THE EFFECTS OF A MUSIC THERAPY INTERVENTION ON AGITATION IN PEOPLE WITH DEMENTIA

by

Martha Aslakson

A Dissertation Submitted in

Partial Fulfillment of the

Requirements for the Degree of

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ABSTRACT

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Martha Aslakson

The University of Wisconsin–Milwaukee, 2010
Under the Supervision of Christine R. Kovach, RN, PhD

The purpose of this dissertation study was to test the effectiveness of a music therapy intervention for reducing agitation and improving engagement and function in people with dementia. Using a convenience sampling method, 40 nursing home residents were selected to participate in the study. Data were collected using a demographic form, the Mini-Mental State Examination, an engagement variable coding form, a Functional Behavioral Profile, and the Wisconsin Agitation Inventory. The residents had an average age of 86 years, had lived in the facility an average of 28 (±4.3) months, were predominantly White (95%), and were predominantly women (90%). The design of the study was an experimental pretest–posttest design with random assignment to groups to test the differences between the experimental and control groups. The participants were randomly assigned to either the treatment group, which consisted of music therapy sessions three times for 1 week, or the control group, which watched a nature video three times for 1 week. The outcome variables for the study included agitation, engagement in the activity, and functional behavior. Although there were some positive trends, there was not a statistically significant difference in agitation between the treatment and control groups. The treatment group at posttest had statistically significantly higher scores in

engagement and social functioning than the control group. The findings indicate a need for future research with an adequate sample size and treatment dose of music therapy.

12/10/10

Major Professor Date

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Chapter 1

Music Therapy Intervention for People With Dementia

Alzheimer's disease (AD) is not part of normal aging but rather is a progressive and fatal disease (Alzheimer's Association 2008). Agitated behavior associated with AD is a major challenge for caregivers. Agitation is marked by vocal or motor behaviors that arise from increased environmental and internal demands and from decreased coping ability (DeYoung, Just, & Harrison, 2002). Agitated behaviors have been documented in 90% of skilled nursing facility residents (DeYoung et al., 2002). Agitation in people with dementia is difficult for the nurses in skilled nursing facilities to handle. It is mandated in Federal Nursing Home Reform Act to provide high quality care to enhance quality of life (Anderson & Bjorklund, 2010). However, providing nursing care for to enhance health and quality of life people displaying agitation seem like an insurmountable endeavor. The presence of agitation and confusion in the elderly is one of the foremost management problems for health care providers (Gerdner and Swanson 1993; Kovach, 2004).

The U.S. population is aging rapidly. According to the Administration on Aging (2004), the number of adults aged 65 years and older was 35.6 million in 2002. Furthermore, by 2030, this number is expected to increase to 71.5 million. Although AD and related disorders are not a normal part of aging, by 2050, the number of Americans with AD could range from 11.3 million to 16 million (Alzheimer's Association, 2004).

AD and related disorders affect society in both monetary and social ways. National direct and indirect annual costs of caring for individuals with AD are at least $100 billion (Alzheimer's Association, 2004). People with AD or related dementia suffer

from a devastating disorder that impairs memory, thinking, and behavior. Ultimately, the disease leads to death.

Medications are widely used in the treatment of people with dementia. These drugs are used to treat neuropsychiatric symptoms, including agitation. The original aims of Nursing Home Reform Act found in OBRA 1987 restricted the use of physical and chemical restraints used to treat agitation (United States Congressional and Administrative News, 1987). However, today, the use of the medications continues to be monitored for inappropriate use (Anderson & Bjorklund, 2009).

Antipsychotic drugs are used to treat psychoses and accompanying agitated behavior. Antipsychotics replaced the older or first-generation drugs because of their perceived relative safety advantages (Schneider, Dagerman, & Insel, 2005). Although these drugs are the mainstay of psychopharmacological treatment, their efficacy has recently come under further investigation (Schneider, Dagerman, & Insel, 2006). Studies have found no evidence of increased risk for falls related to the use of atypical antipsychotic drugs; however, a significant risk for cerebrovascular events and even death was found.

Anxiety is also prevalent in people with dementia (Ballard, Neill, & O'Brien, 2000). Its prevalence rates range from 38% in Alzheimer's disease to as high as 72% in vascular dementia. Research has been conducted to investigate the relationship between anxiety and agitation in people with dementia. A significant positive correlation between anxiety and agitation has been found ((Twelftree & Qazi, 2006). While anxiety and agitation represent different constructs, anxiety can be considered as a possible cause of some agitation in people with dementia.

Central nervous system active medications including benzodiazepine, lorazepam, and alprazolam, are used to treat anxiety in people with dementia (Fick, Kolanowski, & Waller, 2006). They are used despite the evidence that the elderly are more sensitive to psychotropic drug actions (Lader, 1986). In addition, these medications are used despite multiple drug related problems including syncope, fatigue, delirium, confusion, altered consciousness, constipation, sleep disturbance, falls, urine retention, depression, and hypoglycemia.

Owing to the risks and side effects of treating agitation with medications, trends are currently favoring nonpharmacological treatments for agitation, multidisciplinary care, and the use of a person-centered approach toward the care of individuals with dementia. One approach is the use of therapeutic activities to treat agitation in people with dementia. Therapeutic activities include music therapy, art therapy, storytelling, drama, and dance. Music activities and interventions have been used by a variety of health professionals, including music therapists and nurses. In treating people with AD, music therapists structure the use of both instrumental and music strategies to improve functioning or facilitate changes that contribute to quality of life (American Music Therapy Association, 2006). According to Sacks (2007), music therapy with people with dementia "seeks to address the emotions, cognitive powers, thoughts, and memories, the surviving 'self' of the patient, to stimulate these and bring them to the fore. It aims to enrich and enlarge existence, to give freedom, stability, organization, and focus" (p. 337.

Purpose of the Study

The purpose of this study was to examine the effects of a music therapy intervention on agitation in people with dementia. Participants' engagement in therapeutic activities and their functional behavior were also examined.

Significance

As the population of older adults continues to rise, nursing care of the elderly will become increasingly important. Agitation in people with dementia can threaten both the psychological and physical well-being of the person and his or her cohabitants (McGonigal-Kenney & Schutte, 2006). Therefore, research to add to nursing knowledge concerning interventions for treating agitation in people with dementia is needed.

Definition of Concepts

For the purpose of this study, the following definitions are used.

engagement. This is the degree to which a person occupies his or her attention or efforts (Urdang, 1968).

functional behavior. This is described by human functioning and development in alignment with human potential and human limitations (Orem, 1991).

music therapy. This is the use of music to treat behavior. The therapy is guided by the three principles of music therapy, as stated by Gaston (1968, p. v): (a) "the establishment or reestablishment of interpersonal relationships," (b) "the bringing about of self-esteem through self-actualization," and (c) "the utilization of the unique potential of rhythm to energize and bring order."

nursing intervention. A nursing intervention is defined as a nursing action, treatment, procedure, or activity that is designed to achieve an outcome to a diagnosis for which a nurse is accountable (Saba, 2008).

rhythm. Most musical events involve rhythm, which also generates energy. Energy must vibrate. According to Schneck and Berger (2006), "cyclical events, both large and small scale, are the manifest characteristics of energy, the vibrations of which correspond to alternating periods of energy conversion: balance (potential) and imbalance (kinetic)." (p. 139).

Summary

Agitation in people with dementia is a significant health care problem confronting nurses who treat the growing U.S. aging population. Nurses, along with other health care professionals, are working together to provide care for people with dementia that is both safe and effective. As originally stated in OBRA 1987 which still guides care of nursing home residents, "a skilled nursing facility must care for its residents in such a manner and in such an environment as will promote maintenance or enhancement of the quality of life of each resident" (United States Code Congressional and Administrative News, 1987, p. 160). The research for this dissertation is designed to generate data that will contribute to the body of knowledge directed toward providing dementia care to promote a high quality of life involving music therapy interventions for agitation.

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Chapter 2

Conceptual and Theoretical Concepts Surrounding Music Interventions to Decrease Agitation in People With Dementia

Music and healing have been linked throughout history. Descartes (1596–1650), the 17th-century philosopher, first made the connection linking the mind and body and set the stage for the scientific study of how music affects the body (Davis & Gfeller, 2008). In nursing care, Florence Nightingale, in 1859, first recognized the therapeutic properties of music. Since then, the effects of music interventions and how they affect human bodies in both physiological and psychological ways have been studied. The purpose of this chapter is to discuss the conceptual, theoretical basis surrounding music interventions used to decrease agitation in people with dementia.

Music therapy is defined as using music by credentialed professionals to address physical, emotional, cognitive, and social needs of individuals of all ages for specific goals (American Music Therapy Association, 2009). The effect of music therapy on agitation in people with dementia is one area that is studied. The conceptual and theoretical work, developed from biological and environmental perspectives, will be used to explain how music therapy may mediate the relationship between environmental and biological vulnerability and agitated behavior of people with dementia. The central premise for how music therapy mediates this relationship is that the music stimulus acts a mediator between current brain and behavior function. There is a reciprocal relationship between studying the neurobiological foundations of music in the brain and how music behavior, through learning and experience, changes brain and behavior function (Thaut, 2005).

The Process of Human Hearing

This chapter begins with a description of the process of human hearing. The process of hearing a musical sound is complex and begins in the human ear. The ear is divided into the external ear, the middle ear, and the inner ear. The external and middle ears are used for hearing only, whereas the inner ear is used for both hearing and maintaining equilibrium (Huether & Defriez, 2006). The external ear is composed of two parts. First, the obvious, external portion is the pinna or auricle. The external auditory canal is a tube that leads to the middle ear. After the sound waves enter the auditory canal, they hit the tympanic membrane and cause it to vibrate. The tympanic membrane separates the external ear from the middle ear. Sound waves create vibrations, and these vibrations are the basis for hearing musical sound (Radocy & Boyle, 1997).

In the middle ear, the vibration from the tympanic membrane is transmitted to the inner ear. The middle ear consists of the tympanic cavity, a small chamber in the temporal cavity. Inside this cavity are three small bones or ossicles. The bones are called the malleus, the incus, and the stapes. The movement from the bones presses against the oval window and sets the fluids of the inner ear in motion (Huether & Defriez, 2006). A molecule vibrates 20 times per second for the lowest audible pitch and 20,000 times per second for the highest audible pitch (White, 2000).

The inner ear is a system of osseous labyrinths filled with the perilymph. The bony labyrinth is divided into three parts: the cochlea, the vestibule, and the semicircular canals. Hearing receptors or hair cells comprise the organ of Corti, which is located in the cochlea. According to Huether and Defriez (2006), "sound waves that reach the cochlea through vibrations of the tympanic membrane, ossicles, and oval window set the

cochlear fluids into motion. Receptor cells on the basilar membrane are stimulated when their hairs are bent or pulled by the movement" (p. 480). Once the hairs are stimulated, impulses are transmitted to auditory cortex of the brain via the cochlear nerve. The basilar membrane detects the fluid movements and then moves either up or down, depending on the movements' frequency. Higher frequencies elicit maximal membrane movement closer to the base, whereas lower frequencies elicit maximal membrane movement closer to the apex of the membrane. Music, which consists of many varieties and combinations of frequencies, elicits membrane movement at several locations. According to Radocy and Boyle (1997), "where, when, and how much of the basilar membrane is excited provides basic information for perception and organization of the psychological sensations basic to music" (p. 73).

After sound moves through the ear, it enters the brain. Music is processed in multiple centers of the brain. The musical brain consists of a super-structure comprising many overlapping processing centers, each formed by a network of anatomical and functional links between cortical areas (Warren, 2008). PET scans show that music is processed first in the primary auditory cortex (Mirz et al., 1999). Music is then activated more extensively in the temporal lobes of both hemispheres (Klostermann, Loui, & Schimamura, 2009). Furthermore, it is hypothesized that networks of brain involvement are responsible for processing auditory stimuli, depending on the complexity and composition of the stimuli. The right side of the prefrontal cerebral network has been found to process simpler music consisting of melodic traces of familiar tunes. The left side of the brain has been found to process music linked to the access of verbal semantic memory (Groussard, M. et al, 2009).

Musical Perception

Carl Seashore developed a model of musical perception to explain the relationships between the physical and perceptual variables involved in the brain's processing of music, shown in Table 1.

Table 1

Seashore's Model of Music Perception

Physical	Perceptual	Essence of musicality
Frequency	Pitch	Tonal
Amplitude	Loudness	Dynamic
Signal shape	Timbre	Qualitative
Time	Duration	Temporal

Note. From Seashore (1947).

Frequency is the vibration rate of sound and is expressed in cycles per second or hertz. It is the physical property of musical tones and exists independently of any human observer. Pitch is a sensation and a psychological property that requires a human observer (Radocy & Boyle, 1997). The tonal qualities of pitch and frequency are complex and consist of the unlimited varieties of combinations of pitch that make up music.

The phenomenon of loudness is also complex. The most commonly used measurement of loudness, and what Seashore termed amplitude, is the decibel, dB (Astralsound, 2010). It is not a unit of measurement, It is a mathematical tool for comparison similar to a percentage. Expressed in decibels, the smallest sound pressure humans can hear is 0 dB. Sound pressure that is uncomfortably loud is 120 dB. Another

method of measuring loudness is measuring intensity. Intensity is defined as an amount of power per unit area, and watts per square meter are the common units used for sound intensity measurement. Sound intensity of music is usually expressed in terms of intensity level rather than in terms of pure intensity (Radocy & Boyle, 1997). Loudness is a subjective sensation of the sound's magnitude and requires an animate perceiver. The dynamics of music are the subtle changes in loudness made by performers to provide artistic change and interpretation to music performances.

Signal shape or timbre is the characteristic of sound that makes two different sounds at the same frequency distinguishable. Timbre relates to the physics of a vibrating body. Its closest physical property is the waveform (Radocy & Boyle, 1997). A sound wave is a vibrating object that creates a disturbance in a medium. A pure tone, such as that of a flute, consists of a single frequency. More complex tones, such as those produced by a tuba, consist of a set of frequencies in mathematical relationships (Piper, 2009). Timbre is a multidimensional phenomenon. The timbre of sound is affected by the frequency, the perceptual loudness, and the shape of the sound wave. Therefore there is no easy accompanying measuring system. Qualitative words, such as *rich*, *harsh*, or *sonorous*, can be used instead of quantitative measures to describe timbre. The descriptive words for sound also include an individual's interpretation of the sound heard.

Finally, Seashore's model of musical perception includes a temporal dimension related to the cognition rhythm and tempo. Music consists of sound organized in time. In fact, it is difficult to imagine musical sound separated from its temporal dimension (Lipscomb and Hodges, 1997). There are several musical concepts related to the single, physical variable of time. Duration, or length of a musical note, is the psychological

variable concerned with time and how sound is organized into rhythmic patterns. In order for something to be identified as containing any rhythm, it must have at least two of three properties including pulse, pace, and pattern (Schneck & Berger, 2006). Pulse is the underlying movements, similar to human heart beats. The pulse organizes musical events as a unifying factor. Pace is the speed or tempo at which the pulse of the music occurs. Pattern comes about when the musical pulse is divided into regularly occurring sets of accented and unaccented beats, called meter. Rhythm then results when a listener perceives a sequence of sounds of equal or varying length which are used to create variety and interest in musical compositions.

