THE EFFECTS OF GUITAR-ACCOMPANIED SINGING INTERVENTION ON

SUNDOWNING IN ELDERLY PERSONS WITH DEMENTIA

BY
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Submitted to the graduate degree program in Music Education and Music Therapy
and to the Graduate Faculty of the University of Kansas in partial fulfillment of the requirements
for the degree of Master of Music Education (Music Therapy)

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ON SUNDOWNING IN ELDERLY PERSONS WITH DEMENTIA

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Abstract

The purpose of this study was to examine the effects of a guitar-accompanied singing

intervention on agitated behaviors associated with the transition from day to night, referred to as

sundowning, in individuals with dementia. Eleven guardians signed the informed consent;

however, two eligible participants declined to take part in the study. The data on one participant

were used to train the research assistant regarding the data collection method; therefore, her

information and data were excluded from this thesis. Out of the remaining 8 participants (*N*=8),

four (*n*=4) of them received music therapy, and other four (*n*=4) listened to newspaper reading.

The investigator provided both conditions. A single 10-min individual session was offered to

each participant approximately between 3:00 p.m. and 5:00 p.m. The investigator provided a

guitar-accompanied singing intervention to the music therapy treatment group. She read the

inner sections of the Kansas City Star newspaper to the control group. All sessions were video

recorded, and a 15-s time sampling method was used to collect data using rubrics derived from

the Pittsburg Agitation Scale (PAS) for both groups. The results are discussed as a series of case

studies due to the small sample size. All 4 participants in the music therapy condition completed

the entire 10-min session whereas 2 out of 4 participants in the newspaper reading condition

completed only part of the session due to increased agitation and a participant's decision. Motor

agitation was most common, and aberrant vocalization was the next. No aggressiveness was

observed during the sessions. This study was preliminary, and the results cannot be generalized;

however, noteworthy observations were made. Recommendations for future research

implementations are discussed.

Keywords: music therapy, music, singing, agitation, dementia, sundowning

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CHAPTER 1

Introduction

The Growing Elderly Population

The elderly population has been increasing worldwide due to advanced medical technologies and aging baby boomers. For example, people aged 60 years old or older make up one fifth to almost one fourth of the populations in Austria, Czech Republic, Greece, Italy, Japan, Slovenia, and Spain (United Nations, 2011). An increased ratio of elderly persons to the entire population is a serious concern because younger generations may have difficulty providing financial, emotional, and societal supports to older persons.

Most developed countries consider the age of 65 years and older as "elderly" (World Health Organization, 2012), and their numbers in the United States have dramatically increased in the last century. There were approximately 3 million elderly in 1900 and the age group expanded to 33 million by 1994. This growth rate exceeds that of the population under 65 years of age, and the number of older persons is expected to increase even further. For instance, one in eight people were elderly in 1994 and the ratio is estimated to become one in five by the year of 2030 in the United States (Hobbs, 2010). Prolonged life spans may result in an increased number of individuals with age-related diseases and conditions, such as dementia.

Dementia

In 2009, approximately 30 million people had dementia worldwide, and the number is estimated to increase to 100 million by 2050 (The Alzheimer Society of Ireland, 2011). In 2002, in the United States, approximately 3.4 million people were affected by dementia by the age of 71 or older. The possibility of having dementia increases with age with five percent affected between ages 71-79 years and 37.4 percent affected by age 90 and older (Plassman et al., 2007).

Dementia at any age is defined by stages, and symptoms vary depending upon the stage. Dementia may start with mild forgetfulness and eventually lead to the inability to perform activities of daily living (ADL). In this degenerative process, affected individuals exhibit disorientation, confusion, physical and emotional declines, impaired communication, while some display disruptive behaviors (Clair, 1996a).

Effects of Agitation

Agitation behaviors occur in some individuals with dementia and can be a serious concern. This negative behavior may affect delivery of care, social interactions (Gerdner & Schoenfelder, 2010; Léger et al., 2002; Wall & Duffy, 2010), and quality of life (Gerdner & Schoenfelder, 2010; Léger et al., 2002). Caregivers experience a great deal of stress when their clients or loved ones display disruptive behaviors that interfere with care giving. Stress in caregivers may eventually lead them to burnout (Gerdner & Schoenfelder, 2010). In addition, agitation is associated with higher fall risks (Gerdner & Schoenfelder, 2010; Marx, Cohen-Mansfield, & Werner, 1990) and sleep disturbances (Cohen-Mansfield & Marx, 1990; Gerdner & Schoenfelder, 2010) in those who are diagnosed with dementia.

Sundowning

Some elderly persons with and without dementia exhibit increased agitation in the late afternoon and evening, a phenomenon that is called sundowning. The characteristics of sundowning include agitation, anxiety, wandering, pacing, disruptive behaviors, confusion, yelling, and uncooperative behaviors (Kim, Louis, Muralee, & Tampi, 2005). The causes of sundowning are still unclear; nevertheless, abnormality in the circadian rhythm is one of the most well established theories to explain it (Sharer, 2008).

The symptoms of sundowning are often exacerbated by environmental factors, such as stress, shift change in residential care staff, noise, unfamiliar space, and the presence of other people. According to Gerdner and Schoenfelder (2010) and Hall and Buckwalter (1987), cognitive impairment causes a decline in receiving and processing sensory input. As a result, individuals with cognitive impairment, including dementia, have lower stress thresholds that can elicit dysfunctional behaviors that serve as attempts to remediate stress.

Such dysfunction may be the reason that many residents become agitated during staff shift changes in nursing home facilities. Watching staff leave at the end of the workday may remind residents that it is time to go home. As some staff prepare to leave and others come in to work it is common to observe residents stating that they need to go home or asking staff what time their families are picking them up. Agitation becomes worse with changes in routine, room assignment, roommates, and staff. Evans (1987) found that persons who are in their rooms for less than a month in residential facilities are more likely to experience sundowning than persons who have been in place for a longer period of time.

Treatment for Sundowning

Treatment for sundowning includes both pharmacologic and non-pharmacologic approaches. The former includes the use of melatonin to regulate circadian rhythm. Cohen-Mansfield, Garfinkel, and Lipson (2000) studied the effect of melatonin in 11 nursing home residents with dementia. They discovered that melatonin was effective in decreasing agitated behaviors during the day and at night. Beside melatonin, hypnotics and benzodiazepines are often used to manage agitation and disruptive behaviors related to sundowning. These medications, however, can increase the probability of respiratory and central nervous system depression for those with comorbidities (Staedt & Stoppe, 2005). Low dosages of neuroleptics

have been prescribed due to the assumption of the relationships between agitation and dopamine deregulation. These medications benefit some clients; however, side effects exist. Both neuroleptics and benzodiazepines can result in excessive sedation with increased fall risks (Staedt & Stoppe, 2005).

Non-pharmacological approaches to sundowning management incorporate behavioral therapy, including light therapy, to curb negative behaviors (Kim, Louis, Muralee, & Tampi, 2005). Some nursing home residents have significantly less light exposure than others do which affects their circadian rhythms. Research outcomes demonstrate that light therapy decreases nocturnal motor agitation in individuals with dementia, and increased intensity of overhead lighting is also beneficial (Staedt & Stoppe, 2005). Additionally, Evans' study (1987) supported the importance of behavioral management through structured environments and individualized interventions. She found that persons with sundowning received fewer individualized activities than those who did not exhibit it leading to fewer opportunities for stimulation and engagement.

In addition to environmental and behavioral reactions persons with agitation may be affected by other factors that are not related to sundowning. Excessive consumption of caffeine, especially in the afternoons and evenings, can lead to agitation and should be avoided. For those who wander, exercise programs may be helpful to structure experiences and to burn excessive energy (Sharer, 2008). Furthermore, Cohen-Mansfield (2003) points to a sudden increase in agitation, whether or not the person has dementia, as a reaction to medical needs or to pain. For example, dehydration, urinary tract infection, and certain medications can cause agitated behaviors and medical intervention is necessary to resolve them.

Music Therapy

Music Therapy is "the clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program" (American Music Therapy Association, 2011). Music can influence physiological responses, such as blood pressure, heart rate, respiration, galvanic skin response, pupil dilation, discomfort and tolerance to pain (Clair, 1996a; Standley, 1986). These physiological changes elicited by music can affect emotional responses as well (Clair, 1996a; Thaut, 1990). Additionally, music interventions are typically low risk for causing other negative effects and can be tailored to the goals for each individual across the extended life span (Robb, Burns, & Carpenter, 2011).

Use of Music to Affect Agitation in Elderly Persons

Music therapy has been used for older adults to address a variety of their goals, such as mood enhancement, social interaction, reminiscence, stimulation, relaxation, and pain management (Clair, 1996a). In addition, music therapy and practical use of music are a few of the feasible interventions for reducing the effects of dementia-related agitation. For those with dementia, most stimuli can be confusing and have very little meaning; however, preferred and familiar music is an interpretable stimulus (Gerdner & Schoenfelder, 2010). Music also provides temporal structure and predictability because of its steady underlying pulse. This allows individuals with dementia to move in rhythm to exercise, dance, or play percussive instruments. Familiar songs help the elderly with dementia participate in singing. Timing in music contributes to mental organization and allows people with dementia to meaningfully engage in interaction through music (Clair, 1996a; Thaut, 1990).

When dementia progresses into the late stage, individuals are typically less engaging and communicate at a minimal level; however, they can still effectively engage in music therapy. Ebberts (1994) compared the duration of participation in singing, movement, and drumming in people in late stage dementia with agitation. Participants engaged in both movement and drumming longer than they engaged in singing. This result indicates that agitated individuals who are in late stage dementia can still participate and respond positively to structured music interventions (Clair, 1996a). Because music therapy is flexible and adjustable to clients' functional levels, it can be used to engage individuals who are in various stages of dementia.

Music Therapy for Sundowning

A relatively large number of investigations has been conducted to examine the effects of music therapy on agitation in individuals with dementia; however, only one study focused on the effects of music therapy on sundowning. Lesta and Petocz (2006) investigated the effects of small group singing on mood and social behavior in four female nursing home residents with sundowning characterized by negative mood, increased confusion, and agitation in the late afternoon. Research assistants collected data during the 15-min pre-test period, 30-min small group singing session, and 15-min post-test period between 4:15 p.m. and 5:30 p.m. for four consecutive days. The curtains were left open, so that the participants were aware of daylight fading.

Results indicated significant enhancement in mood and social behaviors, such as smiling and appropriately engaging in music. Well-being significantly increased both during and after music therapy. Flat affect and sitting alone significantly decreased both during and after music therapy. It was concluded that opportunities for engagement in structured and familiar singing

activities appear to positively affect sundowning. Yet, the authors suggested further research with a control group, a larger sample size, and data collection with video recording.

Music therapy may have great potential for managing sundowning in the elderly for several reasons. Carefully designed interventions by trained music therapists can create a structured and predictable environment that encourages active engagement. Individuals with dementia can engage in singing familiar songs even when they have no verbal communication. Familiar music engagement requires little cognitive processing and is very accessible to those with cognitive deficits. Therefore, a singing intervention may be a benefit to those with sundowning and their caregivers who must manage their agitation.

Purpose Statement

The purpose of this study was to examine the effects of a guitar-accompanied singing intervention on sundowning in individuals with dementia. Specifically, this investigation was conducted to answer the following research question: Can music therapy or newspaper reading decrease sundowning symptoms in elderly persons with dementia?

CHAPTER 2

Review of Literature

Definition, Types, and Stages of Dementia

The DSM-IV-TR (American Psychiatric Association, 2000) defines dementia as the manifestation of multiple cognitive deficits that interfere with occupational and/or social aspects of a person. Types of dementia include Alzheimer's disease, vascular dementia, Parkinson's disease, Huntington's disease, Pick's disease, Creutzfeldt-Jakob disease, substance-induced dementia, dementia caused by HIV disease, head trauma, other general medical conditions, and multiple etiologies (American Psychiatric Association, 2000).

Although dementia subtypes affect individuals differently, it is typically classified into three stages: early, middle, and late. In early stage dementia, individuals may experience problems with their memory; nevertheless, this may not be very noticeable because even healthy adults can be forgetful at times. Also, some individuals with dementia are capable of hiding or compensating their symptoms with alternative skills, such as note taking. Therefore, family members of individuals with early stage dementia may overlook the signs of dementia. One of the keys is to observe the progression of symptoms, such as forgetfulness, disorientation, and confusion. If these symptoms appear to worsen, it may be signs of dementia (Clair, 1996a).

When dementia symptoms progress, individuals need increased support from others to live safely. Middle stage dementia is characterized by the requirement of assistance with ADLs, increased agitation, anxiety, delusions, obsessive behaviors, and/or irregular sleeping patterns. Individuals in this stage may also have difficulty completing tasks and may not remember their spouses' names and recent events. Aggressive and combative behaviors may be present due to increased confusion making caregiving very difficult. Family members and caregivers may become seriously burdened emotionally and physically (Clair, 1996a).

As dementia continues to deteriorate into late stage, persons exhibit extremely limited verbalization, a loss of ambulation, and bowel and bladder incontinence. These individuals spend a great amount of time sleeping and may not respond to most stimuli. Although they are often unresponsive, it is important to maintain their quality of life, such as keeping them clean and providing them with appropriate medical care. Offering the persons appropriate stimuli remains important for life quality in this stage. Playing recorded music and live music, reading poetry/story/newspaper, and providing touch are examples of stimulations that can be used. Caregivers and therapists must carefully observe the responses of persons with dementia to identify the most desired stimuli for them (Clair, 1996a).

