to all qualitative and quantitative questionnaires and testing instruments.

CHAPTER 2: LITERATURE REVIEW

Schizophrenia is a profoundly disruptive mental illness characterized by a complex system of disabling symptoms and a chronic progressive course. Although there is no known cause or cure, schizophrenia can be a manageable illness. Very frequently, symptoms may be effectively treated, largely through medication management. At other times, symptoms are more residual and resist typical forms of treatment, persisting even after stabilization has occurred through pharmacological treatment. These symptoms may leave the individual with schizophrenia with significant social and occupational impairment and unable to attain full recovery or function safely within the community, at home, or at work or school (Green, 2016; Kwon et al., 2013; Mohammadi et al., 2012;). As a result, rates of relapse are high among this population, with 4% of medication-compliant individuals rehospitalized each month and costing the health care system an estimated one billion dollars annually (Bach & Hayes, 2002). In fact, less than one half of the 21 million individuals treated for schizophrenia worldwide are able to achieve full and functional recovery (Green, 2016).

Summary of Schizophrenia: Positive and Negative Symptoms

The symptoms of schizophrenia are widely documented, can be highly debilitating and fall into one of three categories: Positive symptoms, negative symptoms, and cognitive symptoms (National Alliance on Mental Illness, 2014; National Institute of Mental Health, 2014). Positive symptoms are perhaps the most widely recognized and are described as the presence of psychotic behaviors not observed in healthy individuals. Positive symptoms include auditory, visual, tactile and olfactory hallucinations, paranoid delusions, and distorted perceptions, and are the symptoms which are the primary focus of pharmacological treatment (National Institute of Mental Health, 2014). In contrast, negative symptoms represent a reduction

of behaviors typically observed in healthy individuals, and include anhedonia, asociality, and diminished speech, emotional responsiveness, motivation, movement (National Institute of Mental Health, 2014; Velligan & Alphs, 2008). Cognitive symptoms include impaired memory, attentional deficits, and poor executive function and are considered to be core features of schizophrenia. These symptoms can be more subtle and difficult to detect than either positive or negative symptoms (National Institute of Mental Health, 2014).

Summary of Schizophrenia: Cognitive Symptoms

While positive and negative symptoms often appear more urgent and are typically the primary target of traditional forms of treatment, cognitive symptoms are often more pervasive and persistent. Furthermore, cognitive deficits are considered reliable predictors of functional outcome or level of disability, and are directly related to overall outcome of the illness and everyday functionality (Green, 2016; Kopelowicz, Liberman, & Zarate, 2006). Cognitive symptoms can make it difficult or impossible to lead a normal life or earn a living, can cause significant emotional distress, and provide barriers to engaging in traditional forms of treatment and therapy (Harvey & Bellack, 2009; Velligan & Alphs, 2008). Many individuals with schizophrenia will experience improvement or remission of positive symptoms but residual cognitive symptoms may prevent them from ever functioning within the boundaries of normal societal functioning (Best et al., 2014). Given that cognitive deficits have been found to persist and impact functioning even after clinical stabilization occurs through pharmacological treatment, research indicates that targeting cognitive symptoms for remediation may lead to improved independent living skills and overall social functioning (Giakoumaki, Roussos, Pallis, & Bitsios, 2011).

The cognitive impairments of schizophrenia have long been studied. Once considered a secondary aspect of the illness, many scientists now believe cognitive dysfunction to be a primary and central characteristic of schizophrenia (Green, 2016; Ceccato et al., 2006). This belief is supported by the fact that cognitive impairment has been found to be evident long before the onset of positive or negative clinical symptoms and, furthermore, is not considered to be a byproduct or side effect of treatments the individual may be undergoing (Green, 2016). As previously noted, cognitive deficits remain present for the full duration of the illness despite remission of other symptoms and, in fact, a decline in cognitive performance is often noted after the first major episode of psychosis (Schulz & Murray, 2016; Ceccato et al., 2006). While cognitive impairments noted in schizophrenia include many facets of brain activity, the primary alteration of cognition is evident in attention (Ceccato et al., 2006; Medalia, Aluma, Tryon, & Merriam, 2008).

It is possible that cognitive impairment among individuals with schizophrenia is not simply a byproduct of the illness itself, but also an effect of medications used to treat the illness (Wingo et al., 2009). Therefore, any cognitive remediation efforts made in individuals with schizophrenia may be treating not only cognitive effects of the illness but of the medications as well. Researchers have also demonstrated a link between cognitive function and the dosage of antipsychotic medication. A 2013 study exploring the impact of dose reduction of antipsychotic medication on cognitive function of individuals with schizophrenia, suggested that antipsychotic medication may have a detrimental impact on the impact of dose reduction of risperidone, a drug commonly prescribed in the treatment of schizophrenia. The researchers also found significantly greater improvements in total test scores among the reduction group. Additionally, Frias (2016) suggested the possibility of a negative impact on cognitive function as a result of long-term

treatment of bipolar disorder with lithium and second generation antipsychotics. Specifically, a decline in both verbal memory and learning ability have been found to be linked with long-term treatment of these medications (Frias, 2016). Furthermore, Wingo (2009) found minor negative impact of lithium on cognition of adults with bipolar disorder. While the last two studies are specific to individuals with bipolar disorder, people with schizophrenia may be treated with the same or similar medications and, as such, may experience a similar decline in cognitive function.

Attentional Impairments of Schizophrenia

Attentional impairment is one of the primary cognitive deficits noted among individuals with schizophrenia and is considered one of the biggest factors contributing to poor outcomes in rehabilitative treatment (Fulford et al., 2014; National Institute of Mental Health, 2014; Silverman, 2003; Silverstein et al., 1998). Among individuals with schizophrenia the body's physical attention system itself is impaired, with differences observed in the frontal lobes and brainstem when compared to healthy controls (O'Connell & Robertson, 2011). Attentional impairment is considered a vulnerability marker of schizophrenia and is a strong predictor of social, community and interpersonal function. In addition, deficits of attention may also act to prevent the adequate expression of other abilities, the relearning of lost skills, and the flexible adaptation to disability (Ceccato et al., 2006; Medalia,et al., 2008).

Remediation of Attentional Impairments in Schizophrenia

Though persistent, attentional impairments are not necessarily static. Therefore, it is possible to remediate them through training (Fiszdon, Cardenas, Bryson, & Bell, 2005; Semovska, Beard, Godbout, Limoge, & Stip, 2003; Silverstein et al., 1998). Individuals with attentional impairments may lack the ability to participate in or benefit from recovery-focused psychosocial treatments (Green, 2016; Silverstein et al., 2001). When cognitive deficits are

targeted and gains in this area of functioning are made, however, the success of other rehabilitation efforts will be enhanced (Grohol, 2013). As a result, the individual with schizophrenia will be empowered through an increased likelihood to attain full functional recovery and create a meaningful role for themselves within their community. Therefore, it is imperative to begin directing treatment efforts toward the rehabilitation of attention (Medalia et al., 2008).

While small, the research base examining the rehabilitation of attention among individuals with schizophrenia is expanding. Twenty randomized controlled trials indicate behavioral interventions can lead to significant improvement in cognitive functions in schizophrenia, including remediation of attentional deficits (Kopelowicz et al., 2006). McGurk, Twamley, Sitzer, McHugo and Mueser (2007) conducted a meta-analysis of 26 randomized controlled trials of cognitive remediation of 1,151 individuals with schizophrenia. The results of this meta-analysis indicate cognitive remediation with schizophrenia can lead to moderate improvement in cognitive function and, when combined with various forms of psychiatric rehabilitation and therapies, can improve functional outcome. Furthermore, the impact of cognitive remediation was notably similar despite documented differences in training methods or differences in the length of training (McGurk et al., 2007).

The majority of cognitive remediation training with schizophrenia utilizes a computer-training approach (McGurk et al., 2007). Medalia et al (2008) assessed the impact of computerized attention remediation on 33 adults with chronic schizophrenia and found their experiential program effective in improving information processing. These results differed slightly from those of Benedict et al (1994) whose work resulted in the conclusion that computerized attention drills teach individuals for bypassing deficits as opposed to remediation.

In both studies, however, there was little to no focus on generalization from computerized attention tasks to everyday functioning.

Cognitive remediation can be aimed directly at training individuals on compensatory strategies used to bypass cognitive impairments (Vinogradov & Schulz, 2016). Cognitive remediation programs which have included coaching on strategy and personal accountability have stronger impact on overall functioning than programs focusing only on drill and practice of attention-training tasks (McGurk et al., 2007). Silverstein et al (1998; 2001; 2014) explored the effectiveness of attention shaping procedures on attention span of refractory and severely disorganized schizophrenia patients. In all three studies, attention shaping through a systematic behavioral approach was found to be effective in increasing attention span (Silverstein et al., 1998; Silverstein et al., 2001; Silverstein et al., 2014). Furthermore, patients who participated in intensive individual attention shaping procedures were later able to participate more effectively in other forms of psychosocial treatment (Silverstein et al., 1998; Silverstein et al., 2001; Silverstein et al., 2014).

While computer-based attentional remediation and behavioral approaches have been shown to have some degree of efficacy among adults with schizophrenia, neither may be deemed feasible at many facilities. Silverstein et al (2014) described his attention shaping approach as costly in terms of both time and resources. This approach must be conducted in an extensive series of one to one treatment, demanding time from both the participant and therapist while costing a great deal to accommodate staffing requirements (Silverstein et el, 2014). In a similar vein, computer-based training can be draining on financial resources in an already financially exhausted mental health system (National Alliance on Mental Illness, 2014). There is a crisis in funding and budget cuts for mental health services: Cuts made between 2009 and 2011 led to

significant reductions in treatment and services for individuals with serious mental illness (National Alliance on Mental Illness, 2014). Therefore it is imperative that research be conducted on effective yet cost-efficient and feasible means of attentional remediation in schizophrenia.