Four Perspectives Used for Theoretical Explanation

Here the researcher reviews the four perspectives used to inform theoretical explanations for agitated behavior of people with dementia. Cohen-Mansfield (2000) identified four main theoretical frameworks used to explain behavioral problems or agitation in people with dementia: (a) the direct impact of dementia–biological model, (b) the unmet needs model, (c) the behavioral model, and (d) the environmental vulnerability model. These conceptual models attempt to address how dementia leads to the behavioral problems associated with the disease.

Direct impact of the dementia-biological model. The direct impact of the dementia–biological model utilizes two premises: (a) problem behaviors such as agitation result directly from neurological changes in the brain and (b) severe organic brain deterioration results in behavior disinhibition (Cohen-Mansfield, 2000).The model is shown in Figure 1.

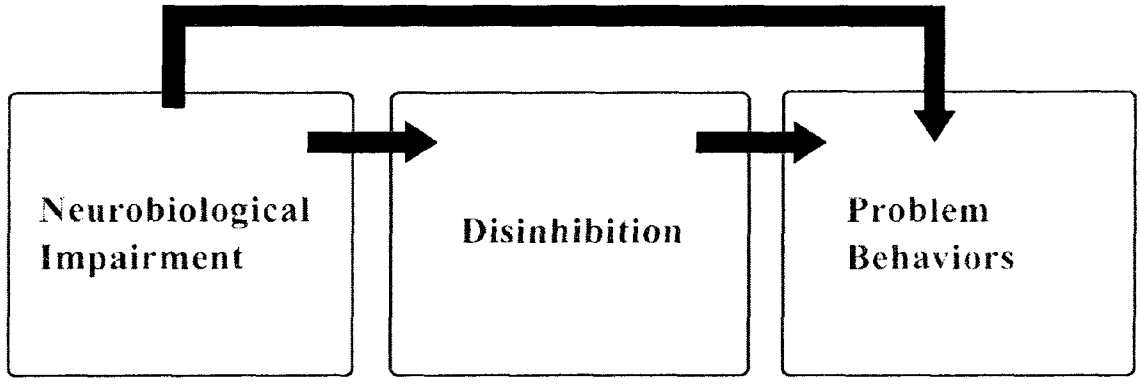

Figure 1. Direct impact of dementia–biological model.

AD is the most common type of dementia. It accounts for 60% to 80% of cases (Alzheimer's Association, 2009). The exact cause of the brain pathology or neurobiological impairment related to AD is not known. According to the direct impact of dementia-biological model, the brain impairment can lead to disinhibition and ultimately problems behaviors. Three theories are currently being investigated for the neurobiological impairment involved with dementia. The first theory concerns the loss of neurotransmitter stimulation by choline acetyltransferase. The second concerns the mutation of encoding amyloid precursor protein, an alteration in apolipoprotein E, which binds beta amyloid. The third theory concerns the pathologic activation of N-methyl-d-aspartate receptors, resulting in an influx of excess calcium (Boss & Wilkerson, 2006). Research evidence has linked abnormalities in the brain's cholinergic, noradrenergic, serotonergic, and dopaminergic neurotransmitters with behavioral manifestations in people with dementia (Garand, Buckwalter, & Hall, 2000). Currently the strongest evidence of neurotransmitter deficit is in the cholinergic system. Dysfunction and behavioral effects include amnesia, agitation, and psychotic symptoms. This evidence also supports the ideas put forth in the direct impact of dementia–biological model.

One class of drugs used to treat the brain pathology of people with dementia includes cholinesterase-inhibiting drugs. Memory and learning are dependent on the neurotransmitter acetylcholine (ACh) and the neurons that function as the cholinergic system. The cholinergic hypothesis states that "cognitive functioning may be preserved in people with Alzheimer's disease if their levels of ACh are maintained" (Adams & Page, 2000, p. 1184). Cholinesterase inhibitors, including donepezil, galatamine, rivastigmine, and tacrine, provide significant benefit in treating people with AD (Wilkinson, Francis, Schwam, & Payne-Parrish, 2004).

Cholinesterase inhibitors are not only used to treat cognitive decline in people with dementia but are also used for treating behavior problems, including dementia. The effectiveness of this use, however, is not overwhelmingly positive. A meta-analysis of six randomized, double-blind, placebo-controlled trials of cholinesterase inhibitors concluded that these medications have only a modest beneficial impact on behavior disturbances in people with dementia (Wilkinson et al., 2004).

Unmet needs model. The unmet needs theoretical model to explain agitation in people with dementia posits that it is the inability of the person with dementia to communicate needs combined with his or her decrease in ability to provide for himself or herself that leads to negative behavioral outcomes, including agitation (Cohen-Mansfield, 2000). A conceptual model for nursing care of people exhibiting agitation related to dementia is the need-driven, dementia-compromised behavior model (NDB; Algase et al., 1996). This model is based on the assumption that *disruptive behavior* is a term that reflects the caregiver's perspective rather than the perspective of the person with dementia. According to Algase et al. (1996),

> although disruptive, dysfunctional, or ineffective from an objective point of stance, NDBs constitute the most integrated and meaningful response possible, given limitations imposed by a dementing condition, strengths preserved from the person's basic abilities and personality, and constraints, challenges, or supports offered by the immediate environment. (p. 11)

Interventions based on the NDB model used strategies designed to maintain independence of the person with dementia by adapting the social and physical environments to capitalize on the strengths that remained intact within the person.

Kovach, Noonan, Schlidt, and Wells (2005) continued the NDB model by explaining the consequences of behavioral symptoms, including agitation, in people with dementia. Kovach showed how an unmet need of a person with dementia can turn into a series of cascading events that can negatively affect the person or the person's caregiver, or the caregiving context. An example is as follows: a person's arthritic knee pain can lead to a primary need for an analgesic or increased rest; this leads to a primary NDB of attempts to exit; this exit attempt leads to a fall with a fractured wrist; this leads to a secondary need for additional analgesic medication, decompression of the fracture, and increased assistance with all activities of daily living (ADLs); finally, this leads to a secondary NDB of decreased eating and increased incontinence. Clearly the inability of a person with dementia to communicate needs effectively can lead to a cascade of undesirable events.

Behavior model. B. F. Skinner originally stated that if the environment rewards behavior, people perform certain acts, and then people tend to repeat the behaviors (Skinner, 1974). The behavioral model to explain agitation in people with dementia is similar and states that behavior problems are determined by antecedents and consequences. The model is shown in Figure 2. In the behavioral model, agitation is

learned in people with dementia because the behaviors are reinforced by caregivers who supply attention when they are present.

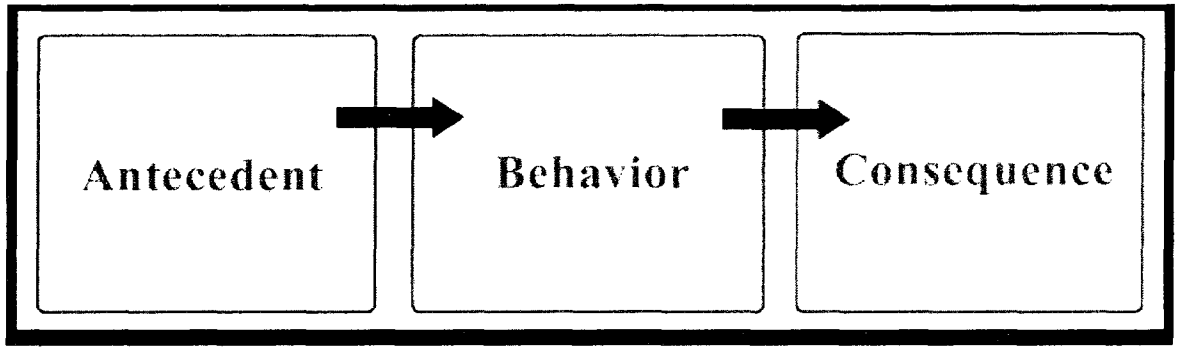

Figure 2. Behavioral model (Cohen-Mansfield, 2000).

Research supports the behavioral model. Teri, Logsdon, and Schindler (1999) developed a comprehensive video training program to help professionals develop treatment plans designed to reduce agitation in people with dementia. Each tape provides instructions for identifying antecedents and consequences of problem behaviors. Then caregivers can develop interventions to modify and reduce problem behaviors.

In addition, a randomized clinical trials (RCT) by Teri et al. (2003) has presented research-based evidence of the effectiveness of the behavior model. The major advantage of the RCT is its ability to demonstrate causality (Hulley et al., 2001). The study was designed to determine whether an exercise program, combined with training in behavioral management techniques for caregivers, would reduce functional dependence and delay institutionalization in people with AD (Teri et al., 2003). The behavioral management training was designed to reduce patient depression and agitation and delay institutionalization. The results showed improved physical health and a decrease in

depression. In addition, the results showed a trend (19% vs. 50%) toward a decrease in institutionalization.

Environmental vulnerability model. The fourth theoretical framework used to explain agitation in people with dementia is the environmental vulnerability model. This model states that people with dementia tolerate less environmental stress as a result of their pathology. Consequently, a stimulus that may be appropriate for a cognitively intact person may result in an over-reaction from a person with cognitive impairment (Cohen-Mansfield, 2000). Kovach et al. (2004) designed a model called the model of imbalance in sensoristasis (MIS). It focuses on the environmental vulnerability model and includes components from the physical, behavioral, and unmet needs categories. The MIS framework posits that balancing time periods of high arousal and low arousal throughout the day will decrease agitation, ameliorate other behavioral symptoms, and prevent functional decline" (Kovach et al., 2004). In their study, Kovach and colleagues found statistically significant evidence to support their theory as a source of agitation in people with dementia.

The four models used to explain agitation in people with dementia are not mutually exclusive and can be interactive. For example, environmental vulnerability in a person with dementia may produce an unmet need when normal levels of stimulation are perceived as overstimulation (Cohen-Mansfield, 2000). Although the theoretical models do not explain fully all the possible causes of agitation in people with dementia, they are necessary for guiding an understanding of a phenomenon. In addition, the use of a theory helps to undergird research because it aids in operationalizing the values of interest so they can be tested and applied (Polit & Beck, 2004).

Environmental Stress and Agitation in People With Dementia

The idea of environmental stress was first defined by Henry Murphy in 1938. He called it *environmental press*, referring to stimuli that possess a motivating quality to a cognate individual need (Lawton, 1982). Lawton expanded on Murray's environmental press and focused on older adults. His ecological model of aging suggests that behavior is a function of the competence of an individual and the environmental press of a situation. Environmental stress is associated with agitation in people with dementia (Cohen-Mansfield, 2000; Hall, 1994). Developed from Lawton's work, Hall and Buckwalter (1987) created a conceptual model called the progressively lowered stress threshold (PLST) that states that most adults have a relatively stable stress threshold but that when adults have dementia, this stress threshold is reduced.

The PLST model divides the symptoms of dementia into four categories (Hall, 1994): (a) cognitive or intellectual losses, (b) affective or personality changes, (c) conative or planning losses that cause a predictable decline in ability to perform functional activities, and (d) loss of stress threshold, causing dysfunctional behavior such as agitation or catastrophic reactions. The PLST model hypothesizes that symptoms in the last group are related to a person's decreased ability to cope. As too much stress accumulates, a person is unable to maintain calm behavior. The person becomes increasingly anxious until the stress threshold is exceeded. Problem behaviors are divided into three types and are shown in Table 2.

Table 2

PLST

Catastrophic behaviors	Violent, agitated, or anxious behavior	Compulsive, repetitive behavior
Confusion or agitated night awakening	Belligerence	Cognitively inaccessible behavior
Purposeful wandering	Noisy behavior	Socially inaccessible behavior
	Purposeless behavior	

Note. From Hall (1994).

The PLST model identifies five common stressors that lead to dysfunctional behavior, including agitation. They include the following: "fatigue, change of environment, routine, or caregiver, misleading stimuli or inappropriate stimulus levels, internal of external demands to achieve that exceed functional capacity, and physical stressors such as pain, discomfort, infection, acute illness, and depression" (Hall, 1994, p. 130). The stressor groups provide a guide for planning care for a person with dementia. Care planning involves identifying careful assessment of the person's dysfunctional behavior and then developing strategies to reduce the presence of the stressors.

According to the originators of the PLST model, "although the PLST model has been widely described and applied in nursing practice, systematic testing and refinement of the model continues" (Smith, Gerdner, Hall, & Buckwalter, 2004, p. 1755). Some evidence has been shown in research studies to support the use of the PLST model to

reduce agitation in people with dementia. In a review of the evidence-based psychological treatment of behavioral disturbances in people with dementia, two studies were sited supporting use of the PLST model (Logsdon, McCurry, & Teri, 2007). Both studies used interventions based on the PLST model that were designed to reduce behavior problems. In a research study, caregivers in the experimental PLST condition learned to observe behavior problems, identify antecedents, and plan environmental scheduling changes to prevent them. Research has been promising, but more is needed to establish whether the model consistently produces positive behavioral outcomes (Smith et al., 2004).

Positive Environmental Stimulation

In addition to decreasing environmental stress, creating positive environmental stimulation may decrease agitation in people with dementia. To begin, there is evidence that all mammals engage in activities throughout their life spans (Brown, 1994). Also, Lawton (1985) has noted that research supports the view that people will create activity where none exists. Researchers have come to the conclusion that a need for sensory stimulation is present in people with dementia, just as it is in people with more normal cognitive abilities. Therefore multisensory environments have been created for individuals with dementia to address their need for positive environmental stimulation. The philosophy of multisensory stimulation provided in the multisensory room (MR) is based on the belief that all individuals have a basic need for social interaction, recreation, and leisure activities (Ball and Haight, 2005).

In an observational study, Cohen-Mansfield, Werner, and Marx (1989) found that nursing home staff believe that boredom triggers agitation in residents with dementia

54.9% of the time. They continued to study the link between agitation and boredom and found that residents exhibit more agitated behavior when unoccupied compared to when they are engaged in activities.

Research to support the use of a multisensory room, or a *Snoezelen room*, as it sometimes called, is lacking in scientific rigor (Burns, Cox, & Plant, 2000). Cox, Burns, and Savage (2004) conducted a mixed-methods study in an attempt to improve on the research methodology. The goal of the study was to compare the effectiveness of a Snoezelen room and a landscaped garden with the usual living room environment. The research had both a quantitative part and a qualitative part. Affect measures were taken in the quantitative part of the study, and there were statistically significant differences between the ratings for pleasure before and during time in each of the three environments, with a greater proportion of participants rated as demonstrating pleasure in the living room, garden, and Snoezelen room. More research is needed to support the effectiveness of environmental interventions.

Music Therapy to Affect Agitation in People With Dementia

There is evidence to support the benefits of therapeutic activities for people with dementia (Marshall & Hutchinson, 2001; Pulsford, 1997). There is also evidence to support the use of therapeutic activities to affect agitation. Music is one environmental stimulant hypothesized to decrease agitation in people with dementia. Music has the unique quality of rhythm as the energizer and the organizer (Gaston, 1968). According to Thaut (2005), "studies have shown impressively over the past 15 years that rhythmic entrainment of motor function can actively facilitate the recovery of movement in patients with stroke, Parkinson disease, cerebral palsy, or traumatic brain injury" (p. 304).

Research needs to continue to study the mechanism of rhythm acting as an energizing and organizing factor among people with dementia.