Definition, Models, and Causes of Agitation

Not all individuals with dementia exhibit agitation; however, when it occurs, the management of agitation may be one of the most challenging matters in dementia care. Agitation is an "inappropriate verbal, vocal, or motor activity that is not explained by needs or confusion per se" (Cohen-Mansfield & Billig, 1986, p.712). Agitation is categorized into three types: physical aggression (e.g., physical outbursts), non-physical aggression (e.g., wandering, pacing), and verbal agitation (e.g., screaming) (Cohen-Mansfield & Billig, 1986; Wall & Duffy, 2010).

Many factors may contribute to agitation in people with dementia. The models by Cohen-Mansfield (2003) include: (a) direct impact of dementia, (b) unmet needs, (c) behavioral patterns, and (d) environmental vulnerability. Dementia itself causes pathophysiological changes in the brain that may directly result in agitated behaviors. Severe deterioration of the brain also affects the domain of inhibition, and those with dementia have difficulty inhibiting their negative behaviors (Cohen-Mansfield, 2003). In addition, individuals with progressed dementia have

difficulty expressing their needs. For instance, when they are thirsty, soiled, or have pain, they cannot verbally communicate to anyone who can satisfy their needs. As a result, they may become agitated. Others may have learned agitated behaviors through reinforcement from staff who give attention when disruptive behaviors are exhibited (Cohen-Mansfield, 2003).

Last of all, individuals with dementia may not be able to process the information in their environments like others do (Cohen-Mansfield, 2003), and this may cause them to display agitation. The elderly have great difficulty differentiating relevant information from irrelevant information due to decreased ability for selective attention. This causes overarousal, which is related to increased stress in the individuals (Clair, Chen, & Nakamura, 2011; Hasher & Zacks, 1988). Those with dementia also have difficulty adjusting to unfamiliar environments, such as new rooms, which are often very confusing and anxiety provoking for them. Thus, it is imperative to search for the underlying causes of agitation in individuals and to provide interventions that are appropriate for the causes (Cohen-Mansfield, 2003).

Cognitive Decline and Agitation

Agitation can occur at any stage of dementia but is related to cognitive function decline (Vink, 2000). Cohen-Mansfield, Marx, and Rosenthal (1990) explained that individuals with relatively intact cognition tend to have verbally agitated behaviors, such as complaining, whereas those with more serious cognitive impairment exhibit aggression and physical agitation. Individuals in middle stage dementia with moderate cognitive impairment show the most severe agitation. After individuals progress into late stage dementia, agitation usually decreases in relation to the weakening of their overall functioning (Vink, 2000).

Agitation is related to sleep disturbances that occur with cognitive decline, and without sleep at night individuals tend to display more agitation during the day. Fatigue caused by a lack

of restful sleep results in inability to manage behaviors (Cohen-Mansfield & Marx, 1990; Vink, 2000). Increased agitation from late afternoon to night is called "sundowning" (Hopkins, Rindlisbacher, & Grant, 1992; Vink, 2000).

Definition, Symptoms, and Possible Causes of Sundowning

Surprisingly, there is no clear definition of sundowning, and this may be due to the indefinite etiology of the phenomenon. Evans (1987) was one of the first clinicians to investigate sundowning and defined it as "the appearance or exacerbation of symptoms of confusion associated with the late afternoon or early evening hours" (p.101).

Cohen-Mansfield (2007) continues to question the choice of the word, sundowning. She investigated the temporal patterns of agitation on nursing home residents with dementia and found that their agitation peaked around 4 p.m.; nevertheless, she is reluctant to collectively name the behaviors "sundowning". Her rationale is that the behaviors did not just appear in the afternoon but began in the morning and gradually increased until 4 p.m. and then decreased after more time. Cohen-Mansfield (2007) associated this pattern of agitation to increased fatigue of daytime staff that likely altered their responses to residents and to shift change that likely increased the stress levels and fatigue in the residents.

Sundowning remains vague and controversial with differing definitions for the phenomenon. Yet, there is a need to study agitation associated with the close of day. It is clear that such agitation increases in the afternoon and evening hours (Cohen-Mansfield, 2007). Even with the controversies regarding sundowning, most professionals agree the symptoms include confusion, agitation, anxiety, pacing, wandering, yelling, and resistance to redirection (Kim, Louis, Muralee, & Tampi, 2005). These symptoms do not only occur in persons who have dementia, and any person who has organic brain impairment or functional mental illness can

exhibit the symptoms (Dewing, 2003; Lesta & Petocz, 2006). It is estimated that 10 to 15 percent of the elderly with moderate to severe dementia in residential care facilities display sundowning (Lesta & Petocz, 2006; Satlin, Harper, Rheaume, & Volicer, 2003).

Though the etiology of sundowning is still uncertain there are several possible explanations. Abnormality in the circadian rhythm is one of the most well accepted explanations for sundowning. The circadian abnormalities progress especially in individuals with Alzheimer's disease, and sundowning is very common. The circadian rhythm is associated with the cycle of light and dark in a 24-hour period and influences individuals' physiology (Sharer, 2008).

The suprachiasmatic nucleus (SCN) is responsible for regulation of circadian rhythms, and the damage to the area may be a possible cause for disruptive behaviors related to sundowning (Kim, Louis, Muralee, & Tampi, 2005). The SCN is found in the hypothalamus that is located above the optic nerves; consequently the function of the SCN is related to light (Sharer, 2008). The SCN affects the core body temperature, heart rate, and hormone secretion (Sharer, 2008; Wu & Swaab, 2005). The breakdown of the SCN is caused by plaque buildup that increases with age. The abnormalities in the SCN cause sleep disturbance, agitation, and other negative behaviors associated with sundowning (Martin, Marler, Shochat, & Ancoli-Israel, 2000; Sharer, 2008).

Environmental factors, such as amount of light exposure, noise, activity levels during the day, disruptions during the night, medications, and comorbidities, may greatly influence the symptoms of sundowning. One investigation at a nursing home revealed that new environments (e.g., new residents, room changes), low lighting during the day, bright lighting during the evening, few activities, and increased napping during the day, contributed to sundowning in the

facility residents (Evans, 1987; Kim, Louis, Muralee, & Tampi, 2005). Environment seems to have a strong influence on the regulation of the circadian rhythm, and milieu improvement is an important part of managing sundowning.

Arousal

Arousal is referred to as an alteration of physiological and/or psychological responsiveness to stimuli (Clair, Chen, & Nakamura, 2011; Howells, Stein, & Russell, 2010). Arousal occurs at different levels and the Yerkes-Dodson Law (1908, as cited in Glass & Holyoak, 1986, p.102) explains the relationships between arousal and optimal task performance. When one has an optimal level of arousal (moderate level of arousal), his/her performance is at its greatest. If the arousal level further increases or decreases, his/her performance deteriorates (Baker, 2001; Glass & Holyoak, 1986).

When an individual has optimal arousal, the person is able to filter out irrelevant stimuli and focus on relevant stimuli. If one is hyper-aroused, the person becomes oversensitive and cannot distinguish relevant stimuli from irrelevant stimuli, which leads to impaired performance (Baker, 2001; Cohen, 1993). In general, the elderly have difficulty filtering relevant stimuli and irrelevant stimuli (Clair, Chen, & Nakamura, 2011) because they lose the ability to inhibit processing irrelevant stimuli, which is called "inhibitory deficit theory" (Clair, Chen, and Nakamura, 2011; Hasher & Zacks, 1988). When individuals with dementia cannot process external stimuli appropriately, they become overaroused, which may result in agitation.

Familiar Music, Unfamiliar Music, and Arousal

Familiar music is a stimulus that individuals with dementia can recognize and process, and this can possibly create optimal arousal in those with confusion and disorientation. Preferred familiar music may bring back comforting associations or feelings from the past that occurred

with singing in the family or dancing with partners. Hirokawa (2004) found that preferred music energized healthy older adults but decreased their tension. It is therefore important to determine an individual's preferred music prior to implementing a music therapy intervention.

On the other hand, unfamiliar stimuli require greater cortical processing than familiar stimuli due to novelty. Thus, unfamiliar stimuli may result in an excessive increase in arousal levels (Baker, 2001; Glass & Holyoak, 1986). Complex music may also increase the arousal level because it requires greater cognitive processing (Baker, 2001; Konecni & Sargent-Pollock, 1976; Scartelli, 1991). Therefore, simpler music may be more suitable for individuals with dementia. Repetitive music can decrease arousal levels due to familiarity and no additional requirement for attention and processing (Baker, 2001; Gardner, 1993).

Definition of Relaxation

Oxford Dictionaries Online defines relaxation as "the state of being free from tension and anxiety" (Oxford Dictionaries Online, n.d.). Generally, physiological responses, such as decreased heart rate, respiration, oxygen intake, muscle tension, and blood pressure, are observed when someone is relaxed (McCaffery & Beebe, 1989, as cited in Clair, 1996a, p. 120). Relaxation is closely related to arousal levels because overarousal means that one is not relaxed. An extended overaroused state negatively affects one's health and may contribute to detrimental conditions, such as heart attack and stroke (Benson, 1992, as cited in Clair, 1996a, p.119); therefore, coping with stress, such as learning relaxation techniques, is important for all individuals. However, most people with dementia are unable to initiate effective relaxation strategies on their own due to impaired cognitive function. Providing appropriate interventions to relax persons with dementia is important, so that they are not in a constant state of arousal, which is detrimental to their health (Clair, 1996a).

Engagement

Engagement implies "the act of being occupied or involved with an external stimulus, which includes concrete objects, activities, and other persons" (Cohen-Mansfield et al., 2011, p.860). Many nursing home residents spend very little time in meaningful activities which may result in apathy, boredom, depression, and loneliness. Engaging individuals with dementia in suitable activities has significant benefits, such as promoting positive emotions, improving ADLs, enhancing their quality of life, and decreasing negative behaviors (Cohen-Mansfield, Dakheel-Ali, & Marx, 2009).

Music Therapy and Engagement

A handful of studies investigated the effects of music therapy on engagement in various settings. Robb et al. (2008) provided Active Music Engagement (AME), music listening, and audio storybooks to children with cancer. Those who were in the AME group displayed significantly higher coping-related behaviors, such as a positive affect. Ghetti also utilized AME in her study in 2011. She offered AME and Emotional-Approach Coping to liver and kidney transplant recipients. The results showed that the former helped to significantly decrease pain, and the latter contributed to significant increases in positive affect. Both interventions significantly decreased negative affect, which is a sign of stress and anxiety.

Research concerning engagement in the elderly has been conducted as well. Clair (2002) trained family caregivers to use music with their loved ones who have dementia. She found that music applications were effective to increase mutual engagement between the couples. Also, the engagement was carried over into the post-music therapy interaction. In another study, activity staff members were trained by a music therapist to use music activities with individuals who have mid-stage dementia. The music therapist conducted the initial assessments, and the trained

activity staff led the following sessions. The results indicated that the staff members were able to successfully lead the activities, and the levels of engagement in the participants were stable throughout the sessions (Clair, Mathews, & Kosloski, 2005).

Music Therapy and Therapeutic Use of Music for Agitation in the Elderly

Various interventions and measurements have been used to investigate the effects of music therapy and practical use of music on agitation. Raglio et al. (2008) conducted a randomized controlled trial (RCT) with 59 individuals who had dementia. The researchers studied the effects of music therapy on behavioral and psychiatric symptoms in the participants. The interventions were based on non-verbal methods, encouraging the participants to play musical instruments as means of communication. The results revealed that the music therapy group demonstrated a significant decrease in delusions, agitation, anxiety, apathy, irritability, aberrant motor activity, and nighttime disturbance.

Lin et al. (2011) also conducted a RCT with 100 elderly adults with dementia. The interventionists were not music therapists but took several music therapy courses and were supervised by music therapists. The music intervention group showed a significant decrease in agitated behaviors. Choi, Lee, Cheong, and Lee (2009) found a similar result, a significant reduction in agitation was observed in the music therapy group. Although this study utilized a smaller sample size, the result is consistent with that of the above studies.

Wandering is also one of the typical agitation behaviors among persons with dementia (Cohen-Mansfield & Billig, 1986). Groene (1993) studied wandering behaviors of individuals with dementia of Alzheimer's type. The baseline data were collected between 2:00 p.m. and 5:30 p.m., which is the typical time frame for sundowning. One group received 5 music therapy and 2 reading sessions, and the other group received 5 reading and 2 music therapy sessions.

The music therapy interventions included singing, playing rhythm instruments, listening, dancing, and moving to music. The researcher found that the participants in both groups remained seated or stayed in the area during music therapy for a longer period of time than during reading sessions. These results indicate that music therapy was more likely to engage the participants and to decrease wandering than reading sessions were.

Similar to Groene's study, Brotons and Pickett-Cooper (1996) utilized various music therapy interventions to manage agitation of persons with Alzheimer's disease as well. The researchers used a hello song, movements, musical games, simple composition/improvisation, and group singing. The results were decreased agitation behaviors of crying and pacing during and after the music therapy sessions.

Clair and Bernstein (1990) created a protocol that is later utilized in several investigations. The original study was conducted with severely regressed individuals with Alzheimer's disease. Although the participants' cognitive, physical, and social functions declined over the course of a 15-month period, they maintained their ability to engage in structured music therapy groups. The participants sat in their chairs without restraints during the 30-min sessions, which was the only time that they were able to successfully participate in social interaction.

Other researchers replicated Clair and Bernstein's protocol. Suzuki et al. (2004) investigated its influences for elderly individuals with dementia. The participants received music therapy twice a week for 8 consecutive weeks. The results demonstrated that confusion, irritability, and agony significantly decreased in the treatment group, whereas the control group did not have significant changes. Endocrinological stress was assessed with salivary chromogranin A (CgA), and the findings revealed that the treatment group had significantly

lower endocrinological stress levels after the final music therapy session. The effects of the music therapy did not have a residual effect a month after the termination of the intervention, however. This result suggests that clients need to continue to receive music therapy in order to benefit from it.

