Title
Effect of a Group Music Nursing Intervention on Anxiety Among Individuals with Mild to Moderate Dementia in Los Angeles Assisted Living Facilities

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Ing-Randolph, Avis

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Los Angeles

Effect of a Group Music Nursing Intervention
on Anxiety Among Individuals with Mild to Moderate Dementia in Los Angeles
Assisted Living Facilities

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy
in Nursing

by

Avis Rii Ing

2016
ABSTRACT OF THE DISSERTATION

Effect of a Group Music Nursing Intervention
on Anxiety Among Individuals with Mild to Moderate Dementia in Los Angeles Assisted Living Facilities

by

Avis Rii Ing
Doctor of Philosophy in Nursing
University of California, Los Angeles, 2016
Professor Eunice Eunkyung Lee, Chair

This study tested the hypothesis that an active-passive group music intervention will decrease anxiety among individuals diagnosed with mild to moderate dementia in assisted living facilities (ALFs) as compared to a control group engaged in care as usual. This study also described the feasibility and acceptability of active-passive group music interventions delivered by a Registered Nurse (RN) without a university or college degree in music intervention techniques to individuals with mild to moderate dementia in an ALF. The study used a quasi-experimental cross-over design with a simplified cluster randomization strategy; simplified because there were only two sites. Thirteen participants were invited, 8 from one facility and 5 from the other. The sample comprised of participants ranging from age 74 thru 98 with Global Deterioration Stages ranging from 2-5. The majority of participants were female, White and were college educated.
Music was considered moderately important to very important. Music was used to effect anxiety levels. Altogether 12 intervention sessions were offered or 6 for each arm. There was a 4 week wash-out period. Four RAID measures were taken during each arm at baseline. Specific Aim 1: Insignificant decreases to anxiety existed by group, however, a trend showing decreases to anxiety levels existed over time (p=0.002): Intervention Group 1 = 18.00 at point 1 to 14.83 at point 4; Intervention Group 2 = 17.20 at point 1 to 10.80 at point 4. During control periods, RAID were: Group 1= 13.33 at point 1 to 10.83 at point 4; and Group 2 = 13.60 at point 1 to 10.40 at point 4. Specific Aim 2: With music education, the use of RNs to deliver group music interventions and supervise music interventions in healthcare is promising.
The dissertation of Avis Rii Ing is approved,

Linda R. Phillips
Frank Heuser
Sophie Sokolow
Eunice Eunkyung Lee, Chair

University of California, Los Angeles
2016
DEDICATIONS

I would like to dedicate this work to the following:

First, to the Lord Jesus Christ who ultimately directed this dissertation and provided for everything along the way. I thank Him for each of you listed below and for the lives of persons in our community that this research will touch. May this research offer hope for improved dementia care in the future.

Second, to my husband and best friend Isaiah, who encouraged and “hung-in” with me. He made me laugh again during the most challenging times.

Third, to Dr. Lee, who stepped in to chair and direct this dissertation.

Fourth, to my current committee members (Dr. Phillips, Dr. Heuser, Dr. Sokolow and Dr. Lee) for your valuable feedback, flexibility, expert mentoring, patience and encouragement as you guided me through this enormous learning experience and helped me through the dissertation challenges I encountered along the way.

Fifth, to Rita Altman, MSN-RN, whose commitment to creating optimal senior living conditions and care made it possible to conduct nursing research within Assisted Living Facilities in Los Angeles.

Sixth, to my family, brother Strather, sister Tracy, sister-in-law Gwen, cousins (Aweau-Ing) and good friends whose love and support have sustained me throughout thick and thin. Thank you for believing in me.
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CURRICULUM VITAE

EDUCATION

University of California, Los Angeles
Master of Science in Nursing 2015
Hawaii Pacific University
Bachelor of Science in Nursing 2008
University of Hawaii, Manoa
Post Baccalaureate Degree in General Music Education 2000
Areas of concentration:  Piano and Voice
University of Hawaii, Manoa
Professional Diploma in Home Economics Education 1988
Area of concentration:  Home Economics
University of Hawaii, Manoa
Bachelor of Science in General Home Economics 1978
Area of concentration:  Human Development

RELATED WORK AND TEACHING EXPERIENCE

NURSING
University of California, Los Angeles 2011 thru 2016
Graduate Fellowship Teaching Assistant:  Epidemiology, Nursing Fundamentals - Clinical Skills Laboratories, Adult Mental Health, Nursing Research, Ethics and Secondary Prevention.  Met with lead instructors to develop curriculum, guest lecture, grade written and objective tests, develop test questions, facilitate discussion sections, model and teach basic nursing skills, answer student questions related to lectures or laboratories and meet with students by appointment regarding understanding of classroom material.

Accredited Home Health Agency, Accent Home Health Care, 2008 thru 2016
Paradise Home Health Agency, Cosmopolitan Home Health Agency and Kokua Nurses (Hawaii).  RN Case Manager.  Applied nursing care for patients at home: major organ system assessments, medications reconciliation, skilled nursing application and patient teaching regarding all aspects of care in order to reach optimal health goals.

Cedars-Sinai Medical Center, Los Angeles 2008 thru 2009
Staff Nurse Residency.  Applied newly acquired nurse skills and patient teaching in an acute care setting.  Majority of patients were liver and kidney post-transplant. Nursing care extended to basic Med-surgical patients depending on unit statistics.

MUSIC
Avis Ing - Music Instruction, Hawaii and California 1986 thru 2016

Provided music instruction with emphasis in group piano and music foundations for children and adults.  Some private piano, children’s choir directing, and piano accompanying.

Hawaii Department of Education 1988 thru 2007
Teacher – music and home economics.  Developed and taught standards-based creative classroom curriculum in two subject areas aimed at all elementary grade levels (includes special education)
and middle school students. Directed and arranged music for select middle-school choirs and ukulele groups in Hawaii. Assisted as a piano accompanist for middle school band competitions. Directed student musicals and special performances.

RELATED EXPERIENCE

HEALTHCARE & MUSIC 2006-2016
Provided music performances and music interventions for patients in acute care hospital units, long-term care and assisted living facilities in Hawaii and California.

MUSIC PERFORMANCE HISTORY Prep School & 2006-2016

ACADEMIC PRESENTATIONS 2011-2012
Advanced Pathophysiology – Dementia and Alzheimer’s Disease

COMMUNITY LEADERSHIP & INTERESTS 1983-2016
Mid-Pacific Road Runners Club Hawaii – Vice President Administration
Homeless Missions – Beverly Hills Presbyterian Church.
Vanuatu Missions 2003 – Calvary Chapel of Honolulu.
OPICA Daycare Center, Los Angeles for Dementia and Alzheimer’s individuals - Volunteer.

SPECIAL MUSIC CERTIFICATION
Orff Schulwerk Level I 2001

PUBLICATION

LANGUAGES
English – Native Language
Japanese – Conversational – Limited.

MEMBERSHIPS (Past and Present)
American Orff Schulwerk Association
American Academy of Neurology
Beta, Beta, Beta (biological) National Honor Society
Music Educators of America
National Guild of Piano Teachers
National Scholars Honor Society
Sigma Theta Tau
The American Home Economics Association
Chapter 1
OVERVIEW OF THE PROBLEM

This study focused on the use of a music intervention delivery by a registered nurse (RN) to reduce anxiety among persons with mild and moderate dementia living in assisted living facilities (ALFs). This chapter described dementia including behavioral symptoms in dementia (BSDs), anxiety in dementia, anxiety and dementia in ALFs, treatment of anxiety among those with dementia and use of music therapy by RNs. The chapter concludes with a statement of the study purpose and specific aims.

Dementia

Dementia refers to a large group of cognitive disorders in which the symptoms of older adults include deficits in memory, language, object recognition, motor and higher order brain activities with resultant occupational and social difficulties and behavioral disturbances (CDC, 2011; Kaplan, Sadock, & Grebb, 1994; Andreasen & Black, 2001; Steinberg et al., 2003).

The prevalence of dementia increases with age. Thus, understanding dementia is of increasing importance as the population ages. About 6% to 10% of individuals aged 65 years or older have dementia (CDC, 2003). This represents nearly 2.5 million Americans living with dementia and the number is expected to reach 5.2 million by 2030 (CDC, 2007).

Dementia leads to increased demands for health care and social services and drains the time and resources of families of older adults with dementia and their non-family caregivers. Care for individuals with dementia often is overwhelming both emotionally and physically, especially when behaviors such as wandering and violence occur (NIH, 2012). Ultimately, many families relinquish their loved ones with dementia to nursing homes (NHs) in order to relieve the burden
Behavioral Symptoms of Dementia

Behavioral symptoms frequently develop during the course of dementia. These symptoms, often termed behavioral symptoms of dementia or BSDs, may reflect the suffering experienced by the person with dementia and cause immense caregiver stress. About 90% of those diagnosed with the disease are expected to develop significant behavioral symptoms (Fernandez, Gobartt & Balana, 2010; Reisberg et al., 1987; Mega, Cummings, Fiorello & Gornbein, 1996; Deutsch, Bylsma, Rovner, Steele & Folstein, 1991).

In a review of the BSDs by Cerejeira, Lagato and Mukaetova-Ladinska (2012), a common find among scientist is that the pathogenesis of BSDs may be a multifaceted interplay of psychological, social and biological factors. Recent studies have stressed the role of neurochemical, neuropathological and genetic factors as the reasons for clinical manifestations of BSD. Some examples of these manifestation are, wandering, pacing, hoarding-rummaging, apathy, sexual disinhibition, and aggression (Cerejeira, Lagarto & Mukaetova-Ladinska, 2012). If untreated, behavioral symptoms can escalate to the point of requiring hospitalization or NH placement. The behaviors may also become life-threatening during heightened agitation and aggression and are one reason for rising health care costs (Hurd, Martorell, Delavande, Mullen & Langa, 2013)

Anxiety in Dementia

For persons with dementia, the diagnosis triggers concern about losing skills and the anticipation of developing health-related problems, which bring on anxiety (Galleo, Kunik & Reid, 2011; Qazi, Spector & Orrell, 2010). Anxiety symptoms are more common in individuals
diagnosed with dementia than for those individuals without the disease (Bungener, Jourent & Derouesne, 1996; Hwang, Masterman, Ortiz, Fairbanks & Cummings, 2004; Lyketsos et al., 2000; Porter et al., 2003; Wands et al., 1990).

The prevalence of dementia anxiety among individuals diagnosed with Alzheimer’s disease and vascular dementia ranges anywhere from 38% to 72% respectively (Ballard, Neill & O’Brien, 2000; Seignourel, Kunik, Snow, Wilson & Stanley, 2008). Research suggests there is no relationship between age and the experience of anxiety among individuals with dementia (Mendez et al., 2006; Paulsen, Ready, Hamilton, Mega & Cummings, 2001; Shankar, Walker, Frost & Orell, 1999). Anxiety affects abilities to engage in activities of daily living (ADL) such as eating, dressing, bathing; lifting objects, mobility and light housework (Brenes et al., 2005; Schultz, Hoth, & Buckwalter, 2004). A reduced quality of life is associated with anxiety. A reduced quality of life involves multidimensional domains which are social, psychological and physical in nature (Birren, Lubben, Rowe & Deutchman, 1991; Caudle et al., 2007; DeLuca et al., 2005; Mantella et al., 2007; Rozzini et al., 2009).