Dr. Linda Gerdner, from the University of Iowa, developed a music intervention while earning her PhD (Gerdner, 1997). She has completed several studies since then to further test her model (Gerdner, 1999, 2000, 2005). The model is based on the PLST model for understanding a possible basis for agitated behavior in people with dementia. The individualized music intervention protocol (IMIA) model is used for people with agitation related to dementia on an individual basis. The protocol is described in by Gerdner (1999b) and involves assessing the person's needs and music preferences. Then the appropriate recorded music is played. In her paper, Gerdner (1999b) reported that based on initial findings, individualized music can be highly effective for some people with agitation related to dementia.

Gerdner's research provides a basis for studying the effects of music intervention; it also leads to many other possibilities related to research on music invention for people with dementia. Sherratt, Thornton, and Hatton (2004) reviewed 21 research articles dealing with music interventions for people with dementia. In their analysis, they provided a summary of the following from each study: year, sample sizes, cognitive screening tools, main target of the interventions, and activities used. Fourteen of the studies used agitation as the target of the music intervention. Thirty participants was the largest sample size for the studies targeted at decreasing agitation. A wide variety of music activities were used for the interventions. Some used group interventions, whereas others used individualized music interventions. The activities ranged from active exercise to passive listening to "calming" music. Most of the music was recorded, but

some was live singing. Two of the 14 studies used cognitive screening tools. From this review of music interventions, it is clear that although there is agreement on the therapeutic benefits of music, the exact methods of the intervention are not agreed on.

Marshall and Hutchinson (2001) did a similar literature review of activities, including music, used to enhance quality of life and treat behavioral problems. Again, the authors pointed out that nursing literature identifies the usefulness of activities (including music) with people with dementia. They analyzed 33 research studies and found the following problems in the studies: theoretical and methodological difficulties; unclear findings; and a lack of emphasis on gender, ethnic, racial, or cultural differences. The authors recommended that additional research be done with improved methodologies.

Model of Music Therapy to Decrease in Agitation

Figure 3 shows a model developed by the writer. It can be used to guide the understanding of the use of a music therapy intervention with people who have dementia. This model begins with cognitive impairment experienced by those individuals with dementia. As stated in the PLST model, cognitive impairment leads to a decrease in the person's threshold for tolerating stress. The decreased stress threshold then leads to a decreased ability to handle stressors and a decreased ability to relate to and understand the environment. Along with the PLST model, the author's model is also based on Gerdner's model (2001) for her individualized music therapy intervention. This music therapy intervention is designed to increase people's attention and coherent connection with the external world.

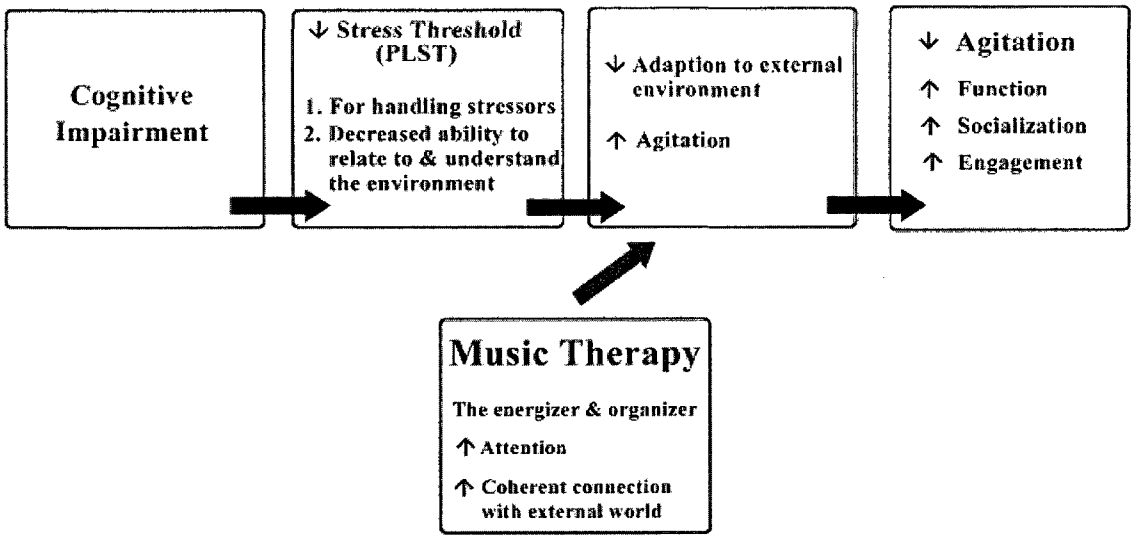

Figure 3. Model of the use of music therapy to reduce agitation.

Music has the possibility of communicating information to the brain that has profound effects on learning, development, recovery of function, and aesthetic engagement (Thaut, 2005). A decrease in agitation is the desired outcome of the music therapy intervention. It is hoped that future research using this model as a guide will lead to an increased understanding of how to reduce agitation in people with dementia through the use of a music therapy intervention.

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Chapter 3

Methodology

The purpose of this study was to determine the effect of group music therapy sessions on agitation in nursing home residents with dementia. This information will be used to establish effect sizes for a randomized clinical trail that is adequately powered. On the basis of the PLST model, it was hypothesized that people who participate in group music therapy sessions would have decreased agitation when compared to the control group. It was also hypothesized that music therapy sessions would elicit a higher level of engagement during the activity when compared to the control group. Finally, the effects of music therapy sessions on task performance, social interaction, and problem solving in people with dementia were examined.

Research Questions

This study was guided by the following primary research question and two secondary questions. The primary research questions asked the following:

1. Is there a difference in agitation levels between people with dementia who attend group music therapy sessions and those who watch a nature video?

The secondary research questions asked the following:

2. Is there a difference in engagement levels between people with dementia who attend group music therapy sessions and those who watch a nature video?
3. Is there a difference in task performance, social interaction, or problem solving between people with dementia who attend group music therapy sessions and those who watch a nature video?

Hypotheses

The null hypotheses tested in the study included the following:

1. Controlling for cognitive status, there is no difference in agitation between people receiving group music therapy and those watching a nature video; $H_0 = \mu_a = \mu_b$.
2. Controlling for cognitive status, there is no difference in engagement during an activity between people receiving group music therapy and those watching a nature video; $H_0 = \mu_a = \mu_b$.
3. Controlling for cognitive status, there is no difference in task performance, social interaction, or problem solving during an activity between people receiving group music therapy and those watching a nature video; $H_0 = \mu_a = \mu_b$.

Alternative hypotheses are as follows:

1. Controlling for cognitive status, there is a difference in agitation between people receiving group music therapy and those watching a nature video.
2. Controlling for cognitive status, there is a difference in engagement during an activity between people receiving group music therapy and those watching a nature video.
3. Controlling for cognitive status, there is a difference in task performance, social interaction, or problem solving during an activity between people receiving group music therapy and those watching a nature video.

Research Design

The design of the study was an experimental pretest–posttest design with random assignment to groups to test the differences between the experimental and control groups.

An experimental design was chosen because of an interest in being able to make causal claims about the effects of music therapy on outcomes. A true experiment with random assignment is chosen because, according to Polit and Beck (2004), the most effective method of controlling individual extraneous variables is random assignment to groups. A true experiment with random assignment to groups is superior to other possible designs in controlling for threats to internal validity. A pretest was used because it offers the possibility of examining the effectiveness of the random assignment process in yielding equivalent groups. If random assignment did not yield equivalence of groups on baseline measures of the dependent variables, it was possible to use analysis of covariance procedures to statistically adjust for the potential threat to internal validity. The design is outlined in Figure 4.

R	O_1	X	O_2
R	O_1		O_2

R = Randomization

O = Observation or measurement

X = Treatment or intervention

Figure 4. Experimental pretest–posttest design.

Blinding was also used in this study because blinding is as important as randomization (Hulley et al., 2001). Blinding shields study participants from any knowledge of study group assignment and therefore is intended to eliminate biased assessment of outcomes.

Setting

The research took place at two skilled nursing facilities in the Midwest. The nursing homes provide 24-hour nonacute nursing, medical, and rehabilitative care. The nursing home in Racine specializes in dementia care.

Sample

The sample was a convenience sample of 21 participants in the experimental group and 19 participants in the control group. To target a homogeneous group of nursing home residents who were most likely to respond to the intervention, criteria with the following measurements were used (Kovach et al., 2004): Mini-Mental State Exam score of 15 or less, identified by staff as displaying some agitation, no chronic psychiatric diagnoses other than dementia, not currently receiving treatment for an acute illness. Participants who did not meet the criteria were dropped.

Measurement Instruments

Mini-Mental State Examination (MMSE). The MMSE is a widely used, brief screening test of cognitive function. It consists of 30 questions, measures global cognitive status, and includes questions regarding orientation, registration, recall, attention, calculation, and language (Ellis, 2006). The MMSE has demonstrated construct validity, and measures of criterion validity have shown high levels of sensitivity for moderate to severe cognitive impairment (Tombaugh & McIntyre, 1992). Kurlowicz and Wallace (2001) wrote that "since its creation in 1975, the MMSE has been validated and extensively used in both clinical practice and research" (p. 12). The range of scores is 0–30 (Folstein, Folstein, & McHugh, 1975). Higher scores indicate greater cognitive ability (adjusted for education: for persons with 0–4 years of schooling, 11 and below; for

persons with 5–8 years of schooling, 15 and below; for persons with 9–12 years of schooling, 19 and below; and for persons with schooling at the college level and beyond, 23 and below). Other tools are available that assess neurocognitive functioning in more detail. However, in this study, cognition is being assessed for descriptive purposes and for use as a covariate and so the MMSE is sufficiently sensitive and reliable for use here.

Wisconsin Agitation Inventory (WAI). An observational tool is used to assess agitation because tools that rely on informant report have been shown to have high levels of measurement error resulting from retrospective recall bias (Cohen-Mansfield, 1999). Direct observation of agitation is more time sensitive but allows for temporal sequencing of the agitation measurements directly after participation in music therapy and nature-watching study conditions. This scale was designed with input from Dr. Cohen-Mansfield. The scale operationalized agitation according to the 29 items from the Cohen-Mansfield Agitation Inventory to develop agitation intensity parameters (Cohen-Mansfield, Marx, & Rosenthal, 1989). A 3-min observation period is required. The WAI is a visual analogue scale with scores ranging from 0 to 100, depending on agitation intensity parameters (Kovach et al., 2004). Interrater reliability was established for the WAI at .85 or higher for study of the effect of the balancing arousal controls excesses intervention for agitation, for which the scale was developed (Kovach et al., 2004).

Functional Behavioral Profile (FBP). This instrument was chosen because the FBP was developed in an attempt to devise an instrument that relies on informants' reports of residual capabilities rather than on a problem-focused assessment of the functional status of a person with dementia (Baum, Edwards, & Morrow-Howell, 1993). It is designed to help clinicians develop a treatment plan to maximize functioning and

interaction between the caregiver and the person with dementia. The FBP comprises 27 items used to record caregivers' recent observations. It consists of three subscales, including Task Performance, Social Interaction, and Problem Solving. The Task Performance subscale measures the capability of doing things, the Social Interaction subscale measures engagement with others in social activities, and the Problem Solving subscale measures the ability to make decisions and learn new tasks.

The researchers who devised the instrument established its validity and reliability. The three subscales of the FBP were noted to be correlated with other measures, including the Zarit Memory and Behavior Problem Checklist, the Blessed Dementia Scale, and the Katz ADL Scale (Baum et al., 1993). In addition, the researchers reported internal consistency reliability (Cronbach's alpha) of .96 for Task Performance, .93 for Social Interaction, and .94 for Problem Solving (Baum & Edwards, 2000). Later, in a research study of stroke patients, reliability was found to be .86 for the FBP, including .82 for Task Performance, .86 for Social Interaction, and .74 for Problem Solving (Baum & Edwards, 2000). Nursing homes that specialize in dementia care, such as the one used in this research study, have therapeutic activity programs designed to maintain functional and social skills and enhance quality of life and self-esteem (Kovach & Magliocco, 1998). The FBP will provide data related to these functional and social skills and how they are affected by music therapy compared to a nature video.

Engagement variable quantified. There is empirical support for the use of therapeutic activities, including music therapy, for older adults with dementia (Gerdner & Swanson, 1993). Nursing literature suggests that these activities should be therapeutic, enhance quality of life, arrest mental decline, and generate and maintain self-esteem

(Marshall & Hutchinson, 2001). Because of the benefits of therapeutic activities, there is interest in determining which activities provoke the greatest level of participation or engagement in the activity. The activities that promote the greatest amount of engagement are considered the most beneficial. For this dissertation research, the engagement variable was quantified using the coding system shown in Table 3.

Table 3

Engagement Coding Chart

Code	Description
1. Unrelated	Engaging in an activity unrelated to the planned therapeutic activity
2. Dozing	Eyes closed in apparent sleep
3. Null	Physically inactive, eyes opened but not focused on a particular event or person, and no purposeful activity apparent
4. Passive	Paying attention to the activity, others participating in the activity or with the leader, or commenting on the activity while not directly engaging in the activity
5. Active	Physically or verbally engaging in the steps of an activity

This coding system was devised by the researcher from the observational notes coding system used in Kovach's article on late-stage dementia and participation in therapeutic activities (Kovach & Magliocco, 1998). Interrater reliability between the principle investigator and research assistants over eight assessments was 92%.

Descriptive data. Descriptive information on age, gender, length of stay, and racial/ethnic profile were collected to describe the sample.

Music therapy intervention. To consistently deliver the intervention with components in an approximately similar dose, the study used music therapy activities recommended for older adults by noted music therapy gerontology experts (Brotons & Pickett, 1996; Clair, 1996; Vink, 2000). The activities included movement, singing, and instrument playing, and each portion lasted approximately 10 min. The session began with an opening greeting song, "The More We Get Together." The session ended with the closing song "God Be With You 'Till We Meet Again." The facility in Racine was a Lutheran home, so a Christian hymn was fitting. Information about music preferences for the singing portion of the music therapy session was taken from data gathered by the nursing home staff at admission. Table 4 provides a description of the music therapy activities and their corresponding rationales

Table 4

Music therapy sessions

Music therapy activity	Description	Rationale
Movement/dance	Participants model movements or dance demonstrated by therapist. Music is instrumental music of Bach Orchestral Suites. Movements will be active chair exercises using the hands, arms, and legs.	Research shows that older adults elicit more active movement with instrumental vs. vocal music (Cervasco & Grant, 2003). Bach provides rhythmic music that is less harsh than music accompanied by a strong percussion section. Tempo of music is close to 60 bpm, which is most calming (White, 2000).

Table 4 (*continued*)

Music therapy activity	Description	Rationale
Singing	Therapist will accompany the singing of old, familiar songs that subjects learned in their youth. Evidence has shown that people with dementia are able to remember songs they learned earlier in life (Clair, 1999). Songs included will be American folk songs, popular songs from the 1940s and beyond, patriotic songs, and religious songs. Songs will be accompanied on the piano or guitar.	Singing is beneficial to people with dementia (Gfeller, 1995). Sorrell and Sorrell (2008) wrote that "singing together can be a way of connecting, inviting the individual with dementia to participate without confronting their losses, serving as an alternative means of communication and social interaction" (p. 22).
Instrument playing	Therapist will conduct subjects in playing rhythm instruments. Music is the Sousa march, *Stars and Stripes for Ever*. Subjects will be directed to model instrument playing in various rhythmic patterns, including stop, start, and shake.	Rhythm is an essential component of music and music therapy. "If rhythm were the *only* effective element of music that contributed to efficient and effective clinical treatment interventions, it alone would suffice to bring about physiological and emotional rehabilitation, driving the body to functionally adapt" (Schneck & Berger, 2006, p. 138). Tempo is approximately 60 bpm.