Similarly, Kumar et al. (1999) examined the effects of active music making based on Clair and Bernstein's protocol (1990) with individuals with Alzheimer's disease. Professional music therapists provided 30- to 40-min sessions from Monday to Friday for 4 weeks. The participants were able to actively engage in music therapy, such as singing familiar songs, learning new songs, learning rhythm patterns, following dynamics changes, and interacting with others. Music therapy stimulated alertness, memory recall, motor functions, and verbal skills.

The results revealed that the participants' serum melatonin levels significantly rose after the 4-week music therapy sessions and further increased at the time of the 6-week follow-up. The researchers noted that stimulation created by music therapy facilitated self-expression and emotional connections which helped to calm and relax the participants. These findings are noteworthy because melatonin is closely tied to the circadian rhythm (Kumar et al., 1999) and an imbalance in the circadian rhythms is considered one possible cause of sundowning (Kim, Louis, Muralee, & Tampi, 2005; Sharer, 2008).

In addition to reported studies with live music and music therapy interventions, recorded music has been utilized in several studies. In 1992, Gerdner conducted a pilot study that investigated the effects of individualized music on agitation in elderly adults with dementia that demonstrated positive outcomes (as cited in Gerdner & Schoenfelder, 2010, p.7). In a follow-up study that used preferred recorded music, participants had significant reductions in agitation

during individualized music interventions and for 30 min immediately following the intervention (Gerdner, 2000; Gerdner & Schoenfelder, 2010).

Clair and Bernstein (1995) investigated the effects of different background sounds on agitation in a residential care facility where all residents were exposed to no music, recorded dance music, and recorded relaxation music. No significant differences were found among the three conditions. The authors concluded one music selection played as background for all persons in an environment was not effective and recommended using music selected according to individual's preferences. Further, professionally structured music interventions might result in more desirable outcomes.

A combination of live and recorded music was studied by Cooke, Moyle, Shum, Harrison, and Murfield (2010) in a randomized crossover design with music and reading groups. Forty-seven individuals with dementia participated, and the maximum number of participants in each group was 16. In the music group, two musicians led group singing and also provided recorded instrumental music. For the control group, a trained facilitator read local news/short stories and led quiz activities. There were no significant differences in reduction of anxiety and agitation between the two groups. The authors concluded that music singing and listening along with reading activities are not effective in large groups to manage agitation. It seems interventions provided by trained music therapy professionals in small group or one on one settings are necessary for desired outcomes in agitation management.

Effects of Singing

Many elderly individuals positively respond to familiar music. Some may respond well to the music from their teenage years to young adulthood, or others may show more reaction to the songs from their childhood. In addition, spiritual music appears to be meaningful for those

with faith backgrounds (Clair, 1996a). Singing familiar songs from the past is possible, even when individuals with dementia lose their ability to verbally communicate effectively. This is because performing acquired musical tasks, such as singing and playing familiar songs, involves procedural memory (Ridder, 2003). This memory is a type of long-term memory and does not require consciousness to perform previously learned skills (Okano, Hirano, & Balaban, 2000).

According to Thaut (2008), individuals with memory problems, such as Alzheimer's disease, retain musical information longer than the majority of their non-musical memory. This may occur when musical memory is deeply embedded into the brain and more resistant to neurodegenerative conditions. This is why individuals with memory impairments are able to engage in interaction through music.

The power of familiar songs to engage the elderly with dementia can be used to influence their behaviors. According to the article "Musical Prescriptions" by Sarah Godcher-Murphy (2002), Dr. Connie Tomaino, music therapist, stated at the Music and Neurology symposium at Berklee College of Music that unfamiliarity exacerbates symptoms of sundowning; therefore, it is important to create environments that are familiar to the elderly through appropriate music before they exhibit sundowning (Godcher-Murphy, 2002; Lesta & Petocz, 2006). Group singing can create a secure, peaceful environment and enhance social interaction (Lesta & Petocz, 2006; Whitcomb, 1994). Singing clients' favorite songs creates a predictable environment (Lesta & Petocz, 2006).

Singing also facilitates deep breathing and encourages oxygenation and physical relaxation that can result in an enhanced mood and positive behavioral outcomes (Clair, 2000; Lesta & Petocz, 2006). Individuals with late stage dementia may not be able to follow verbal instructions, such as "Take a deep breath"; however, singing familiar songs helps those with

severe dementia take deep breaths because singing naturally uses deep inhalation and slow exhalation (Clair, 1996a).

Singing not only has positive influences on persons who are able to actively participate, but also on those who do not respond to most stimuli due to severe dementia. Clair (1996b) examined the effects of silence, singing, and reading on alert responses in individuals with late stage dementia. The results showed that singing elicited the most frequent alert responses, and reading elicited the next most frequent responses, although no statistically significant difference occurred between the singing and reading interventions. Alert responses during silence were significantly lower than responses to singing or reading. It may be that singing familiar songs shifts attention and subsequently engages active participation of people with late-stage dementia.

Entrainment

Entrainment occurs very naturally in human beings. One's motor movements and other physiological mechanisms are likely to synchronize with the musical pulse in the environment. Bernardi, Porta, and Sleight (2006) found that participants' ventilation, blood pressure, and heart rate increased when they listened to fast music. Human bodies and musical pulse/rhythm have a close relationship, and rhythms in music capture one's attention due to neural entrainment in the brain (Schneck, Berger, & Rowland, 2006). The rhythmic stimulus provides cues to the auditory and motor areas of the brain, and this results in motor synchronization (Thaut, 2008).

Rationale for Music Interventions

Providing individualized interventions to manage agitation is important for maximum results. Preferred music typically evokes pleasant associations and provides individuals with feelings of comfort. In addition, musical memory remains in the brain longer than other types of memories and is resistant to neurodegenerative conditions (Thaut, 2008). This is why persons

with dementia can still recognize and sing familiar songs even after they have lost their ability to verbally communicate in an effective manner. Singing songs that individuals listened to or sang many times involves procedural memory (Ridder, 2003). Participating in singing also increases oxygenation and promotes relaxation because singing naturally uses deep inhalation and slow exhalation (Clair, 1996a).

Familiar music also creates predictable environments that individuals with dementia can engage and process, whereas unfamiliar stimuli are often confusing and anxiety-provoking for them. According to Glass and Holyoak (1986) and Baker (2001), familiar stimuli require less cortical processing than unfamiliar stimuli, meaning that the former causes less stressful arousal than the latter does.

Repetitive music can also decrease arousal levels due to familiarity and no additional requirement for attention and processing (Baker, 2001; Gardner, 1993). Thus, repeating familiar lyrics is calming for those with dementia because this is less likely to cause stressful arousal. When persons with dementia are overaroused due to being unable to process unfamiliar surroundings, preferred music may shift their overarousal to more desirable levels (moderate or low arousal levels), which leads to decreased agitation.

Regarding the delivery of music interventions, live music is flexible and facilitates the process to elicit smooth arousal shift through entrainment. When a person is agitated or anxious, she/he tends to have irregular breathing patterns. The steady beat of music promotes stable breathing patterns because rhythmic entrainment naturally occurs in human beings. The tempo and dynamics of the music are matched to the participants' vocal and physical motor activity levels at first. For instance, if a participant is verbally loud and has fast paced movements of the upper or lower limbs, the music therapist uses music that is fast and loud. The participant's body

movements are likely to entrain to the music, such as toe tapping to the beat. Then, the music therapist gradually changes the music to softer and slower music that calms and quiets the person. This method facilitates a gradual reduction of agitation.

On the other hand, when a person is not agitated but is likely to become agitated at a particular time of day, soft quiet music can be introduced just prior to the expected agitation outbreak to facilitate relaxation. With active engagement in singing prior to the usual agitation occurrence, the incidence of agitation may be altogether avoided.

Live singing also creates an opportunity for human contact and becomes a meeting point between the singer and the listener. It draws attentional reaction, eye contact, and affective response even when the listeners cannot have meaningful conversation. Instrumental accompaniment enhances the musical quality and helps to achieve a wide range of dynamics and tonality.

Newspaper Reading

When researchers compare the influences of various stimuli for nursing home residents, reading the newspaper and magazine articles is often included (Cook, 1998; Harper Ice, 2002; Cohen-Mansfield & et al., 2012). This is because reading is one of the activities that nursing homes staff offer to residents. Newspaper reading is usually part of their current event groups (Cook, 1998). Listening to newspaper reading and talking about articles provide residents with opportunities for engagement and participation in activities. This intervention was utilized as the control condition in this study.

Summary

The literature shows individuals with sundowning become more confused, anxious, and agitated during the late afternoons and evenings. Abnormality in the circadian rhythm is one of

the most well accepted theories for sundowning, and environmental factors, such as noise, unfamiliar space, and shift change, can exacerbate the symptoms of sundowning.

Sundowning is managed by pharmacologic and non-pharmacologic approaches, including music therapy. Music therapy designed by trained professionals provides a focus of attention and structured environment. It is likely most effective when initiated before agitation becomes severe for maximum results. Music therapy has a great potential to decrease the symptoms of sundowning through its familiarity and predictability.

Restatement of Purpose

The purpose of this study was to examine the effects of a guitar-accompanied singing intervention on sundowning in individuals with dementia. Specifically, this investigation was conducted to answer the following research question: Can music therapy or newspaper reading decrease sundowning symptoms in elderly persons with dementia?

CHAPTER 3

Methodology

Participants

Participants were recruited from two nursing care facilities in the Midwest. The activity directors at the care facilities presented the study to the guardians of residents who met the following criteria: (a) 65 years-old or older, (b) stage 5, 6, or 7 dementia according to the Functional Assessment Staging Test (FAST) (Reisberg, 1988; The University of Texas Health Science Center at San Antonio, 2012), (c) signs of sundowning (e.g., increased motor agitation, yelling, and aggression in the late afternoon and early evening) observed by facility staff, and (d) functional auditory skills with or without assistive devices, such as a hearing aid and/or hearing amplifier.

Design

The investigator, a board-certified music therapist with 9 years of clinical experience, conducted a 10-min single session with each participant in either music therapy or newspaper reading condition. The duration of each session was determined based on clinical experiences of individual music therapy with persons who display agitation. Groene's (1993) interventions were 7 to 15 min, and participants demonstrated greater engagement and wandered less during music therapy than during reading interventions. The duration of 10 min was expected to be sufficient to change one's arousal level and decrease his/her agitation.

Only a single session was offered to each participant because providing consecutive sessions might possibly be influenced by medication changes on the participants. Tracking medication adjustment would require additional assistance from other medical professionals, and this investigation did not have the capacity for this further process.

Each individual might have slightly different onset times of his/her sundowning symptoms (e.g., increased motor agitation, yelling, and aggression), and session times were scheduled to begin slightly before typical sundowning outbreaks. Dr. Tomaino, D.A., MT-BC (Godcher-Murphy, 2002), who is the Executive Director and co-founder of the Institute for Music and Neurologic Foundation, recommended this approach (CenterLight Health System, 2013). She has conducted numerous music therapy research studies, especially with persons who have neurologic disorders (Nour Foundation, 2012). This investigator consulted with nursing home staff regarding the patterns of sundowning for each participant and determined the approximate starting time of each session. For instance, if a participant usually displays sundowning symptoms around 4 p.m., this investigator initiated the intervention, either music therapy or newspaper reading, at approximately 3:50 p.m.

The initial plan was to use a between-subject design and compare the difference in the agitation scores between the treatment and control conditions using an independent sample *t*-test. However, the number of the participants gathered was small; therefore, statistical tests were not conducted. The data are presented as a series of case studies in the Results Chapter.

Materials

Materials for this study included the Kansas City Star newspaper, Functional Assessment Staging Test (FAST) (Reisberg, 1988; The University of Texas Health Science Center at San Antonio, 2012) [See Appendix B] and the Pittsburgh Agitation Scale (Rosen et al., 1994) that was modified by the investigator for this study [See Appendix C]. An Eastman E6OM orchestral model acoustic guitar with steel strings (Eastman Guitars, 2012) was utilized to accompany singing. The guitar produces a pleasant tonal quality and deep base sounds. The sounds of the steel strings were loud enough for individuals to hear, even when a finger picking style was used.

A Samsung W300 Rugged Full HD 1080p Pocket Camcorder (Samsung, 2013) was utilized to record the sessions for the purpose of data collection. Various songbooks were selected for the study [See Appendix F for a list of songbooks/websites and Appendix G for a list of possible songs.].

Environmental Setting

The sessions were conducted in each participant's room. Some participants were in bed, and others were sitting in a chair, recliner, or wheel chair. The television, radio, and CD players were turned off, so that the participants could hear the investigator's music or newspaper reading.

Procedure

The activity directors at the nursing care facilities contacted the guardians of residents who fit the criteria for the study. The guardians, who agreed to allow their loved ones to participate in the study, signed the informed consent. The consent forms were gradually returned to the activity directors. The investigator made a list of eligible participants in the order that the activity directors presented the consent forms to her. The investigator provided the music therapy intervention to the first person on the list and used this video to train the research assistant in data collection. Thus, this person was not counted as a participant, and her data were excluded from this study. The investigator provided music therapy or newspaper reading alternatively to the participants by following the order of the participant-list she had created above; for example, participant 1, 3, 5, and 7 received music therapy, and participant 2, 4, 6, and 8 received newspaper reading. The investigator provided all sessions in both groups individually. She gathered information about the participants' musical preferences from facility staff prior to the music therapy intervention.

In late afternoons approximately between 3:00 p.m. and 5:00 p.m., individual sessions were offered to the participants. The investigator read the assent script [See Appendix D] at a slow pace, and participants were asked to provide assent for participating in the study. If participants were unable to provide assent due to cognitive impairment, the investigator watched their non-verbal response, such as facial expression and body language. If there were no apparent signs of refusal, the investigator moved onto the next step. The participants were guided or brought to their respective sleeping room. If the participants needed to use the toilet, the facility staff assisted the participants prior to the interventions.