Anxiety among persons with dementia is prevalent in a variety of residential settings including retirement villages, nursing homes, private dwellings and assisted living facilities (ALFs); however, there is a higher prevalence of anxiety and anxiety symptoms in people residing in ALFs (Neville & Teri, 2011). Manifestations of anxiety are: feelings of apprehension, vigilance, motor tension, autonomic hyper-activity, phobias and panic attacks (Shankar et al., 1999) which could cause significant management problems in residential settings.

In addition to creating significant management problems, anxiety is difficult to study. This difficulty is in part due to the lack of research on anxiety. For those few studies that have been conducted, there is a lack of agreement on the prevalence, concepts, and definitions of
anxiety in cognitively impaired people (Seignourel et al., 2008). Some of these disagreements may be attributed to variances in methods; site differences such as residential or clinical environments; and cognitive, physical and functional shortfalls (activities of daily living) such as losing the ability to feed or dress oneself. Differences in study outcomes may also be the result of using care-giver versus self-report ratings from persons with mild to moderate dementia to assess prevalence. Differences like these have resulted in lack of consistency in the definition and severity ratings of anxiety.

It is often difficult to know whether anxiety is the cause or result of an associated psychological or behavioral symptom such as depression and agitation (Shankar & Orrell, 2000; Ballard, Boyle, Bowler & Lindesay, 1996; Hersen & Van Hasselt, 1992). This confusion contributes to the wide disparity of outcomes in studies investigating anxiety in dementia care. Some studies categorize anxiety as a behavioral symptom and others as a psychiatric symptom (Twelftree & Qazi, 2007; Ballard et al., 2000). As a psychological symptom, anxiety may manifest as worry, irritability or muscle tension (Twelftree & Qazi, 2007; Ballard et al., 2000). As a behavioral symptom, anxiety is related to but not clearly seen as a symptom in agitation, fear, aggression, wandering, and sleep disturbances (Teri et al., 1999; Hwang et al., 2004; Starkstein, Jorge, Petracca & Robinson, 2007). Within ALFs, some of the variance in prevalence of anxiety may be due to the use of measures that are not specifically developed for anxiety in older people with dementia. For instance, Neville and Teri (2011) noted past studies which used measures developed for non-specific age groups that had been validated for use in older people (Bierman, Comijs, Jonker & Beekman, 2007; Ferretti, McCurry, Logsdon, Gibbon & Teri, 2001; Kang, Smith, Buckwalter, Ellingrod, & Schultz, 2010; Starkstein et al., 2007; Wands et al., 1990). Examples of non-specific anxiety measures by age include the global behavior rating
scales (Cheng et al., 2009; Ferrietti et al., 2001; Teri et al., 1999); global mental disorders scales (Forsell & Windblad, 1997; Savva et al., 2009), global symptomatology scales with anxiety subscales (Lyketsos et al., 2001; Steinberg et al., 2008), and other miscellany methods such as self-reports, observations, interviews, and checklists (Elfgren, Gustafson, Vestberg & Passant, 2010; Ballard et al., 2000; Chemerinski et al., 1998; Teri et al., 1999).

Despite incongruences, anxiety is believed to be relatively stable for persons diagnosed with dementia across the range of dementia severity until the profound/terminal stage, at which point anxiety prevalence declines (Seignourel, et al., 2008). Explanations for the profound/terminal stage are not discussed further in this study as the terminal stage is associated with severe dementia (Seignourel et al., 2008), and this study focused on persons with mild to moderate dementia, as defined in Chapter 4 under Instruments and Measures. Anxiety is associated with a poor quality of life (QoL), problem behaviors such as wandering, sexual disinhibitions, hallucinations, verbal threats, depression, irritability, overt aggression, crying, limits in activities of daily living (ADL), interrupted sleep especially at night, and poor neuropsychological performance even after accounting for depression (Badrakalimuthu & Tarbuck, 2012; Seignourel et al., 2008; Chemerinski et al., 1998; Hoe, Hancock, Livingston & Orrell, 2006; McCurry, Gibbons, Logsdon & Teri, 2004; Rozzini et al., 2009; Starkstein et al., 2007).

Figure 1.1 represents the hypothetical development of increased anxiety states in persons diagnosed with dementia. The diagram is modeled on Linda Gerdner’s (1997) Individualized Music Intervention for Agitation, but without using the concept, music intervention. Exchanges are made for the following components of the model: Progressing Dementia was exchanged for “Cognitive Impairment”, Mood Alteration was exchanged for “Agitation”, and Increased Anxiety
was exchanged for “Decreased Agitation”. \textit{Progressing dementia} is the state in which increased changes occur to the brain resulting most notably in memory loss, motor difficulties, and language and object recognition difficulties. These changes, according to Hall & Buckwalter (1987), lead to \textit{decreased stress thresholds}, which trigger \textit{mood alterations} which in turn lead to \textit{increased anxiety} (Hall & Buckwalter, 1987).

\textbf{Dementia and Anxiety in Assisted Living Facilities (ALF)}

The attractiveness of ALFs as a long-term care model has grown over the last decade (ALFA, 2013). This increasing attractiveness is the result of the belief that the ALF model addresses the gap between long-term institutional care such as a NH and home care (Hawes, Rose, & Phillips, 1999). Assisted Living Facilities for this study was defined as a type of residential care facilities which does not require 24-hours of skilled nursing medical care as compared to NHs (FCA, 2006; CANHR, 2008). Alzheimer’s disease and other dementias
comprise about 42% of ALFs (NCAL, 2010). However, up until 2008, most research regarding anxiety in dementia have been conducted at sites other than ALFs, most commonly in nursing homes (Seignourel et al., 2008).

**Treatment of Anxiety Among Individuals with Dementia**

The most common pharmacological treatments for anxiety are anxiolytic agents (Small et al., 1997). Unfortunately, individuals with dementia frequently experience heightened confusion when taking anxiolytic agents because of increased sensitivity to this class of drugs and slower metabolism toward these long acting agents (AGS, 2012; Salzman et al., 2008; Vigen, Mack & Keefe, 2011). Therefore, the use of benzodiazepines have been discouraged for treatment of anxiety in older adults as increased risk of cognitive impairment, delirium, falls, fractures, and motor vehicle accidents may result (AGS, 2012). Because anxiety is associated with other behavioral symptoms, it is not unusual for individuals with dementia to be prescribed additional medications at the same time, such as mood stabilizers, hypnotics, antipsychotics and cholinesterase inhibitors (Desai & Grossberg, 2001). Ultimately, most pharmacological treatments are harmful to elderly people especially for those who are both elderly and diagnosed with dementia (AGS, 2012). For this reason, guidelines from national associations advise against using pharmacological therapy as a first-line defense for the treatment of dementia-related conditions (Sink, Holden & Yaffe, 2005; AGS, 2012).

Despite the availability of a wide assortment of non-pharmacological therapies, only five have shown promise for the treatment of anxiety among individuals with dementia. These therapies are: behavioral (Spira & Edelstein, 2007) and cognitive-behavioral therapy (Kraus et al., 2008), music therapy (Bannan & Montgomery-Smith, 2008; Killick & Allan, 1999; Takahashi & Matsushita, 2006), animal assisted therapy (AAT) (Marx et al., 2010), exercise
therapy (Eggermont & Scherder, 2006), and touch therapy (Cohen-Mansfield, 2001). In particular, music therapy has been demonstrated as useful for treating anxiety in persons with more severe cognitive impairments (McClive-Reed & Gellis, 2010). Presently, debate exists among Music Therapist on who is qualified to use the term “music therapy”. Hereinafter, the term “music therapy” will be referred to as “music interventions” and is discussed further in Chapter 2 under “Music Therapy and Music Therapist”. In one of the latest meta-analyses, findings from several clinical trials on the effects of music interventions on anxiety and related symptoms of dementia, found that these effects ranged from moderate to large (O’Connor, Ames, Gardner & King, 2009).

Music interventions fall into two categories. The first is passive or ‘receptive’ music interventions, which involves listening by the recipient (Clark, Lipe & Bilbre, 1998). The second type is active, live or interactive music interventions, which require individuals to engage in structured sound making (Raglio et al., 2008). Most studies of the effect of music intervention on anxiety have demonstrated benefits of passive music listening; only several have used performance or active music making in the intervention (Bannan & Montgomery-Smith, 2008; Killick & Allen, 1999; Takahashi & Matsushita, 2006). Passive music has shown benefits ranging from stimulating recall of positive memories from the past which evoke calming feelings in the present (Gerdner, 2000), creating a relaxed atmosphere (Ragneskog, 1996b), and acting as a distraction to disquieting noises in the environment (Denney, 1997; Goddaer & Abraham, 1994). On the other hand, active music making has been shown to result in positive social effects in persons with moderate dementia who were initially reluctant to participate in music activities (Han et al., 2010). The effects observed were smiling and increased energy over the course of the music intervention program (Han et al., 2010). Because of the noted positive effects of both
passive and active music, this study examined the effect of a combined passive and active group music intervention on anxiety.

Although several studies on the effects of music interventions in dementia care have been conducted in hospital outpatient clinics and dementia day care centers, most research on this topic has been conducted in NH. However, since alternative living situations continue to develop, research examining the effectiveness of music interventions on elderly persons living within those situations was needed. This study is believed to be the first to investigate the effects of a combined active-passive group music intervention delivered by a Registered Nurse (RN) in an ALF on anxiety among individuals with dementia.

**Registered Nurses (RN) and Music Therapy**

Group music interventions are rarely implemented by RNs. This may be due to the complexity of group music interventions and the lack of formal music training. Thus, the majority of music interventions have been delivered by Music Therapists, assistive nursing personnel or volunteers with years of experience either performing or teaching music, with or without formal music training (a university or college degree). Presently, RNs and other healthcare-related professionals supervise complimentary therapies, often without knowing how to do the interventions themselves. This is potentially unsafe for individuals on the receiving end. Supervision involves leadership and modeling. There is a need for RNs and any professionals involved in supervision to acquire knowledge of, or an ability to perform, the interventions themselves. Presently, there is a lack of research on RNs delivering active group music interventions on anxiety among individuals with dementia (Ing-Randolph, Phillips, & Williams, 2015). The use of personnel such as Music Therapist lacking nurse education or the use of music in healthcare by nurses who lack education in music is of concern because it conflicts with high
quality person-centered care and patient safety. Therefore, research is needed to explore the feasibility and effectiveness of RN-delivered group music interventions for anxiety in dementia for residents residing in ALFs. Investigating music interventions in ALFs was warranted as most studies have been conducted in nursing homes, but the prevalence of anxiety among persons with dementia is higher within ALFs (Neville & Teri, 2011).