Control group. The best control group is a group that receives no treatment in a way that can be blinded (Hulley et al., 2001). The nature video was chosen because it is an activity provided at most nursing homes. In addition, it is an activity that requires no active involvement of a person, thus remaining closest to "no treatment."

Procedures

Following consent procedures, pretesting was done. The treatment of the music therapy intervention occurred three times in 1 week, on Monday, Wednesday, and Friday. The 30- to 40-min sessions began at 3:00 P.M. They were led by a baccalaureate-prepared music therapist. The researcher consulted with the facility activities director to determine the best time for the study groups to begin. Baseline measures of agitation were taken at the same time of day. When the study began, agitation was measured on Wednesday and Friday with the WAI. Two observations 10 min apart were taken at 5 min and 30 min after the session ended. The control group watched a nature video. Agitation was measured according to the same time schedule as used with the experimental group.

The engagement variable was measured during both the control group and the treatment group on Friday. The data collector observed the participant for 1 min every 10 min and recorded his or her level of engagement. The FBP was administered at baseline and after treatment to provide descriptions of participants' capabilities in performing tasks, interacting with others, and solving problems. This measurement tool was completed by a facility nurse.

Data collectors were nursing students recruited by the principal investigator from the University of Wisconsin–Milwaukee. They were paid through the Harriet Werley Doctoral Research Award, which the principal investigator received in 2008. The data collectors were trained by the principal investigator and were tested for interrater reliability. The training was continued until interrater reliability reached 85%. Training for the WAI was done according the protocol set up by Dr. Kovach for the balancing arousal controls excesses intervention research study (Kovach et al., 2004). According to

Hulley et al. (2001), *blinding* is defined as follows: "Whenever possible the investigator should design the interventions in such a fashion that neither the study participants nor anybody who has contact with them has any knowledge of the study group assignments" (p. 150). In an attempt to achieve blinding, the data collectors, when measuring agitation with the WAI, were unaware to which group the participants were assigned, whether treatment or control.

Data Management and Analysis

Data analysis was conducted using SPSS version 16.0 software packages. Initially, the distributions of each variable were analyzed using frequency distributions, means, and standard deviations. Transformations were used in the presence of skewed distributions or medians and nonparametric analysis. Descriptive statistics were used to describe and summarize sample characteristics as well as to describe the dependent variable. Continuous variables, such as age and length of stay, were described using the mean and standard deviation. Categorical variables, such as gender and race, were described using frequencies, frequency distributions, and percentages. The mean profiles of outcome variables over time of testing were described for each group.

To address the study hypotheses, analysis of covariance (ANCOVA) was performed. A repeated-measures ANCOVA was used to get a more precise examination of the IV–DV relationship after the removal of the effect of the covariates (Tabachnick & Fidell, 2001). To determine which variables to include as covariates, a comparison was made between treatment and control groups in descriptive characteristics of the sample as well as in pretest measures of agitation, engagement, social interaction, task performance, and problem solving. Chi-square tests were used to compare nominal variables, and

independent-sample *t* tests were used to compare differences between the groups on ordinal level pretest measures. Variables that were statistically significantly different between the treatment and control groups were included as covariates. The MMSE was the variable used for the ANCOVA.

Limitations

A limitation to this research was the use of convenience sampling. It is the weakest form of sampling, but it is also the most widely used (Polit & Beck, 2004). Attempts were made to counteract this weakness by employing intervention inclusion criteria. Another limitation was the limited number of participants—with 19 participants in the control group and 21 participants in the experimental group, the study was underpowered; however, this research is a doctoral dissertation, and resources are limited.

Conclusion

This research study was designed to determine the effects of a music therapy intervention on agitation in people with dementia. It is hypothesized that music therapy will decrease agitation. In addition, engagement in a therapeutic activity was studied, and it is hypothesized that the music therapy sessions will elicit more engagement than nature video watching. Finally, the effects of music therapy on task performance, social interaction, and problem solving were investigated.

This research attempts to improve on the methodology used in previous research studying the effects of music therapy on agitation in people with dementia. Through the use of an experimental design with randomization to groups, the results will have the possibility of being more generalizable.

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Chapter 4

Pilot Testing of the Music Therapy Intervention

AD and related dementia are prevalent and progressive disorders. They are associated with functional impairment and behavioral disturbances (Kovach, Noonan, Schlidt, & Wells, 2005). Agitation, a form of behavioral disturbance, is "defined by vocal or motor behaviors that arise from increased environmental and internal demands and from decreased coping ability" (DeYoung, Just, & Harrison, 2002, p. 25). Agitation in people with dementia is difficult for the nurses in skilled nursing facilities to manage and is considered one of the foremost problems in nursing facilities (Gerdner & Swanson, 1993). The purpose of this chapter is to present a music therapy intervention as a viable treatment for agitation in people with dementia.

Music therapy is defined as using music to address physical, emotional, cognitive, and social needs of individuals of all ages (American Music Therapy Association, 2009). Research articles studying the effects of music on agitation have been written by a variety of health professionals, including nurses and creative arts therapists. The articles have shown positive results, but they lack the scientific rigor to make causal connections between the use of music and reduced agitation. Journal articles reviewing research of music interventions have found gaps in making causal links between the effectiveness of music interventions and reduced agitated behaviors (Brotons, Koger, & Pickett-Cooper, 1997; Koger, Chapin, & Brotons, 1999; Lou, 2001; Marshall & Hutchinson, 2001). Sherratt, Thornton, & Hatton, 2004; Sung & Chang, 2005). Problems in research methodologies have included small sample sizes; a lack of experimental design, including random assignment to groups; a lack of standardized intervention protocols to maintain

integrity of research; varied outcome measurements with unreported reliability of observations; and a lack of consistent acknowledgment of the use of theoretical frameworks to guide research. Music therapy is currently focused on functional outcomes in elder care (Clair & Davis, 2008). The goal of music therapy interventions is to achieve the best functional outcomes possible within a person's environment. For this reason, functional behavior was chosen as an outcome variable for this study. From reviews of music interventions, it is clear the exact dose of music therapy using specifically defined techniques needs to be defined and studied.

Theoretical Basis for Intervention

Agitation. A theoretical framework used to explain agitation in people with dementia is the environmental vulnerability model. The model is based on Lawton and Nahemow's (1973) environmental docility hypothesis, which states that older adults with lower competence are more prone to what the authors call *environmental press*. The environmental vulnerability model states that people with dementia tolerate less environmental stress as a result of their pathology, and "therefore a stimulus that may be appropriate for a cognitively intact person may result in an over-reaction from a person with cognitive impairment" (Cohen-Mansfield, 2000, p. 15).

A nursing model, the PLST model, is built on the environmental vulnerability model (Hall & Buckwalter, 1987). It is used to explain agitation in people with dementia. The model states that most adults have a relatively stable stress threshold but that when adults have dementia, the stress threshold is reduced. The PLST model divides the symptoms of dementia into four categories (Hall, 1994): (a) cognitive or intellectual losses, (b) affective or personality changes, (c) cognitive or planning losses that cause a

predictable decline in ability to perform functional activities, and (d) a loss of stress threshold causing dysfunctional behavior such as agitation or catastrophic reactions. The PLST model hypothesizes that symptoms in the last group are related to a person's decreased ability to cope. As too much stress accumulates, a person is unable to maintain calm behavior. The person becomes increasingly anxious, until the stress threshold is exceeded.

Gerdner (2001) has developed a mid-range theory for the use of an individualized music therapy intervention for agitation in people with dementia. On the basis of the PLST framework, Gerdner's model states that cognitive impairment leads to a lowered stress threshold, which can then lead to agitation. If individualized music intervention is used, the person's focus of attention is shifted. It will then be focused on memories associated with positive feelings and will alleviate or prevent agitation (Gerdner, 2001). Before the intervention is started, the person must be assessed for music preferences and time of day when the peak level of agitation occurs. When this is determined, preferred music should be played on an electronic device for approximately 30 min in a location where the person spends the majority of his or her time. This intervention can be carried out by a variety of staff or family members.

Engagement. Nursing home residents with dementia can display changes in behavior. They may begin to withdraw from their environment, reduce daily interactions with other people, and demonstrate fewer emotional responses to the events they experience. This is called *problematic passivity*, and it occurs in 61% to 88% of people with dementia (Conti, Voelkl, & McGuire, 2008). Colling (1999) said that allowing

residents to continue passive behaviors without engaging them within their environments and with self-care can lead to loss of functional abilities.

One method of engaging nursing home residents within their environment is providing therapeutic activities in which the residents can participate. There is empirical support for the use of therapeutic activities, including music therapy, for older adults with dementia (Gerdner & Swanson, 1993). Nursing literature suggests that these activities should be therapeutic, enhance quality of life, arrest mental decline, and generate and maintain self-esteem (Marshall & Hutchinson, 2001). Because of the benefits of therapeutic activities, there is interest in determining which activities provoke the greatest level of participation or engagement in the activity. The activities that promote the greatest amount of engagement are considered the most beneficial. There is evidence that activities involving music promote the highest level of participant engagement. Groene (1993) has demonstrated that people with dementia engage in activities involving music longer than they engage nonmusical activities.

Functional behavior. A definition of health in older adults has included the maintenance of functional health until death (Song, Kyung, Kim, & Jeon, 2004). A decline in functional behavior is often seen in people with dementia and is associated with a decreased quality of life. In addition, functional health in dementia can lead to agitation (Hill, Backman, & Fratiglioni, 1995). Decreased function in dementia can lead to unmet needs, which then may contribute to agitation. Little is known about the effects of music therapy on the functional behavior of people with dementia.

Methodology

The music therapy intervention. To consistently deliver the intervention with components in an approximately similar dose, this study used music therapy activities recommended for older adults by noted music therapy gerontology experts (Brotons & Pickett-Cooper, 1996; Clair, 1996; Gfeller, 1995; Vink, 2000). The activities included movement, singing, and instrument playing, and each portion lasted approximately 10 min. The session began with an opening greeting song, "The More We Get Together." The session ended with the closing song "God Be With You 'Till We Meet Again." The sessions lasted approximately 40 min and were held three times in 1 week. Table 4 provides a description of the music therapy activities and their corresponding rationales.

Table 4

Music therapy sessions

Music therapy activity	Description	Rationale
Movement/dance	Participants model movements or dance demonstrated by therapist. Music is instrumental music of Bach Orchestral Suites. Movements will be active chair exercises using the hands, arms, and legs.	Research shows that older adults elicit more active movement with instrumental vs. vocal music (Cervasco & Grant, 2003). Bach provides rhythmic music that is less harsh than music accompanied by a strong percussion section (Gardner, 1990). Tempo of music is close to 60 bpm, which is most calming (White, 2000).

Table 4 (*continued*)

Music therapy activity	Description	Rationale
Singing	Therapist will accompany the singing of old, familiar songs that subjects learned in their youth. Evidence has shown that people with dementia are able to remember songs they learned earlier in life (Clair, 1999). Songs included will be American folk songs, popular songs from the 1940s and beyond, patriotic songs, and religious songs. Songs will be accompanied on the piano or guitar.	Singing is beneficial to people with dementia (Gfeller, 1995). Sorrell and Sorrell (2008) wrote that "singing together can be a way of connecting, inviting the individual with dementia to participate without confronting their losses, serving as an alternative means of communication and social interaction" (p. 22).
Instrument playing	Therapist will conduct subjects in playing rhythm instruments. Music is the Sousa march, *Stars and Stripes for Ever*. Subjects will be directed to model instrument playing in various rhythmic patterns, including stop, start, and shake.	Rhythm is an essential component of music and music therapy. "If rhythm were the *only* effective element of music that contributed to efficient and effective clinical treatment interventions, it alone would suffice to bring about physiological and emotional rehabilitation, driving the body to functionally adapt" (Schneck & Berger, 2006, p. 138). Tempo is approximately 60 bpm.

Research design. The design of the study was an experimental pretest–posttest design with random assignment to groups to test the differences between the experimental and control groups. An experimental design was chosen because of an interest in being able to make causal claims about the effects of music therapy on outcomes. The design is outlined in Figure 4.

The research assistants collecting data on the variables for the study were blinded. They did not know to which treatment group the participants were assigned. Blinding is as important as randomization (Hulley et al., 2001). Blinding shielded study participants from any knowledge of study group assignment and therefore was intended to eliminate the biased assessment of outcomes.

Sample. The sample size was a convenience sample of 40 participants from two long-term care facilities in the Midwes. Nineteen participants were in the control group, and 21 were in the treatment group. To target the intervention to those most likely to respond and to form a homogeneous group for generalizing findings, the following inclusion criteria were used:

1. MMSE score of 15 or less (Folstein, Folstein, & McHugh, 1975)
2. Identified by staff as displaying some agitation
3. No chronic psychiatric diagnoses other than dementia
4. Not currently receiving treatment for an acute illness
5. Reside at nursing home for at least 4 weeks

Descriptive statistics for the sample are provided in Table 5. Participants' ages ranged from 70 to 96 years, with a mean of 86 (SD = 6.76). In this sample, the participants were predominantly female (90%; n = 36). Ninety-five percent (n = 38) of the participants were White, and 5% (n = 2) were Black. Individual participants' MMSE scores ranged from 0 to 15, with a mean of 6.7 (SD = 6.13). Specifically, in the treatment group, the mean score of the MMSE was 8.3 (SD = 6.04), and the mean in the control group was 5.0 (SD = 5.90). Although the mean MMSE for the control group was lower, the t test for equality of means showed no statistically significant results, t = 1.73, p = .09.

Participants lived in the nursing home on average 28 months, with a range of 3–101 months. The length of stay is higher for the control group, but again, it is not a statistically significant difference, $t = -1.56$, $p = .128$. Table 6 supports that random assignment was effective in yielding equivalent groups for all variables.

Measures. Agitation was measured using the WAI (Kovach et al., 2004). This scale was designed with input from Cohen-Mansfield. The scale operationalized agitation according to the 29 items from the Cohen-Mansfield Agitation Inventory to develop agitation intensity parameters (Cohen-Mansfield, Marx, & Rosenthal, 1989).

Table 5

Description of Participants in the Experimental and Control Groups

Variable	Treatment	Control	Test statistic	Probability
Gender			$\chi^2 = .902$	.342
Male	3	1		
Female	18	18		
Age			$t = -.782$	.439
M	85.00	86.68		
SD	5.73	7.82		
MMSE			$t = 1.736$	.091
M	8.3	5.00		
SD	6.04	5.91		
Length of stay			$t = -1.557$	.128
M	23.05	32.53		

SD	15.77	22.45		
Race			$\chi^2 = 1.905$	.168
White	19	19		
Black	2	0		

A 3-min observation period is required. The WAI is a visual analogue scale with scores ranging from 0 to 100, depending on agitation frequency, duration, and intensity parameters. For example, one minimally intense behavior lasting ≤15 s would receive a score of 25, whereas two behaviors would receive a score of 50. One high-intensity behavior of duration ≥120 s would receive a score of 100. Interrater reliability between the principal investigator and the research assistants over eight assessments was 90%.

The engagement variable was quantified using the coding system shown in Table 3. This coding system was devised by the researcher from the observational notes coding system used in Kovach's article on late-stage dementia and participation in therapeutic activities (Kovach & Magliocco, 1998). Interrater reliability between the principal investigator and research assistants over eight assessments was 92%. Content validity has not been established for this coding system.