Music Therapy

In contrast to the aforementioned procedures, music therapy can be used to as both an economical and effective way to treat a variety of clinically diagnosed mental illnesses (Talwar et al., 2006). Music therapists working within the field of mental health find themselves treating a variety of diagnoses and symptoms through multiple active and passive therapeutic approaches (Silverman, 2007). Music therapy interventions in mental health treatment are generally psychotherapeutic in nature and are used to address the following: the development of coping and relaxation skills, support healthy feelings and thoughts, improve reality testing and problem solving skills, improve concentration, and promote and increase positive social interactions, thereby decreasing isolation (AMTA, 2013; Gold et al., 2005). The most commonly utilized music therapy techniques in mental health care include music assisted relaxation, songwriting, lyric analysis, and improvisation (Silverman, 2007). Each of these interventions are utilized in a prescribed manner to address clinical, non-musical goals related to mental health diagnoses.

Research indicates the aforementioned music therapy interventions can serve as effective forms of mental health treatment. Recent studies demonstrate music therapy is effective at increasing mean quality of life scores while decreasing mean depression scores among adult mental health consumers (Silverman, 2009). Gold et al (2005) found that music therapy, provided as an additional form of treatment to standard care, can improve global states of individuals with schizophrenia and improved mental state and functioning. Additionally, the use

of music therapy in treatment can increase amount learned concerning symptom management (Leonard & Silverman, 2012) while decreasing the frequency, duration, and severity of auditory hallucinations (Silverman & Marcionetti, 2004). Therefore, evidence exists supporting music therapy as an effective treatment modality within the field of mental health.

The effectiveness of music therapy in the treatment of individuals with schizophrenia and other similar psychiatric disorders was illustrated in a 2004 meta-analysis. This review analyzed eleven studies focusing on the use of music therapy among adolescents with psychiatric disorders and found music therapy had a significant ($p < .001$) medium to large positive effect on clinical outcomes (Gold, Voracek, & Wigram, 2004). Additional support for the use of music therapy in the treatment of mental disorders was given in a Cochrane review evaluating 28 non-pharmacological interventions for schizophrenia, psychosis and bipolar disorder. This review deemed music therapy to be one of only four interventions with strong evidence (Jung & Newton, 2009).

Music therapy appears to have a significant impact on the negative symptoms associated with schizophrenia. While Mohammadi et al (2012) state music therapy is effective in decreasing both positive and negative symptoms of the illness, a larger body of research identifies music therapy as being most effective in decreasing negative symptoms, especially when used as an adjunct to standard care (De Sousa & De Sousa, 2010; Mohammadi et al., 2012; Mossler et al., 2011; Peng et al., 2010). Negative symptoms, including affective flattening and bluntness, poor social interaction and decreased motivation, appear to respond to the non-threatening and motivational factors of music therapy when they typically do not respond well to other forms of treatment (Gold et al., 2004; Gold et al., 2005). Ulrichs et al (2007) found group percussion instrument playing was successful in decreasing negative symptoms among patients with

schizophrenia. In a Cochrane review of music therapy with schizophrenia, Gold et al (2005) deemed both improvisational and receptive forms of music therapy to be especially well-suited for treatment of negative symptoms.

In exploring the direct benefit of specific musical elements, rhythm is considered to be vital for training attention (Thaut, et a.l, 2014). Commonalities have been identified found between areas of the brain impaired among individuals with schizophrenia and where rhythm is processed (Simons et al., 2006). More specifically, the cerebellum is less functional among individuals with schizophrenia than in healthy controls, and this is the same area of the brain activated in the processing of rhythm (Lin et al., 2011). Therapeutic music exercises can provide sensory stimulation to the brain's attention system, thereby assisting in the process of attentional rehabilitation (Thaut et al., 2014). Despite the growing body of research documenting the positive effects of music therapy in treating mental illness, there remains an overall lack of quantitative, randomized, controlled studies of sufficient duration exploring the benefits of this type of treatment (Gold et al., 2005; Lin et al., 2011). Furthermore, very little research has yet explored the direct impact of focused music therapy interventions on cognitive symptoms and functioning in individuals with residual schizophrenia.

Ceccato et al (2006) appraised the effects of a music therapy protocol on components of attention and memory in individuals with schizophrenia. The Sound Training for Attention and Memory (STAM) protocol evaluated in this study focuses on selective, sustained, and alternating attention in addition to working memory (Ceccato et al., 2006). The STAM protocol includes a series of progressive music therapy exercises divided into four separate phases, with one phase used for each function of attention, and was based on both improvisational and creative models of music therapy (Ceccato et al., 2006). After examining the effects of the STAM protocol on

eight individuals with schizophrenia, the protocol was deemed effective in improving memory and skills. While improvement in attention was not observed as an outcome in this study, Ceccato et al (2006) argue further research is needed before making any conclusive remarks in this area.

The researchers in this study identified a number of limitations which likely impacted outcome. The effectiveness of the STAM protocol was studied on a small number of subjects which does not allow for generalization of results (Ceccato et al., 2006). Furthermore, four sessions were dedicated to each phase regardless of the readiness of the participant to move to the next level (Ceccato et al., 2006). Increased individualization in the implementation of this protocol might result in increased impact on attention. Lastly, the authors argue for a stronger protocol which would also focus on transfer to functional exercises of daily living and which could be replicated across settings as a means of increasing external validity (Ceccato et al., 2006).

Ceccato et al (2006) argued that much music therapy research in mental health lacks external validity due to its inability to be replicated across settings. In current music therapy research there are a number of studies dealing with schizophrenia, but most of these are qualitative and provide information that may not be generalizable (Silverman, 2003; Ceccato et al., 2006). Furthermore, some authors make the statement that the music therapy literature base lacks quality quantitative research, particularly in the area of mental health (Silverman, 2008). The ability to be replicated across settings and to gather evidence in a quantitative manner are two benefits of using a Neurologic Music Therapy protocol.

Neurologic Music Therapy

Neurologic Music Therapy (NMT) is a collection of clinical protocols and techniques which are not only supported by evidence, but which are also standardized in terms of terminology and application (Thaut, McIntosh, & Hoemberg, 2014). The 20 current clinical NMT techniques are based on scientific research as well as on a neuroscience model of music production, perception, and the influence of music on functional change in the brain and in nonmusical behavior (Thaut et al., 2014). At its core, NMT is the therapeutic application of music to sensory, cognitive and motor dysfunction resulting from neurologic disease. In over 20 years of continued and evolving research, one of several major areas of therapeutic neurological rehabilitation not covered by NMT is psychiatric rehabilitation.

Musical Attention Control Training (MACT) is one of nine evidence-based cognitive NMT clinical techniques. The application of MACT includes structured improvisational and/or receptive musical interventions through which musical elements cue specific musical responses as a means of practicing focused, sustained, selective, divided or alternating attention functions (Thaut, 2005). There are many factors contributing to the success of MACT techniques. Musical elements such as melody and rhythm can enhance ability to shift attention, can facilitate divided attention, and can use timing, grouping and organization required for sustaining attention (Thaut et al., 2014). Furthermore, music requires the use of shared brain systems with can assist in improvement of alternating attention in the frontal lobes (Thaut,et al., 2014). Additionally, research shows attention is hierarchical and remediation will be successful only if the most basic components of attention are focused on first, with progression to advanced components as skills are built (O'Connell & Robertson, 2011; Silverstein et al., 2001; Sohlberg et al., 2003). MACT techniques may be used in this progressive manner, beginning with sustained attention and

building to more advanced areas. MACT has been shown to be useful in improving attention functioning in multiple populations including traumatic brain injury, stroke, autism and dementia and is considered likely to be useful in other neurological disorders, including schizophrenia (Thaut & Gardiner, 2014).

Summary

Schizophrenia is a profoundly disruptive mental illness with symptoms which can be both debilitating and difficult to treat. An individual diagnosed with schizophrenia experiences disruptions in thought, behavior, and mood, and is prone to frequent relapse of the illness. The cognitive impairments resulting from schizophrenia, particularly attentional deficits, are thought to have more impact on everyday activity than the positive and negative symptoms (Lopez-Luengo et al., 2003). Increased cognitive functioning may lead to improved quality of life for individuals with schizophrenia, making it possible to engage in other forms of therapy while allowing for increased feelings of self-worth, independent living opportunities, and overall safety. Impairment in cognitive abilities is a clear and serious concern. Therefore, developing economical and effective non-pharmacological treatments to directly target cognitive and attentional impairment in schizophrenia is worthy of investigation.

Traditional therapies, including medication as well as non-pharmacological psychosocial treatments such as Cognitive Behavioral Therapy and social skills training, focus primarily on the reduction of positive symptoms and have been ineffective in the treatment of attentional deficits (Ellis, Caponigro, & Kring, 2013). Creative therapies including music therapy have been found to be effective in the treatment of the negative symptoms and, to some extent, the cognitive symptoms of schizophrenia. Music therapy is one of the psychosocial interventions that can effectively manage psychiatric symptoms of schizophrenia while treating symptoms not

responsive to medications, such as achieving improved social interaction and neurophysiologic function (Gold et al., 2009; Jung, 2011; Moesler et al., 2011). Furthermore, music therapy can be regarded as an effective intervention for improving attention, memory and other cognitive abilities among individuals with chronic schizophrenia (Kwon et al., 2013; Ceccato,et al., 2006).

The published research regarding music therapy's effectiveness in treating cognitive deficits and attentional impairments of schizophrenia is minimal. The literature cites a need to continue exploring the impact of both functional music and non-music exercises in remediating attention among individuals with schizophrenia (Ceccato et al., 2006; Patton, 2006; Smid, Martens, de Witte, & Bruggeman, 2013; Sohlberg et al., 2003). A more substantial research base is needed in order to better understand role of music therapy and support its clinical use in the treatment of cognitive impairments of schizophrenia.