The proposed intervention for this study was led by an RN facilitator without a university or college degree in music intervention techniques. The intervention combined familiar-preferred, active-passive and live group music strategies to achieve optimal therapeutic outcomes. Additional research beyond this study will ultimately be needed to determine the cost effectiveness of RNs rather than music therapists delivering music interventions and whether healthcare curricula should be revised to include complementary therapy education.

**Summary**

Among individuals with mild to moderate dementia, anxiety is a distressing subjective state and is believed to yield to observable behavioral symptoms. Its prevalence is expected to increase as the population ages. The evidence base confirms pharmacological interventions for anxiety are unsafe for treating elderly people age 65 and over, especially those with dementia. Complementary therapies show promise and may be other options to treat anxiety among individuals with dementia. Specifically, studies using music interventions have shown music interventions ameliorate many behavioral symptoms of dementia, including anxiety. However, the majority of research has examined the impact of music interventions delivered by a music therapist. To support person-centered care and advocate for patient safety, it is not known if an active (participation in music-making) passive group music intervention delivered by an RN to a group of ALF residents diagnosed with mild to moderate dementia will reduce their anxiety.
STUDY PURPOSE

Little is currently known about the effect of nurse-delivered group music interventions, specifically, active-passive music interventions, on anxiety among persons with mild to moderate dementia residing in ALFs. Furthermore, little is known about the feasibility of RNs delivering anxiety reducing music interventions in group situations to persons diagnosed with dementia. Therefore, the primary purpose of this study was to examine the effectiveness of a nurse-delivered active-passive group music intervention to reduce anxiety among individuals with dementia.

SPECIFIC AIMS AND HYPOTHESES

The specific aims of this study were:

1. To test the hypothesis that a combined active-passive group music intervention decreases anxiety among individuals diagnosed with mild to moderate dementia in assisted living facilities (ALFs) as compared to a control group engaged in care as usual.

2. To describe the feasibility and acceptability of a combined active and passive group music intervention delivered by an RN without a university or college degree in music intervention techniques to individuals with mild to moderate dementia in ALFs.
Chapter 2

LITERATURE REVIEW

Chapter two examines the literature on the current state of dementia including the extent, causes, some of the types of dementia in existence, origins of behavioral symptoms, a description of anxiety among individuals with dementia, types of treatments and research literature specifically addressing anxiety among individuals with dementia. The chapter concludes with a summary on the state of research on anxiety among persons with dementia.

Epidemiology of Dementia

The population of persons aged 65 years or older in the United States is expected to increase to 70 million people by 2030 (FIFARS, 2012). With longer life spans, the prevalence of dementia is also expected to climb and includes several United States racial and ethnic groups in addition to African-Americans and Caucasians (Plassman et al., 2007).

The 2010 United States Census showed a 43.3 percent increase in the number of individuals of Hispanic or Asian background living in the United States between the years 2000 and 2010 as compared to those of White or Black ancestry, with a 5.7 and 12.3 percent change, respectively (U.S. Census Bureau, 2011). For Hispanic and Asian individuals age 65 and over, projections for the year 2050 are estimated to increase from under 3 million in 2010 to 17.5 million for Hispanics; and over 1 million in 2010 to about 7.5 million by 2050 (FIFARS, 2012). Given the growth of Hispanic and Asian ethnicities in America, it is increasingly important to include these groups in studies of dementia (Sayegh, Kellough, Otilingam, & Poon, 2013; Lampley-Dallas, 2002). At this writing there is little information regarding the prevalence of dementia by ethnicity.
While many studies of dementia warn of the growth in its prevalence, two studies, one conducted by Schrijvers et al. (2012) in the Netherlands and another led by Rocca (2011) in the United States, found otherwise. In Rotterdam, a city in the Netherlands, there was a decrease in the development of dementia between 1990 and 2000. A 1990 sub-cohort of 25,696 person-years was compared to a sub-cohort in 2000 comprised of 8,384 person-years. Individuals who participated did not have dementia at the start of the study. In the 1990 sub-cohort, 286 persons developed dementia as compared to the 2000 sub-cohort in which only 49 persons developed dementia. In the same study, magnetic resonance images (MRI) found less brain atrophy and less cerebral small vessel disease in the 2000 cohort (Schrijvers et al., 2012). These positive anatomical developments were attributed to antithrombotic and lipid-lowering drugs, higher education of the subjects, decreasing stroke incidences, and anti-hypertensive drug use causing an effect size of 13 percent reduction (Schrijvers et al., 2012).

Similarly, research in the United States led by Rocca (2011) found a decline in the prevalence of dementia due to a decline in heart disease and stroke and in the successful treatment of hypertension and diabetes (Rocca et al., 2011). This investigation incorporated data from several ethnically diverse regions in the United States and spanned a period of over thirty years from 1975 through 2008 (Rocca et al., 2011). The author, while optimistic about the decline in dementia, advises work should continue toward understanding all factors determining dementia’s occurrence and treatment (Rocca et al., 2011). This study addresses Rocca and colleague’s (2011) recommendation in the treatment of dementia among individuals with dementia.
Pathology

There are several types of cognitive disorders that are considered forms of dementia. The most common is Alzheimer’s disease (AD), a progressive debilitating brain syndrome characterized by memory loss, which worsens of with time as the disease progresses. The development of plaques and tangles in the brain is thought to be responsible for the decline in cognitive abilities (Waldemar et al., 2007; Sunderland et al., 2003; Blennow & Hampel, 2003; Blennow & Vanmechelen, 2003). These plaques and tangles may cause the loss of critical brain cell connections and eventually lead to cell death (Tiraboschi, Hansen, Thal & Corey-Bloom, 2004).

About 4.7 million Americans have AD, although the number varies depending upon how AD was measured (Hebert, Weuve & Evans, 2013). This represents about 75% of all individuals with dementia (CDC, 2009). AD is the 6th leading cause of death in the United States and the 5th leading cause of death for persons 65 years of age and older (Heron et al., 2009). Risk factors for AD are family history, limited education, head injury, genetics and age (Hall et al., 1998; Jorm, 1997; Myhrer, 1998; Lindsay, 2002). Variation in these risk factors may be attributed to differences in choice of diagnostic criteria. To improve consistency across studies, the 1995 United States National Advisory Council on Aging proposed a selective risk factor search using cross-cultural epidemiological studies as a standardized goal for any national program on Alzheimer’s research (NACA, 1995). Other diseases with symptoms similar to those of AD include vascular dementia, Lewy body dementia, frontotemporal dementia, Huntington’s disease and Creutzfeldt-Jakob disease. Only three are briefly mentioned due to their commonalities.

Vascular dementias are the result of brain damage from cerebrovascular or cardiovascular problems such as strokes or heart inflammation diseases (Roh & Lee, 2014). About 15% to 20%
of older adults with dementia have vascular dementia (Roh & Lee, 2014). Vascular dementia commonly coexists with AD and both are linked to late-life depression as a risk factor (Lenoir et al., 2011; Dintz, Butters, Albert, Dew & Reynolds, 2013).

Lewy body dementia is a progressive type of dementia involving death of the brain’s outer-layer and portions of the mid-brain. Remaining cells contain altered structures known as Lewy bodies. Lewy bodies are also common to individuals with Parkinson’s disease. Lewy body dementias comprise about 15% to 20% of all dementias (Campell, Stephens & Ballard, 2001; McKeith, 2000). Recent research has associated a higher risk for this type of dementia and mutations of the glucocerebrosidase (GBA) gene (Tsuang et al., 2012). Glucocerebrosidase, is responsible for Gaucher disease, which is a lysosomal storage disorder and is a recessively inherited deficiency of glucocerebrosidase, an enzyme encoded by the GBA gene (Brady, Kanfer & Shapiro, 1965).

**Explaining the Development of Behavioral Symptoms Among Individuals with Dementia**

Knowledge of the pathways to pathological conditions in dementia and the resultant behavioral manifestations lead to the need for greater understanding of how these behavioral symptoms in individuals with dementia develop. There are several theories which explain how behavioral symptoms among individuals with dementia manifest. Dementia-associated behavioral symptoms are thought to emanate from a complex interplay of psychological, social, and biological factors and neurochemical, neuropathological and genetic factors. Jiska Cohen-Mansfield proposed four theoretical models to explain the causes of behavioral symptoms in dementia (Cohen-Mansfield, 2000). They are as follows.

The *direct impact of the dementia –biological model* is based on two premises: (1) that behavioral symptoms are the direct result of neurological alterations in the brain and (2) that
behavioral dis-inhibition is due to severe brain changes (Cohen-Mansfield, 2000). Behavioral dis-inhibition is the thought to be a cause of behavioral symptoms of dementia (BSDs)

The *unmet needs model* describes behavioral symptoms as a function of progressing dementia which reduces individuals’ abilities to communicate their needs and the individuals’ capacities to provide for themselves (Cohen-Mansfield, 2000). Examples of needs are pain/health/physical discomfort, mental discomfort (manifested in emotional states such as depression, anxiety, or frustration), lack of social contacts, less than optimal environmental conditions, and inappropriate stimulation levels (Cohen-Mansfield, 2000).

The *behavioral model* proposes that behavioral symptoms are controlled by antecedents and consequences. Behavioral symptoms are learned through reinforcement by staff members who provide attention when the behaviors are exhibited (Cohen-Mansfield, 2000).

Finally, the *environmental vulnerability model* asserts that as dementia progresses, there is a decreasing resilience to less than optimal environmental conditions and that a lower threshold to stimuli develops which affects behavior (Cohen-Mansfield, 2000). Thus, these individuals over-react to stimuli that are deemed appropriate for those who are cognitively intact.

**Anxiety Among Individuals with Dementia**

Neville and Teri (2011) proposed that BSD are distressing for individuals diagnosed with dementia and that the distress might manifest as anxiety (Ferretti et al., 2001; Teri et al., 1999; Neville & Teri, 2011). Moreover, whether the anxiety trait comes before, is exacerbated by a situation, the anxiety state, or exists alongside BSD is still debatable.

As a result, there is no consensus about the definition of anxiety among individuals with dementia. The term “anxiety” is sometimes used synonymously with “agitation”. However, the two words refer to distinctly different conditions. Some authors suggest that agitation is the
expression of underlying anxiety (Shankar & Orrell, 2000), while the opposing view is that they are not so closely related and must be differentiated (Ballard et al., 1996; Hersen & Van Hasselt, 1992).