The study made use of another instrument called the FBP. This instrument was chosen because it was developed in an attempt to devise an instrument that relies on informants' reports of residual capabilities rather than on a problem-focused assessment of the functional status of a person with dementia (Baum, Edwards, & Morrow-Howell, 1993). It is designed to help clinicians develop a treatment plan to maximize the functioning and interaction between the caregiver and the person with dementia. The

FBP comprises 27 items used to record caregivers' recent observations. It consists of three subscales: Task Performance, Social Interaction, and Problem Solving. The Task Performance subscale measures the capability of doing things, the Social Interaction subscale measures engagement with others in social activities, and the Problem Solving subscale measures the ability to make decisions and learn new tasks.

The researchers who devised the instrument established its validity and reliability. The three subscales of the FBP were noted to be correlated with other measures, including the Zarit Memory and Behavior Problem Checklist, the Blessed Dementia Scale, and the Katz ADL Scale (Baum et al., 1993). In addition, the researchers reported internal consistency reliability (Cronbach's alpha) of .96 for Task Performance, .93 for Social Interaction, and .94 for Problem Solving (Baum & Edwards, 2000). Later, in a research study of stroke patients, reliability was found to be .86 for the FBP, including .82 for Task Performance, .86 for Social Interaction, and .74 for Problem Solving (Baum & Edwards, 2000). Nursing homes have therapeutic activity programs designed to maintain functional and social skills and enhance quality of life and self-esteem (Kovach & Magliocco, 1998). The FBP was administered at baseline and then again after treatment. It provided data related to these functional and social skills and how they are affected by music therapy compared to nature video watching.

Analysis

Because of the small sample size and pilot nature of the investigation, descriptive analyses were considered important for examining trends and describing differences between groups. Inferential analyses were also done. A repeated-measures analysis of variance (ANOVA) was used to test the differences in agitation, engagement, and

functional behavior. Adjustment for the covariate MMSE was tested, but it did not significantly change the results; therefore the final results reflect the univariate repeated-measures ANOVA models. A $p < .05$ level of significance was used in all analyses.

Results

Agitation. As seen in Figure 5, agitation levels decreased over time for both the music therapy and the nature video conditions. Table 6 summarizes the ANOVA and shows that the decreases in agitation over time were statistically significant, $F = 5.83$, $p = .02$. The baseline measures from Time 1 to Time 4 show that agitation levels were decreasing prior to delivery of the intervention. For the music therapy group, the Time 1 baseline agitation mean was 44.12 ($SD = 42.87$), and the Time 4 baseline agitation mean was 30.88 ($SD = 41.95$). Effect size for the treatment group was .46. Time 1 and Time 4 baseline measures in the nature video group were 42.64 ($SD = 36.20$) and 33.82 ($SD = 38.47$), respectively. Effect size for the control group was .33. The treatment group displayed less agitated behavior than the control group after the intervention was administered. These differences did not reach a level of statistical significance, $F = 0.04$, $p = .84$. The effect size between the treatment and control groups for agitation was $\eta^2 = .001$.

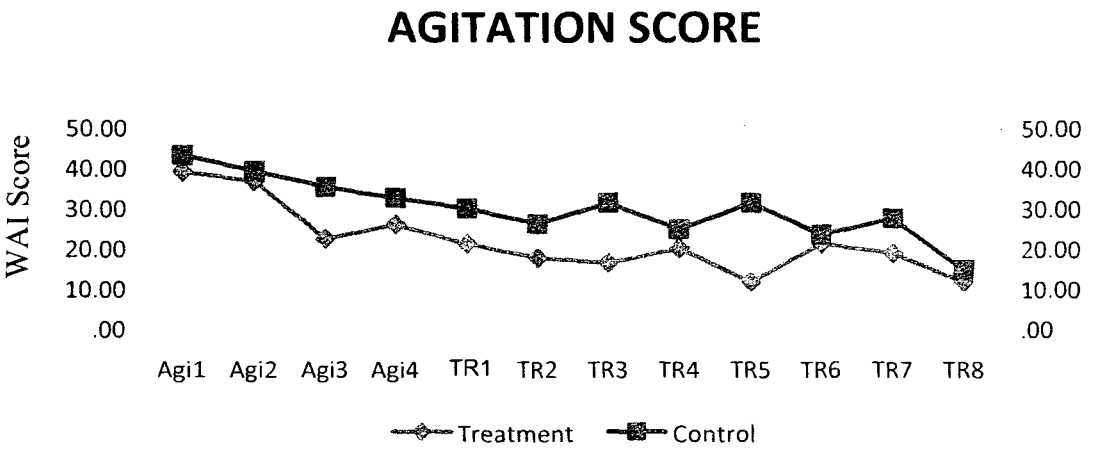

Figure 5. Graph of agitation after intervention.

Engagement. As seen in Table 7, there was a statistically significant difference in engagement level between the treatment and control groups, $F = 24.54$, $p = .00$. The average engagement level for the music therapy group at pretesting was 3.3 ($SD = 1.18$), and this increased to 4.5 ($SD = 1.20$) at posttesting. The effect size was .94. The average level of engagement for the control group at pretesting was 3.4 ($SD = .76$) and decreased to 2.3 ($SD = .96$) at posttesting. The effect size was .59. The effect size between the treatment and control groups was $\eta^2 = .392$.

Table 6

Analysis of Variance Summary for Agitation

Source	*df*	*SS*	*MS*	*F*
Time	1	3171.01	3171.01	5.83**
Time and group	1	23.40	23.40	.04
Total	2	3194.41		

**$p < .05$.

Table 7

Analysis of Variance Summary for Engagement

Source	*df*	*SS*	*MS*	*F*
Time	1	.144	.144	.128
Time and group	1	27.64	27.64	24.54**
Total	2	55.28		

**$p < .05$.

Function. There was statistically significant difference in the functional behavior of social interaction between the treatment and control groups, $F = .93$, $p = .00$. The effect size was .57 for the treatment group and .48 for the control group. The effect size between the treatment and control groups was $\eta^2 = .036$. See Table 8 for ANOVA results of the FBS.

Table 8

Analysis of Variance for Functional Behavior Profile

Source	*df*	*MS*	*F*
Task Performance	1	.707	2.54
Social Interaction	1	.059	.93**
Problem Solving	1	.053	.2

**$p < .05$.

Covariate adjustment. Statistical testing with ANCOVA did not change the statistical significance of the results. Table 9 displays the statistics. Statistically significant differences were found in the engagement variable. The level of engagement was higher in the treatment group than the control group when using the MMSE scores as a covariate. The mean of the MMSE for the control group was 5.00 (*SD* = 5.97), whereas the mean of the MMSE for the treatment group was 8.29 (*SD* = 6.04). In addition, there was a statistically significant difference in social interaction between the treatment and control groups when using the MMSE as a covariate.

Table 9

Analysis of Covariance

Source	*df*	*MS*	*F*
Agitation	1	124.46	.639
Engagement	1	5.85	5.86**
FBP: Task Performance	1	.875	3.14
FBP: Social Interaction	1	1.27	19.72**
FBP: Problem Solving	1	.000	.002

**$p < .05$.

Intervention fidelity. Intervention fidelity is defined as the adherent and competent delivery of an intervention by the interventionist as set forth in the research plan (Santacroce, Maccarelli, & Grey, 2004). It is a necessary component to the inference of validity in nursing intervention research. In this pilot study, the music therapy intervention was carried out according to the plan, except in one instance. In the experimental group, which had participants whose race was Black, the music therapist

included some African American spirituals in the movement portion of the music therapy session.

Discussion

Results from this study support that the music therapy intervention was beneficial to the participants in the study. There was a positive trend toward improving quality of life through a decrease in agitation in people with dementia. In addition, social interaction and engagement in therapeutic activities was increased. The researcher, who was present at the music therapy sessions, notes that there were many positive responses from the participants, including smiles, positive statements, and applause.

While both the nature video and music therapy reduced agitation, music therapy was statistically, significantly better at increasing engagement. In this study, engagement was conceptually and operationally defined in terms of individual attention. There was no attempt to measure relational or dyadic engagement during the group. However, in this study, there was a reduction of social isolation found in the experimental group when compared to the control group.

Agitation is a difficult variable to quantify. There is large individual variability in both the types and frequency of behaviors manifested. This individual variability makes it more difficult for measures of agitation to be sensitive indicators of treatment effects. Also, people exhibit agitated behavior at a low frequency rate. These behaviors are important, however, because of their impact (Cohen-Mansfield, 1999). The high standard deviations in the current study may reflect this individual variability and error variation. For example, the mean of the posttreatment agitation scores was 17.56 with a

standard deviation of 22.61, and the mean of the postcontrol group agitation scores was 26.30 with a standard deviation of 30.56.

The study would be improved with a larger sample. This study of 40 participants was not adequately powered. In addition, the dose of music therapy, three times for 1 week, may have been too small to achieve statistically significant differences between the treatment group and control group. That the engagement variable and the social interaction portion of the FBP improved lends support to the potential of music as a therapeutic intervention for those with dementia and points to the need for future research with adequate sample sizes and doses of music therapy.

The implications for clinical practice from the research indicate that people with dementia can benefit from small-group therapeutic activities. Participation in therapeutic activities, including music therapy, is reported to have a range of benefits, including greater engagement of people in meaningful stimulation and improvement in quality of life (Pulsford, 1997). The finding that even the control group level of agitation trended down in this study suggests that involvement in therapeutic activities, including music therapy, may need to be a part of the treatment plans of people with dementia. These results are consistent with other studies of music interventions that lack scientific rigor (Marshall & Hutchinson, 2001; Sherratt et al., 2004). In conclusion, this study provides beginning support for the use of group therapeutic activities in general and for music therapy as a treatment for agitation, socialization, and engagement needs in particular. Future research using a larger sample and dose of music therapy is recommended

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Chapter 5

Music Interventions to Reduce Agitation in People With Dementia: What Works?

The U.S. population is aging rapidly. According to the Administration on Aging (2004), the number of adults aged 65 years and older was 35.6 million in 2002. Furthermore, by 2030, this number is expected to increase to 71.5 million. Although AD and related disorders are not a normal part of aging, by 2050, the number of Americans with AD could range from 11.3 million to 16 million (Alzheimer's Association, 2004).

AD and related disorders affect society in both monetary and social ways. National direct and indirect annual costs of caring for individuals with AD and related disorders are at least $100 billion (Alzheimer's Association, 2004). People with AD and related disorders suffer from devastating disorders that impair memory, thinking, and behavior. AD and related disorders are progressive and fatal diseases.

Agitated behavior associated with AD and related disorders is a major challenge for caregivers. Agitation can be defined by both vocal and motor behaviors that arise from increased environmental and internal demands and from a decrease in coping ability (DeYoung, Just, & Harrison, 2002). Agitated behaviors have been documented in 90% of skilled nursing facility residents (DeYoung et al., 2002). Agitation in people with dementia is difficult for the nurses in skilled nursing facilities to treat. The presence of agitation and confusion in the elderly is one of the foremost management problems among health professionals (Kovach, 2004; Gerdner and Swanson, 1993). The purpose of this chapter is to describe music therapy interventions and provide an overview of research studies examining the effects of these interventions on agitation in people with

dementia. Additional positive outcomes of music interventions, including increased engagement in activities and improvement in function, will be discussed.

Background

Medications are widely used to treat neuropsychiatric symptoms experienced by people with AD and related disorders. Second-generation antipsychotic drugs are currently used to treat psychoses and accompanying agitated behavior. These antipsychotics replaced older or first-generation drugs because of their perceived relative safety advantages (Schneider, Dagerman, & Insel, 2006). Although these drugs are the mainstay of psychopharmacological treatment, their efficacy has recently come under further investigation (Schneider, Dagerman, & Insel, 2006). Studies have found no evidence of increased risk for falls related to the use of atypical antipsychotic drugs; however, a significant risk for cerebrovascular events and even death was found (Schneider, Dagerman, & Insel, 2005).

Anxiety is also prevalent in people with dementia (Ballard, Neill, & O'Brien, 2000). Its prevalence rates range from 38% in Alzheimer's disease to as high as 72% in vascular dementia. Research has been conducted to investigate the relationship between anxiety and agitation in people with dementia. A significant positive correlation between anxiety and agitation has been found (Twelftree & Qazi, 2006). While anxiety and agitation represent different constructs, anxiety can be considered as a possible cause of some agitation in people with dementia.

Central nervous system active medications including benzodiazepine, lorazepam, and alprazolam, are used to treat anxiety in people with dementia (Fick, Kolanowski, & Waller, 2007). In addition, these medications are used despite multiple drug related

problems including syncope, fatigue, delirium, confusion, altered consciousness, constipation, sleep disturbance, falls, urine retention, depression, and hypoglycemia.

Owing to the risks and side effects of treating agitation with medications, trends are currently favoring nonpharmacological treatments of agitation. There are some noted difficulties in implementing nonpharmacological strategies for managing problem behaviors in people with dementia (Kolanowski, Fick, Frazer, and Penrod, 2009). However, sensory interventions including aromatherapy, thermal baths, calming music, and hand massage have shown some moderate efficacy in reducing agitation in people with dementia (Kong, Evans, & Guevara, 2008).

Creating positive environmental stimulation through therapeutic activities is a nonpharmacological treatment hypothesized to decrease agitation in people with dementia. Providing meaningful activities is a part of nursing care for people with dementia (Volicer, Simard, Pupa, Medrek, & Riordan, 2006). The strong need for humans to engage in meaningful activities was illustrated by Lawton's (1985) statement that "people will create activity where none exists" (p. 131). This includes people with dementia. There is evidence that people with dementia, even late-stage dementia, can still respond to various therapeutic activities (Kovach & Magliocco, 1998).

Some questions about the role of nursing in providing therapeutic activities have been posed. Pulsford (1997) identified four reasons why nurses should do therapeutic activities with people with AD and related disorders: (a) to enhance mental state or arrest mental decline, (b) to reduce behavior problems, (c) to improve residents' quality of life, and (d) to enhance staff morale and attitudes. The relationship of nurse-led therapeutic activities to the outcomes Pulsford hypothesized requires empirical validation.

Music Therapy to Reduce Agitation in People With Dementia

Music interventions have been used by a variety of health professionals, including music therapists and nurses, to provide positive environmental stimulation. In treating people with AD, music therapists structure the use of music strategies to improve functioning or facilitate changes that contribute to life quality (Clair & Davis, 2008). Decreasing agitation is considered a quality of life outcome. Ongoing research in music therapy and nursing studies the use of music to decrease agitation in people with dementia (Clair & Davis, 2008).

Music may be particularly useful in eliciting responses in people with dementia because music is processed in the brain in more that one place (Goodall & Etters, 2005). Music has many elements and is processed by parts of the brain including the right hemisphere, the left hemisphere, and the limbic system. A neuroimaging study of the brain showed that the right regions of the brain were used for familiar, simple melodic fragments while the left side was used for more complicated musical tasks involving semantic memory (Groussard et al, 2009).

It is not unusual to witness older adults with dementia enjoying singing songs from their youth when they are unable to speak coherent sentences. Studies of people with brain pathology distinguish between procedural memory and declarative memory. Procedural memory uses information based on skills learned implicitly, whereas declarative memory uses information based on specific facts acquired explicitly and with deliberate attention (Crystal, Grober, & Masur, 1989). Music is hypothesized to be processed through a special kind of procedural memory and stored in a part of the brain that is spared until the latest stages of dementia.