CHAPTER 3: METHODS

Study Design

This study was a Randomized Controlled Trial completed using a convenience sample of individuals who were residents of an in-patient psychiatric facility. In order to control for selectivity bias, participants who consented to the study were randomized in to one of two treatment groups: Musical Attention Control Training (MACT) group or control group. Participants assigned to the MACT group took part in five 30-minute sessions occurring over a period of five consecutive days. Participants assigned to the control group engaged in treatment as usual, which consisted of a variety of psychosocial treatment groups offered within this facility.

Participants and Setting

Participants were recruited from one of three inpatient forensic units in a state psychiatric facility in a metropolitan city. All participants met the following inclusion criteria: a) a formal diagnosis of schizophrenia by a psychiatrist based on the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria for more than two years since initial diagnosis, b) adults over 20 years of age and who understand the purpose, procedures, benefits, and potential risks of the study and agree to participate with a written consent, given agreement from guardians or parents as required (Appendix A) c) no acute psychotic symptoms, and d) ability to communicate verbally. Those with disruptive and/or aggressive behaviors, active substance abuse within 6 months of this study, or with evidence of neurological illness or traumatic head injury were excluded for consideration as the presence of such symptoms and behaviors could affect the outcome of the study. All participants were identified by clinical members of interdisciplinary treatment teams as having significant attention deficits. Additionally, participants in this study

were asked to not participate in any other cognitive remediation program before or during the study.

Twenty-two male participants began the study. All participants were between the ages of 22 and 53. One participant in the MACT group discontinued involvement in the study due to an unanticipated discharge from the hospital two days after completing the pre-test. One participant in the control group dropped out of the study due to a disinterest in continuing. One participant in the MACT group discontinued his participation due to scheduling conflicts. Of the nineteen remaining participants, all completed the required pre- and post-testing, and all assigned to the experimental group completed all five of the required 30-minute music therapy sessions. Each of the nine participants in the experimental group completed a questionnaire containing both Likert and open-ended questions.

Measurement Tools

Each participant used their 9-digit hospital-assigned identification number to use as a code for completion of data collection. Data were collected through a pre-intervention (Appendix B) and post-intervention (Appendix C) questionnaire prepared by the researcher as well as through the Montreal Cognitive Assessment (MoCA). Permission to use the MoCA in this research study was obtained from the creator of the assessment prior to administration of the study. Data were collected on each participant through administering the previously mentioned testing instruments both immediately preceding the first session and immediately following the final session of the randomly assigned treatment condition.

The Montreal Cognitive Assessment (MoCA) was originally designed in 1992 as a rapid screening instrument for cognitive dysfunction. Since this time, the MoCA has been adapted into a quick yet comprehensive assessment used to assess major cognitive domains including

attention and concentration. The MoCA has been found to be useful in detecting cognitive impairment in many conditions including head trauma, substance abuse, and schizophrenia (Nasreddine, 2016). Administration of the MoCA requires approximately 10 minutes; a total possible score is 30 points, with a score of 26 or above indicating normal. One additional point is given to any individual with less than a twelfth grade education. This assessment tool is widely recognized, being used in 100 countries around the world. While the test may be administered by anyone who is able to both understand and follow the accompanying instructions, the results may only be interpreted by a health professional with expertise in the cognitive field, such as a licensed clinical psychologist (Nasreddine, 2016).

The pre- and post-intervention questionnaire contained both Likert and open-ended questions. The questionnaire was created by the researcher and was not previously tested for validity or reliability. The first three items on both questionnaires utilized a Likert format to measure participant confidence in relation to various aspects of attention. The remaining questions sought to explore insight and self-perception of existing attentional impairments. For example, open-ended questions gauged participant perception of the impact of attentional impairment on general functioning, life, and on recovery. In addition, open-ended questions on both questionnaires explored individual outlook and perception about recovery and the future.

The psychologist, who remained blind to group assignment throughout the duration of the study, performed data collection through administering the MoCA to all study participants. The researcher (music therapist) collected the educational data for the psychologist in order for her to make appropriate adjustments to participant scores. In addition, the researcher collected data from study participants assigned to the experimental group using the pre- and post-study

questionnaire. Testing occurred in identical treatment rooms on each patient's respective home unit of a state psychiatric hospital.

Procedures

Prior to the recruitment process, full approval for this study was granted by the Colorado State University Human Subjects Committee as well as by the Ohio Department of Mental Health and Addiction Services (OhioMHAS) Institutional Review Board. Before involvement in the study, all participants signed an approved informed consent including the purpose, procedures, benefits, and potential risks of the research (Appendix A). All participants were notified of their right to withdraw from the study at any time without any consequence.

A psychologist who was blinded to group assignment completed the pre and posttest MoCA with each participant. All participants assigned to the experimental group also met with the principal investigator for 30 minutes immediately prior to the implementation of the first intervention and for 30 minutes immediately following the administration of final intervention, for purposes of completing the descriptive questionnaire.

The MACT intervention included structured improvisational and receptive exercises designed to target sustained attention. The music therapy intervention was led by a the principle investigator, who is a board-certified music therapist with specialized training in Neurologic Music Therapy. All interventions occurred in identical treatment rooms on each patient's respective home unit located in the facility at which participants are hospitalized. Equipment was comprised of instruments belonging to this facility and included one guitar, three assorted drums (djembes and tubanos), auxiliary percussion instruments (shakers, cymbals, xylophone, maracas, bells), a CD player, a selection of pre-recorded music, and two chairs. Some interventions required the use of lyric sheets and writing utensils.

Participants assigned to the MACT group met with this writer in a treatment room on their respective hospital units, with the door closed and locked so as to minimize distraction. During the first five minutes of the first session, the music therapist welcomed the participants and introduced them to the purpose of the study as well as to the first MACT techniques that would be used. Twenty minutes of MACT followed, with the final five minutes used to discuss strategies used to help successfully complete the musical tasks. Additionally, time was given to discussing strategies for transitioning these techniques into daily life on the unit. During subsequent sessions, the first five minutes was used to review the MACT exercise from the previous day as well as to discuss any effort to transition these exercises and techniques into life on the unit.

Each session involving participants assigned to the experimental group included structured MACT music therapy protocols designed to practice and enhance sustained attention. Music therapy experiences included a variety of techniques including receptive and improvisational methods and became progressively more challenging as each participant demonstrated readiness (Appendix D).

The foundational sustained attention protocol introduced to participants during the first session involved the investigator playing a song with lyrics. Participants were asked to listen for and note every time a pre-determined word was sung. This pre-determined word was a word occurring one or more time within the lyrics of a song. When the song ended, the participant shared with the investigator how many times they heard the pre-selected word. The goal of this exercise was for the participant to demonstrate the ability to focus and sustain attention on a given stimulus while correctly interpreting the information they are receiving. The difficulty of the exercise was made increasingly more challenging as the participant demonstrated readiness

for a more difficult format. For example, the investigator asked the participant to track and count multiple pre-determined words at one time. Additionally, the frequency with which the pre-determined word or words occurred within the music decreased as a way of challenging the participants' ability to sustain attention with fewer occurring stimuli.

The control group did not meet with the researcher to engage in any form of MACT. Aside from meeting with the psychologist for purposes of completing the pre- and post-test, the participants assigned to this group did not receive any form of engagement beyond their typical treatment schedule. The participants assigned to this group were offered the opportunity to engage in individual MACT sessions with the researcher following conclusion of this study.

Data Analysis

Data collected was quantitative with some open-ended questions, with participants in the experimental group completing pre- and post-intervention surveys in addition to quantitative assessments. The pre- and post-intervention questionnaires contained both Likert and open-ended questions. Responses were recorded and presented by the researcher.

Statistical analysis was conducted through use of SPSS Statistics v 22. Data were analyzed through an independent *t*-test of difference scores on the MoCA and the attention subset of the MoCA and confirmed using a Mann-Whitney U test. Level of significance was set at $p<0.05$.

CHAPTER 4: RESULTS

Raw scores from the MoCA and the attention subscale can be found in Table 1. A comparison of the difference scores for the MoCA and the attention subscale of the MoCA were tested using a independent *t*-test and then confirmed with a Mann-Whitney U test. There were no significant differences for group for the MoCA ($t(17) = .601$, $p = .452$) or for the attention subscale ($t(17) = -1.141$, $p = .074$). These results were maintained with the Mann-Whitney U test. A comparison of difference scores can be found in Table 2.

Table 1. *Individual Pre- and Post-Test Scores for the MoCA and Attention Subset by Group*

Participant	MoCA Pre	MoCA Post	Attention Pre	Attention Post
Control				
1	22	26	6	6
2	20	23	6	5
3	25	25	6	6
4	17	21	3	3
5	23	25	6	6
6	16	18	1	2
7	28	26	6	5
8	25	31	6	6
9	29	25	5	6
10	20	21	5	5
M(SD)	22.5(4.352)	24.1(3.573)	5(1.699)	5(1.414)
Experimental				
1	21	17	4	3
2	15	15	1	1
3	18	14	4	3
4	22	24	5	6
5	10	17	1	1
6	18	18	2	3
7	23	25	5	6
8	14	19	2	4
9	13	11	1	2
M(SD)	17.11(4.428)	17.78(4.494)	2.78(1.716)	3.22(1.856)

Table 2. *Comparison of Difference Scores*

	Control Group Difference Scores		MACT Group Difference Scores		Results of *t* Tests		
	M	*(SD)*	*M*	*(SD)*	*t* value	*df*	*p* value
Attention Subscale	.00	(.6667)	.444	(1.01)	-1.141	17	.074
MOCA	1.600	(2.988)	.667	(3.77)	.601	17	.452

Note. *M* = Mean. *SD* = Standard Deviation.