Twelftree and Qazi (2006) aimed to clarify the relationship between anxiety and agitation in dementia. Using a cross-sectional correlation design, 40 participants were recruited from day hospitals and community mental health teams in the United Kingdom. Anxiety was measured using the Rating Anxiety in Dementia (RAID) scale and the Spielberger State-Trait Anxiety Inventory (STAI-S), while agitation was measured using the Cohen Mansfield Agitation Inventory (CMAI). Restlessness, an item on both scales, was removed to assure restlessness did not affect the outcome. Results showed a positive moderate correlation ($r = 0.41$, $p=0.009$) between the CMAI and the RAID measures (Twelftree & Qazi, 2006). Thus, the authors inferred that anxiety and agitation were qualitatively different constructs and posited that anxiety referred to an internal feeling while agitation described a behavior. Moreover, they suggested that anxiety was a possible, but not sole, cause of agitation (Twelftree & Qazi, 2006).

Anxiety symptoms reflect an internal state and are responses to the fear of losing something of meaning while anxiety disorders are conditions that include anxiety symptoms but the worry is not temporary. For persons with an anxiety disorder, the anxiety does not go away and may worsen over time. The feelings may interfere with daily activities such as job performance and relationships (NIMH, 2016; APA, 2000). The presence of anxiety symptoms in cognitively impaired persons is associated with increased levels of other BSD such as insomnia, night-time waking, wandering, sexual disinhibitions, hallucinations, verbal threats, depression, irritability, overt aggression and protracted crying (McClive-Reed & Gellis, 2010; Neville & Teri, 2011; Chemerinski et al., 1998; McCurry et al., 2004; Rozzini et al., 2009).
While caregiver burnout may be a reasonable cause for suggesting NH placement, recent research by Neville and Teri (2011) found the prevalence of anxiety in those persons diagnosed with dementia was greatest among residents of ALFs because of the lack of patient-relation skills among staff. Neville and Teri (2011) used mean RAID scores as the dependent variable while age, caregiver qualifications (nurse’s aide versus other qualification), Revised Memory and Behavior Problems Checklist (RMBPC) reaction, the Short Sense of Competence Questionnaire (SSCQ), and job satisfaction were the independent variables (Neville & Teri, 2011). The independent variables accounted for 41% of the variance in anxiety (p < 0.0001). The authors posited a feedback loop in which behavioral symptoms were stressors for staff which affected staff reactions to the behavioral symptom, and in turn affected residents’ anxiety (Neville & Teri, 2011). Other factors predicting a state of anxiety included lack of daytime activities, psychological distress, lack of company, memory and communication difficulties and the presence of depression (Neville & Teri, 2011).

**Pharmacological Treatment of Anxiety Among Individuals with Dementia**

The outlook for treatment of anxiety with pharmacological methods is dismal for persons’ age 65 and older (AGS, 2012). Despite recent evidence discouraging use of these medications, use persists (AGS, 2012). Common anti-anxiety drugs with their potential side effects are discussed below.

Typical anxiolytic agents comprise the benzodiazepine family of drugs, which include lorazepam, oxazepam, flurazepam, diazepam, alprazolam, temazepam, and triazolam. Unfortunate side effects of anxiolytics include excessive sedation and dizziness that contributes to falls (Ames et al., 2005; Moretti, Torre, Antonello & Pizzolato, 2006; Lenze et al., 2003). Short acting benzodiazepines such as oxazepam and lorazepam were at one time preferred over
long acting forms due to metabolite accumulation in the blood which are responsible for adverse
effects (Grad, 1995). However, since 2012, the Beers List of drugs to avoid prescribing to elderly
persons 65 years of age and older does not recommend use of any benzodiazepines specifically
for treatment of dementia and cognitive related problems (AGS, 2012).

Pharmacological treatment options for anxiety also include Trazodone and Buspirone.
Trazodone, which is an anti-depressant improves behavioral symptoms in individuals with
dementia and is recommended if non-drug interventions do not work (Desai & Grossberg, 2001).
Buspirone works best when patients continue to show persistent symptoms or generalized
anxiety (Desai & Grossberg, 2001).

Multiple drug therapy such as combining Aricept, a Cholinesterase inhibitor with
Memantine is commonly practiced by doctors and increases the likelihood of stroke and
premature death, especially with the addition of antipsychotics (Ballard & Waite, 2006; Ballard
et al., 2009; Banerjee et al., 2009; Huybrechts et al., 2012; NINDS, 2012). Therefore, the
American Geriatrics Society 2012 Beers Criteria Update Expert Panel, USA Food and Drug
Administration (FDA) and the UK National Institute for Health and Clinical Excellence (NICE)
have issued guidelines to reduce prescribing of these drugs for dementia by healthcare providers
(AGS, 2012; Ballard et al., 2009; Banerjee et al., 2009).

Non-pharmacological Treatment of Anxiety Among Individuals with Dementia

Few studies provide strong empirical evidence supporting the effectiveness of non-
pharmacological interventions specific for anxiety in the cognitively impaired older adult. The
primary psychosocial outcomes for these studies have been agitation, aggression and behavioral
problems other than anxiety.
However, four categories of non-pharmacological therapies may be useful in addressing anxiety: *Emotion-Oriented Therapies* which include reminiscence therapy, simulated presence therapy, and validation therapy; *Brief Psychotherapies* which include behavioral and cognitive-behavioral therapy; *Sensory Stimulation Therapies* which include activity therapies, aromatherapy, bright-light therapy, music interventions, and multisensory approaches; and the newest approach, *Individualized or Person-Centered Psychosocial Interventions* which encompass a combination of various complementary therapies customized for individual cases and sometimes supplemented with pharmacological therapies.

*Emotion-Oriented Therapies* aim to meet the emotional needs of persons with dementia with intent to improve the quality of life, social functioning, and the ability to cope with the cognitive, emotional and social consequences of the disease as perceived by the person (Fiennema et al., 2005). *Reminiscence Therapy* is one form of emotion-oriented therapy. Reminiscence stimulates recollections about the past with the use of personal memory aides. The aides may be family photos or objects from the past. These aides encourage recollections and conversation about them ensues (Moos & Bjorn, 2006; Yasuda, Kuwabara, Kuwahara, Abe & Tetsutani, 2009). *Validation Therapy* is designed to accept and respond to the emotions of the individuals with dementia as a valid reaction to their perceptions of reality (Neal & Briggs, 2003). As a result, attempts to reorient persons with dementia to a shared perception of reality are avoided (Neal & Briggs, 2003). *Simulated Presence Therapy* involves playing audio or videotapes of loved ones communicating positive shared memories to the individual with dementia in hopes of encouraging positive behaviors (Browne & Shlosberg, 2006; Peak & Cheston, 2002).
Brief Psychotherapies include Behavioral Therapies and Cognitive–Behavioral Therapies. Cognitive-Behavioral Therapies are best applied to persons experiencing mild to moderate dementia. Those with severe dementia may respond better to behavioral modification.

Behavioral Therapy involves comprehensive assessments of a problem behavior in which the behavioral triggers, resultant behaviors, and reinforcements are identified and their relationships analyzed. In persons with dementia the information is used to address difficult behaviors through the recognition and management of qualifiers (triggers). In milder cases of dementia, the information may be used to teach alternative responses to the triggers (Snow, Powers, & Liles, 2006).

Cognitive Behavioral Therapy (CBT) was originally developed to treat caregivers rather than persons with dementia (Pinquart & Sorensen, 2006; Selwood, Johnston, Katona, Lyketsos & Livingston, 2007). Cognitive Behavioral Therapies (CBT) focuses on decreasing cognitive burden by increasing repetitions, changing the focus on negative thoughts to positive ones and using concrete instead of abstract examples (Snow et al., 2006). Memory aides are used during CBT sessions. They may be in the form of cue cards or session notebooks (Snow et al., 2006). However, one of the later studies found anxiety levels did not change much for persons with dementia after CBT therapy (Caudle et al., 2007).

Sensory Stimulation Therapies include the following sub-therapies: art/music interventions, activity (physical/exercise) therapy, animal assisted therapy (AAT), aromatherapy, touch therapy, bright-light therapy and multisensory therapies. Rigorous studies of these therapies are few and findings have been mixed regarding the effectiveness of treatments. Thus, evidence for the management of anxiety using sensory stimulation therapies is limited, but studies show these therapies are promising.
Individualized or Person-Centered Psychosocial Interventions can be a combination of any one of the previously mentioned therapies but customized for an individual with dementia (McClive & Gellis, 2010). The therapies may at times be combined with pharmacological therapies to reach optimal health goals (McClive & Gellis, 2010). Individualized or Person-Centered Care was started by Tom Kitwood in 1997 and has evolved to include families (Kitwood, 1997; Lopez, Mazor, Mitchell & Givens, 2013).

Despite the myriad of non-pharmacological therapies available, only a few have shown promise in treating dementia associated anxiety (McClive & Gellis, 2010). These therapies are behavioral and cognitive-behavioral therapies, some sensory stimulation therapies which include, music therapies, Animal Assisted Therapies, Exercise Therapies and Touch Therapies (McClive & Gellis, 2010).

Measuring Anxiety Among Individuals with Dementia

There are several tools to measure anxiety among individuals with dementia. The tools are critiqued here to ultimately justify the use of the Rating Anxiety in Dementia (RAID) tool for this study. Two of the most commonly used are the Behavioral Pathology in Alzheimer’s Disease Rating Scale (BEHAVE-AD), and the Neuropsychiatric Inventory (NPI) (Reisberg et al., 1987; Cummings, 1997). Though not without criticism, there is presently only one tool used to specifically measure for anxiety in dementia. The tool is called the Rating Anxiety in Dementia (RAID) and was created by Shankar, Walker, Frost and Orrell in 1999 (Shankar et al., 1999).

The Behavioral Pathology in AD Scale (BEHAVE-AD) tool was developed by Barry Reisberg and published in 1987. It was used to rate behavior pathology from the charts of 57 outpatients with Alzheimer’s disease (Reisberg et al., 1987). The scale is comprised of 25 behaviors of seven clusters and includes assessing for symptoms and global ratings of caregiver
distress (Reisberg et al., 1987). Paranoid and delusional ideas, hallucinations, activity disturbances, aggressiveness, disturbances related to diurnal rhythms and affect, anxieties and phobias are some behaviors rated (Reisberg et al., 1987). Symptoms from the previous two weeks are rated on a scale of 0 to 3 by caregivers. A global assessment of caregiver distress on a scale of 0 to 3 is also done by the caregiver. The tool is considered to be valid and reliable and takes approximately 20 minutes to complete (Ferris et al., 1997). Since its inception, there have been several versions of the tool such as the E-BEHAVE-AD which relies on direct observation of behavioral symptoms; and the BEHAVE-AD-FW which adds frequency and weighting of behavioral symptoms to the original scale (Reisberg et al., 1996; Monteiro et al., 2001).