In addition, music may be useful as a means to change behavior in people with dementia because (a) music has a universality of appeal and (b) music possesses the unique property of rhythm as an energizer and the organizer (Gaston, 1968). Rhythm is a key component of the appeal of music. Every musical event involves rhythm, which also involves energy. Energy must vibrate. Schneck and Berger (2006) posit that energy involves cyclical events; both on a large and a small scale, and are the manifest characteristics of energy. The rhythm of music energizes and motivates a person with dementia to pay attention to the music and actively participate in activities. For example, Mathews, Clair, and Koslowski (2003) conducted a research study involving the addition of rhythmic music to exercise among people with dementia. In the study, after the addition of music to an exercise class, the mean percentage of resident participation increased from 53% to 69%. In addition, participation decreased to 41% after taking away the music. This evidence suggests that rhythmic music may be an important intervention to increase overall engagement in exercise in people with dementia.

There is also evidence that music interventions elicit a higher level of participation than activities not involving music (Clair, 1996; Conti, Voelkl, & McGuire, 2008). A study compared alert responses to activities of people with late-stage dementia. Twenty-six patients were observed for alert responses with either singing, reading of the news, or silent conditions. The results showed significant differences between singing and silence, with the greatest number of responses occurring during music. Owing to the small sample size, the generalizability of these results is guarded, however.

Numerous research studies have supported the use of music therapy to affect agitation in people with dementia (Brotons & Pickett-Cooper, 1996; Gerdner, 2001;

Gerdner & Swanson, 1993; Ragneskog, Kihlgren, Karlsson, & Norberg, 1996). There is, however, great variation in the specific methods involved in the delivery of the music therapy interventions. Two main differences can be identified: First, the music intervention can be delivered in a group or individually; and second, the music can be live music or recorded. Evidence for the effectiveness of the details related to music interventions will be presented next.

Individualized Music Interventions

There is evidence for the use of individualized, recorded music to affect agitation in people with dementia. An example is found in the Evidenced-Based Protocol: Individualized Music from the University of Iowa Gerontological Nursing Interventions Research Dissemination Core. The goal of this protocol is to reduce and to prevent the frequency and severity of agitation episodes in confused, elderly patients (Gerdner, 2001). Gerdner has developed a mid-range theory to explain the effects of individualized music on agitation. The theory is based on the PLST model for understanding agitation in people with dementia (Hall & Buckwalter, 1987). The model states that most adults have a relatively stable stress threshold but that when adults have dementia, the stress threshold is reduced. The PLST model divides the symptoms of dementia into four categories (Hall, 1994): (a) cognitive or intellectual losses, (b) affective or personality changes, (c) cognitive or planning losses that cause a predictable decline in ability to perform functional activities, and (d) the loss of stress threshold, causing dysfunctional behavior such as agitation or catastrophic reactions. The PLST model hypothesizes that agitation is related to a person's decreased ability to cope. As too much stress

accumulates, the stress threshold is exceeded. Then, more problem behaviors including agitation can occur.

Gerdner's (2001) model states that cognitive impairment leads to a lowered stress threshold, which can then lead to agitation. If the individualized music intervention is used, the person's focus of attention is shifted to memories associated with positive feelings. These positive feelings are thought to alleviate or prevent agitation (Gerdner, 2001).

Before the intervention is started, the person is assessed for music preferences and time of day when the peak level of agitation occurs. When this is determined, preferred music is played on an electronic device for approximately 30 min in a location where the person spends the majority of his or her time. This intervention can be carried out by a variety of staff or family members. Gerdner has tested the intervention and found music to be effective in reducing agitation in people with dementia (Gerdner, 2000, 2001, 2005; Gerdner & Swanson, 1993).

In addition to Gerdner's research, there is evidence to support the use of individualized music to treat agitation. Examples are provided in Table 10

Table 10

Summary of Studies on the Effectiveness of Individualized Music

Study	Design	Sample	Main measures	Major findings
Snyder and Olson (1996)	Experimental crossover	$n = 5$, mean age 92	No mention of measures used for agitation, relaxation	Significantly improved relaxation but did not affect aggressive behaviors
Cohen-	Repeated-	$n = 32$, mean	SBMI, CMAI	Verbal

Mansfield and Werner (1997)	measures pretest–posttest crossover	age 86; BCRS (mean score 5.5)		disruptive behaviors decreased by 56% during social interaction, 46% during videotape, 31% during music, and 16% during no intervention
Ragneskog, Asplund, Kihlgren, and Norberg (2001)	Repeated measures	$n = 4$, mean age 81	Behaviors observed/counted from list including agitation; FACS	Agitation reduced with music in two of four subjects
Hicks-Moore and Robinson (2008)	Experimental 3 × 3 repeated-measures	$n = 41$, mean age 85; mean score of MMSE 23	CMAI	Familiar music and hand massage individually and combined shown effective in decreasing agitation immediately following treatment
Park and Pringle Specht (2009)	Repeated measures	$n = 15$, mean age 83; mean score of MMSE 8.33	M-CMAI-I	Mean agitation levels significantly lower while and after listening to preferred music than before listening to music

Note. CMAI, Cohen-Mansfield Agitation Inventory; FACS, Facial Action Coding System; SBMI, Screaming Behavioral Mapping Instrument.

Based on the research that presented in the table, there is evidence that individualized music can reduce agitation in elderly people with dementia. Future studies should involve experimental research methodologies, larger sample sizes, and the development of a clearer, precise method of delivering individualized music interventions.

Group Music Interventions

There is evidence that people with dementia show a high level of participation in music therapy group activities. For example, a study of 10 participants with dementia was designed to test a music therapy program to see if it met the participants' needs related to providing an optimal sensory environment and positive group experiences. Participants demonstrated active involvement in all of the treatment conditions. Average participation in four music activities was as follows: 83% for a rhythm activity, 51% for a movement activity, 49% for an a cappella singing activity, and 49% for singing accompanied by live instruments (Cervasco & Grant, 2003).

The typical music therapy session starts with a greeting song. This is followed by a variety of activities, including singing, playing instruments, dance and movement, musical games, and composition and improvisation (Brotons & Pickett-Cooper, 1996; Cervasco & Grant, 2003 Clair, 1996; Gfeller, 1995). The session concludes with a closing activity. Sessions usually last from 30 to 40 min.

There is evidence to support the use of preferred music in group music therapy sessions. Data were collected from 514 older adults with varying physical, mental, and emotional disabilities as well as from higher functioning people in independent living settings. Clinical applications of the data analysis indicated that despite disabilities,

geriatric populations were able to discriminate clearly their musical preferences (Moore, Staum, & Brotons, 1992). This is also true for people with dementia. Gfeller's (1995) research in preparing a best practices manual for music therapy activities for individuals with AD found that people with dementia respond to group music therapy sessions with increased interest, motivation, and positive responses when therapists select specific musical selections to match musical preferences.

People with dementia can participate in and enjoy singing. A repertoire of well-known songs from the participants' youth and young adult years is recommended (Gfeller, 1995). It should be noted that as dementia progresses, active singing, defined by singing with the text, diminishes. There is also evidence that presentation and accompaniment styles affect responsive behaviors during group music therapy sessions. In a study that included 16 sing-along sessions, the following treatment conditions were used: live music with simple guitar accompaniment, live music of complex guitar accompaniment, recorded music of simple guitar accompaniment, and recorded music of complex guitar accompaniment (Groene, 2001). Results found significantly more participation in the live sessions than in the recorded sessions. When considering accompaniment styles, complex accompaniment styles for singing elicited far more positive responses.

People with dementia appear to participate most purposefully in music activities, such as movement, that do not require extensive verbal skills (Gfeller, 1995). Although active participation declines as the disease progresses, active participation in movement activities has been observed even in people in the late stages of dementia. When employing music therapy activities that involve movement or dance, there is evidence that the specific type of recorded music affects the level of active participation. In a

study of 14 participants with dementia, Cervasco and Grant (2003) found that exercise to instrumental music resulted in significantly higher participation than exercise to vocal music, $t = 2.6, p < .05$. It appears that recorded, instrumental music should be used during music activities that involve movement.

A few research studies found in the literature pertain to the effect of group music therapy sessions on agitation in people with dementia that employ experimental methodologies such as those used in RCTs. Research questions should be answered, when feasible, with randomized trials because this methodology has the potential for controlling for the influence of confounding variables (Hulley et al., 2001). Ultimately, more conclusive answers are obtained with clinical trials. Studies have been done showing the effectiveness of group music therapy sessions on agitation and on the various music activities used during therapy groups. These studies have used quasi-experimental research methods.

In a study testing the effects of group music therapy on agitation in people with dementia, a significant main effect of agitated behavior, $F = 16.33, p = .0001$, was found (Brotons & Pickett-Cooper, 1996). In addition, subsequent Fisher PLST tests indicated that participants appeared significantly more agitated before music therapy sessions ($M = 11.46$) than during either of two observations ($M = 7.68$, $M = 7.52$, respectively) and after music therapy sessions ($M = 8.37$). The sample size for this study was 20, and sample size requirements were not addressed. Participants were videotaped, and agitation levels were assessed using the Agitation Behavior Scale of the Disruptive Behavior Rating Scales (Mungas, Weiler, Franzi, & Henry, 1989). The rating scale has established

validity and reliability, but no indication of interrater reliability was mentioned. Results of the study would be strengthened with more a rigorous research methodology.

Group music played during mealtimes has shown some potential for reducing agitation (Denny, 1997; Goddaer & Abraham, 1994; Ragneskog et al., 1996; Richeson & Neill, 2004). Each study of this effect has used a quasi-experimental design. They all used relaxing, recorded music played during meals. The purpose of music during meals is to relax people and to act as a buffer against agitated behaviors. Positive results were found in the studies. For example, in one study, the addition of recorded music during meals reduced the total number of agitated behaviors by 63.4% (Goddaer & Abraham, 1994). The sample sizes used in the studies related to mealtime agitation ranged from 5 to 29. Additional research is needed with studies using more rigorous experimental designs.

Group music activities can be implemented by music therapists, family members, and caregivers. According to Gfeller (1995), the following knowledge and skills are necessary to carry out successful music therapy activities:

- Knowledge of the characteristics of dementia and the functional abilities across stages of decline
- Knowledge of the music repertoire preferred by clientele, with special attention paid to cultural and individual preferences
- Ability to lead groups in a structured but flexible manner
- Ability to maintain a basic respect and positive regard for clientele
- Knowledge of how to use a variety of musical materials effectively and flexibly

The particular music activities used depends on the particular skills required for the activity itself. Some musical activities require considerable skill to facilitate the group. Others require less musical expertise. Group leaders should be flexible and select activities that match their own personal skill levels. For example, recorded music can be used for activities if the group leader lacks the skills necessary for a live musical performance.

Evidence supports the efficacy of using staff other than music therapists to do music activities. Research has studied the effects of in-service training to teach activity aides to do rhythm activities with nursing home residents with dementia (Mathews et al., 2000). Aides were taught to engage people in both individual and group activity sessions. The results of the research indicate that aides, after instruction, were able to successfully involve residents with dementia in music activities involving rhythm instrument playing. Residents were observed to be engaged during 33.8% of all baseline observations. Engagement increased to 58.2% for the posttraining observation, $t(15) = 4.52$, $p < .01$.

The Future of Music Interventions for Agitation in People With Dementia

Although research indicates that music therapy is an effective intervention for reducing agitated behaviors, there are weakness and limitations to the existing studies (Ledger & Baker, 2006). Yu, Kolanowski, Strumpf, and Eslinger (2006) identified key elements of studies used to assess the quality of studies. Some include the following:

- Participant population profile (demographics, residence, referral pattern) well described
- Participant sampling/selection process well characterized
- Raters or interviewers blinded to outcome assessment

- Sample size for adequate power and clinically significant associations calculated and stated in the method
- Statistical methods clearly explained

Designing new research studies with special attention paid to these key elements would improve the quality of research related to agitation in people with dementia. Attention to these elements would also improve the generalizability of results, which would lead to more effective implementation of interventions used to treat agitation.

The future of research in the therapeutic use of music appears to be headed in the direction of brain research in music (Thaut, 2005). Formerly, music research was focused on music's role in facilitating social learning and well-being. According to Thaut (2005), though,

> more recently—under the influence of new data in brain research in music—new findings suggest that music can stimulate complex cognitive, affective, and sensorimotor processes in the brain, which can then be generalized and transferred to nonmusical therapeutic purposes. (p. 303)

Woods and Diamond's (2002) research is an early example of the newer trend in research. They hypothesized that developments in neuroendocrinology would point to an interaction among stress, aging, and cortisol, suggesting that with chronic stress and aging, a subtle elevation in basal cortisol occurs that leads to neuronal damage. They also hypothesized that there is a positive relationship between elevated cortisol and agitated behavior in people with AD. New studies related to how music interventions affect agitation in people with dementia would be greatly enhanced with their purposes turned toward investigating how the interaction of physiological and behavioral factors, such as cortisol and agitation, informs interventions.

In conclusion, a variety of music interventions have been used to reduce agitation in people with dementia. A variety of both individualized music interventions and group music interventions have been studied. Additional research is needed to provide a precise dose of music therapy to be delivered in the environment most predictive for positive results.

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Chapter 6

Synthesis

Nursing care involving society's elders has been a part of life since Nightingale's time. It is increasingly important today because of the rapid aging of the U.S. population. According to the Administration on Aging (2004), the number of adults aged 65 years and older was 35.6 million in 2002. Furthermore, by 2030, this number is expected to increase to 71.5 million. Gerontology is the study of aging and the special problems of aged persons (Urdang, 1968). It is a multidisciplinary field that includes nursing, social work, medicine, education, physical and occupational therapy, dietetics, creative arts therapies, and architecture. Nursing plays a pivotal role in the care of the elderly. This dissertation studied a specific nursing intervention designed to affect agitation in people with dementia. Chapter 4 provided a description of the limitations related to the music therapy intervention study conducted as part of this dissertation. In addition, chapter 4 provided suggestions for future research. The purpose of this chapter is to synthesize the manuscripts contained in this dissertation and discuss their implications for policy, practice, and future research in gerontological nursing.

Synthesis of Dissertation Manuscripts

Chapter 2 explored the science related to the use of music therapy to affect agitation in people with dementia. First, a discussion of the process of the perception of music in humans was presented. This was followed by an overview of the current conceptual frameworks of agitation in people with dementia. The chapter concluded by presenting an overview of the science of music therapy and how it is used to affect agitation in people with dementia.

Chapter 3 discussed the research methodology of this study. Chapter 4 provided a data-based report of the results of the dissertation research study. It found statistically significant results in increasing engagement in the therapeutic activity of music therapy and decreasing social isolation. Chapter 5 offered a description of the science of music interventions in relation to their use in treating agitation in people with dementia and concluded with implications for future research. Considering the risks involved in treating agitation primarily with medications, a review of the nonpharmacological treatment of music was explored.

Policy Implications

Nursing homes operate under the federal Nursing Home Reform Act, located in OBRA 1987 (OBRA-87; Anderson & Bjorklund, 2010). This act became law because of a growing public concern with the poor quality of care delivered in many nursing homes in the United States (Turnham, 2006). It came about with the concerted effort of consumers, provider associations, and health care professionals, including nurses. As a result of their efforts, Congress asked the Institute of Medicine (IOM) to study how to better regulate the quality of care in Medicare- and Medicaid-certified nursing homes. In its 1986 report, the IOM recommended the following:

- A stronger federal role in improving quality
- Revision in performance standards, the inspection process, and the remedies to improve nursing home services
- Better training of nursing home staff
- Improved assessment of resident needs

- A dynamic and evolutionary regulatory process (National Academy of Sciences, 1986)

To ensure the implementation of the IOM's recommendations, national organizations representing consumers, including the AARP; nursing homes; and heath care professionals, including the National League for Nursing's Division on Gerontology, worked together to provide consensus positions based on the IOM's report. Their efforts laid the foundation for the federal law (Turnham, 2006).