Data from Questionnaires

Data collected on pre- and post-intervention questionnaires were visually analyzed by the researcher for trends. Data from the questionnaires showed that six of nine participants experienced improvement in one or more of three measured areas of confidence. Three of nine participants reported improvement in all three measured areas of confidence. Participant Four was unwilling or unable to provide a numerical score for the three measured areas of confidence during the pretest, but did so during the post test. See Figures 1 through 3 for questionnaire data.

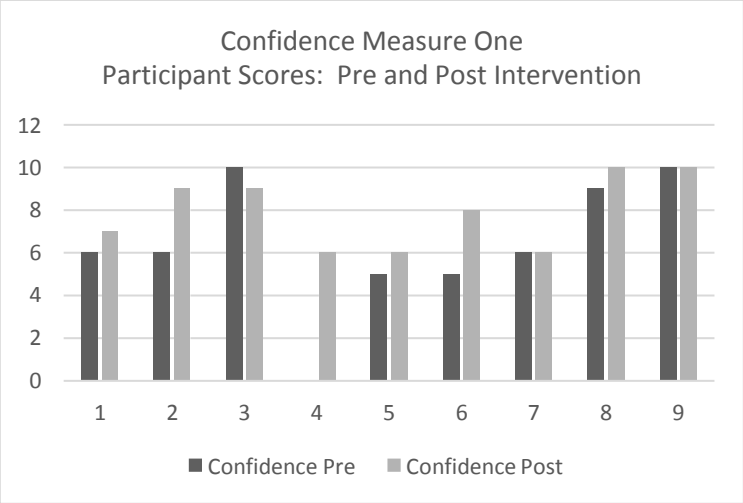

Figure 1. Confidence measure one: Ability to maintain focus as needed to complete a task.

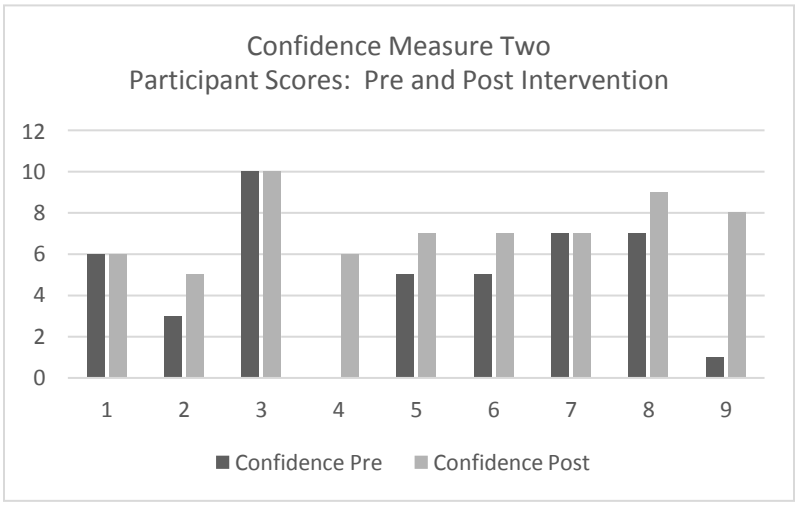

Figure 2. Confidence measure two: Ability to divide attention between two or more stimuli.

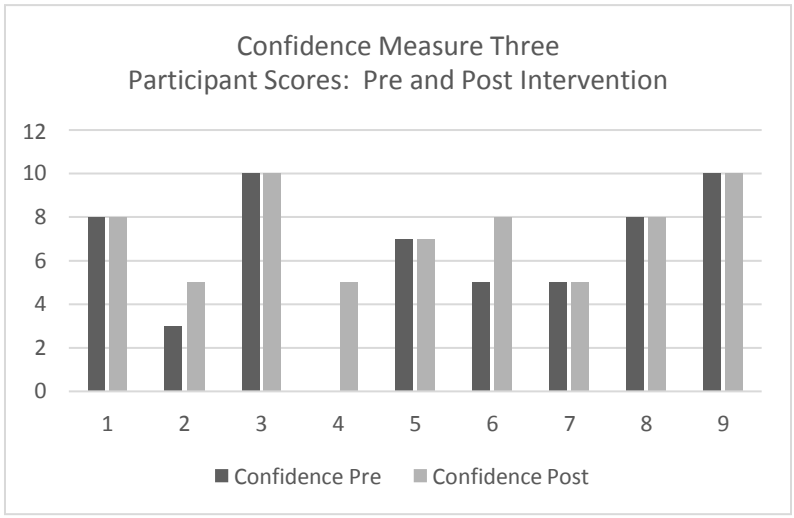

Figure 3. Confidence measure three: Ability to ignore distractions.

Participants were asked if the music interventions had an effect on overall attention and distractibility. Participant One responded, “I think they did. And I’ve noticed it has helped in my life outside the sessions, like when I’m doing my homework.” Patient Two provided similar feedback indicating, “Yes, I can listen a little bit better now.” Patient Three also noted

improvements in these areas, stating, “The exercises – just doing them helped.”

Multiple participants indicated that participation in the study has impacted their ability to participate in, or benefit from, other treatment groups and interventions. Some indicated they had not yet had an opportunity to attend other groups, so could answer neither yes nor no. One participant responded that the interventions “maybe” impacted his ability to participate in, or benefit from, other treatment groups but could not provide any examples or further details. Participant Two stated, “Yes. I was paying attention more better (sic) today than on Monday,” referring to a non-music therapy treatment group he’d attended earlier that day. Participant Five stated participation in this study worked on “different learning abilities” he could “apply to other groups and try to be more attentive.” Participant Nine stated that participation in this study has “helped me to focus more in other groups. In other groups, I’ve been yawning and having trouble focusing but now it's better.”

When asked if participation in this study has impacted individual outlook on recovery as well as on the future. In response to this question, Participant One noted, “It helped me to notice when distractions are occurring. I can distinguish between distractions and focus better. I can be more attentive in treatment and in groups.” Similarly, Participant Nine observed, “It’s helped me focus more and listen more intently, which helps me be more positive about recovery and about the future.” Participant Two agreed, stating, “I think it can help me get out of here if I can go to group and listen.” Participant Three stated he is “confident in being able to achieve the situations I’m in. It feels good to have been successful.”

Participants were asked if they feel any changes made in attention as a result of participation in the study will impact other areas of life. Participant Seven indicated the belief that this experience will impact his ability to engage more appropriately in social situations: “I’ll be able to pay better attention to them, be able to concentrate more.” Participant Two stated he

feels that participation in this study will "help my life later on in the future. Help me take care of myself, help me pay attention to things like hygiene, cleaning clothes."

Participants were asked to identify favorite aspects of the music interventions. Participant One stated, "Now I can take the therapy into my life and feel more confident in my attention span. I can use some of the exercises in my room, like listening for words in a song." Participant Three identified a different benefit to engaging in the music interventions, stating his favorite part was "going through it, 'cause it was a challenge." Participant Six provided similar feedback, stating he most enjoyed "the distractions with the video, the song, and counting words," "It was a lot more challenging. I didn't think I could do it at first, but then I did and now I know I could do it in the future."

Finally, when asked to provide any additional thoughts regarding participation in this study, Participant One stated, "I look forward to using these exercises on my own to get my attention span going." Participant Nine responded, "You helped me in many ways focus on my future instead of on my past."

CHAPTER 5: DISCUSSION

The quantitative results of this study indicate that there is no significant effect of this version of a MACT intervention on attentional impairments of schizophrenia. Overall improvement in participant scores between pre- and post-test did not suggest the therapeutic intervention was beneficial in improving attentional deficits among individuals diagnosed with schizophrenia. Furthermore, the *t*-tests of difference scores did not result in findings of significance.

The individual differences in score between pre- and post-test may offer some insight, both into potential impact of music interventions on attention, as well as on challenges and limitations presented within the context of the research. In regard to improvements in total MoCA score, seven of ten participants assigned to the control group exhibited an improvement between pre- and post-test. In contrast, four of nine participants assigned to the experimental group exhibited an improvement in pre- and post-test scores. In consideration of improvements within the attention subset, two of ten participants in the control group exhibited an improvement in attention score between pre- and post-test. Within the same control group, two of ten participants exhibited a decrease in attention score and six of ten exhibited no change in score between pre- and post-test. In contrast, five of nine participants assigned to the MACT group exhibited an improvement in score between pre- and post-test, two of nine participants exhibited a decrease in score, and two of nine participants exhibited no change in score. Such results could potentially indicate that the treatment received by the control group is impacting attention in a manner not previously accounted for. Additionally, it is possible that the MACT protocol is effective for some but not for others. Consideration should also be given to the fact that the sample size may be too small to provide conclusive or consistent results. Lastly, it is possible

that the frequency and duration of MACT sessions did not allow sufficient time for global changes to occur or to become established.

While more improvement was noted between pre- and post-test scores among participants assigned to the experimental group, a review of these scores indicates some potential limitations within the research. The random assignment of participants to the control and experimental group resulted in an unanticipated, uneven distribution of functioning level between the groups. The experimental group had a greater number of long-term, chronically ill patients functioning at a lower cognitive level. Among the control group, two participants demonstrated initial MoCA scores placing them in the "normal mental functioning" testing range, four placed into the "mild cognitive impairment" range, and one participant scored at or below the MoCA established testing limit for Alzheimer's. In contrast, among the experimental group, zero participants demonstrated initial MoCA scores placing them in the "normal mental functioning" range, four placed at or below the "mild cognitive impairment" range, and four scored at or below the score designating Alzheimer's or similar cognitive function. Future research should explore possibilities for increasing even distribution of cognitive skill or symptomatology of participants among groups, such as through stratified random sampling.