The *Neuropsychiatric Inventory* (NPI) was developed by Cummings and colleagues (1994). The original scale assessed for delusions, hallucinations, dysphoria, anxiety, agitation, euphoria, apathy, irritability, disinhibition and deviant motor behaviors (Cummings et al., 1994). Other behaviors were later added measuring eating and night-time behaviors (Cummings et al., 1994). Completing the inventories involve structured interviews facilitated by clinicians with the assistance of caregivers (Cummings, et al., 1994). The caregiver is asked to rate the frequency of behaviors using a 4-point scale and the severity of the behaviors on a 3-point scale (Cummings et al., 1994). Studies report good inter-rater reliability (Cummings et al., 1994; Frisoni et al., 1999); internal consistency, and criterion validity was assessed by correlating questions measuring similar behaviors on the NPI and the BEHAVE-AD (Cummings, 1997). The results of paired items showed good to moderate correlations for each item (Cummings, 1997). Later versions of the inventory were translated into several languages and while the NPI is popular worldwide, it has been criticized for not being responsive to change and score distributions (SD) (Perrault, Oremus, Demers, Vida & Wolfson, 2000).
The RAID consists of 18 items clustered into six sub groups: Worry, Apprehension and Vigilance, Motor Tension and Autonomic Hypersensitivity, Phobias, and Panic Attacks (Shankar et al., 1999). The Rating Anxiety in Dementia (RAID) demonstrates moderate to good reliability with inter-rater reliability ranging from 0.51-1 and a test-retest reliability range from 0.53-1 in previously completed studies. There is significant correlation between RAID and the Clinical Anxiety Scale (p < 0.001) and the Anxiety Status Inventory (p < 0.001) (Shankar et al., 1999).

Internal consistency of RAID was found to be high according to Shankar and associates (1999). Rating Anxiety in Dementia shows restlessness to be a useful and observable sign of anxiety in persons with dementia (Shankar et al., 1999).

The RAID tool allows individuals with dementia to rate their own anxiety if possible. However, individuals with dementia may not be able to report their symptoms accurately. Thus, most symptom ratings have been performed by caregivers or proxies on behalf of people diagnosed with dementia (Bravo, Dubois & Paquet, 2004; Kim et al., 2009). Contrary to previous evidence, a recent study by Bradford (2013) suggests that self-reports of individuals diagnosed with Alzheimer’s disease who suffer from anxiety are equally accurate and similar to proxy counterparts (Bradford et al., 2013). Other studies have shown proxy ratings were lower than self-reports of individuals with dementia and have led to over and under-estimation biases (Snow et al., 2005; Arlt, Lindner, Rösler, von Renteln-Kruse, 2008).

Bradford (2013) examined measurement tools which were completed by both people with dementia and their proxies. Two previously validated measures of anxiety; the Geriatric Anxiety Inventory (GAI) and the Penn State Worry Questionnaire-Abbreviated (PSWQ-A) were used (Bradford et al., 2013) in a study in which all subjects were diagnosed with mild to moderate dementia. The results showed individuals diagnosed with dementia who completed the
assessment tools were as accurate in predicting a clinical diagnosis of an anxiety disorder as their proxies (Bradford et al., 2013). The area under the curve (AUC) for the GAI was equivalent (p=0.21 or no difference), as was the AUC for the PSWQ-A (p=0.27 or no difference) (Bradford et al., 2013). Proxies, however, provided more severe ratings on overall anxiety symptoms and the cut-off point for identifying a diagnosis was lower for individuals diagnosed with dementia (Bradford et al., 2013). Thus, inclusion of self-reports from individuals diagnosed with mild to moderate dementia is warranted and was included in this study. Upon consideration of all available anxiety measuring tools and their features, RAID was selected because it measured anxiety exclusively and included self-reporting from persons with dementia.

**Music Interventions**

Once tools to measure anxiety changes are selected, different types of music interventions and their mechanism of effect are examined. In general, music interventions aimed at decreasing anxiety and other dementia symptoms have been shown to increase memory, social interaction, and reality orientation (Ueda, Suzukamo, Sato & Izumi, 2013; Brotons, Koger & Pickett-Cooper, 1997; Groene, Zapchenk & Marble, 1998). Music influences behavioral and emotional responses through the limbic system, the brain’s center of emotions, and in particular within the hippocampal structures where memory is consolidated with access to and from the diencephalon, basal forebrain and the prefrontal cortex (Zatorre & McGill, 2005; Marieb, 2004).

There are basically two categories of music therapy interventions. The first is passive or ‘receptive’ music interventions, which involves listening on part of the recipient (Clark et al., 1998). The second type is active, live or interactive music therapies which require individuals to engage in structured sound making (Raglio et al., 2008). Researchers have found live, possibly because of a visual component, as opposed to pre-recorded (passive) music has the additional
benefits of promoting arousal and social engagement (O’Connor et al., 2009; Sherratt, Thornton & Hatton, 2004).

Therapies also may be classified as either individual or group music interventions. Individual music interventions focus on one to one therapeutic relationships; whereas group music therapies focus on social connections that may encourage empathetic, supportive and therapeutic peer relations (Hanser, 1999). Passive and active individual music interventions, have been found to work best for those individuals diagnosed with severe rather than mild to moderate dementia (Sakamoto, Ando & Tsutou, 2013). In contrast, group music interventions are most effective in reducing agitation and anxiety (Raglio et al., 2008) in patients diagnosed with mild to moderate dementia. This study investigated the effect of a group music intervention comprised of both active and passive participation on persons diagnosed with mild to moderate dementia.

Familiar music is a tune, with or without lyrics, which an individual has heard before. Familiar music decreases agitated behaviors and triggers memories connected to past events and all emotions associated with them (Clark et al., 1998; Gerdner, 2000; Groene, 1993; O’Connor et al., 2009; Ragneskog, Brane, Karlsson & Kihlgren, 1996a; Cuddy & Duffin, 2005; Smith, 1986). These past memories may in turn bring about the reoccurrence of other functions. It is thought that functions return due to significant decreases in anxiety as the person with dementia engages in autobiographical memory recall (Foster & Valentine, 1998). Furthermore, because music and other creative arts therapy rely on minimal verbal processing, access to other areas of stored knowledge and memories that control certain behaviors are thought to be possible (Brotons, & Koger, 2000; Koger, Chapin & Brotons, 1999; Groene, 2001).
Most research investigating the effects of music interventions on dementia has incorporated *familiar music*. Thus far, only one study has looked at the effect of unfamiliar music or music composed specifically for the study on subjects with dementia. In that study, unfamiliar music successfully decreased symptoms of agitation (Ho et al., 2011). It may be that the unfamiliar music had characteristics similar to music that was preferred by the subjects and therefore produced similar therapeutic effects (Ho et al., 2011; Lai, 2004; Lai & Good, 2005). The study was ground breaking because it suggested that clinicians may be less limited in the choice of which music to use with persons diagnosed with dementia. However, further research is needed to confirm these findings.

Since the 1990’s, a wide assortment of musical genres have been studied for their effects on a range of dementia symptoms, generally with favorable results (Brotons & Pickett-Cooper, 1996; Clark et al., 1998; Gerdner, 1997; Goddaer & Abraham, 1994; Jennings & Vance, 2002; Ragneskog et al., 1996a). The musical genres that have been employed include patriotic, folk, classical, new age, pop, rock, western, religious and Polynesian music performed to an array of varying tempos (Ashida, 2000; Brotons & Marti, 2003; Brotons & Picket-Cooper, 1996; Gerdner, 1997; Goddaer & Abraham, 1994; Ragneskog et al., 1996b; Sherratt & Hatton, 2004; Tabloski, McKinnon-Howe, & Remington, 1995; Vink, Birks, Bruinsa, & Scholten, 2003).

Marked decreases in a number of psychological and behavioral difficulties from progressing dementia, including aberrant social behaviors, emotions, depression, anxiety and agitation, have been noted (Sung, Chang, & Lee, 2010; Lord & Garner, 1993; Odell-Miller, 1995; Olderog-Millard & Smith, 1989; Raglio et al, 2008). The level of significance which music played in a person’s life prior to the onset of dementia is thought to be associated with the effectiveness of a music intervention (Clark et al. 1998, Gerdner, 2000). Usually, music that was
popular during the older person’s youth evokes fond memories (Gibbons, 1977) and musical choices that are most familiar to individuals with dementia have been associated with the most effective music intervention outcomes (Yang et al., 2012; Sung, Lee, Li and Watson, 2011; Ziv, Granot, Hai, Dassa & Haimov, 2007; Cuddy & Duffin, 2005; Dileo & Bradt, 2005; Gerdner, 1997; Gerdner, 2000; Jennings & Vance, 2002).

However, music selections that are unfamiliar and yet contain stylistic components that are similar to the individual’s preferred music may also produce favorable outcomes. Preferred music is based on personal preference or affinity (Gerdner, 1997) and the term unfamiliar refers to music that is not recognized or for which there is no preference. Preferred unfamiliar music describes music that may be liked but not necessarily recognized. Using researcher-composed musical pieces, (which had not been heard previously by the subjects), Ho (2011) found significant decreases in agitation after intervention. The study used six researcher-composed piano pieces based on the assumption that different musical compositions may achieve the same therapeutic effects if they have similar characteristics (Ho et al., 2011). Ho’s (2011) study aligns with the 1956 Leonard Meyer theory Emotion and Meaning in Music, which asserts that the experience of a music listener evolves from the listener’s emotions and feelings about the music and that these feelings and emotions are a function of relationships within the music itself (Meyer, 1956). Regarding this point, Ho’s (2011) study demonstrated, and other music interventionist researchers have postulated, that unfamiliar (researcher composed) music may achieve similar therapeutic effects to preferred music if each type contains similar characteristics or function of relationships (Ho et al., 2011; Lai, 2004; Lai & Good, 2005). Nevertheless, because past research attributed successful music interventions to an intact long-term memory as compared to short-term memory for those persons diagnosed with dementia, further
investigations are needed to confirm these results (Gerdner, 1997; Gerdner, 2000; Jennings & Vance, 2002).

Considerable information is available regarding the use of individual music interventions in dementia care. However, group music interventions seem to be more effective in reducing agitation, anxiety, and irritability than individual music sessions, especially for those persons diagnosed with mild to moderate dementia (Raglio et al., 2008; Suzuki et al., 2004). *Group music interventions* involve the making of music by two or more individuals together. The *group arrangement* has been observed to promote feelings of belonging which some researchers have found is a form of *entrainment*. Entrainment, triggered through rhythmic sounds heard in the environment, is thought to move individuals to join in a social process such as making group music or moves and provides a channel for communication and social interaction among participants with dementia (Phillips-Silver, Aktipis & Bryant, 2010; Eberts, 1994; Pollack & Namazi, 1992; Sung, Chang, Lee & Lee, 2006). Group music interventions also produce positive mood and social behaviors in individuals with dementia (Chu et al., 2013).