When the participants arrived at their rooms, the investigator positioned a chair in which she sat for the session. She placed a video camera behind the chair and slightly to the side to record the participants as they faced her. To begin the session the participants were seated in a chair, recliner, or wheel chair, or lying down in bed. The investigator then pushed the start button on the video camera. She sat in her chair and began conducting the session. If a participant, who is non-ambulatory, attempted to stand up, the investigator encouraged him/her to remain seated for safety reasons. If emergent interventions, such as PRN medication and restraint, were applied, the investigator would state what method was used (e.g., "PRN medicine was given." "Restraint is started." "Restraint is ended.").

When the 10-min session was complete or needed to be discontinued (e.g., participant's unredirectable sundowning symptoms, such as excessive motor agitation and aggression, and/or decision to stop participating in the session), the investigator stood up and stopped the video recording. If a participant displayed unmanageable sundowning symptoms, the investigator notified facility staff, who then assisted the participant. If a participant was awake at the end of

the session, the investigator thanked him/her for his/her participation. If a participant required transportation to another area of the facility, the investigator or facility staff provided assistance.

Treatment group intervention. Once a music therapy session began, the investigator matched the tempo and dynamics of the music to the participant's activity level. For example, if the participant appeared very agitated, such as moving his/her limbs restlessly and/or being vocally loud, the investigator began singing with acoustic guitar accompaniment in a fast speed with a strong, loud sound. She sang participant-preferred music identified by the activity director and/or participant prior to the session by memory with guitar accompaniment. When the investigator observed entrainment (i.e., foot tapping in time with the music, inhalation and exhalation in time with the music), she gradually shifted the singing and accompaniment to slower and softer music. The music-entrained responses were expected to correspond with the slower and softer music changes; thus, the participant's sundowning symptoms would subside as the music became calmer.

If the participant was calm at the beginning of the intervention, the investigator sang participant-preferred music slowly and softly with the guitar to maintain a low level of or no sundowning symptoms. As the investigator sang and played, she made frequent eye contact with the participant and maintained a facial expression that reflects positive affect. The investigator sang the first verse of each song 3 times unless the participant indicated that he/she would like to move on to the next song. If the participant needed redirection, such as a non-ambulatory person trying to stand up, the investigator provided verbal directions and quickly returned to the music therapy intervention.

Control group intervention. The control group sessions began and ended identically to the music therapy sessions. For the control application the investigator sat quietly in front of

each participant and stated, "I'm going to read the Kansas City Star."   If a participant was able

to identify his/her interests, the investigator read the articles related to the participant's interests.

If a participant could not identify his/her interests, the investigator read the articles from the

inner sections of the newspaper, such as cooking, gardening, or sports. When the participant

asked the investigator questions, she responded to the questions and resumed reading the

newspaper.

Data Collection

The Pittsburgh Agitation Scale (PAS) (Rosen et al., 1994) was adapted to measure the

level of participants' agitation. The PAS is relatively easy to use and fits the needs to describe

agitated behaviors in short-term investigations as conducted in this study. Interrater reliability

and measures of validity of the PAS were tested on an acute psychogeriatric inpatient unit and in

a nursing home. The Interrater reliability at the former was +0.82, and the latter demonstrated

+0.93 interrater reliability (Rosen at al. 1994). Validity at the nursing home found significant

correlations between one observer and the other rater who used the real-time microcomputer

monitoring system in "Aberrant Vocalization (r= +0.64; p< 0.01), Motor Agitation (r= +0.61;

p<0.01), and Aggressiveness (r= +0.89; p=0.001)" (Rosen at al. 1994, p.55). The PAS is a

reliable tool for measuring agitation (Rosen et al., 1994).

Neville and Byrne (2001)**,** who reviewed 31 rating scales for behaviors of persons with

dementia, identified the PAS as one of the five appropriate scales for agitation in dementia care.

The PAS has been used in various studies, such as a supervised exercise program for elderly with

cognitive impairments (Aman & Thomas, 2009), Snoezelen therapy for persons with dementia

(Staal et al, 2007), and aromatherapy for individuals with severe dementia (Holmes et al, 2002).

The PAS has 4 major categories of behaviors (aberrant vocalization, motor agitation, aggressiveness, and resisting care). Each category has 5 intensity levels from 0 (not present) to 4 (most intense) with rubrics that specifically describe behaviors included within each intensity level. In this investigation, only the first three categories of the PAS were used: aberrant vocalization, motor agitation, and aggressiveness. The fourth category, resisting care, was irrelevant since no personal or medical care was provided during the treatment/control interventions except for emergent circumstances. This investigator trained a research assistant, who was not involved in the delivery of interventions, to obtain observational data with the use of the PAS. The rubrics are:

> Aberrant Vocalization (repetitive requests or complaints, non-verbal vocalizations, e.g., moaning, screaming):
>
> > 0. Not present
> >
> > 1. Low volume, not disruptive in milieu, including crying
> >
> > 2. Louder than conversational, mildly disruptive, redirectable
> >
> > 3. Loud, disruptive, difficult to redirect
> >
> > 4. Extremely loud screaming or yelling, highly disruptive, unable to redirect
>
> Motor Agitation (pacing, wandering, moving in chair, picking at objects, disrobing, banging on chair, taking others' possessions. Rate "intrusiveness" by normal social standards, not by effect on other patients in milieu. If "intrusive" or "disruptive" due to noise, rate under "Vocalization."):
>
> > 0. Not present
> >
> > 1. Pacing or moving about in chair at normal rate (appears to be seeking comfort, looking for spouse, purposeless movements)

2. Increased rate of movements, mildly intrusive, easily redirectable

3.Rapid movements, moderately intrusive or disruptive, difficult to redirect

4. Intense movements extremely intrusive or disruptive, not redirectable verbally

Aggressiveness (score "0" if aggressive *only* when resisting care):

0. Not present

1. Verbal threats

2. Threatening gestures; no attempt to strike

3. Physical toward property

4. Physical toward self or others (p.58)

The research assistant was trained to use a time sampling method (Hall, 1974) to record the agitation levels every 15 s for each individual using the PAS rubrics. The assistant marked the highest intensity that was occurring for each PAS behavior category every 15 s. An auditory recording that cues the research assistant to observe the videos at the end of each 15-s interval was used for a maximized accuracy of time sampling. When the assistant heard the cues, he looked up at the videos for a moment and then recorded the levels of agitation on the data collection sheet [See Appendix E]. The assistant conducted inter-rater reliability tests with the investigator, and the training continued until a criterion of .90 [(number of agreements) divided by (the number of agreements + number of disagreements) × 100] (Hall & Van Houten, 1983) was reached. Data from the training video were not used in this study.

In addition, the research assistant and investigator conducted inter-rater reliability tests on 2 participants (participant 3 who was in the treatment group and participant 6 who was in the control group) to monitor observer drift throughout the data collection process. If the inter-rater reliability fell below the .90 criterion, the research assistant was re-trained until the criterion was

met. The research assistant observed each video for each participant three times to collect the

data regarding agitated behaviors. In the first round of the data collection, he recorded the level

of aberrant vocalization, and in the second round, he recorded the level of motor agitation. In the

third round, the research assistant recorded the level of aggressiveness. During the third viewing

of the videos, the research assistant also recorded emergent interventions, such as seclusion, PRN

medication, restraint, and/or other interventions, if any of these were used during the rating

period.

Data Analyses

Individual scores of each behavior category were entered into an Excel Spreadsheet. The

initial intent was to utilize an independent sample *t*-test to analyze the data. However, the

number of participants who completed the sessions was small; therefore, statistics were not

conducted. The data are presented as a series of case studies with descriptions and graphs. The

scores of the three agitation categories in each participant are identified. In addition, the total

scores of the agitation categories in all participants are added to examine which type of agitation

was most frequent. Average levels of three agitation categories per 15-s time sample were

calculated, comparing the differences between the treatment and control groups.

CHAPTER 4

Results

Twenty-one nursing home residents met the criteria for the study. Their guardians were

contacted and informed about the investigation by the activity directors. Eleven guardians

signed the informed consent for their loved ones. Two out of 11 residents declined to receive the

interventions. The data on one participant were utilized to train the research assistant regarding

data collection; therefore, her demographic information and data were excluded from this thesis.

Out of the remaining 8 participants (*N*=8), 5 of them were female and 3 of them were male. The

age of the 8 participants ranged from 67 to 92, and the average was 84.1. Four (*n*=4) received

music therapy, and the other four (*n*=4) listened to newspaper reading.

For two participants in the control group (newspaper reading), the investigator had to

discontinue interventions in the middle of their sessions. Participant 2 exhibited the sundowning

symptom of motor agitation and attempted to leave the area by moving his wheel chair on his

own. Participant 6 asked the investigator to discontinue the session in the middle. Thus, six

participants completed the entire 10-min sessions. The research assistant collected data on all

participants, including those who completed the sessions and did not, for the time of their

participation.

Although the initial intent of this investigation was to analyze the collected data using an

independent sample *t*-test with 30 participants, only 6 participants completed the entire study.

Statistics were not viable with this small number of participants; thus, the results are discussed as

case studies of 8 participants, who entirely or partially completed the study. As the consents

were gradually returned to the activity directors from the guardians, the investigator began

conducting the sessions. Odd-numbered participants received music therapy and even-numbered

participants received newspaper reading.

Participant Case Studies

Participant 1 was a 78-year-old male with the FAST scale of 7a, who received the music

therapy intervention. He was able to provide an assent to the investigator prior to the

intervention. According to the activity director at the nursing facility, participant 1's musical

preferences were country and Native American flute music. Because he appeared calm at the

beginning of the session, the investigator began softly singing well-known country songs while

fingerpicking the acoustic guitar. Participant 1 continued to rest with his eyes closed most of the

time while the investigator was singing and playing country music. His feet moved several times,

but it appeared that he was trying to keep the beat of the music for a short period of time.

Participant 1 completed the entire 10-min session. His total score for aberrant vocalization was 0,

motor agitation was 1, and aggressiveness was 0. Participant 1 seldom displayed the signs of

sundowning. The vertical line of the graph below illustrates the level of agitation. The

horizontal line shows time sampling units (a 10-min session consists of 40 observe-periods each
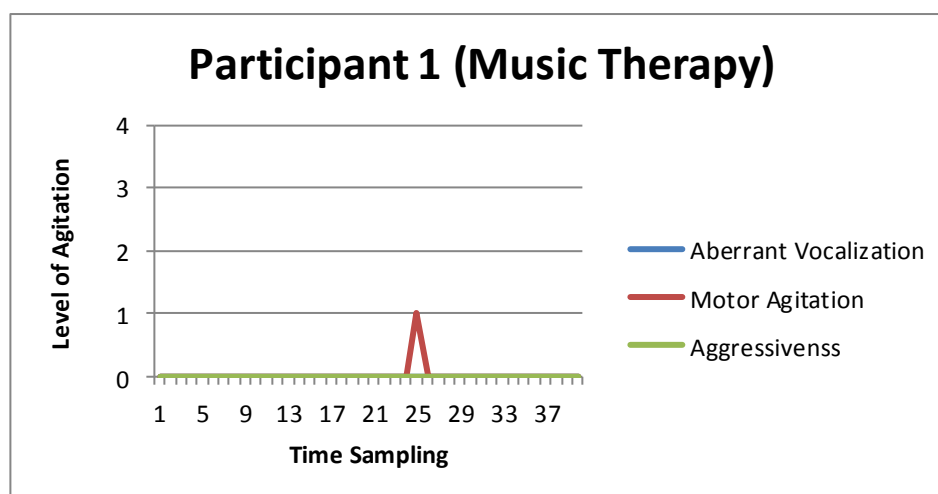
15 s.).

Figure 1. Participant 1 Level of Agitation on the modified Pittsburg Agitation Scale

Participant 2 was a 92-year-old male with the FAST scale of 7c, who received the newspaper reading intervention. He was unable to engage in effective verbal communication. Prior to the session, he was moving his wheel chair with his hands and feet in the common area and not engaging in any meaningful interaction. Participant 2 propelled his wheel chair in a backward motion at times, and it stuck against such objects as a table and chair. He was restless and clearly displayed signs of sundowning prior to the session.