Among pre-test scores, six of ten participants in the control group achieved the highest possible score (6/6), with two of ten participants scoring the second highest possible score (5/6). In contrast, zero of nine participants in the experimental group achieved the highest possible score on the pre-test, with only two of nine scoring the second highest possible score. Among experimental group participants, five of nine scored at 2/6 or below on the pre-test, out of a total possible score of 6/6. Given eight of ten participants in the control group scored at the highest or second highest possible score on the pre-test, the possibility and impact of a ceiling effect should

be considered as a potential limitation to this study and could be a factor into why more than half of participants assigned to the control group maintained their score between pre- and post-test.

Unlike the experimental group, where more than half of assigned participants scored in the bottom third of all total possible points, participants in the control group had little to no room in which to demonstrate improvement. It is possible, given these pre-test scores and possibility of a ceiling effect, that the testing instrument itself may not have provided a sufficient measure of attention for this particular research. Specifically, only 6 of 30 total possible points scored on the MoCA are questions pertaining to attention. Future research in this area should consider a more robust testing instrument. The Montreal Cognitive Assessment (MoCA) was selected by the researcher for its success among individuals with schizophrenia as well as for the length of time used to complete the test (provide reference where it has been successful). However, as this test focuses on seven separate areas of cognitive function in addition to attention, it is possible that a testing instrument solely emphasizing attention alone may prove more effective for the purposes of this study.

Additional insight can be gleaned from the pre- and post-test total scores differences. As can be seen, several patients across both groups demonstrated a fairly substantial increase or decrease in score between pre- and post-test. This is especially of interest among the control group, where little should have changed between pre- and post- test due to the controlled nature of the environment. However, within the control group three participants demonstrated an increase in score of four or more points between pre- and post-test while one decreased in score by four points. Within the experimental group, three participants exhibited a decrease in score from pre- to post-test. One participant went from scoring below the designated Alzheimer's testing range on pre-test to scoring nearly high enough to be considered in the "mild cognitive

impairment" range. These shifts in scores may speak to the changing symptomatology of individuals diagnosed with schizophrenia. Even while medications remain stable and clients are viewed as being in recovery, it is possible for symptoms to worsen or improve within the course of a single day. Such changing of symptoms can certainly impact overall functioning to the point of affecting test scores and may highlight the unpredictable nature of working with participants diagnosed with thought disorders. Future research should take symptom management into further consideration when developing participant inclusion criteria as well as in the selection of testing instruments.

While there were no significant effects of MACT on attentional impairments of persons with schizophrenia, the questionnaire results provided some insight as to participant perception of and outlook on their unique recovery process. As discussed in chapter four, several participants experienced improvement in one or more of three measures of confidence. This indicates a positive shift, even if only among a subset of the overall experimental group. Deeper exploration of the responses to the Likert and open-ended questions sheds light on additional positive change evoked through this research process.

Pre-intervention questionnaire responses gathered from participants indicate a fairly prevalent belief that attentional impairments interfere with mental health treatment and with daily life, as well as a belief that attentional impairments will impact individual recovery and future. Through explanation of these responses, one participant stated he "can't participate in groups as much as others." He provided specific examples of struggles to engage in treatment: "In DRA group, everyone reads. We read 'til it's done and then we're supposed to comment. When it comes to me I say my name and pass because my memory doesn't serve me correct. I can't remember what I read. Basically I read but don't retain the information." "It has affected

my treatment but I try to compensate by using my strengths." Other participants spoke to their struggles with requiring repetition of instruction or assistance to stay on task. Another participant noted that, "with practice and time" attentional impairments could possibly "not have a negative impact anymore." Finally, one participant described how attentional impairment has led to social isolation, while another described attentional impairments as a barrier to learning techniques to coping with his schizophrenia.

Post-intervention questionnaire responses gathered from participants indicate self-perceived positive impact in a variety of categories. As previously discussed, multiple participants experienced improvement in one or more of three measures of confidence. Furthermore, several stated that participation in the study impacted their ability to participate in, or benefit in, other treatment groups and interventions, while all participants noted the belief that the music interventions had some degree of effect on overall attention. Additionally, participants reported the belief that participation in the study will have a positive impact on areas of their life beyond attentional ability. For example, improvement was noted in ability to engage socially, ability to care for oneself, and improvement of outlook on their future.

Multiple patients provided statements indicative of increased feelings of confidence and ability. One participant stated he is now "confident in being able to achieve the situations I'm in. It feels good to have been successful." Another participant spoke of his hope and belief that participation in this study will allow him to take care of himself instead of relying on others to do so. Likewise, another patient shared the feeling of being more hopeful for his future because of increased ability to distinguish between distractions and to focus. "I can be more attentive in treatment teams and in groups." Similarly, another participant stated that participation in the study has helped him "focus more and listen more intently, which helps me be more positive

about recovery and about the future." He shared the hope that, with continued improvement of attentional impairments, he could begin to "drive a car and focus on seeing goals through." "You helped me in many ways focus on my future instead of on my past." Lastly, one participant stated, "It has impacted my outlook. I feel like I'm more aware of what I'm doing when I'm in group." He stated the musical exercises were "challenging. I didn't think I could do it at first, but then I did and now I know I could do it in my future." Statements of hope can often be rare when working with individuals with schizophrenia, and so the aforementioned survey responses are powerful and deserving of attention when considering the results of this study. Future research should not neglect a deeper exploration of the impact of structured therapeutic music experiences on individual outlook on and perception of the recovery process.

Limitations

This study involved a small sample size and a larger sample size would be necessary to establish a connection between structured therapeutic music interventions and attentional impairments of schizophrenia. One fairly significant challenge of this study was recruitment and maintenance of a sufficient sample size given the relatively limited timeframe of the experiment. The inclusion criteria for this study was fairly strict; as a result, many patients verbalized interest in participating but were not eligible. In addition, scheduling conflicts posed a barrier for several potential participants and was documented as the primary factor for one participant's choice to discontinue involvement prior to completion of the study. Consideration could be given to conducting future research in this area over an extended period of time so as to obtain an adequate sample size.

In addition to any limitations posed by a relatively small sample size, consideration should also be given to limitations posed by the dosage of the experimental treatment. As

described in chapter three, participants assigned to the experimental group were expected to participate in five 30-minute sessions over five consecutive days, with an additional hour allotted for completion of the pre- and post-test questionnaire and additional thirty minutes allotted for completion of the pre- and post-test versions of the MoCA. While certainly posing a scheduling challenge, daily participation in the study also appeared to pose fairly rigorous physical and mental demands to those who have historically been uninvolved in treatment and spend much of their time in their rooms. Several participants commented on being tired, both mentally and physically. One stated, "It's already time to do this again? This is a lot!" Finally, one participant tated he was glad the study only lasted five days because he didn't think he would have the energy to continue with the same frequency for a longer period of time. In the future, it may be beneficial to consider conducting the interventions at a lower frequency and for an extended duration. For example, sessions could be conducted every other day over a two-week period in contrast to daily for five consecutive days. Dosage at the current prescribed frequency is likely to be unfeasible to replicate or even to maintain as a form of treatment over time, particularly if done in a community setting where participants would have more demands on their time.

Some limitations of this existing study make any results inconclusive overall. While some of the data from the questionnaires may indicate a potential positive impact of the experimental treatment on individual perception of the recovery process, any long-term effects or improvements are unknown. Several participants noted improvement in the confidence measures as well as in outlook on recovery; however, the post-test was administered immediately upon conclusion of involvement in the fifth and final music therapy session. Thus, it is possible any self-perceived improvements were only temporary. Participant Four even made mention of this when stating, "I feel like I could do better on that test now. But I wonder if this would wear off

after awhile." In the future, it might be beneficial for researchers to consider administering both the MoCA and qualitative questionnaire at regular intervals following completion of the music therapy treatment. Doing so would allow for the opportunity to monitor any decrease or maintenance in improvement or other change over time. Researchers should also consider the possibility of response bias when utilizing responses from the questionnaires.

In addition to the aforementioned limitations, the role of music in improving confidence, outlook on the recovery process, or attentional ability remains unclear, given the use of "treatment as usual" as the contrasting intervention to MACT. In the post-intervention questionnaire, participants provided feedback indicating they found the MACT interventions to be "enjoyable," "helpful," "fun," and "challenging." Additionally, several identified feeling increasingly confident or capable upon conclusion of the study. It remains unclear whether these responses could be attributed to the nature of the structured MACT exercises or simply to the mere presence of music itself. In the future researchers should consider utilizing three groups: Treatment as usual, a MACT group, and a non-MACT music intervention group. Doing so could help identify any potential benefit of MACT interventions over non-MACT music attention exercises.

Lastly, in the future it might be beneficial to explore the adaptation of the questionnaire itself, with emphasis placed on developing or using a tool with high validity and reliability. Future research should remain sensitive to cultural context in regards to the language of the testing instrument itself. For example, future research could ensure that the questionnaire reads at an eighth grade level. Furthermore, future research could consider adaptation of the 10-point Likert scale used, as some participants appeared to struggle with the use of the scale. For example, several participants appeared to have difficulty understanding which end of the scale

was high or low and failed to retain this information with instruction. Additionally, more than one patient commented that a ten-point scale was quite broad and made it challenging to pick a number. In consideration of both of these factors, future research might explore the use of either a more concise, five-point scale or possibly a Visual Analog Scale.

Conclusion

Schizophrenia is a severe mental illness characterized by complex symptomatology including the impairment of cognitive functioning. Cognitive deficits and, specifically, attentional impairments of schizophrenia are likely to persist even after treatment, are detrimental to the ability to engage in traditional psychosocial treatments, are a leading cause of negative emotion and social dysfunction, and present a dominant barrier to attaining full and functional recovery. In this sense, the impact of cognitive and attentional impairment on individuals with schizophrenia is significant. While still small, the research base examining the rehabilitation of attention among individuals with schizophrenia is expanding. However, the published research base regarding the effectiveness of music therapy in treating cognitive deficits and attentional impairment of schizophrenia is minimal. Therefore, there remains a great need for continued exploration of the effectiveness and feasibility of attention control training and cognitive remediation, particularly of music-based interventions, in this area.