In 1987, President Ronald Reagan signed into law the first major revision of the federal standards for nursing home care since 1965, when Medicare and Medicaid were created. President Reagan was not known for his support of legislation to expand the federal government's involvement in regulation of industries, including the health care industry; however, he signed the bill. It mandated the most comprehensive legislative requirements to date in terms of nursing home care of the elderly and disabled (Zhang and Grabowski, 2004).

In P.L. 100-203, the following is stated related to the provision of services in a nursing home: "a skilled nursing facility must care for its residents in such a manner and in such an environment as will promote maintenance or enhancement of the quality of life of each resident" (U.S. Code Congressional and Administrative News, 1987, p. 160). This statement is broad in scope and implies a moral or ethical obligation to care for the elderly and disabled living in nursing homes in the United States. The morality of caring for vulnerable individuals in society has its roots in many religious traditions from Judeo-Christianity to Buddhism. It is also a part of most health care providers' codes of ethics. Although it is difficult to legislate morality, OBRA-87 attempts to do so.

A part of the Nursing Home Reform Act advises nursing homes to eliminate the use of physical and chemical restraints. The controversy related to the use of restraints has a long history dating back to the nineteenth century. John Conolly made the following statement related to the use of restraints in the early 1800s: "restraints and neglects may be considered as synonymous, for restraints are merely a general substitute for the thousand attentions required by troublesome patients" (Conolly, 1973, P. 6). The contemporary battle over the morality of restraint use continues. It came to public attention through key articles in the *New York Times*, the *Philadelphia Inquirer*, and the *Washington Post* around 1990 (Strumpf & Tomes, 1993). These articles described extreme, hurtful uses of physical restraints in health care facilities. They helped to turn public attention to the side of those who supported the Nursing Home Reform Act. As a result, the country had an increased desire to pay attention to moral obligations and improve the care of the elderly and disabled in nursing homes.

The latest round of updates to OBRA-87 was completed in 2006 (Anderson & Bjorklund, 2010). The original goals to restrict the use of chemical and physical restraints continue. The latest revision states that all medications, including psychotropic medications used for treatment of agitation in people with dementia, should continue to be subjected to scrutiny for inappropriate usage. This dissertation study was designed to assist nursing homes in providing nursing care that is in alignment with the OBRA-87 guidelines to provide high-quality care.

Currently, the field of dementia care has experienced changes in both health policy and philosophy. The shift is from a medical model to a more person-centered approach to care (Wilkinson & Weaks, 2008). Public policy plays a critical role in

determining the quality of life for the elderly with dementia in the United Sates. Since 70% of individual with dementia live in the community, policies must include larger social environmental concerns. These concerns include community support for people with dementia and their caregivers (Murray & Boyd, 2009).

The music therapy intervention studied in this dissertation may be accessible to people with dementia living in the community such as an adult day center care. Since a decrease in social isolation and an increase in engagement in therapeutic activities were included in the statistically significant results, music therapy groups may be considered as a way to enhance quality of life in people with dementia.

Nursing Practice Implications

With a governmental mandate to provide care in nursing homes that maintains or enhances quality of life, it is necessary to design nursing care plans with interventions that address quality-of-life issues. Lawton (1997) identified four domains of quality of life in older adults: psychological well-being, behavioral competence, objective environment, and perceived quality of life. The music therapy intervention studied in this dissertation measured psychological well-being of both the agitation variable and the social isolation variable. In addition, it measured behavioral competence through measurement of the engagement variable.

Involvement in therapeutic activities, including music therapy, is hypothesized to be an important strategy for reducing agitation and improving quality of life; however, typical activity programs are limited to short periods of time, leaving residents unoccupied for large amounts of time. Activities for nursing home residents with dementia often last for 30 to 45 minutes. Then, the activity staff leaves the area and the

residents wander, sleep, become agitated or may have undesirable interaction with other residents (Volicer, Simard, Pupa, Medrek, and Riordan, 2006). The nursing staff members are present for the entire day and night of the nursing home residents' day. Therefore it is necessary for nurses to include therapeutic activities in their care plans.

Along with the nursing intervention studied in this dissertation, other nursing interventions involving therapeutic activity programs have been successfully implemented. For example, favorite music and hand massage have been used to significantly decrease agitation in people with dementia (Hicks-Moore & Robinson, 2008). In addition, Gerdner (2005) has developed an evidenced-based intervention using individualized music to reduce agitation. She has successfully trained nursing staff and family members to carry out the intervention.

Future Research

Assessment of agitation and quantifying agitation in people with dementia can be difficult. The problems are related to the following factors (Cohen-Mansfield, 1999):

- It is impractical to ask someone with dementia the frequency of his or her agitation behaviors.
- There is a lack of objective criteria when assessing agitation. Caregiver ratings are often biased. Observational methods can only capture limited time periods of agitated behavior.
- The assessment of agitation can be complicated because it involves multiple caregivers, including family, nursing home staff, and physicians.
- There is large individual variability in the types of behavior manifested in people with dementia.

- Within-individual variability in agitated behaviors can occur. Some behaviors, such as wandering, can occur often, whereas other behaviors can occur infrequently.
- Most people exhibit agitated behavior at a low frequency rate. These behaviors are important, however, because of their impact.

Assessment of agitation is most often performed either through direct observation or through caregiver ratings (Cohen-Mansfield, 1999). Technological devices have recently grown in usage, however. Observations allow for researchers to focus on elderly individuals for a specified amount of time and observing the individuals systematically in their natural environments (Cohen-Mansfield, 1999). Sometimes the observations are videotaped or audiotaped. Observations provide relatively objective information, but they can be costly and time consuming.

Caregiver ratings are usually provided through the completion of a questionnaire either by family members or formal caregivers. These ratings of agitation provide an assessment of agitation over a longer period of time than observations. One drawback to this method is the possible subjectivity of the caregivers who have long-established relationships with elderly people. In addition, questionnaires relying on the retrospective recall of nurses or other caregivers may be inaccurate.

Technological devices are either attached to a person or are placed in close proximity to a person with dementia. They automatically record the behaviors under study. Assessment of wandering is an example of behavior that can be monitored with a technological device.

Despite these difficulties related to researching agitation in people with dementia, such research should continue. Related to the dissertation topic of this research, music therapy interventions used to decrease agitation in people with dementia need further investigation. Larger sample sizes and more rigorous research methodologies are needed to support the use of music therapy interventions to affect agitation in people with dementia.

The research variable of engagement studied in this dissertation produced statistically significant results. This was encouraging considering the subject's average MMSE score was 6.7. It shows that severely impaired individuals with dementia can engage fully in a therapeutic activity involving music. The variable of engagement was defined in narrow terms directly related to the coding system used for the research. Further research is needed to define the concept of engagement more completely. In nursing research, engagement has been studied in context of the working environment of nurses. The definition of engagement in this setting includes three sub-constructs including vigor, dedication, and absorption (Schaufeli et al.). Absorption is defined as being fully present. This could be related to the environment of a music therapy group. An exploration into the possible sub-constructs of engagement in a music intervention would be beneficial to clarify how music increases engagement in people with dementia.

The fact that agitation also trended down in the nature video condition leads to the need for future research designed to investigate the possible benefits of people with dementia watching nature videos. Perhaps the video provided some organization through visual imagery provided by the video. Or perhaps the environment in which the video

took place was calming. Further investigation might determine some of the specific mechanisms through which agitation is reduced when watching nature videos.

While this study was a randomized clinical trial with controlled procedures, multiple anecdotal examples of positive affect and engagement occurred during this study. Many participants who were unable to speak were observed during the music group either smiling or focusing their attention on the music through tapping their feet, playing a rhythm instrument, or humming. A future qualitative study using mixed methods should examine, more systematically, the outcomes of music therapy through observational, qualitative techniques.

This dissertation research studied the effects of a music therapy intervention on agitation in people with dementia. Three variables were examined including agitation, engagement and functional behavior. Agitation, although not statistically significant was trending downward in both treatment conditions. In addition, statistically significant results were obtained in subjects increasing their engagement in a therapeutic activity involving music and decreasing social isolation. With these positive results achieved, the researcher has the basis for further study to clarify the effects of a music therapy intervention to affect agitation in people with dementia.

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APPENDIX A

UNIVERSITY OF WISCONSIN – MILWAUKEE
CONSENT TO PARTICIPATE IN RESEARCH

This research is approved by the University of Wisconsin-Milwaukee IRB.

1. General Information

Study title: The Effect of Music Therapy on Agitation in People with Dementia

Person in Charge of Study (Principal Investigator): The Principle investigator is Christine R. Kovach, RN, PhD, FAAN. She will be supervising Martha Aslakson, RN, BSN, who is doing the research as part of a PhD program in nursing at the University of Wisconsin-Milwaukee.

2. Study Description

You are being asked to participate in a research study. Your participation is completely voluntary. You do not have to participate if you do not want to.

Study description: You are being asked to participate in a research study. Your participation is completely voluntary. You do not have to participate if you do not want to.

Study description:
The purpose of this study is to study the stress that some people with dementia experience. A non pharmacological treatment of the stress is music therapy. This research is designed to study the effects of music therapy on stress in people with dementia. Some research studies have been done previously to study the effects of music therapy. More research is needed, however, with improved research methodology to clarify the specifics of how music therapy is delivered to relieve stress in people with dementia.

The research will take place at the Becker-Shoop Center in Racine, Wisconsin. 60 subjects are planned to participate. 30 subjects will be randomly assigned to the experimental group receiving the music therapy and 30 subjects will randomly assigned to the control group watching a nature video. Each participant will be involved in pretesting for one week and treatment for one week.

3. Study Procedures

What will I be asked to do if I participate in the study?
If you agree to participate you will be asked to attend the groups, either treatment or control, to which you are randomly assigned at the Becker-Shoop Center. You will be asked to participate in the group as you wish for one week. The sessions will last for 30-40 minutes. No audio/video/photographic recordings will be done.

4. Risks and Minimizing Risks

What risks will I face by participating in this study?
There are only minimal risks anticipated for involvement in this study. Perhaps, you could be fatigued. If you wish to leave the group if you are tired, you may do so.

5. Benefits

Will I receive any benefit from my participation in this study?
The benefit from participating in this study is possibly to reduce stress.

Are subjects paid or given anything for being in the study?
No participants are being paid for their participation in the research.

6. Study Costs

Will I be charged anything for participating in this study?
There are no costs involved in participation in the research.

7. Information about HIPAA

The Health Insurance Portability & Accountability Act (HIPAA) provides regulations for the privacy and security of patient health records. The primary purpose of HIPAA is to protect the confidentiality of patient health information that is generated during health care services. HIPAA limits how and by whom your personal health information may be used.

We are asking you to allow us access to your health information that is protected by law. This information ("Protected Health Information") is part of your medical record at your doctor's office and / or hospital.

What PHI (Protected health Information) will be used if I participate in the study?
If you agree to participate we will be collecting the following information:

- Agency Intake/Assessment

- Medical records from date of admission to 12/2009.
- Updated progress notes.

Who will have access to the PHI?
By agreeing to participate in this study, you are giving permission to Christine Kovach and Martha Aslakson to use your Protected Health Information for activities relating to this research study. Further, you are giving permission to your health care provider to share the information needed for this study and described above with the above mentioned individuals.

UWM has rules to protect your personal information. We will only use and disclose your information as described here. Other state and federal rules also protect their rights as a research participant. However, we are obligated to disclose to you that once you give permission for your information to be used for this research study, the information may no longer be protected by HIPAA - the federal law that covers patient health information.

You may inspect and receive a copy of the information to be used and disclosed pursuant to this authorization form at any time during this research study or upon its completion by contacting Martha Aslakson. His/her contact information can be found under Section 11.

Voluntary Authorization and Withdrawal
If you do not want your information to be used in this study, and do not want to participate, this decision will not affect your ability to obtain treatment, payment, or eligibility for benefits you would otherwise be entitled to receive. Please understand that if you refuse to allow the use or disclosure of your Protected Health Information, you will not be eligible to participate in the research study.

You may revoke the authorization for use of your protected health information at any time. However, this must be done in writing. You must either give your revocation in person to the principal Investigator, the Principal Investigator's staff, or mail the revocation (see PI contact information in Section 11). If you revoke this authorization, we will not be able to collect new information about you and you will be withdrawn from the research study.

If you do not decide to stop participating earlier, your consent to use the information obtained in the study will expire 12/2011.

8. Confidentiality

What happens to the information collected?
All information collected about you during the course of this study will be kept confidential to the extent permitted by law. We may decide to present what we find to others, or publish our results in scientific journals or at scientific conferences. Only the PI or Martha Aslakson will have access to the information related to the study. However, the Institutional Review Board at UW-Milwaukee or appropriate federal agencies like the Office for Human Research Protections may review your records. Information about each subject will be recorded using a code number rather than a name. Information will be stored in a locked cabinet or stored on a password protected computer. When the study is complete information will continue to be stored in the secured place for 5 years for future use.

9. Alternatives

Are there alternatives to participating in the study?
There are no known alternatives available to you other than not taking part in the study.

10. Voluntary Participation and Withdrawal

What happens if I decide not to be in this study?
Your participation in this study is entirely voluntary. You may choose not to take part in this study. If you decide to take part, you can change your mind later and withdraw from the study. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with the University of Wisconsin Milwaukee. If the subject withdraws or is withdrawn early the information collected will be destroyed.

11. Questions

Who do I contact for questions about this study?
For more information about the study or the study procedures or treatments, or to withdraw from the study, contact: For more information about the study or the study procedures or treatments, or to withdraw from the study, contact: Martha Aslakson
427 Emerald Drive]
Racine, WI 53406
Phone: 414-581-5381

Who do I contact for questions about my rights or complaints towards my treatment as a research subject?
The Institutional Review Board may ask your name, but all complaints are kept in confidence.

Institutional Review Board
Human Research Protection Program
Department of University Safety and Assurances
University of Wisconsin – Milwaukee
P.O. Box 413
Milwaukee, WI 53201
(414) 229-3173

12. Signatures

Research Subject's Consent to Participate in Research:
To voluntarily agree to take part in this study, you must sign on the line below. If you choose to take part in this study, you may withdraw at any time. You are not giving up any of your legal rights by signing this form. Your signature below indicates that you have read or had read to you this entire consent form, including the risks and benefits, and have had all of your questions answered, and that you are 18 years of age or older.

_____
Printed Name of Subject/ Legally Authorized Representative

_____ _____
Signature of Subject/Legally Authorized Representative Date

Principal Investigator (or Designee)
I have given this research subject information on the study that is accurate and sufficient for the subject to fully understand the nature, risks and benefits of the study.

Martha Aslakson _____ PhD Student _____
Printed Name of Person Obtaining Consent Study Role

_____ _____
Signature of Person Obtaining Consent Date

APPENDIX B

Dear Administrator,

I am a doctoral student at the University of Wisconsin-Milwaukee College of Nursing. For my dissertation research I am exploring the effects of music therapy on agitation in people with dementia. I would like to include your facility as a research site.