A staff member pushed the participant's wheel chair to his room for this investigation, and he closed his eyes and appeared to calm down a little. However, participant 2 began moving his wheel chair while the investigator was reading the inner section of the Kansas City Star. At one point, he placed his hand on another wheel chair in the room and attempted to pull it. Because he was not redirectable, the investigator ended the session. Staff was notified and brought participant 2 back to the common area. The total session time was 2 min 15 s. His total score for aberrant vocalization was 0, motor agitation was 9, and aggressiveness was 0 for the duration of the session**.**

Figure 2. Participant 2 Level of Agitation on the modified Pittsburg Agitation Scale

Participant 3 was a 67-year-old female with the FAST scale of 7d, who received the music therapy intervention. She was non-verbal and did not respond to yes/no questions**.** She was sitting in a wheel chair and leaning towards one side. Because her FAST scale was 7d, which is the "ability to sit up without assistance lost" (Reisberg, 1998; The University of Texas Health Science Center at San Antonio, 2012), she was in late stage dementia. According to the activity director, participant 3's musical preferences included hymns, country, and oldies. She kept her eyes closed and remained quiet throughout the session. Participant 3 completed the entire 10-min session. Her total score for aberrant vocalization was 0, motor agitation was 0, and aggressiveness was 0. She displayed no signs of sundowning during the session.
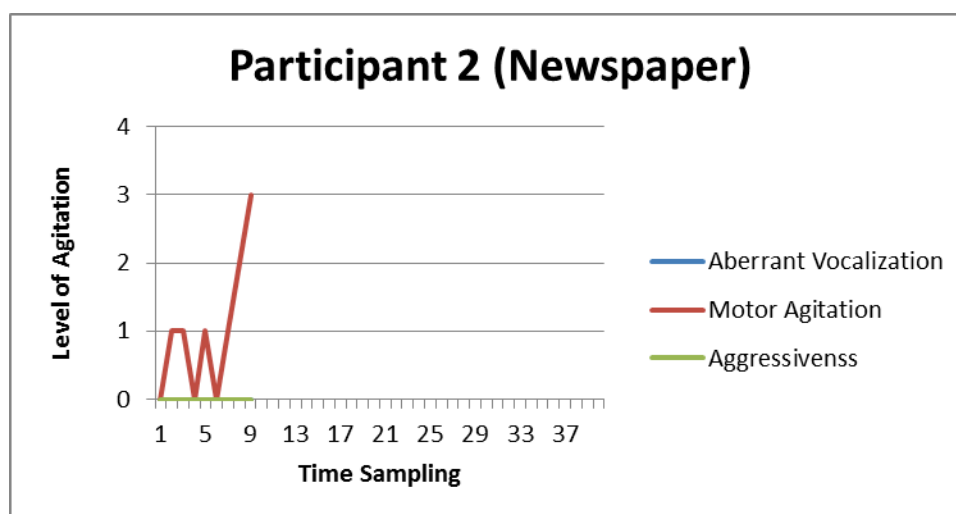

Figure 3. Participant 3 Level of Agitation on the modified Pittsburg Agitation Scale

Participant 4 was an 81-year-old male with the FAST scale of 6e, who received the newspaper reading intervention. He was able to give the investigator an assent prior to the intervention. The participant also responded to simple questions, such as "Do you like sports?" and "Do you like cars?", when the investigator asked him about his preferences for the newspaper reading. Participant 4 moved his hands at times but was quiet and calm overall. He looked down most of the time and rarely made eye contact with the investigator. Participant 4 completed the entire 10-min session. His total score for aberrant vocalization was 0, motor agitation was 3, and aggressiveness was 0. Participant 4 showed minimal symptoms of sundowning during the session.

Figure 4. Participant 4 Level of Agitation on the modified Pittsburg Agitation Scale

Participant 5 was a 91-year-old female with the FAST scale of 6e, who received the music therapy intervention. She was able to verbally communicate and gave the investigator an assent prior to the intervention. When the investigator asked the participant about her musical preferences, she stated, "I like good music." The investigator chose popular songs based on the participant's age. The participant sang part of the songs along with the investigator and briefly made positive comments about the music. She gently moved her hands to the music in a small range at times and closed her eyes towards the end of the session. Participant 5 completed the entire 10-min session. Her total score for aberrant vocalization was 0, motor agitation was 1, and aggressiveness was 0. Participant 5 seldom displayed the signs of sundowning during the session.
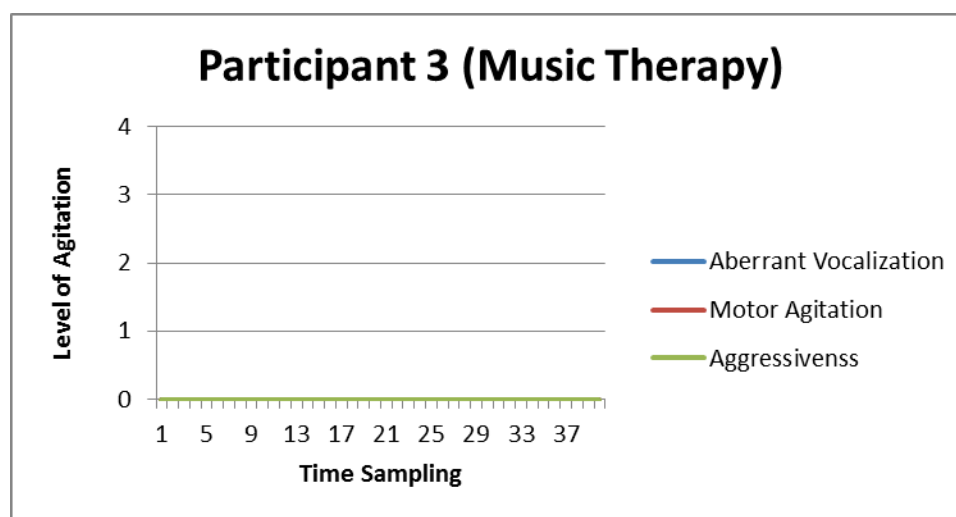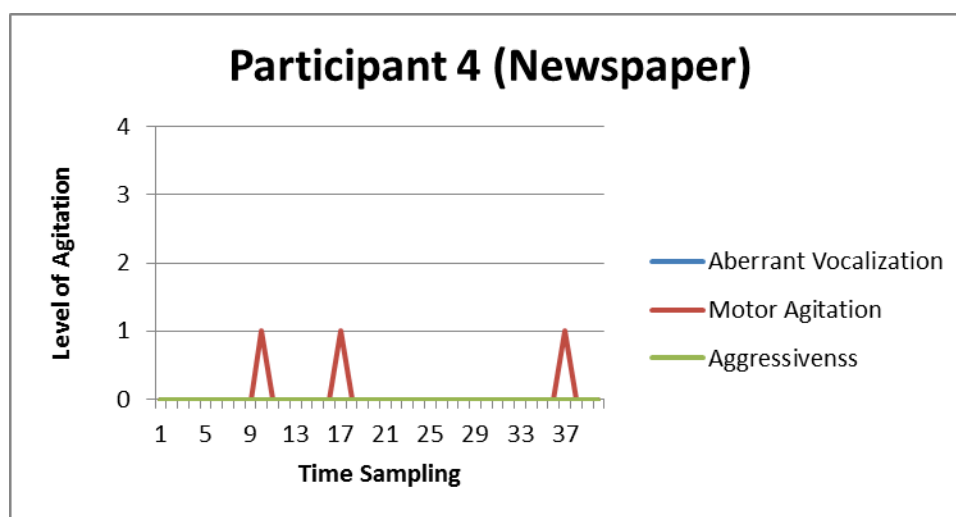

Figure 5. Participant 5 Level of Agitation on the modified Pittsburg Agitation Scale

Participant 6 was an 88-year-old female with the FAST scale of 6b, who received the newspaper reading intervention. She had the ability to verbally communicate and gave the investigator an assent prior to the session. When she heard that the investigator was a university student during the assent process, the participant "really wanted to help". The investigator began reading the inner sections of the Kansas City Star.

In the middle of the session, however, the participant began showing the signs of restlessness, such as moving her hands frequently and shifting herself in the chair. Because the participant also frowned and verbalized that she had difficulty grasping the contents of the newspaper, the investigator switched the article to a possibly simpler topic. A few minutes later, the participant again stated she could not understand the content very well. Since she appeared frustrated, the investigator asked the participant whether she wanted to continue or discontinue the session. The participant chose to discontinue the session, and the investigator stopped the video recording and thanked the participant for her time.

The total session time was 5 min. Her total score for aberrant vocalization was 2, motor agitation was 10, and aggressiveness was 0 for the duration of the time. It was uncertain if her motor agitation was due to sundowning. Her dementia might have contributed to her frustration and agitation due to being unable to comprehend the newspaper contents. The figure is presented on the next page.
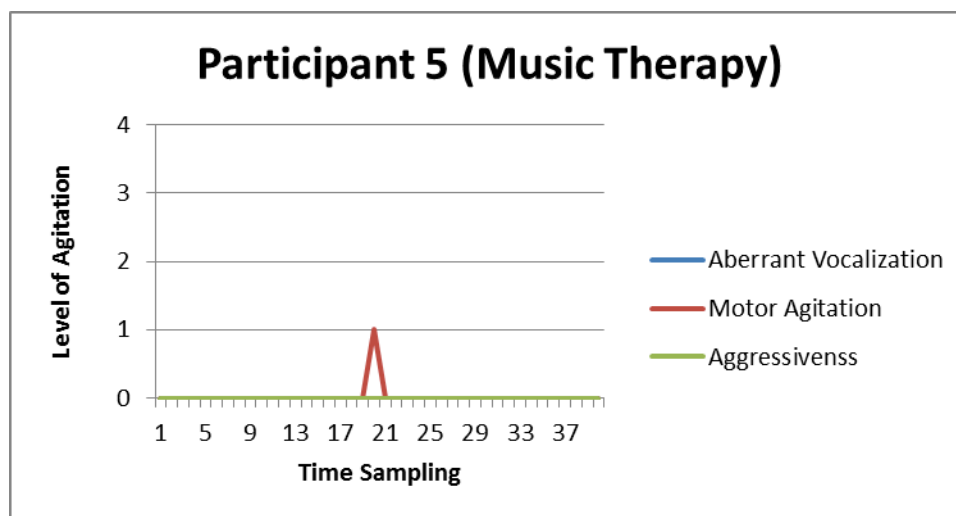
Figure 6. Participant 6 Level of Agitation on the modified Pittsburg Agitation Scale

Participant 7 was an 87-year-old female with the FAST scale of 7a, who received the music therapy intervention. The activity director reported 1930s and 1940s music as the participant's musical preferences. She appeared extremely confused, such as talking to herself and making vocal sounds. Two staff members were needed to walk the participant to a chair in her room since her ambulation was unstable. Transferring her from one place to another seemed to further increase her agitation. Although these behaviors are common in persons with dementia, participant 7's symptoms might be exacerbated by sundowning in the late afternoon.

The participant made vocal sounds at the beginning of the session; however, she began humming melodies while the investigator was singing 1930s and 1940s popular songs. Although the participant could not hum the correct melodies, it was obvious that she was responding to the music. Her aberrant vocalization completely disappeared when approximately 4 min past. She was placing her hands on her lap and randomly moved them at times; however, her motor agitation also disappeared when 7 min and 15 s past. Overall participant 7's sundowning symptoms decreased as the session progressed, and she completed the entire 10-min session. Her total score for aberrant vocalization was 5, motor agitation was 6, and aggressiveness was 0.
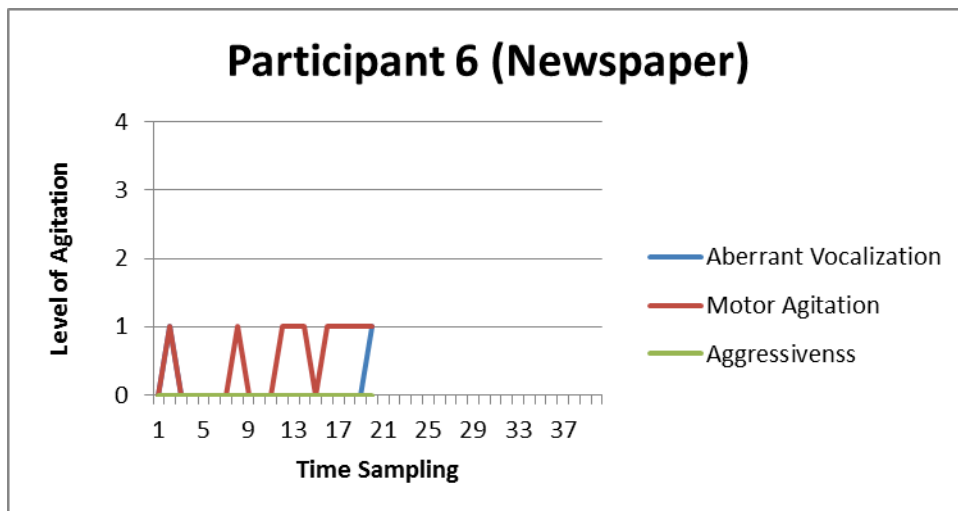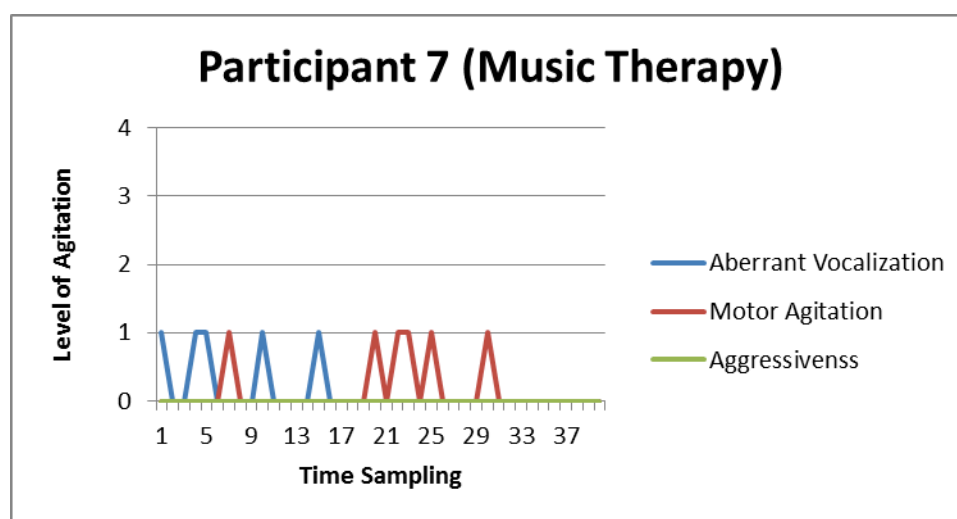

Figure 7. Participant 7 Level of Agitation on the modified Pittsburg Agitation Scale