While the quantitative results of this study indicate no significant effect of a MACT intervention on attentional impairments of schizophrenia, the qualitative results suggest a potential link between structured therapeutic music experiences and improvement of individual outlook on and perception of the recovery process. A review of the data from the questionnaires reveals that participants demonstrated improvement in confidence and outlook on their recovery

and future, and all participants assigned to the MoCA group believed the interventions had some degree of positive impact on their overall attentional abilities.

The results of this study can serve as a foundation for future research. Given the limitations of this study, future research should consider symptom management when determining inclusion criteria, enlarging the sample size, the use of a more robust testing instrument, the implementation of a non-music based treatment intervention, and dosage and measures of maintenance of treatment. Finally, given the devastating impact of schizophrenia on overall functioning, it is imperative that future research continues to explore the concepts of consumer perception and outlook in regards to recovery.

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APPENDIX A

Consent to Participate in a Research Study Colorado State University

TITLE OF STUDY:

Attention Control Training as Attentional Remediation for Adults with Schizophrenia

PRINCIPAL INVESTIGATOR:

Lindsey A. Holmes, MT-BC

Department of Music, Theatre, and Dance

Colorado State University

Twin Valley Behavioral

Healthcare 614-752-0333

WHY AM I BEING INVITED TO TAKE PART IN THIS RESEARCH?

The researchers are looking for adults with schizophrenia over the age of 20 who regularly experience difficulty with attention. Difficulties with attention and focus may or may not have impacted your ability to engage in other forms of treatment such as group therapy.

WHO IS DOING THIS STUDY?

This study will be conducted by a Mater's student in the Music, Theatre, and Dance Department of Colorado State University under the supervision of her advisor Dr. A. Blythe LaGasse, PhD, MT-BC. Lindsey Holmes, MT-BC will conduct all sessions. Lindsey is a music therapy student at CSU and is a board certified music therapist at Twin Valley Behavioral Healthcare with experience working in mental health. Pre and post-test data will be collected through testing administered by Lindsey Holmes.

WHAT IS THE PURPOSE OF THIS STUDY?

The purpose of this study is to determine if brief exposure to Musical Attention Control Training has an effect on improving attention among individuals with schizophrenia.

WHERE WILL THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST?

This study will take place in the music therapy facilities of Twin Valley Behavioral Healthcare. Each session will last approximately 30 minutes with additional time allotted for the purpose of testing. Sessions will be conducted on an individual basis and will occur once daily for 30 minutes over 5 consecutive days. The total time commitment will be approximately 2.5 hours.

IF I PARTICIPATE, WHAT WILL I BE ASKED TO DO?

You will take part in a variety of active therapeutic music experiences. You will have the option to not take part in any number of the exercises. Interventions will include:

- Music listening: You will listen to recordings or live performances of selected songs. A guided listening assignment will be given by the investigator for each song utilized.
- Individual following: You will follow the leader in playing instruments. You will follow the therapist in changing various elements of the music (speed, volume, rhythm). You may be asked to track two or more musical stimuli simultaneously.
- Music improvisation: You will play a percussive instrument in any way you choose while listening for and responding to specific musical cues given by the investigator.

ARE THERE ANY REASONS THAT INDICATE I SHOULD NOT TAKE PART IN THIS STUDY?

If you do not feel clinically stable (i.e. experiencing significant mood shifts, experiencing homicidal or suicidal ideation, or experiencing a significant worsening in symptoms) you should not volunteer for this study. In addition, if you do not enjoy music you should not volunteer for this study.

WHAT ARE THE POSSIBLE RISKS RELATED TO THIS STUDY?

There are no identified risks involved with participation in this study. While it is not possible to identify all potential risks in research procedures, the investigator of this study has taken reasonable safeguards to minimize any known or potential risks.

WILL I BENEFIT FROM TAKING PART IN THIS STUDY?

There is no known benefit to participating in this study.

DO I HAVE TO PARTICIPATE IN THIS STUDY?

Your participation in this study is voluntary. If you decide to participate in the study you may withdraw your consent and cease participation at any time and without penalty or loss of benefit to which you are otherwise entitled.

WHAT WILL IT COST ME TO PARTICIPATE?

There is no cost involved with participation in this study.

WHO WILL SEE THE INFORMATION I GIVE?

All research records will be kept private, including any that identify research participants, to the extent allowed by law. You will not be identified in any written materials related to this study. The researcher may publish results of this study; however, your name and any other identifying information will be kept private.

Every effort will be made to prevent anyone who is not part of the research team from knowing that you participated in this study or what information you contributed. For example, your name will be kept separate from research records and both names and research records will be stored in different locked locations.

You should be aware that some circumstances do exist in which the researcher may need to show your information to other people. Health care laws require the investigator to alert your treatment team should any adverse reactions to therapy be observed or should you present with any noticeable change in behavior or presentation.

CAN MY TAKING PART IN THE STUDY END EARLY?

If you are found to be a danger to yourself or others or experience a significant worsening of symptoms which requires an adjustment in medication, you may be removed from the study. If you are unable to attend more than one session your data may be excluded from the study.

WILL I RECEIVE ANY COMPENSATION FOR TAKING PART IN THIS STUDY?

You will not receive any compensation for taking part in this study.

WHAT IF I HAVE QUESTIONS?

Before you decide whether you will accept this invitation to participate in this study, please ask any questions that come to mind. If you should have questions about the study afer consenting to participate, you can contact the primary investigator, Lindsey A. Holmes, MT-BC through your hospital direct care staff. If you have questions about your rights as a volunteer in this research, contact (is there someone to contact, like a research coordinator or administrator?).

You will be given a copy of this consent form to keep for your personal records. In addition, a copy of this consent form will be placed in your medical file.

WHAT ELSE DO I NEED TO KNOW?

Data collection will occur following each session. You will be identified only by a specifically assigned research number. You will be asked to answer a brief series of both qualitative and quantitative questions.

Your signature acknowledges that you have read the information stated in this document and that you willingly consent to participation in this study. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing three pages.

Signature of Research Participant	Date	Time
Printed name of Participant	Date	Time
Signature of Research Staff	Date	Time
Signature of Witness	Date	Time

APPENDIX B

PRE-INTERVENTION
QUESTIONNAIRE

Research Participant ID Number:

Date:

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task?

2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli?

3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions?

4. Have you ever heard that you have difficulty maintaining focus or ignoring distractions? If so, please describe what you have heard.

5. Have you ever felt that you struggle to maintain focus or ignore distractions? If so, please describe the nature of what you've experienced by giving one or more examples of how distractibility or difficulty focusing impacts your daily life.

6. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your treatment? If so, please describe how.

7. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your daily life? If so, please describe how.

8. Have you ever worried that difficulty maintaining focus or with distractibility will impact your recovery and future? If so, please describe how.

9. How do you feel that improvement in maintaining focus or in decreasing distractibility can impact your recovery and future?

APPENDIX C

POST-INTERVENTION
QUESTIONNAIRE

Research Participant ID Number:

Date:

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.

2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.

3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.

4. Do you feel as though the music interventions had an effect on your overall attention and distractibility?

5. Please describe if and how participation in this study has impacted your ability to participate in, or benefit from, other treatment groups and interventions.

6. Please describe if and how participation in this study has impacted your outlook on your recovery and your future.

7. Do you feel as though any changes made in your attention throughout this study will impact other areas of your life? If so, please describe.

8. What was your favorite aspect of the music interventions?

9. Were there any aspects of the music interventions which you did not enjoy or did not find helpful? If so, please describe.

10. Please provide any additional thoughts you may have regarding your participation in this study.

APPENDIX D

SAMPLE MUSIC INTERVENTION

Goal of exercise: Participants will demonstrate the ability to focus and sustain attention on a given stimulus while correctly interpreting the information they receive.

Setting: Individual

Equipment needed: CD player, recorded music with words, guitar, paper, pencil

Procedure:

1. The investigator will play a recorded or live song with words. Participants will be asked to listen for and note every time a pre-determined word is sung. When the song has ended, the participant will share with the investigator how many times they heard the selected word.
2. The investigator will play a recorded or live song with words. Participants will be asked to listen for and note every time two pre-determined words are sung. When the song has ended, the participant will share with the investigator how many times they heard the selected words.
3. This procedure may be repeated, becoming progressively more challenging, by increasing the number of selected words which the participant must listen for.

APPENDIX E

PRE-INTERVENTION
QUESTIONNAIRE:
PARTICIPANT RESPONSES

Participant One

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task?
   - 6

2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli?
   - 6 or 7
   - Things like TV make it challenging.

3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions?
   - 8

4. Have you ever heard that you have difficulty maintaining focus or ignoring distractions? If so, please describe what you have heard.
   - No, but I think the treatment team thinks I do.

5. Have you ever felt that you struggle to maintain focus or ignore distractions? If so, please describe the nature of what you've experienced by giving one or more examples of how distractibility or difficulty focusing impacts your daily life.
   - Yes. When someone asks me a question and I'm working on something I have a hard time hearing and understanding what they're saying. Sounds in the environment and symptoms are hard for me to ignore.

6. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your treatment? If so, please describe how.
   - No. Well, maybe sometimes like in Creative Expressions group it used to. There was a lot going on and I would be unaware of what was going on in my environment so I needed instructions repeated.

7. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your daily life? If so, please describe how.
    - Yes. It impacts my ability to remember, and not being able to focus when I need to.

8. Have you ever worried that difficulty maintaining focus or with distractibility will impact your recovery and future? If so, please describe how.
    - No, because I feel like I am getting better.

9. How do you feel that improvement in maintaining focus or in decreasing distractibility can impact your recovery and future?
    - With practice and time it will improve and not have a negative impact anymore.