The superiority of *active or live* group music sessions (music making) has been demonstrated in the short-term treatment of apathy in dementia patients (Holmes, Knights, Dean, Hodkinson & Hopkins, 2006). When live sessions are combined with physical coordination of certain body parts such as playing a simple rhythm instrument, cognitive processing time is increased (Toole, Park & Al-Ameer, 1993). The effect of using musical instruments on the BSD may enhance communication between subjects and lead to positive reductions in negative behaviors (Stern, 1985; Stern, 2004).

*Group Music Interventions Addressing Anxiety in Dementia:* Table 2.1 summarized studies using group music interventions on anxiety in dementia care. It is difficult for those
providing the therapy to conduct active-live group arrangements without meaningful education. Therefore, no study to date has employed nurses to deliver active-live group music interventions (Ing-Randolph et al., 2015).

One of the earliest studies by Svansdottir and Snaedal (2006) examining group music interventions evaluated the effect of music therapy on behavioral and psychological symptoms of dementia (BPSD) in patients diagnosed with moderate to severe AD. The BEHAVE-AD scale was used to measure behavioral changes after interviews with the nursing staff from two nursing homes (NH) and two psychogeriatric wards. In particular, significant changes to anxiety levels were observed from pre-treatment (1.0) to post treatment (0.7) with p<0.01. Music interventions were conducted over 18 sessions for 6 weeks and were held three times a week for 30 minutes each session. Each group consisted of only three to four patients. According to Yalom (1975), groups consisting of less than five individuals are too small and result in less member interactions and the facilitator engaging in individual rather than group therapy. Hence, for patients with moderate to severe dementia in Svansdottir and Snaedal (2006) study, the interventions may have been successful because they were engaged in individual rather than group music interventions and according to Sakamoto, Ando and Tsutou (2013), individual music interventions work best for those diagnosed with severe dementia.

In another study, musical instruments served as a communication tool to treat BSD (Raglio et al., 2008). The study was conducted in Northern Italy at three NHs. All group music interventions were directed non-verbally and comprised the use of rhythmical and melodic instruments. The purpose was to allow participants a means to express their emotions and feelings with the assistance of a music therapist and by so doing modify their global emotional and affective state. Fifty-nine patients diagnosed with moderate to severe dementia completed
<table>
<thead>
<tr>
<th>Author(s) and Year</th>
<th>Sample Size</th>
<th>Participants on Pharmacological use with Intervention</th>
<th>Site and Country</th>
<th>Type or Study</th>
<th>Dementia Stage &amp; Assess using...</th>
<th>Type of Group Music Intervention</th>
<th>Delivered by</th>
<th>Outcome Measure</th>
<th>Significant Anxiety Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choi et al., (2009)</td>
<td>20 n=10 IG</td>
<td>No mention</td>
<td>Dementia Day Care Unit/South Korea</td>
<td>NR w/ Repeated Measures</td>
<td>Dx of Dementia NIS</td>
<td>Active 3xs/wk over 5 wks.</td>
<td>3 MTs</td>
<td>NPI-some reduced anxiety</td>
<td>Pre=1.2 Post=0.8 P=0.33</td>
</tr>
<tr>
<td>Cooke et al., (2010)</td>
<td>47</td>
<td>No mention</td>
<td>Long Term Care w/ low living ALF and high NH care/Queensland, Australia</td>
<td>RC w/ Repeated Measures w/ Cross-over Design</td>
<td>Early to mid-stage dementia DSN-IV MMSE</td>
<td>30 mins, preferred Active /Live group music, and 10 mins. Active listening over 6 mos.</td>
<td>2 Musicians</td>
<td>RAID - Measured 3xs. Minimal change in anxiety levels.</td>
<td>Mean=6.17; 7.58 and 7.50. 95% CI</td>
</tr>
<tr>
<td>Fischer-Terworth &amp; Probst, (2011)</td>
<td>n=30 6-10 M=7.4 IG</td>
<td>No mention</td>
<td>Dementia Care Unit/Germany</td>
<td>NR w/ Repeated Measures &amp; NR by parallelizing of IG &amp; CG</td>
<td>Mild to moderate dementia GDS &amp; MMSE</td>
<td>Active 1xs/wk. 45 minutes over 6 mos.</td>
<td>Therapist type; not specified</td>
<td>NPI – Reduced Anxiety</td>
<td>Pre M=2.8 t=1.88; p&lt;.05 Post M=1.9; t=1.19; p&gt;.05</td>
</tr>
<tr>
<td>Raglio et al., (2008)</td>
<td>59 n=30</td>
<td>Yes</td>
<td>NH/Italy</td>
<td>Repeated Measures w/ NSCT</td>
<td>Dx of AD or Vascular Dementia DSM-IV &amp; MMSE</td>
<td>Active 3 cycles of 10 sessions at 30 mins. each over 4 mos.</td>
<td>MT</td>
<td>NPI-Reduced Anxiety</td>
<td>Base=3.34 8 wks=2.93 16 wks=2.93 4 wks post end of trial=3.10 p=0.002</td>
</tr>
<tr>
<td>Raglio et al., (2010)</td>
<td>60 into groups of 3 IG</td>
<td>No mention</td>
<td>NH/Italy</td>
<td>RC w/ Repeated Measures</td>
<td>Moderate to Severe Dementia DSM-IV, MMSE &amp; CDR</td>
<td>Active 30 min. sessions of 3 cycles/wk. over 4 wks followed by 1 mo. washout totaling 6 months</td>
<td>MT</td>
<td>NPI Decreased Anxiety</td>
<td>Mean Change T0=2.63 T1=0.93 P&lt;0.001</td>
</tr>
<tr>
<td>Author(s) and Year</td>
<td>Sample Size</td>
<td>Participants on Pharmacological use with Intervention</td>
<td>Site and Country</td>
<td>Type or Study</td>
<td>Dementia Stage &amp; Assess using. . .</td>
<td>Type of Group Music Intervention</td>
<td>Delivered by</td>
<td>Outcome Measure</td>
<td>Significant Anxiety Results</td>
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<td>Sung et al., (2010)</td>
<td>52 n=29 IG</td>
<td>No mention</td>
<td>NH/Taiwan</td>
<td>RC w/ Repeated Measures</td>
<td>Moderate to Severe GDS</td>
<td>Preferred music listening to CDs over 6 weeks. (non-active group music intervention)</td>
<td>Nursing Staff (RNs and Nurse Aides)</td>
<td>RAID</td>
<td>Decreased Anxiety</td>
</tr>
<tr>
<td>Sung et al., (2011)</td>
<td>55 n=27 IG</td>
<td>No mention</td>
<td>Residential Care Facility/Taiwan</td>
<td>RC w/ Repeated Measures</td>
<td>Dx of dementia NIS</td>
<td>Mostly preferred selections. Active 30 min sessions 2x/wk over 6 wks.</td>
<td>Research Assistant</td>
<td>RAID</td>
<td>Reduced Anxiety</td>
</tr>
<tr>
<td>Svansson &amp; Snaedal, (2006)</td>
<td>38 (groups of 3 to 4 for IG and n=20)</td>
<td>No mention</td>
<td>NH and Psychogeriatric Wards/Iceland.</td>
<td>RC</td>
<td>Moderate of, Severe Dementia GDS</td>
<td>Active/Passive (Differed by subject ability to participate) 18 sessions (3x a week) for 30 min. each over 6 weeks.</td>
<td>MT</td>
<td>BEHAVE-AD</td>
<td>Decreased Anxiety</td>
</tr>
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Acronym Key:
AD = Alzheimer’s Disease
BEHAVE-AD = Behavior Pathology in Alzheimer’s Disease Rating
CDR = Clinical Dementia Rating
CG = Control Group
DSM-IV = Diagnostic and Statistical Manual
DX = Diagnosis
GDS = Global Deterioration Scale
IG = Intervention Group
M = Mean
MMSE = Mini Mental State Exam
NIS = No Instrument Specified
NR = Non Random
NSCT = Non-Standard Controlled Trial
RC = Random Controlled
the study, with \( n=30 \) patients assigned to an experimental group and \( n=29 \) patients to a control. Each session was video-taped with a fixed camcorder on a tripod in the corner of the therapy room. Behaviors were categorized using a music therapy-coding scheme (MTCS). The study was non-standardized and used the Neuropsychiatric Inventory (NPI) to measure outcomes. A single physician administered measurements for the Mini Mental State Examination (MMSE), a tool to assess the mental status of older persons, and the Barthel Index, to assess the ability for self-care and the NPI. The physician was blinded to the patient group membership (experimental or control) and was not aware of any changes in cognitive, functional and behavioral status. The NPI was completed by proxy or by caregiver observations. The results showed that anxiety, and other neuropsychiatric disturbances, were reduced significantly (\( p=0.002 \)) (Raglio et al., 2008). The author attributed the phenomena to music raising the environmental threshold based on a psychiatric model originated by Volicer and Hurley (2003). However, it is not clear if the music therapist interacted one-on-one with individual members of the experimental group or with all members at once. This may conflict with other findings stating individual and not group music interventions work best with those who are diagnosed with moderate to severe dementia (Sakamoto et al., 2013) and that anxiety is more prevalent in mild to moderate dementia than in moderate to severe dementia (Seignourel et al., 2008; Galleo et al., 2011).

A nurse-scientist examined the effects of group music on BSD in a comprehensive manner by implementing vocal music, analysis of words in songs, constructing musical instruments, in which details were not provided, playing various instruments, such as pianos and hand bells, song drawing and song writing (Choi, Lee, Cheong & Lee, 2009). Participants were from a special dementia care unit in South Korea. The interventions were employed by a music therapist over a 15-week period with twenty patients non-randomly allocated to either a
music intervention or care as usual group. Outcomes for anxiety and other BSD were measured using the NPI. Anxiety reduction was minimal, from 1.2 at pre to 0.8 at post with music interventions; and only agitation was reduced significantly (Choi et al., 2009). The study did not specify the severity of dementia in subjects, which may be the reason for the minimal effects on anxiety.

A study looking at the efficacy of active group music interventions on elders with severe dementia resulted in a significantly improved NPI score for both experimental and control groups (Raglio et al., 2010). All subjects were recruited from five NHs in Italy and all were diagnosed with severe dementia. Each group received the same standard care intervention except for the experimental group, which received the standard care intervention plus music interventions. Fifty-three patients completed the study. Each session consisted of a group of three patients and lasted 30 minutes, meeting three times a week. There were three cycles totaling 12 music intervention sessions. Each session was video-taped and led by a music therapist. Changes in outcomes were measured using the NPI over six months. Anxiety was reduced in both the experimental and control groups (Raglio et al., 2010). This may be due to a very small group music intervention (three individuals) for the music intervention group. These findings contradict studies investigating group music interventions on individuals severely affected with dementia; as group music interventions are thought to be less effective in those diagnosed with severe dementia (Suzuki et al., 2004) and as dementia progresses to severe levels; anxiety levels also diminish (Seignourel, et al., 2008).