Participant 8 was an 89 year-old female with the FAST scale of 6a, who received the newspaper reading intervention. She was able to provide an assent prior to the session. The participant also responded to questions, such as "Do you like roses?", when the investigator was attempting to identify the participant's preferences for the newspaper reading. She quietly listened to the investigator read the inner sections of the Kansas City Star. Although the participant sometimes moved her feet, overall she quietly and receptively participated in the newspaper reading session. After the intervention, the participant stated she always liked to read the newspaper. Participant 8 completed the entire 10-min session. Her total score for aberrant vocalization was 0, motor agitation was 6, and aggressiveness was 0. She exhibited moderate signs of sundowning during the session.
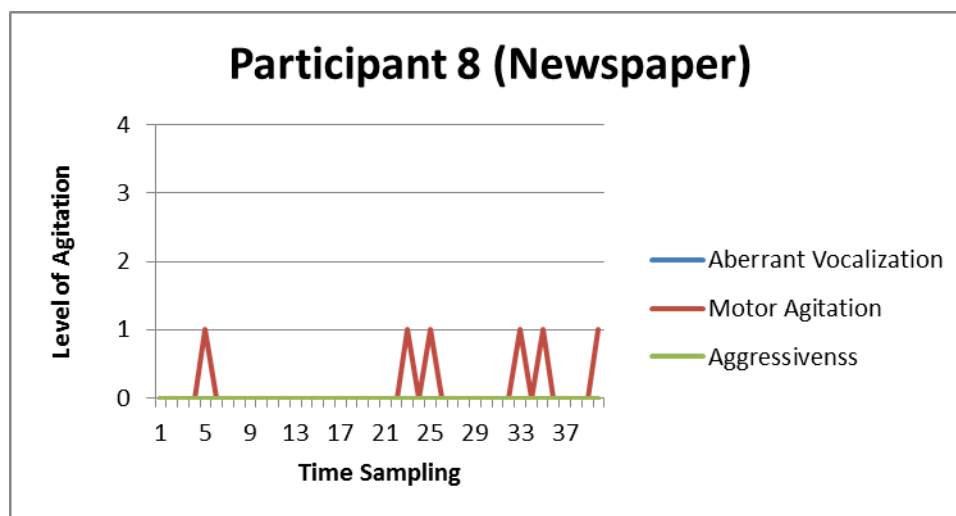
Figure 8. Participant 8 Level of Agitation on the modified Pittsburg Agitation Scale

Trend

The total scores of each agitation category in the above participants are the following: aberrant vocalization = 7, motor agitation = 36, and aggressiveness = 0. These results show that the participants exhibited a considerably greater number of motor agitation than the other two agitation categories. Aberrant vocalization was observed in a few participants, and none of the participants displayed aggressiveness.

Out of the total aberrant vocalization score which was 7, the total score for the treatment group was 5, and 2 for the control group. The number of time samples collected for the former was 160 since all participants completed the entire 10-min session consisting of 40 time samples (15 s * 40 = 10 min). The number of time samples collected for the latter group was 109 since sessions with two participants had to be discontinued in the middle. The average levels of aberrant vocalization per 15-s time sample were 0.03 (5 divided by 160) for the treatment group and 0.02 (2 divided by 109) for the control group.

Regarding motor agitation with the total scores of 36, the score for the treatment group was 8 and 28 for the control group. As shown in the previous paragraph, the former had 160 time samples, and the latter had 109 time samples. The average levels of motor agitation per 15-s time sample were 0.05 (8 divided by 160) for the treatment group and 0.26 (28 divided by 109) for the control group. No participants displayed aggressiveness, which was the third category. Figure 9 compares the average levels of agitation categories per 15-s time sample between the treatment and control groups.
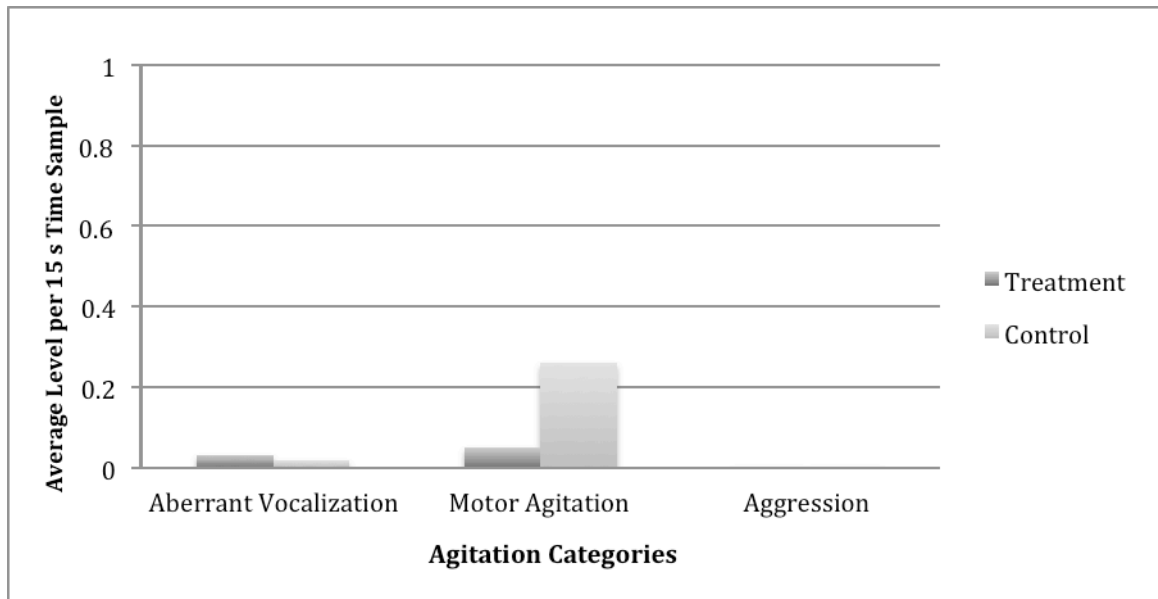
Figure 9. Average levels of three agitation categories on the modified Pittsburg

Agitation Scale between treatment and control groups

CHAPTER 5

Discussion

Results and Indications

The purpose of this study was to examine the effects of a guitar-accompanied singing intervention on sundowning in individuals with dementia. The initial plan was to obtain 30 participants and conduct an independent sample *t*-test to compare the difference in three agitation categories between the treatment and control groups; however, the investigator faced difficulty recruiting participants. One of the explanations is that only approximately 10 to 15 percent of the elderly with moderate to severe dementia in residential care facilities display sundowning (Lesta & Petocz, 2006; Satlin, Harper, Rheaume, & Volicer, 2003); therefore, the investigator was unable to recruit many participants from the few nursing homes that had given permission to her to conduct this investigation. In addition, the criteria for the study excluded some individuals from participating, such as those who are in the early stage of dementia.

Statistics were not conducted due to the small sample size. Average levels of the agitation categories were calculated. The average aberrant vocalization per 15-s time sample in the treatment and control groups was almost identical (0.03 for the former and 0.02 for the latter). On the other hand, the average motor agitation per 15-s time sample was higher in the control group (0.26) than in the treatment group (0.05). The trend showed that guitar-accompanied singing intervention might be more effective than newspaper reading to maintain or decrease motor agitation in elderly persons with dementia. However, this study has limitations (e.g., small sample size and no statistical tests); thus, the results cannot be generalized.

Yet, noteworthy matters were observed in this preliminary investigation. Participant 7, who received the music therapy intervention, was agitated at the beginning of the session. A

nursing home staff, who assisted the participant to walk to a chair in her room, even told the

investigator, "Let me know if she tries to stand up." Although participant 7 did not attempt to

stand up, she displayed both aberrant vocalization and motor agitation during the first and middle

sections of the 10-min session. When 7 min and 15 s past, both agitation behaviors completely

disappeared. At the end of the session, participant 7 was calm and quiet.

The rest of the 6 participants, who completed the entire 10-min session, showed no or

relatively low levels of agitation. This investigation was conducted in springtime, and it was

bright outside when the sessions were offered. Exposure to sunlight is believed to be closely

related to the circadian rhythms that have an important role in sundowning (Staedt & Stoppe,

2005). It has been reported that incidents of sundowning increase in fall and winter due to

decreased amount and duration of sunlight (Volicer, Harper, Manning, Goldstein, Satlin, 2001;

Khachiyants, Trinkle, Son, & Kim, 2011). The season might have contributed to no agitation or

the low levels of agitation in the participants in this study. Conducting the same study in fall or

winter may yield different outcomes.

All 4 participants in the music therapy condition completed the entire 10-min session;

however, 2 out of 4 participants in the newspaper reading condition completed only part of the

session due to increased agitation and a participant's decision. Participant 2, who received the

newspaper reading intervention, did not calm down during the session. In fact, his agitation

escalated, and the investigator needed to discontinue the intervention in the middle and ask for

assistance from staff.

Participant 6, who decided to discontinue the session in the middle, had moderate

dementia. She was able to understand the assent script used and gave the investigator permission

to conduct the study. At the beginning of the intervention, she was eager to "help the university

student" by participating in this investigation. Nevertheless, her attitude gradually changed during the intervention because she had difficulty processing the information read from the newspaper. The investigator slowly read the newspaper to all participants in the control condition. She even switched the article to a possibly simpler piece for participant 6, yet she continued to display the signs of frustration (e.g., frowning) and restlessness (e.g., moving her hands frequently). Therefore, the investigator asked participant 6 whether she would like to continue to listen to the newspaper reading or she would like to stop listening to it. The participant chose to stop listening to the investigator read the paper.

Newspaper reading is a common activity used in nursing home facilities. Staff may offer this activity in group or individual settings. Providing information that residents have difficulty comprehending can create frustration in them, especially those who are cognizant enough to know their inability to understand the information given. Similarly, it has been observed in clinical settings that asking persons with dementia difficult questions and giving them exceedingly challenging tasks can cause frustration, disengagement, restlessness, and even anger in these individuals. Nursing home staff need to observe residents' reactions when they are providing activities, such as current events, newspaper reading, and games that require cognitive processing.

Although this investigation did not measure the levels of engagement in the interventions, participants appeared to actively engage in music therapy more than in newspaper reading. Participant 5 sang along with the investigator, displayed a positive affect and spontaneously made positive comments about the music. Participant 7 was extremely confused and could not engage in verbal interaction. In spite of this, she engaged in the music therapy by attempting to hum the melodies along and by maintaining eye contact with the investigator. On the other hand,

participants 4 and 8, who were assigned to the newspaper reading, displayed a flat affect and made very little eye contact with the investigator during the intervention.

Recommendations for Future Research

A relatively small percentage of persons display sundowning; still, investigations related to this symptom are imperative. There are many unknown factors regarding sundowning, and further research concerning this symptom may benefit affected individuals and their caregivers in the future. Music therapy is one of the non-pharmacological interventions that has potential to benefit persons with sundowning. Music can cause physiological changes in persons (Clair, 1996a; Standley, 1986) and be tailored to individual goals. However, more research is necessary to clearly identify the effects of music therapy on those who exhibit sundowning.

Another important reason for conducting research on sundowning is that a few nursing home residents with agitation can negatively influence other residents, such as possibly increasing their stress levels and causing agitation in them. Decreasing sundowning-related symptoms in this small percentage of individuals may lead to less agitation in other residents. In turn, this would reduce the need for urgent interventions provided by staff members. Dealing with agitation can be stressful for them, and the reduction of agitation in residents may contribute to less stress and burnout in facility staff members.

For the implementations of future studies, the following is suggested: (a) within-subject design, (b) a larger sample size, (c) a greater number of sessions, and (d) implementation of sessions in different seasons. Because a relatively small percentage of people exhibit sundowning, and this may result in a small number of participants in future studies as experienced in this investigation. A within-subject design, providing both music therapy and control conditions to each participant, could be more appropriate at this stage to investigate the

feasibility of music therapy on sundowning. If music therapy is found to be feasible, researchers may conduct larger studies using a between-subject design with a greater number of participants. Statistical tests would be viable with a large sample size, and the results from replicated studies can be generalized.

This study offered a single session to each participant; however, examining the effects of more than a single session may reveal unknown trends and tendencies. Furthermore, offering interventions in different seasons may be necessary to explore the complex relationships among participants' sunlight exposure, sundowning, and the effects of interventions.

Conclusion

As people live longer, more individuals are likely to develop dementia. Progression of this condition requires a great deal of care and support, which our society needs to continue to address and innovate. Music therapy has been actively used in dementia care, and research findings will continue to contribute to the area of this cognitive deteriorating condition.

Approximately 10 to 15 percent of the elderly with moderate to severe dementia in residential care facilities display sundowning (Lesta & Petocz, 2006; Satlin, Harper, Rheaume, & Volicer, 2003), and this percentage seems small. However, this should not prevent researchers from investigating sundowning because each individual's concerns are important, and the impact on the client, other clients, caregivers, and facility staff can be significant. Individualized music therapy has potential for managing this symptom in persons with dementia, and more research is necessary to further understand the effects of this intervention on sundowning.

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Appendix A

CONSENT FORM

Parent-Guardian Informed Consent Statement

The Effects of Guitar-Accompanied Singing Intervention
on Sundowning in Elderly Persons with Dementia

INTRODUCTION

The Department of Music Education and Music Therapy at the University of Kansas supports the practice
of protection for human subjects participating in research. The following information is provided for you
to decide whether you wish your dependant to participate in the present study. You may refuse to sign
this form and not allow your dependant to participate in this study. You should be aware that even if
you agree to allow your dependant to participate, you are free to withdraw at any time. If you do
withdraw your dependant from this study, it will not affect your relationship with (FACILITY'S NAME),
the services it may provide to you, or the University of Kansas.

PURPOSE OF THE STUDY

The purpose of this study is to examine the effects of a guitar-accompanied singing intervention on
agitated behaviors associated with the transition from day to night (referred to as sundowning) in
individuals with dementia.

PROCEDURES

Your dependant will be asked to participate in either a single 10-minute 1:1 music therapy session or
newspaper reading. An assignment to either music therapy or newspaper reading will be random.