Participant Two

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task?
   - 6
2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli?
   - 3
3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions?
   - 3
4. Have you ever heard that you have difficulty maintaining focus or ignoring distractions? If so, please describe what you have heard.
   a. Not that I remember.
5. Have you ever felt that you struggle to maintain focus or ignore distractions? If so, please describe the nature of what you've experienced by giving one or more examples of how distractibility or difficulty focusing impacts your daily life.
   a. No. I can listen pretty good.
6. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your treatment? If so, please describe how.
   a. No.
7. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your daily life? If so, please describe how.
   a. No.
8. Have you ever worried that difficulty maintaining focus or with distractibility will impact your recovery and future? If so, please describe how.
   a. No.
9. How do you feel that improvement in maintaining focus or in decreasing distractibility can impact your recovery and future?
   a. I don't know.

Participant Three

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task?
   - 10

2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli?
   - 10

3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions?
   - 10

4. Have you ever heard that you have difficulty maintaining focus or ignoring distractions? If so, please describe what you have heard.
   a. No.

5. Have you ever felt that you struggle to maintain focus or ignore distractions? If so, please describe the nature of what you've experienced by giving one or more examples of how distractibility or difficulty focusing impacts your daily life.
   a. No.

6. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your treatment? If so, please describe how.
   a. Patient stated he could not understand the question and could not answer, despite this writer rephrasing the question several times.

7. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your daily life? If so, please describe how.
   a. Patient stated he could not understand the question and could not answer, despite this writer rephrasing the question several times.

8. Have you ever worried that difficulty maintaining focus or with distractibility will impact your recovery and future? If so, please describe how.
   a. No.

9. How do you feel that improvement in maintaining focus or in decreasing distractibility can impact your recovery and future?
   a. I don't know.

Participant Four

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task?
   - Sometimes I'm able to, sometimes I have trouble.

2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli?
   - I used to be able to multitask but not anymore.

3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions?
   - It depends.

4. Have you ever heard that you have difficulty maintaining focus or ignoring distractions? If so, please describe what you have heard.
   - Someone said maybe I have ADD. I've been having trouble concentrating on cards.

5. Have you ever felt that you struggle to maintain focus or ignore distractions? If so, please describe the nature of what you've experienced by giving one or more examples of how distractibility or difficulty focusing impacts your daily life.
   - Yes, I do. In a conversation I have trouble keeping pace.

6. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your treatment? If so, please describe how.
   - Yes. Because it makes me have trouble communicating.

7. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your daily life? If so, please describe how.
   - Yes. Communication, participating in groups with others.

8. Have you ever worried that difficulty maintaining focus or with distractibility will impact your recovery and future? If so, please describe how.
   - Yes. They might not take me as seriously. They may not have respect for me. I worry I may lose my mentality.

9. How do you feel that improvement in maintaining focus or in decreasing distractibility can impact your recovery and future?
   - I guess I think it will. That's a big, important item.

Participant Five

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task?
   - A 4 or 5. I have a lot of difficulties with comprehension.

2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli?
   - 5

3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident - are you in your current ability to ignore distractions?
   - 7

4. Have you ever heard that you have difficulty maintaining focus or ignoring distractions? If so, please describe what you have heard.
   - Yes. Back when I was in school, in class.

5. Have you ever felt that you struggle to maintain focus or ignore distractions? If so, please describe the nature of what you've experienced by giving one or more examples of how distractibility or difficulty focusing impacts your daily life.
   - Yes.

6. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your treatment? If so, please describe how.
   - Some. I feel they're not really understanding my sense of wellbeing. They neglect other treatment interventions and overdo medications. These things have caused me a lot of distraction.

7. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your daily life? If so, please describe how.
   - I don't know.

8. Have you ever worried that difficulty maintaining focus or with distractibility will impact your recovery and future? If so, please describe how.
   - Yes. Just my sense of wellbeing.

9. How do you feel that improvement in maintaining focus or in decreasing distractibility can impact your recovery and future?
   - Of course I do.

Participant Six

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task?
   - 5. I've never really been challenged all these years, so these skills have slowly diminished over a long period of time.

2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli?
   - 5. Same as the last one.

3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions?
   - 5

4. Have you ever heard that you have difficulty maintaining focus or ignoring distractions? If so, please describe what you have heard.
   - Maybe. In DRA group, everyone reads. We read 'til it's done and then we're supposed to comment. When it comes to me I say my name and pass because my memory doesn't serve me correct. I can't remember what I read in the book. Basically I'm reading but not retaining the information.

5. Have you ever felt that you struggle to maintain focus or ignore distractions? If so, please describe the nature of what you've experienced by giving one or more examples of how distractibility or difficulty focusing impacts your daily life.
   - Yes. I think I answered this in the last one.

6. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your treatment? If so, please describe how.
   - Yes. I can't participate as much in groups as others. It has affected my treatment but I try to compensate by using my strengths.

7. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your daily life? If so, please describe how.
   - No, just treatment.

8. Have you ever worried that difficulty maintaining focus or with distractibility will impact your recovery and future? If so, please describe how.
   - I don't know.

9. How do you feel that improvement in maintaining focus or in decreasing distractibility can impact your recovery and future?
   - Yes it would.

Participant Seven

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task?
   - 6

2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli?
   - 7

3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions?
   - 5

4. Have you ever heard that you have difficulty maintaining focus or ignoring distractions? If so, please describe what you have heard.
   a. Yes. I'm not sure of specific examples.

5. Have you ever felt that you struggle to maintain focus or ignore distractions? If so, please describe the nature of what you've experienced by giving one or more examples of how distractibility or difficulty focusing impacts your daily life.
   a. Yes. Being around a crowd, lots of people, I get more distracted, so I stay by myself.

6. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your treatment? If so, please describe how.
   a. No.

7. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your daily life? If so, please describe how.
   a. Yes. There's a lot out there to learn so sometimes it prevents me from learning. Also keeping a conversation with other people is difficult for me.

8. Have you ever worried that difficulty maintaining focus or with distractibility will impact your recovery and future? If so, please describe how.
   a. Yes. Limitations come into play when something new happens, then I get excited and overwhelmed, then things get distorted.

9. How do you feel that improvement in maintaining focus or in decreasing distractibility can impact your recovery and future?
   a. Yes.

Participant Eight

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task?
   - 9

2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli?
   - 7

3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions?
   - 8

4. Have you ever heard that you have difficulty maintaining focus or ignoring distractions? If so, please describe what you have heard.
   a. No.

5. Have you ever felt that you struggle to maintain focus or ignore distractions? If so, please describe the nature of what you've experienced by giving one or more examples of how distractibility or difficulty focusing impacts your daily life.
   a. No. Later added: My attention's a little weak. I need to work on that.

6. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your treatment? If so, please describe how.
   a. No response

7. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your daily life? If so, please describe how.
   a. No response

8. Have you ever worried that difficulty maintaining focus or with distractibility will impact your recovery and future? If so, please describe how.
   a. No response

9. How do you feel that improvement in maintaining focus or in decreasing distractibility can impact your recovery and future?
   a. Yes.

Participant Nine

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task?
   - 10 Sometimes I have to force myself. Sometimes I have to fight it in my mind.

2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli?
   - 1 I can't do two things at one time.

3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions?
   - 10

4. Have you ever heard that you have difficulty maintaining focus or ignoring distractions? If so, please describe what you have heard.
   - Yes. Up front in the unit. I was talking to somebody, and I looked away and he asked what happened. And I couldn't remember what he was talking about.

5. Have you ever felt that you struggle to maintain focus or ignore distractions? If so, please describe the nature of what you've experienced by giving one or more examples of how distractibility or difficulty focusing impacts your daily life.
   - Yes. Sometimes I need reminders of what we're talking about.

6. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your treatment? If so, please describe how.
   - Sometimes. I got so much on my mind and can't always focus on the present.

7. Have you ever felt that difficulties with maintaining focus or distractibility interfere with your daily life? If so, please describe how.
   - Yes. I drift off in conversation and I forget what I'm doing.

8. Have you ever worried that difficulty maintaining focus or with distractibility will impact your recovery and future? If so, please describe how.
   - Yes. I'm already bipolar and fly off the handle. I need to learn better techniques but sometimes it's hard to pay attention to learn them.

9. How do you feel that improvement in maintaining focus or in decreasing distractibility can impact your recovery and future?
   - Yes. It would help me figure things out before I explode.

APPENDIX F

POST-INTERVENTION QUESTIONNAIRES: PARTICIPANT RESPONSES

Participant One

1. On a scale of 1-10, 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 7

   - I think it increased from when we started. I think you're bringing out more of my attention span, being able to focus. I try to do that on my own but think the treatment sessions with you have increased my ability to concentrate.
2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 5

   - I think it's increased since we started. It depends on the volume.
3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 8

   - I think it changed because the exercises we did brought it out a little more and gave me a chance to practice.
4. Do you feel as though the music interventions had an effect on your overall attention and distractibility?
   - I think they did. And I've noticed it has helped in my life outside our sessions. Like when I'm doing homework.
5. Please describe if and how participation in this study has impacted your ability to participate in, or benefit from, other treatment groups and interventions.
   - I didn't have groups this week to see.
6. Please describe if and how participation in this study has impacted your outlook on your recovery and your future.
   - It helps me to notice when distractions are occurring. I can distinguish between distractions and focus better. I can be more attentive in treatment teams and groups.

7. Do you feel as though any changes made in your attention throughout this study will impact other areas of your life? If so, please describe.
   - I'm not sure.

8. What was your favorite aspect of the music interventions?
   - It used music I already enjoy. I learned to use music from another point of view. Now I can take the therapy into my life and feel more confident in my attention span. I can use some of the exercises in my room, like listening for words in the song.