A similar result for decreases in dementia-related anxiety occurred after six months of Music Therapy sessions using the NPI as a measuring tool. The study was conducted by Fischer-Terworth and Probst (2011) and evaluated the use of the Treatment and Education of Autistic
TEACCH is a set of guidelines and principles developed as individual interventions for persons with autism. These guidelines are intended to regulate autistic behaviors (Schopler, Mesibov & Haresey, 1995). The authors modified TEACCH according to the core needs of individuals with dementia and created a structured teaching approach aimed at making the social environmental situations less confusing, more predictable, coherent and familiar (Fischer-Terworth & Probst, 2011). Music interventions were selected as the core intervention due to their distinct abilities to influence both behavior and emotions. Other cognitively stimulating activities were employed between the musical activities, including quizzes, word-association games, and semantic categorization exercises. Twenty-six patients from a special dementia care unit located in Germany participated. There were also 23 controls (also with dementia) recruited from another unit within the same institution who were offered traditional care (Fischer-Terworth & Probst, 2011). Results showed the NPI decreased in several neuropsychiatric symptoms. Most notably, anxiety reduced from a mean score of 2.8 to 1.9 (t = 1.88, p=0.07) in the 26 patients with dementia in the intervention group, with no difference for those in the control group (Fischer-Terworth & Probst, 2011).

Despite these noteworthy results, the study had shortcomings. A set of measures comparing the independent variables across studies would have assisted in discerning which of the various activities may have had a greater influence on decreasing NPI symptoms. There is some discussion on specific music interventions implemented, but none on the in-between activities except that they were clumped together and named under one cognitive stimulation category. Since these activities may have influenced the outcomes, at least a brief discussion on
each would have been helpful. The use of another set of controls with dementia engaged in the
cognitive activities used in between the music interventions may have also helped to distinguish
which activity might have more influence over the NPI scores. Constructing modifications to
environments is not new in dementia research. Since the study purpose was to effect dementia, a
mention of Hall and Buckwalter’s (1987) Progressively Lowered Stress Threshold (PLST) could
have been mentioned as the structured teaching (2007) model was very similar. The PLST
model recommends changes to the environment specifically for persons diagnosed with dementia
(Hall & Buckwalter, 1987).

Sung and colleagues (2010) examined the effects of preferred music listening on anxiety
in a sample of 29 adults age 65 and older diagnosed with moderate to severe dementia (Sung et
al., 2010). This appeared to have been an individual music intervention, although that is not clear
from the report. Registered Nurses and Nurse Aides were trained to deliver all interventions, and
training was provided by a nurse researcher with expertise in dementia care and music therapy.
The study was conducted at a NH in Taiwan. The authors found a significant decrease in anxiety
from 10.93 at pretest to 8.93 at post-test (p < 0.001) using the Rating Anxiety in Dementia
(RAID) scale.

While the results of the Sung and colleagues study were significant, further research is
needed to determine what types of music interventions are appropriately delivered by registered
nurses, nurse aides and informal caregivers. In the Sung study, the education of music
interventionist was provided by a nurse researcher with expertise in dementia and music therapy,
although whether the nurse was credentialed in music therapy was not reported. Some nationally
certified music therapists argue that no one without their credentialing may use the term music
therapist (Fischer, 2013). However, the study by Sung and colleagues suggests a starting point
for the provision of music education to both professional and informal caregivers involved in dementia care.

Findings from only one study to date failed to demonstrate a significant relationship between group music interventions and reduction in anxiety (Cooke, Moyle, Shum, Harrison & Murfield, 2010). This study involved a randomized cross-over design using two groups of subjects (n = 7) with early to mid-stage dementia: an experimental group and a reading control group. The study was described as being conducted in terms of “semi-assisted living” and “high nursing home (NH) care”. No descriptions were given regarding what the terms “semi”-assisted living and “high NH” meant. A mixture of both live group and pre-recorded music interventions were implemented by two musicians while the reading control groups were facilitated by a research assistant (RA). Both the musicians and the reading control RA were trained in delivery of the interventions in four training sessions (Cooke et al., 2010). The participants in the experimental group sang, played instruments and moved to music. Anxiety was measured using RAID. The music intervention and control activities ran for 40 minutes three times a week. The results did not show music decreased anxiety in participants over the six-month period. These results are not consistent with others that showed positive effects of group music interventions on anxiety (Raglio et al., 2010; Sung et al., 2011b; Raglio et al., 2008; Choi et al., 2009; Svansdottir & Snaedal, 2006). Another researcher recently reported that both individualized passive and interactive music interventions reduced stress and BPSD, and induced relaxation in individuals with severe dementia (Sakamoto et al., 2013).

In another study conducted in Taiwan, Sung and colleagues (2011b) examined the use of group music interventions using percussion instruments with familiar music to reduce anxiety and agitation experienced by subjects living in a residential care facility (RCF). The study was
conducted over a six-week period with therapy sessions occurring twice a week for 30 minutes. All music interventions were led by a research assistant trained in music intervention skills. Nursing staff were involved in assessing participant music preferences, but not in intervention delivery. Participants were randomly assigned to either an experimental or control group and anxiety was measured using RAID. Participants who received group music interventions had significantly lower anxiety scores than those in the control group (F=8.98, p=.004) (Sung et al., 2011b). This rigorous study followed the Medical Research Council guidelines for evaluation of complex interventions (Anderson, 2008).

There are at least three potential explanations for the discrepancy in findings between the Cooke (2010) study and others (Choi et al., 2009; Fischer-Terworth & Probst, 2011; Raglio et al., 2008; Raglio et al., 2010; Sung et al., 2010; Sung et al., 2011; Svansdottir & Snaedal, 2006). First, the way interventions are delivered and by whom may make a large difference in the effects. The Cooke study utilized the services of two semi-professional musicians trained to deliver the interventions and included a music practice session conducted in an alternative long-term care facility (LTC) (Harrison, Cooke, Moyle, Shum & Murfield, 2010). It is not clear whether there was sufficient training time to focus on the clinical problem. Musicians are usually performers and do not have therapeutic education. It appears they performed a repertoire according to a well thought out musical research agenda, but may have lacked awareness of which behavioral responses were either encouraged or discouraged through the music. The musicians were also allotted four music practice sessions prior to the study. However, music interventions may require more specialized training time with further input from music therapists or specialists in other disciplines, such as nurses, in order to tailor the musical activities more directly to persons with dementia who are experiencing anxiety.
Secondly, there might be a limit to the group size in which group music interventions are effective. Subject attendance numbers fluctuated. At site A, the maximum group attendance was 16; and for site B, nine (Cooke et al., 2010). No minimal group size was reported. Third, subject selection should have included a report on ethnicity. Sociocultural factors associated with ethnicity may affect the severity of anxiety and response to music interventions (Seignourel et al, 2008). The inability to guarantee a set number of subject/participants at each session may have influenced the study outcomes.

The difference in outcomes of the study by Cooke and colleagues (2010) and Sung and colleagues (2011b) studies are puzzling. Both studies used the RAID tool to measure changes in anxiety post music interventions (Cooke et al., 2010; Sung et al., (2011b) yet, resulted in different outcomes. Perhaps the differences are due to the way RAID was administered; as the strengths of RAID has been acknowledged by several researchers (Sung et al., 2011b; Cooke et al., 2010; Sansoni et al., 2007). It could be that blinding or the lack of blinding made a difference. Cooke and colleagues (2010) trained RAs who were blind to the intervention for measures at baseline, and post-intervention (Cooke et al., 2010). Whereas, Sung and colleagues (2011b), acknowledged results that may have been affected by non-blinding of the data collectors. Finally, ethnic and cultural factors may need to be considered if individuals of Asian and Hispanic heritage experience more anxiety than individuals of other ethnic-cultural backgrounds as is suggested by Seignourel and colleagues (2008). The Cooke (2010) study did not report ethnicity. In contrast, Sung and colleagues (2011b) noted that participants were recruited from a residential care facility located in Taiwan and that over half of the sample were Taiwanese (72.5%). Future studies need to acknowledge and account for ethno-cultural factors.
Both studies could have included demographic data on the ethnicity of subjects and place of birth.

**Music Therapy/Music Therapist**

Thus far, studies have not addressed controversies regarding the current use of “music therapy” and its delivery to decrease anxiety among individuals with dementia. Until recently, the term “music therapy” has been loosely and often naively used to refer to the process of using music to foster healing. Increasingly, music therapists argue that the term should be associated with formal schooling and certification (Fischer, 2013). Nevertheless, most studies of the effects of music on symptoms of dementia have used the term “music therapy” regardless of official definitions and credentialing. Part of the confusion is that the exact mechanism of how music affects people has not been conclusively demonstrated (Sackett, Richardson, Rosenberg & Haynes, 1997; Vink et al., 2003) leaving skepticism in the minds of many individuals.

Regardless, many investigations have shown promising results for the use of music in healthcare.

*Music Therapists* are highly skilled and trained musicians with additional academic core work in developmental, psychosocial, and group theories and practices; but their training does not include an intensive science core focus. Table 2.2 compares the preparation of a college-level music therapist with that of a college-level nurse. Note also that Music Therapy undergraduates receive formal music degrees from accredited schools of music.

*Music Therapy* is defined by The American Music Therapy Association (AMTA) as “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” (AMTA, 2013, p.1). Rafieyan (2007) a certified music therapist and author of *A Description of the Use of Music Therapy in Consultation-Liaison Psychiatry* describes a music
therapist as a highly skilled musician with additional coursework in developmental, psychosocial and group theories and practices (Rafieyan & Ries, 2007).

In recent years, Certified Music Therapists have campaigned for status as licensed professionals in order to prevent uncertified individuals from calling themselves “Music Therapist” or using “Music Therapy” on various patient populations. Music Therapists arguing in support of licensure cite situations in which patients experiencing a medical crisis have been saved by the Music Therapist’s knowledge in delivering an appropriate music intervention (Fischer, 2013). For instance, a Music Therapist from Tucson, Arizona was able to return an anxious, pediatric patient’s oxygen saturation and respiration rates to normal levels while the patient was in an induced coma state. The Music Therapist specifically resolved the problem by analyzing the situation first and then switching the music. The incident occurred after finding the patient reacting badly to a certain type of music being played (Fischer, 2013).