The investigator will obtain information about your dependant including 1) name, 2) age, 3) gender, 4)
stage of dementia according to the Functional Assessment Staging Test (FAST) which will be determined
by a nurse or the activity director in a process that takes just a few minutes, 5) hearing ability concerning
whether your dependant can hear ordinary speech or requires a hearing aid or hearing amplifier to hear,
and 6) musical preferences. A nurse or the activity director will provide the investigator with
information about your dependant's hearing ability. For those persons assigned to the music therapy
group the investigator will gather information about musical preferences from nursing home charts and
facility staff members prior to the intervention. Both music therapy and newspaper reading will be
provided in late afternoons between 3:00pm to 5:00 pm. Those who receive music therapy will be
invited to listen to the investigator sing and play music. Those who are in the newspaper reading
condition will be asked if they want to listen to the investigator read the newspaper. If the participants
agree to participate, they will be guided or brought to their respective sleeping room for their assigned
intervention that will last about 10-minutes. All the participants will be asked if they need to use the
toilet prior to the session and facility staff members will assist.

Music therapy intervention: Once a music therapy session begins, the investigator will match the
tempo and dynamics of the music to the participant's agitation level. For example, if the participant
appears very agitated such as moving his/her limbs restlessly and/or being vocally loud, the investigator
will begin singing with acoustic guitar accompaniment in a fast speed with a strong, loud sound. She will
sing participant-preferred songs by memory with guitar accompaniment. The participant's motor
movements and other physical responses (i.e., breathing patterns) will likely entrain (synchronize) to the

music. When the investigator observes entrainment (i.e., foot tapping in time with the music, inhalation and exhalation in time with the music), she will gradually shift the singing and accompaniment to slower and softer music. The music entrained responses will correspond with the slower music changes and his/her agitation is likely to subside as the music becomes softer and slower. If the participant is calm at the beginning of the intervention, the investigator will sing participant-preferred songs slowly and softly with the guitar to maintain a low level of agitation or no agitation. As the music therapist sings and plays, she will make frequent eye contact with the participant and maintain a facial expression that reflects positive affect. The investigator will sing the first verse of each song 3 times to provide sufficient time for the participant to engage. If the participant needs redirection, such as a non-ambulatory person trying to stand up, the music therapist will provide verbal directions and quickly return to the music therapy intervention.

Control intervention (newspaper reading): The control group sessions will begin and end identically to the music therapy sessions. If a participant is able to identify his/her interests, the investigator will read the articles related to the participant's interests from the Kansas City Star. If a participant cannot identify his/her interests, the investigator will read the article(s) from the inner sections of the newspaper, such as cooking, gardening, or sports. When the participant asks the investigator questions, she will respond to the questions and resume reading the newspaper. The investigator will not initiate interaction unless it is necessary. For instance, if a participant who is non-ambulatory attempts to stand up, the investigator will encourage him/her to remain seated for safety reasons.

With both the music therapy and newspaper reading interventions a participant will receive assistance if he or she becomes agitated and cannot be redirected by the investigator. In this event the investigator will notify a facility staff member and request assistance. At the end of a session, the investigator or facility staff will accompany the participant to his or her next scheduled activity. All sessions will be video recorded to collect data on agitation. A research assistant will later observe the video recordings to collect data using a time sampling approach to determine the number of time intervals in which agitation occurred. The video recordings will be stored in the principal investigator's computer device which is password protected. This computer device will be stored in a locked closet when it is not being used during this study. After the completion of this study, the video recordings will be deleted from the computer device.

RISKS

No risks are anticipated in this study.

BENEFITS

Your dependant may or may not benefit from this study. The investigator hopes that the information gathered in this study will help her learn about the effects of singing on agitation at the end of the day, called sundowning, in elderly persons with dementia. The results of this study may contribute to overall dementia care because management of agitation is one of the most important aspects for persons with dementia and their caregivers.

PAYMENT TO PARTICIPANTS

Participants will not be paid for participating in this study.

INFORMATION TO BE COLLECTED

To perform this study, the investigator will collect information about your dependant. This information will be obtained from your dependant's nursing home chart and facility care team (i.e., nurse and activity director) at (Facility's name). The information will be collected from the study activities that are listed in the Procedures section of this consent form.

Your dependant's name will not be associated in any way with the information collected about him/her or with the research findings from this study. The researchers will use a study number or a pseudonym instead of your dependant's name.

The information collected about your dependant will be used by Noriko Nakamura (principal investigator), Dr. Alicia Clair, Ph.D., MT-BC (faculty supervisor), thesis committee members (Dr. Cynthia Colwell, Ph.D., MT-BC and Dr. Christopher Johnson, Ph.D.) and KU's Center for Research and officials at KU that oversee research, including committees and offices that review and monitor research studies.

In addition, Dr. Clair, Ph.D., MT-BC and her team may share the information gathered in this study, including your dependant's information (age, gender, stage of dementia according to the FAST, auditory skills, musical preferences, intervention type received, collected data on agitation according to the agitation scale used) with collaborating researchers and colleagues. Again, your dependant's name would not be associated with the information disclosed to these individuals**.** The researchers will not share information about your dependant with anyone not specified above unless (a) it is required by law or university policy, or (b) you give written permission.

Permission granted on this date to use and disclose your information remains in effect indefinitely. By signing this form you give permission for the use and disclosure of your information for purposes of this study at any time in the future.

REFUSAL TO SIGN CONSENT AND AUTHORIZATION

You are not required to sign this Consent and Authorization form and you may refuse to do so without affecting your right to any services you are receiving or may receive from the University of Kansas or to participate in any programs or events of the University of Kansas. However, if you refuse to sign, your dependant cannot participate in this study.

CANCELLING THIS CONSENT AND AUTHORIZATION

You may withdraw your consent to allow participation of your dependant in this study at any time. You also have the right to cancel your permission to use and disclose further information collected about your dependant, in writing, at any time, by sending your written request to: Noriko Nakamura 15208 W 123rd St. Olathe, KS 66062

If you cancel permission to use your dependant's information, the researchers will stop collecting additional information about your dependant. However, the researchers may use and disclose information that was gathered before they received your cancellation, as described above.

QUESTIONS ABOUT PARTICIPATION

Questions about procedures should be directed to the principal investigator, Noriko Nakamura, listed at the end of this consent form.

PARTICIPANT CERTIFICATION:

I have read this Consent and Authorization form. I have had the opportunity to ask, and I have received answers to, any questions I had regarding the study. I understand that if I have any additional questions about my dependant's rights as a research participant, I may call (785) 864-7429, write to the Human Subjects Committee Lawrence Campus (HSCL), University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7568, or email irb@ku.edu.

I agree to allow my dependant to take part in this study as a research participant. By my signature I affirm that I have received a copy of this Consent and Authorization form.

_____   _____

    Print Participant's Name   Date

_____

    Parent/Guardian Signature

[If signed by a personal representative, a description of such representative's authority to act for the individual must also be provided, e.g. parent/guardian.]

Researcher Contact Information

Noriko Nakamura	Alicia Ann Clair, Ph.D.
Principal Investigator	Faculty Supervisor
Div. of Music Ed. & Music Therapy	Div. of Music Ed. & Music Therapy
School of Music	School of Music
University of Kansas	University of Kansas
15208 W 123rd St.	1530 Naismith Dr., 448D Murphy Hall
Olathe, KS 66062	Lawrence, KS 66045
913-744-1265	785-864-9636

Appendix B

FUNCTIONAL ASSESSMENT STAGING TEST (FAST)

Stage Skill Level

1   No difficulties, either subjectively or objectively.

2   Complains of forgetting location of objects. Subjective word finding difficulties.

3   Decreased job function evident to co-workers; difficulty in traveling to new locations. Decreased organizational capacity.*

4   Decreased ability to perform complex tasks (e.g., planning dinner for guests), handling personal finances (forgetting to pay bills), difficulty marketing etc.

5   Requires assistance in choosing proper clothing to wear for day, season, occasion.

6a   Difficulty putting clothing on properly without assistance.

 b   Unable to bathe properly (e.g., difficulty adjusting bath water temperature) occasionally or more frequently over the past weeks.*

 c   Inability to handle mechanics of toileting (e.g., forgets to flush the toilet, does not wipe properly or properly dispose of toilet tissue) occasionally or more frequently over the past weeks.*

 d   Urinary incontinence, occasional or more frequent.

 e   Fecal Incontinence, (occasional or more frequently over the past week).

7a   Ability to speak limited to approximately a half dozen different words or fewer, in the course of an average day or in the course of an intensive interview.

 b   Speech ability limited to the use of a single intelligible word in an average day or in the course of an interview (The person may repeat the word over and over.)

 c   Ambulatory ability lost (cannot walk without personal assistance).

 d   Ability to sit up without assistance lost (e.g., The individual will fall over if there are no lateral rests [arms] on the chair).

 e   Loss of the ability to smile.

     Stage: _____

*Scored primarily on the basis of information obtained from a knowledgeable informant and/or caregiver.

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Appendix C

AGITATION SCALE (ADAPTED FROM THE PITTSBURGH AGITATION SCALE)

Instruction: Mark the highest intensity that is occurring for each PAS behavior category every 15-seconds.

Aberrant Vocalization (repetitive requests or complaints, non-verbal vocalizations, e.g., moaning, screaming):

>0. Not present
>
>1. Low volume, not disruptive in milieu, including crying
>
>2. Louder than conversational, mildly disruptive, redirectable
>
>3. Loud, disruptive, difficult to redirect
>
>4. Extremely loud screaming or yelling, highly disruptive, unable to redirect

Motor Agitation (pacing, wandering, moving in chair, picking at objects, disrobing, banging on chair, taking others' possessions. Rate "intrusiveness" by normal social standards, not by effect on other patients in milieu. If "intrusive" or "disruptive" due to noise, rate under "Vocalization."):

>0. Not present
>
>1. Pacing or moving about in chair at normal rate (appears to be seeking comfort, looking for spouse, purposeless movements)
>
>2. Increased rate of movements, mildly intrusive, easily redirectable
>
>3.Rapid movements, moderately intrusive or disruptive, difficult to redirect
>
>4. Intense movements extremely intrusive or disruptive, not redirectable verbally

Aggressiveness (score "0" if aggressive *only* when resisting care):

>0. Not present
>
>1. Verbal threats
>
>2. Threatening gestures; no attempt to strike
>
>3. Physical toward property
>
>4. Physical toward self or others

Adapted from: Rosen, J., Burgio, L., Kollar, M., Cain, M., Allison, M., Fogleman, M., Michael, M., et al. (1994). A user-friendly instrument for rating agitation in dementia patients. *The American journal of geriatric psychiatry: official journal of the American Association for Geriatric Psychiatry*, *2*(1), 52–59.

Appendix D

ASSENT SCRIPT

Assent Script

Hello, (participant's name), my name is Noriko Nakamura and I am a student at the University of Kansas. I am doing a project to learn how (singing / newspaper reading) affects agitation because it may help people relax. When I tell other people about this project, I will not use your name. So, no one can tell who I am talking about. If you would like, you can be in my study. If you don't feel like listening to (my singing / newspaper reading), you don't have to. You can stop at any time when I am (singing / reading), and that will be all right. Do you want to take part in this project?

Appendix E

DATA COLLECTION SHEET

Participant #: ____**Group (circle one):** Treatment   Control
AV=Aberrant Vocalization, MA=Motor Agitation, AG=Aggressiveness
Level: See the Pittsburgh Agitation Scale sheet
Additional info: Rst=Restraint, Sec=Seclusion, PRN Med=Medication, Other=Other intervention

	AV	MA	AG	
	Level	Level	Level	Emergent Interventions (Circle intervention(s) if any of the following are used.)
0:15				Rst Sec Med Other:
0:30				Rst Sec Med Other:
0:45				Rst Sec Med Other:
1:00				Rst Sec Med Other:
1:15				Rst Sec Med Other:
1:30				Rst Sec Med Other:
1:45				Rst Sec Med Other:
2:00				Rst Sec Med Other:
2:15				Rst Sec Med Other:
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8:30				Rst Sec Med Other:
8:45				Rst Sec Med Other:
9:00				Rst Sec Med Other:
9:15				Rst Sec Med Other:
9:30				Rst Sec Med Other:
9:45				Rst Sec Med Other:
10:00				Rst Sec Med Other:

Appendix F

LIST OF SONGBOOKS/WEBSITES

Songbooks	Authors
Christmas Solos for All Ages – Medium Voice	Boytim (2001)
Fake Book of the World's Favorite Songs: C Edition	Hal Leonard Corporation (1990a)
Get America Singing…Again!	Hal Leonard Corporation (1996)
Merry Christmas Songbook: Over 100 Holiday Classics	Fox (2007)
Songs [Large print edition]	Anderson (1992)
The American Song Treasury: 100 Favorites	Raph (1964)
The Baptist Hymnal"	Forbis (1991)
The Best Fake Book Ever: For Keyboard, Vocal, Guitar, and All "C" Instruments.	Hal Leonard Corporation (1990b)
The Best of Hank Williams	Williams (1999)
The Greatest Guitar Songbook	Hal Leonard Corporation (1999a)
The Thirties: 80 Years of Pop Music	Hal Leonard Corporation (1999b)
The Ultimate Fake Book"	Hal Leonardo Corporation (1994)
Value Songbooks - Show Tunes: Piano/Vocal"	Hal Leonard Corporation (2010)
Websites	
Higher Praise	Higher Praise Inc. (1999)
Spiritual Worship	Spiritual Worship (2012)