If you agree to participate in the study, your involvement will consist of providing access to your staff, having the staff identify those residents that may meet the criteria for this study, and asking for their permission for me to talk with them or sending out a letter that I will provide to the family member/proxy for those residents.

Confidentiality will be preserved throughout the study and in all reports. Your name, the name of your facility, and the names of any residents will not be revealed. I anticipate that the findings from this study will lead to a better understanding of the use of a music therapy intervention to reduce agitation in people with dementia.

I look forward to meeting with you,

Martha Aslakson RN
Doctoral Candidate - Nursing

APPENDIX C

MEASUREMENT INSTRUMENTS

The Mini-Mental State Examination

Subject Code: _____ **Rater:**_____ **Date:** _____/_____/_____

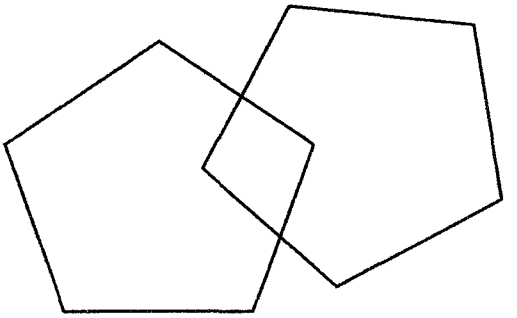
			Score	Points
Orientation				
1.	What is the:	Year?	_____	1
		Season?	_____	1
		Date?	_____	1
		Day?	_____	1
		Month?	_____	1
2.	Where are we?	State?	_____	1
		County?	_____	1
		Town or city?	_____	1
		Hospital?	_____	1
		Floor?	_____	1
Registration				
3.	Name three objects, taking one second to say each. Then ask the patient all three after you have said them. Give one point for each correct answer. Repeat the answers until the patient learns all three.		_____	3
Attention and calculation				
4.	Serial sevens. Give one point for each correct answer. Stop after five answers. *Alternate*: Spell WORLD backwards.		_____	5
Recall				
5.	Ask for names of three objects learned *in Question 3. Give one point for each* correct answer.		_____	3
Language				
6.	Point to a pencil and a watch. Have the patient name them as you point.		_____	2
7.	Have the patient repeat "No ifs, ands, or buts."		_____	1
8.	Have the patient follow a three-stage command: "Take the paper in your right hand. Fold the paper in half. Put the			

paper on the floor." _____ 3

9. Have the patient read and obey the following: "CLOSE YOUR. EYES." (Write in large letters.) ____ 1

10. Have the patient write a sentence of his or her own choice. (The sentence should contain a subject and a verb and should make sense. Ignore spelling errors when scoring.) ____ 1

11. Enlarge the design printed below to 1 inch per side and have the patient copy it. (Give one point if all sides and angles are preserved and if the intersecting sides form a quadrangle.) ____ 1



Total Points ____

Instructions for Administration of Mini-Mental Status Examination

Orientation: Ask for the date. Then ask specifically for parts omitted, e.g., "Can you also tell me what season it is?" One point for each correct answer. Ask in turn "Can you tell me the name of this hospital?" (nursing home, town, county, etc.). One point for each correct answer.

Registration: Ask the patient if you may test his memory. Then say the names of 3 unrelated objects, clearly and slowly, about one second for each. After you have said a 3, ask him to repeat them. This first repetition determines his score (0-3) but keep saying them until he can repeat all 3, up to 6 trials. If he does not eventually learn all 3 recall (see below) cannot be meaningfully tested.

Attention and Calculation: Ask the patient to begin with 100 and count backwards by 7. Stop after 5 subtractions (93, 86, 79, 72, 65). Score the total number of correct answers. If the patient cannot or will not perform this task, ask him to spell the word "world" backwards. The score is the number of letters in correct order. E.g. dlrow = 5, dlorw = 3.

Recall: Ask the patient if he can recall the 3 words you previously asked him to remember. Score 0-3.

Language:
Naming: Show the patient a pencil and ask him what it is. Repeat for wrist watch. Score 0-2, one for each correct answer, 0 if none are named.

Repetition: Ask the patient to repeat the sentence after you. Allow only one trial. Score 0 or 1.

3-Stage command: Give the patient a piece of plain blank paper and repeat the entire command. Score 1 point for each part correctly executed.

Reading: On a blank piece of paper print the sentence, "Close your eyes," in letters large enough for the patient to see clearly. Ask him to read it and do what it says. Score 1 point only if he actually closes his eyes.

Writing: Give the patient a blank piece of paper and ask him to write a sentence for you. Do not dictate a sentence; it is to be written spontaneously. It must contain a subject and verb and be sensible. Correct grammar and punctuation are not necessary.

Copying: On a clean piece of paper, draw intersecting pentagons, each side about 1 inch, and ask him to copy it exactly as it is. All 10 angles must be present and 2 must intersect to score 1 point. Tremor and rotation are ignored.

Level of Consciousness: Estimate the patient's level of sensorium along a continuum, from alert on the left to coma on the right.

Functional Behavior Profile

All of the questions relate to how the individual with impaired cognitive function performs in their daily activities. As a reference, the respondent should complete the instrument based on the impaired individual's behavior during the past week.

Participant Code_____ Information obtained from:_____

	4	3	2	1	0	Score
1. Is able to concentrate on a task for:	More than 25 minutes	5 to 15 minutes	3 to 5 minutes	1 to 3 minutes	< 1 minute	T_____
2. Finishes the tasks that have been started.	Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	T_____
3. Performs work that is neat (tidy).	Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	T_____
4. Can use tools or instruments (e.g., razor) in performing tasks (e.g. in the kitchen, for a hobby)	Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	T_____
5. Can manipulate small items (e.g. doing hand work, buttoning, applying making.	Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	T_____
6. Activities are appropriate to the time of day (e.g. sleeps at night, alert during the day)	Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	T_____
7. Performs work that is accomplished within a reasonable timeframe	Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	T_____
8. Performs activities without frustration	Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	T_____
9. Continues an activity when frustrated	Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	T_____
10. Shows enjoyment in activities	Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	S_____

11. Participates in activities.

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	S_____

12. Can identify familiar individuals.

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	S_____

13. Initiates conversations with family.

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	S_____

14. Socializes when others initiate the interactions.

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	S_____

15. Expresses himself or herself appropriate to the situation.

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	S_____

16. Makes simple decisions independently (e.g. what to wear, what to eat, what to do around the house).

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	P_____

17. Is able to make a decision when presented with choices.

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	P_____

18. Can learn a simple activity without difficulty (e.g. stirring, wiping dishes)

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	P_____

19. Can respond to a two-step command (e.g. directions to do two things in sequence like "open the door" and "get the newspaper")

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	P___

20. Can solve a problem when given repeated assistance

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	P_____

21. Takes responsibility for tasks that previously have been theirs (e.g. responsibilities for cooking, cleaning, home maintenance)

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	P_____

22. Can respond to a one-step command (e.g. directions to do only one thing like "sit here" or "take my hand").

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	P_____

23. Can respond to a three-step command (e.g. directions to do three things in sequence like "open the door"," get the newspaper" and "if Mary is in the yard tell her to come in for dinner")

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	P_____

24. Can learn a complex activity without difficulty (e.g. new game, directions)

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	P_____

25. Knows the day of the week and/or the date

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	P_____

26. Independently makes complex decisions.

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	P_____

27. Can solve a problem without assistance.

4	3	2	1	0	
Always (100%)	Usually (80%)	Sometimes (50%)	Rarely (20%)	Never (<10%)	P_____

Scoring: Total those marked according to the key on the right-hand side (i.e. T,S,P) and divide by the number of items in the scale. You can use the Task Performance, Social Interaction and Problem Solving Scales separately or use a total score. SubtotalT____/9, S_____/6, Total P____/12 Total Score_____

(Baum, CM, Edwards, DF & Morrow-Howell, N (1993). Identification and measurement of productive behaviors in senile dementia of the Alzheimer type. *The Gerontologist* 33, 403-408.)

Task Performance Score (T):_____
Social Interaction Score (S):_____
Problem Solving Score (P):_____

Participant Code_____
Subject code_____ Date_____

SCORING SHEET

Wisconsin Agitation Inventory
WAI

SUBJECT # _____

RATER _____ DATE _____

Time Scheduled	Time Collected	Agitation Scale Score				
1615		0	25	50	75	100
1625		0	25	50	75	100
1700		0	25	50	75	100
1710		0	25	50	75	100

Agitation Intensity Parameters

Score	# of Behaviors	Duration of Behaviors	And / Or	Intensity
0	0	---	---	The person was entirely calm.
25	1	≤ 15 seconds	AND	Minimal motor, verbal or vocal behavior.
50	1	16-59 seconds	OR	> Minimal motor, verbal or vocal behavior.
50	2	≤ 15 seconds	AND	Minimal motor, verbal or vocal behavior.
75	1	60-119 seconds	AND	Minimal motor, verbal or vocal behavior.
75	2	16-59 seconds	AND	Minimal motor, verbal or vocal behavior.
100	1	≥ 120 seconds	OR	High motor, verbal or vocal behavior.
100	≥ 2	≥ 60 seconds	OR	High motor, verbal or vocal behavior.

Measuring Agitation

Agitated behavior is verbal, vocal, or motor behavior that is not explained by the events (e.g. need of the situation) per se. In other words, in a non-demented person in a similar situation, the behavior would not be expected. Agitation is an excited or aroused state.

Look at the random order table to determine the sequence of observing residents. Since we don't observe residents in the toilet, or behind a closed privacy curtain, you may adapt this sequence to ensure feasible data collection. Observe the subject for 3 minutes. Please try to capture all behaviors and don't underestimate behaviors that you can explain away or potentially "fix."

Place a slash mark on the line to indicate how agitated the subject has been over the previous 3 minutes. Here are some definitions of what marks at various points along the line indicate:

0	=	the person was entirely calm.
25	=	the behavior was brief (< 16 seconds) AND involved minimal increase in motor, verbal or vocal behavior from baseline.
50	=	the behavior EITHER lasted 16-59 seconds OR involved more than a minimal increase in motor, verbal, or vocal behavior from baseline OR involved 2 brief behaviors.
75	=	the behavior lasted 60-119 seconds OR involved 2 behaviors lasting 16-59 seconds.
100	=	the behavior lasted 2 minutes or > OR involved a high level of motor, vocal or verbalized behavior OR 2 behaviors lasted 1 minute or > .

The maximum score for each line is a 100. For example, if a subject displayed two behaviors (i.e. move repetitively for 10 seconds and scratch for 50 seconds) the score would be a 75 since the 2 behaviors lasted 60 seconds. If the person bit another person for 10 seconds the score would be 100 since this is a high level of motor activity that is not usual.

EXAMPLES OF AGITATED BEHAVIORS♦

1. Complaining- whining, complaining about self, physical complaints, personal gripes or complaining about external things or other people.
2. Negativism-bad attitude, doesn't like anything, nothing is right
3. General Restlessness- fidgeting, always moving around in seat, getting up and sitting down, inability to sit still
4. Pacing and Aimless Wandering- constantly walking back and forth, does not indicate normal purposeful walk, include wandering when done in a wheelchair
5. Cursing or Verbal Aggression- swearing, unkind speech or criticism, verbal anger, verbal combativeness
6. Constant Unwarranted Request for Attention or Help- verbal or nonverbal unreasonable nagging, pleading, demanding
7. Repetitive Sentences or Questions- repeating the same sentence or question one right after the other
8. Inappropriate Dressing or Disrobing- putting on too many clothes, putting on clothing in a strange manner, taking off clothing in public or when it is inappropriate
9. Spitting- spitting onto floor or other people, include spitting while feeding. Do not include salivation over which the person has no control or spitting into tissue, the toilet, or onto the ground outside
10. Hitting (including self)- physical abuse, striking, pinching, banging self/furniture
11. Kicking- strike forcefully with feet at people or objects
12. Grabbing Onto People or Things Inappropriately- snatching, seizing roughly, taking firmly, or yanking
13. Pushing- forcefully thrusting, shoving, moving, putting pressure against
14. Throwing Things- hurl, violently tossing in the air
15. Making Strange Noises- including crying, weeping, moaning, weird laughter, grinding teeth
16. Screaming- loud, shrill, shouting, piercing howl
17. Biting- chomp, gnash, gnaw (people or self)
18. Eating or Drinking Inappropriate Substance- putting into mouth and trying to swallow items that are inappropriate
19. Scratching- clawing, scraping with fingernails (people or self)
20. Trying to Get to a Different Place- trying to get out of the building, off the property, sneaking out of the room, leaving inappropriately, trying to get into locked areas, trespassing within unit, other people's room or closet
21. Intentional Falling- purposefully falling onto floor, include from wheelchair, floor or bed
22. Hurting Self or Other- burning self or other, cutting self or other, touching self or other with harmful objects
23. Handling Things Inappropriately- picking up things that don't belong to them, rummaging through drawers, moving furniture, playing with food, fecal smearing
24. Hiding Things- putting objects under or behind something
25. Tearing Things or Destroying Property- shredding, ripping, breaking, stomping on something

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♦ Used with permission of J. Cohen-Mansfield.

26. Performing Repetitious Mannerisms- patting, tapping, rocking self, fiddling with something, rubbing self or object, sucking fingers, taking shoes on and off, picking at self, clothing or objects, picking at imaginary things out of air or off floor, manipulation of nearby objects in a repetitious manner
27. Making Verbal Sexual Advances- sexual propositions, sexual innuendo, or "dirty" talk
28. Making Physical Sexual Advances or Exposing Genitals- touching a person in an inappropriate sexual way, rubbing genital area, inappropriate masturbation when not alone in own room or bathroom, unwanted fondling or kissing

Hoarding Things- putting many or inappropriate objects in purse or pockets,

CURRICULUM VITAE

Martha Aslakson

Place of Birth: Cortland, New york.

Education

BS, Illinois State University, 1985
Major: Music

MM, University of Wisconsin–Madison, 1999
Major: Organ Performance

BSN, Carroll Columbia College of Nursing, 1999
NCLEX: Passed

PhD, University of Wisconsin–Milwaukee, 2010
Dissertation Title: The Effects of a Music Therapy Intervention on Agitation in People With Dementia

Employment

August 2010-present
University of Wisconsin-Milwaukee
Position: Teaching Assistant for the College of Nursing

August 2005–2009
Carroll University, Waukesha, Wisconsin
Position: Adjunct Professor of Nursing

February 2001–2008
Kenosha Visiting Nurse Inc., Kenosha, Wisconsin
Position: RN Case Manager

June 2000–February 2001
Village Adult Day Center, Milwaukee, Wisconsin
Position: Coordinator of Nursing Services

May 1999–February 2001, December 2004–present
Becker-Shoop Center, Racine, Wisconsin
Position: Staff Nurse

May 1991–present
Wauwatosa Avenue United Methodist Church, Wauwatosa, Wisconsin
Position: Organist and Handbell Choir Director

Memberships

Sigma Theta Tau

Milwaukee Symphony Chorus
American Guild of Organists

Personal Statement

I consider myself a hardworking, ambitious, analytical, scientifically disciplined and committed person focused on achieving the highest standards of excellence in my profession. I have good experience of teamwork and organization and feel confident and comfortable in performing whatever is consistent with my level of training. I have the personal ability and drive, along with the necessary communication skills, to undertake commendably any appropriate job that is assigned to me. I am a self-motivated individual. I am committed to improving the health and well-being of people. I have a particular interest in working with older adults, especially those stricken with dementia.

12/10/10

Major Professor Date