9. Were there any aspects of the music interventions which you did not enjoy or did not find helpful? If so, please describe.
   - No. I think all were pretty helpful.

10. Please provide any additional thoughts you may have regarding your participation in this study.
    - I enjoyed it, Lindsey. It's been beneficial, and I appreciate you and Dr. J. doing this for me. I look forward to using these exercises on my own to get my attention span going. You've brought out something that's very important to me.

Participant Two

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 9

   - I got to practice it more than I usually do.

2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 5

3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 5

   - I can listen a little bit better now.

4. Do you feel as though the music interventions had an effect on your overall attention and distractibility?
   - Yes. I can listen better now.

5. Please describe if and how participation in this study has impacted your ability to participate in, or benefit from, other treatment groups and interventions.
   - Yes. I was paying attention more better today than on Monday.

6. Please describe if and how participation in this study has impacted your outlook on your recovery and your future.
   - Yes, on recovery. I think it can help me get out of here if I can go to group and listen.

7. Do you feel as though any changes made in your attention throughout this study will impact other areas of your life? If so, please describe.
   - Yeah, I think it can help my life later on in the future. Help me take care of myself, help me pay attention to things like hygiene, cleaning clothes.

8. What was your favorite aspect of the music interventions?
   - Learning to listen more, take care of myself.

9. Were there any aspects of the music interventions which you did not enjoy or did not find helpful? If so, please describe.
   - I think everything was helpful.

10. Please provide any additional thoughts you may have regarding your participation in this study.
    - No additional thoughts provided.

Participant Three

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 9
2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 10

   - The tests helped me feel more confident just by going through it.
3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 10
4. Do you feel as though the music interventions had an effect on your overall attention and distractibility?
   - Somewhat. Picking up different songs and words, the exercises, just doing them helped.
5. Please describe if and how participation in this study has impacted your ability to participate in, or benefit from, other treatment groups and interventions.
   - I haven't noticed a difference.

   - The patient later noted he had not had an opportunity to attend other groups.
6. Please describe if and how participation in this study has impacted your outlook on your recovery and your future.
   - Yes. I'm confident in being able to achieve the situations I'm in. It feels good to have been successful.
7. Do you feel as though any changes made in your attention throughout this study will impact other areas of your life? If so, please describe.
   - It will help me pay attention to more in all areas.
8. What was your favorite aspect of the music interventions?
   - Going through it, 'cause it was a challenge.
9. Were there any aspects of the music interventions which you did not enjoy or did not find helpful? If so, please describe.
   - No.

10. Please provide any additional thoughts you may have regarding your participation in this study.
    - It was fun.

Participant Four

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 6

   - I'm kind of tired today, so I don't know.

2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 6

   - Maybe, not really sure.

3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 5

   - It's about the same.

4. Do you feel as though the music interventions had an effect on your overall attention and distractibility?
   - Maybe.

5. Please describe if and how participation in this study has impacted your ability to participate in, or benefit from, other treatment groups and interventions.
   - Did not provide response, asked for help understanding the questions.

6. Please describe if and how participation in this study has impacted your outlook on your recovery and your future.
   - The patient stated he was unsure of an answer.

7. Do you feel as though any changes made in your attention throughout this study will impact other areas of your life? If so, please describe.
   - The patient stated he did not know how to answer.

8. What was your favorite aspect of the music interventions?
   - Being able to listen to familiar music.

9. Were there any aspects of the music interventions which you did not enjoy or did not find helpful? If so, please describe.
   - The interference was interfering.

   - The patient stated he was referring to the distractions this writer would provide during the exercises. He stated the distractions interfered with his ability to enjoy the music.

10. Please provide any additional thoughts you may have regarding your participation in this study.
    - I enjoyed listening to some of my favorite songs. I feel like I could do better on that test, the one with the rhinoceros, now. But I wonder if this would wear off after awhile.

Participant Five

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 6

   - Trying to work with you on music with the guitar, trying to follow.

2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 7

   - I just feel a little more confident. I would attribute the change to the music exercises.

3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 6 or 7

   - Having the chance to practice

4. Do you feel as though the music interventions had an effect on your overall attention and distractibility?
   - Yes.

5. Please describe if and how participation in this study has impacted your ability to participate in, or benefit from, other treatment groups and interventions.
   - I think it's been helpful. It gives a different aspect on learning, it works on different learning abilities.

6. Please describe if and how participation in this study has impacted your outlook on your recovery and your future.
   - Yeah. I'm hoping to use the techniques to apply them to other groups and try to be more attentive.

7. Do you feel as though any changes made in your attention throughout this study will impact other areas of your life? If so, please describe.
   - It could help me be more multitasking.

8. What was your favorite aspect of the music interventions?
   - I just enjoyed the music and learning different abilities to apply thought, theory, and concepts.

9. Were there any aspects of the music interventions which you did not enjoy or did not find helpful? If so, please describe.
   - No. I enjoyed them all.

10. Please provide any additional thoughts you may have regarding your participation in this study.
    - I think everything was excellent.

Participant Six

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 8

   - I do feel more confident after this week 'cause of what I was learning, how to make my attention better. I've never really challenged it before.

2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 7

   - I feel more confident.

3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   -8

   - I have increased confidence.

4. Do you feel as though the music interventions had an effect on your overall attention and distractibility?
   - Yes, it did have an effect.

5. Please describe if and how participation in this study has impacted your ability to participate in, or benefit from, other treatment groups and interventions.
   - It will help in the future. I feel like it could help because I'll utilize some of this and pay attention to using these techniques.

6. Please describe if and how participation in this study has impacted your outlook on your recovery and your future.
   - It has impacted my outlook. I'll still be going to groups til I leave, so I'll still be able to use these experiences. I feel like I'm more aware of what I'm doing when I'm in group.

7. Do you feel as though any changes made in your attention throughout this study will impact other areas of your life? If so, please describe.
   - Yes. People come to me because I've been here so long, and ask questions. I'll be able to pay better attention to them, be able to concentrate more.

8. What was your favorite aspect of the music interventions?
   - The distraction with the video, the song and counting words. It was a lot more challenging. I didn't think I could do it at first, but then I did and now I know I could do it in the future.

9. Were there any aspects of the music interventions which you did not enjoy or did not find helpful? If so, please describe.
   - Giving me words and having me remember. I didn't like it because I wasn't good at it.
10. Please provide any additional thoughts you may have regarding your participation in this study.
   - It was good. Very good. I learned something. Something I didn't always bother with.

Participant Seven

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 6
2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 7
3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 5
4. Do you feel as though the music interventions had an effect on your overall attention and distractibility?
   - Not really. A little bit, I guess.
5. Please describe if and how participation in this study has impacted your ability to participate in, or benefit from, other treatment groups and interventions.
   - The patient stated he couldn't think of any ways it helped in this area.
6. Please describe if and how participation in this study has impacted your outlook on your recovery and your future.
   - The patient stated yes, but then stated sure he wasn't sure how to describe it.
7. Do you feel as though any changes made in your attention throughout this study will impact other areas of your life? If so, please describe.
   - The patient stated yes, but then stated he wasn't sure how to describe it.
8. What was your favorite aspect of the music interventions?
   - I liked listening to you play the guitar.
9. Were there any aspects of the music interventions which you did not enjoy or did not find helpful? If so, please describe.
   - No.
10. Please provide any additional thoughts you may have regarding your participation in this study.
    - The patient stated he could not think of any additional thoughts.

Participant Eight

1. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 10

   - I think I got better. This exercise using two words at once was pretty hard. The exercises helped.

2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 9

   - Practicing paying attention.

3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 8

4. Do you feel as though the music interventions had an effect on your overall attention and distractibility?
   - Yes.

5. Please describe if and how participation in this study has impacted your ability to participate in, or benefit from, other treatment groups and interventions.
   - I haven't noticed.

6. Please describe if and how participation in this study has impacted your outlook on your recovery and your future.
   - Yeah, but I don't know.

7. Do you feel as though any changes made in your attention throughout this study will impact other areas of your life? If so, please describe.
   - Yes. My memory.

8. What was your favorite aspect of the music interventions?
   - I liked this one we did with two words at once, and distractions.

9. Were there any aspects of the music interventions which you did not enjoy or did not find helpful? If so, please describe.
   - No.

10. Please provide any additional thoughts you may have regarding your participation in this study.
    - No additional thoughts provided.

Participant Nine

1. On a scale 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to maintain focus as needed to complete a task? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 10

2. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to divide your attention between two or more stimuli? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 8

   - I surprised myself this week. By me paying more attention to it, it helped me out to do the exercises.

3. On a scale of 1-10, with 10 being very confident and 1 being not confident, how confident are you in your current ability to ignore distractions? If this number has changed from the rating given during the pre-intervention questionnaire, please describe the nature of this change.
   - 10

   - It taught me to focus more and to listen very, very carefully.

4. Do you feel as though the music interventions had an effect on your overall attention and distractibility?
   - Yes, I'd definitely say that.

5. Please describe if and how participation in this study has impacted your ability to participate in, or benefit from, other treatment groups and interventions.
   - It helped me to focus more in other groups. In other groups I've been yawning and having trouble focusing but now it's better.

6. Please describe if and how participation in this study has impacted your outlook on your recovery and your future.
   - I would say it has. It's helped me focus more and listen more intently, which helps me be more positive about recovery and about the future.

7. Do you feel as though any changes made in your attention throughout this study will impact other areas of your life? If so, please describe.
   - Yes, it will impact the way I do things. Driving a car and focus on seeing goals through.

8. What was your favorite aspect of the music interventions?
   - The music part.

9. Were there any aspects of the music interventions which you did not enjoy or did not find helpful? If so, please describe.
   - No. Everything was perfect.

10. Please provide any additional thoughts you may have regarding your participation in this study.
    - You helped me in many ways focus on my future instead of on my past.