Appendix G

LIST OF POSSIBLE SONGS

Country	Composer, Artist, and/or Origin	Book or Website
Back in the Saddle Again	Gene Autry (1939)	The Ultimate Fake Book
Blue Eyes Crying in the Rain	Fred Rose (1945)	The Ultimate Fake Book
Cold Cold Heart	Hank Williams (1951)	The Best of Hank Williams
Deep in the Heart of Texas	June Hershey & Don Swander	The Ultimate Fake Book
Happy Trails	Dale Evans (1951)	The Ultimate Fake Book
Hey, Good Lookin'	Hank Williams (1951)	The Ultimate Fake Book
I Walk the Line	John R. Cash (1956)	The Ultimate Fake Book
Jambalaya	Hank Williams (1952)	The Greatest Guitar Songbook
Red River Valley	Gene Autry	The American Song Treasury: 100 Favorites
South of the Border	Jimmy Kennedy & Michael Carr (1939)	The Ultimate Fake Book
The Yellow Rose of Texas	Mitch Miller (1955)	The American Song Treasury: 100 Favorites
Walking After Midnight	Patsy Cline (1961)-Artist	The Ultimate Fake Book
Your Cheatin' Heart	Hank Williams (1953)	The Best of Hank Williams
Folk	**Composer, Artist, and/or Origin**	**Book or Website**
Billy Boy	Lyrics were based on the old English song "Lord Randall" (1800)	The American Song Treasury: 100 Favorites
Camptown Races	Stephen Foster (1851)	The American Song Treasury: 100 Favorites
Clementine	Percy Montross (1885)	The American Song Treasury: 100 Favorites
Down in the Valley	Composer unknown (1835)	The American Song Treasury: 100 Favorites
Home in the Range	Brewster Higley & Dan Kelly (1873)	The American Song Treasury: 100 Favorites
I've Been Working on the Railroad	Composer unknown (1881)	The American Song Treasury: 100 Favorites
Oh, Susanna	Stephen Foster (1849)	The American Song Treasury: 100 Favorites
On Top of Old Smoky	Composer unknown (1841)	The American Song Treasury: 100 Favorites
She'll Be Comin' 'Round the Mountain	Composer unknown (1870)	The American Song Treasury: 100 Favorites
Shenandoah	Composer unknown (1837)	The American Song Treasury: 100 Favorites
Yankee Doodle	Composer unknown (1754)	The American Song Treasury: 100 Favorites
You Are My Sunshine	Jimmie Davis (1940)	The Ultimate Fake Book

Gospel	Composer, Artist, and/or Origin	Book or Website
Amazing Grace	John Newton	The Ultimate Fake Book
Blessed Assurance, Jesus Is Mine	Fanny Crosby & Phoebe Knapp	The Baptist Hymnal
Bringing in the Sheaves	Composer unknown	Fake Book of the World's Favorite Songs
Count Your Blessings	Johnson Oatman Jr. & Edwin O. Excell	The Baptist Hymnal
Glory, Glory, Hallelujah	Negro Spiritual	Spiritual Worship
He's Got the Whole World in His Hand	Composer unknown	The American Song Treasury: 100 Favorites
Holy, Holy, Holy	Reginald Heber & John B. Dykes	Fake Book of the World's Favorite Songs
How Great Thou Art	Stuart K. Hine (1953)	The Baptist Hymnal
I'll Fly Away	Albert Brumley (1960)	Songs [Large print edition]
In the Garden	C. Austin Miles	Fake Book of the World's Favorite Songs
I've Got Peace Like a River	Negro Spiritual	The Baptist Hymnal
Jesus Is on the Main Line	Norman Hutchins (Artist)	Higher Praise
Jesus Loves Me	Anna Warner & William Bradbury	The Baptist Hymnal
Just a Closer Walk With Thee	K. Morris	Fake Book of the World's Favorite Songs
Kum Ba Yah	Composer unknown	Songs [Large print edition]
Love Lifted Me	James Rowe & Howard E. Smith	The Baptist Hymnal
Oh, How I Love Jesus	Frederick Whitfield & Anonymous	The Baptist Hymnal
Sweet Hour of Prayer	William Walford & William Bradbury	The Baptist Hymnal
Swing Low	Composer unknown	Songs [Large print edition]
Tell Me Why	Composer unknown	Fake Book of the World's Favorite Songs
The Church in the Wildwood	Wm. S. Pitts	Fake Book of the World's Favorite Songs
What a Friend We Have in Jesus	Joseph Scriven & Charles C. Converse	Fake Book of the World's Favorite Songs
When the Saints Go Marching In	Composer unknown	The American Song Treasury: 100 Favorites
Will the Circle Be Unbroken	Composer unknown	Fake Book of the World's Favorite Songs

Jazz Standards	Composer, Artist, and/or Origin	Book or Website
All of Me	Seymour Simons & Gerald Marks (1931)	The Ultimate Fake Book
Blue Skies	Irving Berlin (1927)	The Ultimate Fake Book
Fly Me to the Moon	Bart Howard (1954)	The Ultimate Fake Book
It's Only a Paper Moon	Billy Rose & E. Y. Harburg; Harold Arlen	The Ultimate Fake Book
L-O-V-E	Bert Kaempfert & Milt Gabler (1965)	The Best Fake Book Ever
Sentimental Journey	Arthur Green; Les Brown & Ben Homer (1944)	The Best Fake Book Ever
Patriotic	**Composer, Artist, and/or Origin**	**Book or Website**
America the Beautiful	Katherine Bates & Music by Samuel Ward (1895)	The American Song Treasury: 100 Favorites
God Bless America	Irving Berlin (1938)	Get America Singing…Again!
Yankee Doodle Boy	George M. Cohan (1904)	The American Song Treasury: 100 Favorites
My Country 'Tis of Thee	Samuel Francis Smith	The Ultimate Fake Book
You Are a Grand Old Flag	George M. Cohan (1906)	The American Song Treasury: 100 Favorites
Popular Sing-along Songs	**Composer, Artist, and/or Origin**	**Book or Website**
Ain't She Sweet	Jack Yellen & Milton Ager (1927)	The Best Fake Book Ever
Bicycle Built for Two	Harry Dacre *(1893)	The American Song Treasury: 100 Favorites
Blue Moon	Richard Rodgers & Lorenz Hart	The Thirties: 80 Years of Popular Music
By the Light of the Silvery Moon	Ed Madden & Gus Edwards	Fake Book of the World's Favorite Songs
Cuddle Up a Little Closer, Lovey Mine	Otto Hauerbach & Karl Hoschna	Fake Book of the World's Favorite Songs
Don't Sit under the Apple Tree	Lew Brown & Charles Tobias; Sam H. Stept	The Best Fake Book Ever
Down by the Riverside	Composer unknown	Fake Book of the World's Favorite Songs
Five Foot Two, Eyes of Blue	Sam Lewis & Joe Young; Ray Henderson	Songs [Large print edition]
For He's a Jolly Good Fellow	Composer unknown	Fake Book of the World's Favorite Songs

Goodnight, Irene	Huddie Ledbetter & John A. Lomax (1936)	The Ultimate Fake Book
Hello Ma Baby	Joe Howard (1899)	The American Song Treasury: 100 Favorites
I Want a Girl	William Dalton & Harry Von Tilzer	Fake Book of the World's Favorite Songs
In My Merry Oldsmobile	Vincent P. Bryan & Gus Edwards	Fake Book of the World's Favorite Songs
In the Good Old Summertime	George Evans & Ren Shields (1902)	The American Song Treasury: 100 Favorites
Let Me Call You Sweetheart	Beth Slater Whitson & Leo Freidman	Fake Book of the World's Favorite Songs
Mary's a Grand Old Name	George M. Cohan	Fake Book of the World's Favorite Songs
Meet Me in St. Louis, Louis	Andrew B. Sterling & Kerry (Frederick Allen) Mills (1904)	The American Song Treasury: 100 Favorites
My Bonnie Lies Over the Ocean	J. T. Wood & H. J. Fulmer (1882)	The American Song Treasury: 100 Favorites
My Wild Irish Rose	John Olcott (1900)	The American Song Treasury: 100 Favorites
Oh! You Beautiful Doll	A. Seymour Brown & Nat D. Ayers	Fake Book of the World's Favorite Songs
Over There	George M. Cohan	The Best Fake Book Ever
Polly Wolly Doodle	Composer unknown (1855)	The American Song Treasury: 100 Favorites
School Days	Will D. Cobb & Gus Edwards	Fake Book of the World's Favorite Songs
Shine on Harvest Moon	Jack Norworth & Nora Bayes (1908)	The Best Fake Book Ever
Side by Side	Harry Woods	The Ultimate Fake Book
Take Me Out to the Ball Game	Jack Norworth & Albert Von Tilzer	Fake Book of the World's Favorite Songs
Too-Ra-Loo-Ra-Loo-Ral	J. R. Shannon	Fake Book of the World's Favorite Songs
Ta-Ra-Ra Boom-Der-É	Henry J. Sayers	Fake Book of the World's Favorite Songs
When Irish Eyes Are Smiling	Chauncy Olcott & Geo. Graff Jr; Ernest R. Ball	Fake Book of the World's Favorite Songs
When the Red, Red, Robin Comes, Bob, Bob, Bobbing Along	Harry Woods (1926)	The Best Fake Book Ever
When You Wore a Tulip	Jack Mahoney & Percy Wenrich	Fake Book of the World's Favorite Songs

50's	Composer, Artist, and/or Origin	Book or Website
All I Have To Do is Dream	Boudleaux Bryant (1958)	The Ultimate Fake Book
Blue Suede Shoes	Carl Lee Perkins (1955)	The Ultimate Fake Book
Don't Be Cruel	Otis Blackwell & Elvis Presley (1956)	The Ultimate Fake Book
Hound Dog	Jerry Leiber & Mike Stoller (1956)	The Ultimate Fake Book
Kansas City	Jerry Leiber & Mike Stoller (1959)	The Best Fake Book Ever
Love Me Tender	Elvis Presley & Vera Matson (1956)	The Ultimate Fake Book
Peggy Sue	Buddy Holly, Jerry Allison & Norman Petty (1957)	The Best Fake Book Ever
Que Sera Sera	Jay Livingston & Ray Evans (1955)	The Ultimate Fake Book
Sugartime	Charles Phillips & Odis Echols	The Ultimate Fake Book
60's & 70's	**Composer, Artist, and/or Origin**	**Book or Website**
Can't Help Falling in Love	George David Weis, Hugo Peretti & Luigi Creatore (1961)	The Ultimate Fake Book
Eight Days a Week	John Lennon & Paul McCartney (1964)	The Ultimate Fake Book
Leaving on a Jet Plane	John Denver (1967)	The Ultimate Fake Book
Proud Mary	John Fogerty (1968)	The Ultimate Fake Book
Sunshine on My Shoulders	John Denver (1971)	The Ultimate Fake Book
Take Me Home, Country Roads	John Denver, Bill Danoff & Taffy Nivert (1971)	The Ultimate Fake Book
Tiny Bubbles	Leon Pober; Dan Ho (1966)	The Ultimate Fake Book
Mo-town/Soul	**Composer, Artist, or Origin**	**Book or Website**
Dock of the Bay	Steve Cropper & Otis Redding (1968)	Songs [Large print edition]
Lean on Me	Bob Withers (1972)	Songs [Large print edition]
My Girl	William Robinson & Ronald White (1964)	The Best Fake Book Ever
Stand by Me	Jerry Leiber, Mike Stoller & Ben E. King (1961)	The Ultimate Fake Book

Show Tunes / Movie Hits	Composer, Artist, and/or Origin	Book or Website
Do-Re-Mi	Oscar Hammerstein II & Richard Rogers	The Ultimate Fake Book
Edelweiss	Oscar Hammerstein II & Richard Rogers	The Ultimate Fake Book
Happy Talk	Oscar Hammerstein II & Richard Rogers	The Ultimate Fake Book
Moon River	Johnny Mercer & Henry Mancini	The Ultimate Fake Book
My Favorite Things	Oscar Hammerstein II & Richard Rogers	The Ultimate Fake Book
Over the Rainbow	E. Y. Harburg & Harold Arlen (1939)	Value Songbooks - Show Tunes: Piano/Vocal
Summertime	George Gershwin (1935)	Value Songbooks - Show Tunes: Piano/Vocal
Seasonal (Christmas)	**Composer, Artist, and/or Origin**	**Book or Website**
Away in a Manger	James R. Murray	Fake Book of the World's Favorite Songs
Angels We Have Heard on High	Traditional Christmas song	Fake Book of the World's Favorite Songs
Deck the Hall	Traditional Christmas song	Fake Book of the World's Favorite Songs
Jingle Bells	James Pierpont	Fake Book of the World's Favorite Songs
O Holy Night	Lyric by J. S. Dwight & Music by Adolphe Adam	Fake Book of the World's Favorite Songs
O Christmas Tree	German Christmas Song	Fake Book of the World's Favorite Songs
O Little Town of Bethlehem	Brooks & Redner	Fake Book of the World's Favorite Songs
Rudolph the Red Nosed Reindeer	Johnny Marks (1949)	Mary Christmas Songbook: Over 100 Holiday Classics
Santa Claus Is Coming to Town	J. Fred Coots & Haven Gillespie	Mary Christmas Songbook: Over 100 Holiday Classics
Silent Night	Joseph Mohr, (English Translation by) John F. Young; Franz Crüber	Mary Christmas Songbook: Over 100 Holiday Classics
The First Noel	Composer unknown	Fake Book of the World's Favorite Songs
The Little Drummer Boy	Katherine Davis, Henry Onorati & Harry Simeone	Mary Christmas Songbook: Over 100 Holiday Classics
Up on the Housetop	Benjamin Russell Hanby	Mary Christmas Songbook: Over 100 Holiday Classics
We Wish You a Merry Christmas	Composer unknown	Fake Book of the World's Favorite Songs
White Christmas	Irving Berlin (1942)	Christmas Solos for All Ages – Medium Voice