Some music therapy state senate bill proposals have gone so far as to consider practicing music therapy without certification a crime with up to 30-days of jail time (Fischer, 2013). To date, four states have implemented licensure for music therapists: North Dakota (April 26, 2011), Nevada (June 3, 2011), Georgia (May 2012) (AMTA, 2013) and New York (NYSED.gov, 2009). However, New York is the only state that places music therapy licensure within a creative arts category which also includes other creative arts disciplines such as dance/movement, drama, poetry and art. (NYSED.gov, 2009). Nevertheless, although music therapists may be granted licensure, they are still unable to diagnose and must report to other healthcare providers, including nurses, for supervision.
### TABLE 2.2

**COMPARISON OF TYPICAL CURRICULUMS: BACHELOR IN MT VERSUS BACHELOR IN NURSING**

<table>
<thead>
<tr>
<th>Course</th>
<th>*(Semester) Credits/Units</th>
<th><strong>Course</strong></th>
<th>*(Quarter) Credits/Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT CONCENTRATION &amp; INSTRUMENTAL CLASSES</td>
<td>34</td>
<td>NURSING CONCENTRATION</td>
<td>94</td>
</tr>
<tr>
<td>(Health related to sound)</td>
<td></td>
<td>(Health related to all senses)</td>
<td></td>
</tr>
<tr>
<td><em>BACHELOR IN MUSIC THERAPY</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CORE MUSIC</td>
<td>63</td>
<td>PREPARATION FOR MAJOR</td>
<td>55-56</td>
</tr>
<tr>
<td>(All music no science)</td>
<td></td>
<td>(Heavy Science)</td>
<td></td>
</tr>
<tr>
<td>GENERAL EDUCATION</td>
<td>31</td>
<td>GENERAL EDUCATION</td>
<td>48</td>
</tr>
<tr>
<td>(Two classes from biological sciences)</td>
<td></td>
<td>(Music as an elective with 18 credits from science)</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>128</strong></td>
<td><strong>TOTAL</strong></td>
<td><strong>180-216</strong></td>
</tr>
</tbody>
</table>

*University of Kansas (2015 School Year)*  
**UCLA School of Nursing (2013-2014 School Year)*
Presently, the movement advocating for Music Therapist state licensing is growing. Many of the delays in licensure are because of the inability of Music Therapists to describe the mechanism of effect (Sackett et al., 1997; Vink et al., 2003). Thus, for now, responsibility for the care and safety of persons with dementia (PWD) receiving music interventions fall to licensed personnel such as physicians and nurses and the services of Music Therapists are usually supervised through these licensed personnel. Unlike RN supervision of assistive nursing personnel such as CNAs, the safety of this current practice is questionable. How can healthcare professionals, including RNs, supervise and lead Music Therapists and other music related personnel without knowledge of how to do the interventions themselves?

**Nurses as Music Interventionists**

Until the exact mechanism of how music works in people is known, it may be safer and best that Registered Nurses (RN) or other professional healthcare disciplines such as Physical or Occupational Therapists or Medical Doctors be assigned the responsibility for the supervision of Music Therapists and also be knowledgeable in music interventions themselves. Registered Nurses in particular, engage in the process of diagnosing human responses to actual or potential health problems while providing supportive and restorative care, and since RN education extends beyond the psychological to include all aspects of human life, it appears logical that RNs should supervise Music Therapist and know how to do the interventions themselves. Meanwhile, in consideration of Music Therapist lobbying for change, all music therapy terminology for this study was referred to as a music intervention or music interventions.

A Nursing Music Intervention (NMI) is a nurse’s action or behavior that implements a nursing care plan involving music interventions to fulfill a specific objective. For example, a
nurse may choose to prevent agitation or lower anxiety levels in patients with dementia by using music interventions (Brotons & Picket-Cooper, 1996; Sung & Chang, 2005; Svansdottir & Snaedal, 2006). An NMI is an author-created term, as MTs are lobbying for the term *Music Therapy* to be used only by those with certification in Music Therapy (Fischer, 2013).

There is little research on the effectiveness of nurses delivering group music interventions to older persons with dementia who are experiencing anxiety using active-passive approaches. Implementation of group music interventions is much more complex than individual interventions, which may be the reason why there has been little research on using nurses to deliver group interventions.

Research on RN music intervention delivery is scarce if nonexistent, especially for active group music interventions. In past years, nurses in research and a few in clinical practice have employed the services of a trained music therapist, or assistive nursing personnel or volunteers with years of experience either performing or teaching music with or without formal training to help facilitate music interventions rather than deliver the interventions themselves. Many of these volunteers may be unaware of the reasons for each music intervention unless counseled by experts with experience in the use of music in healthcare.

One solution to resolve who should deliver music interventions in healthcare, may be to add music education to the nursing curriculum. A recent therapeutic music review by Skingley and Vella-Burrows (2010), citing studies by Remington (2002) and Norberg, Melin and Asplund (2003), recommended that nurses be trained in both music interventions delivery and interpretation of patient responses to these interventions as a means to support music integration.
into nursing care (Skingley & Vella-Burrows, 2010; Remington, 2002; Norberg, Melin & Asplund, 2003).

Another study conducted in Taiwan investigated nurses’ attitudes about the use of music for older people with dementia residing in LTC facilities. The study showed that nurses were open to, and had positive regard for the use of music in the care of older people with dementia, but few had delivered music interventions in practice because of the lack of formal training (Sung, Lee, Chang & Smith, 2011a). The study did not state why Music Therapist use was infrequent within LTC facilities, in Taiwan; except that most Music Therapists prefer working in hospitals versus LTC facilities. Therefore, in Taiwan, access to a trained Music Therapist was difficult for older people living in LTC facilities (Sorell & Sorell, 2008). At least in Taiwan, Sung and colleagues (2011a) suggested that music in healthcare should become a part of nursing curricula in formal nursing education and can be taught in continuing education clinical nursing programs.

**Registered Nurses (RN) in Assisted Living Facilities (ALF)**

Assisted Living Facilities focus on supportive care. Supportive care consists of non-skilled nursing procedures such as preparation of meals, cleaning rooms, changing soiled bedding, and accompanying care recipients on shopping trips (Park-Lee et al., 2011). The level of care does not require 24-hour skilled nursing care and ALFs are considered non-medical facilities. Hiring supportive care providers rather than RNs is a cost savings for ALF owners. Presently, in most states, ALFs are not required to have RNs, medical doctors (MD)s or certified nursing assistants (CANs) on site (CANHR, 2008). As a result, the number of RNs employed in
ALFs is relatively small. However, RNs do work in some ALFs in both part and full-time positions, and some ALFs have RNs on staff up to 24 hours daily.

The roles of RNs in ALFs vary from state to state due to differences in the regulations governing these facilities. Definitions of ALF and the educational level of nurses delivering care in the ALF also vary by state. At least three studies suggest that involvement of Public Health Nurses (PHN), Mental Health Nurses (MHN) and Nurse Practitioners (NP) in care delivery in ALF settings is beneficial, but much more research is still needed to establish “best practice” guidelines for the roles of RNs in ALFs (Phillips & Ziminski, 2012; Smith, Buckwalter, Kang, Ellingrod & Schultz, 2008; Wink & Holcomb, 2002).

An example of one nurse practitioner’s role in an ALF is described by Nurse Practitioner (NP) Meredith Wallace in her article “Is There a Nurse in the House: The Role of Nurses in Assisted Living: Past, Present, and Future.” The NP manager was hired to supervise marketing, activities, maintenance, and food services in addition to nursing staff (Wallace, 2003). Because nurses may supervise many aspects of a healthcare organization, this is an additional reason to increase nurses’ knowledge of complementary therapies by offering training courses in various types, including music (Gotell, Brown & Ekman, 2009; Remington, 2002; Norberg et al., 2003; Chatterton, Baker & Morgan, 2010).

Some types of music interventions are easy and appropriate for nursing staff to learn and implement in long term care facilities (Gerdner, 2006; Sung, Chang & Abbey, 2008). It is reasonable to expect that nurses may be able to deliver a wide range of music interventions successfully if given some problem-focused musical training. Examples of music interventions include selecting calming music for relaxation, facilitating movement and exercise with rhythmic
music, evoking reminiscences with singing songs and using call and response techniques to encourage listening, speech and sharpen attention skills. Upon graduation, registered nurses and those with advanced nursing education have intensive study in clinical, biological, chemical and physical science but have little knowledge of therapies based on the arts.

Little is known about the feasibility of nurses implementing active-passive group music interventions or about the effectiveness of active-passive group music interventions delivered by nurses in clinical settings. Although the majority of past research studying the effects of music interventions involved the services of both certified music therapists and nurses (Sherratt and Hatton, 2004), only a few studies identified whether the primary interventionists providing passive group music interventions were registered nurses. To date, the current research base for nurses delivering active-passive group music interventions is yet to be constructed.

Avoiding Bias in Music Intervention Designs

Developing research methods which avoid bias may be challenging as some of the studies reviewed have shown. It seems easier to integrate blinding and remain impartial when implementing allocation designs, such as drug studies. However, allocation designs integrating blinding is not always possible especially for studies investigating the usefulness of nursing interventions (Polit & Beck, 2012).

One way to avoid this is by masking participants’ treatment status from people collecting outcome data and from other clinicians providing normal care (Polit & Beck, 2012). Research Assistants assisting in data collection in the present study were blind to the intervention at baseline, mid-point and post interventions/control sessions. Furthermore, a cross-over design in which all subjects receive the intervention was implemented. Cross-over designs ensure high
equivalence among subjects exposed to different conditions. Thus, the groups being compared are equal with respect to age, weight, health, and so forth because they are composed of the same people (Polit & Beck, 2012). The drawbacks of cross-over designs may result from carry-over effects (Polit & Beck, 2012). These effects may be avoided by implementing a wash-out period (Polit & Beck, 2012). Previous research using music interventions in dementia care has found the effects of interventions dissipate anywhere between one to four weeks after sessions (Bruer, Spitznagel & Cloninger, 2007; Svansdottir & Snaedal, 2006). However, further research is needed to find which particular week and under what study condition the effects dissipate.

**CURRENT STATE OF RESEARCH - SUMMARY**

Chapter 2 provided insight into the growing problem of dementia with particular focus on anxiety symptoms of those diagnosed with the condition. Explanations for how the symptoms of dementia develop and possible interventions to treat the symptoms were discussed. Treatments include both pharmacological and non-pharmacological of which non-pharmacological interventions are the gold standard. Several types of non-pharmacological interventions were mentioned with the most favorable being music interventions.

Current research investigating the use of group music interventions on anxiety in dementia care were reviewed. Table 2.1 delineates studies that investigated the use of group music interventions on anxiety in dementia care with attention to the country of origin and the professional background of the person delivering the intervention. There is a wide assortment of investigators representing various countries. However, American studies investigating group music interventions, specifically, active-passive group music interventions delivered by an RN on anxiety, have not been conducted. Given the central importance of society and culture in both
patient musical experiences and nursing clinical practice, such research is warranted. Regardless of interventionist or country, the table reveals that the majority of studies show music interventions help to decrease symptoms of anxiety in persons with dementia.

Who safely delivers music interventions in healthcare is a new area of concern and has not been researched before. Current literature was examined regarding Music Therapy and Music Therapist and why professional healthcare providers in particular, RNs may need music education in their curriculum. Therefore, because anxiety among individuals with dementia is most prevalent in ALFs, this study was designed to examine the efficacy and feasibility of active-passive group music nursing interventions on anxiety in dementia care delivered by American RNs in two ALFs located in the United States.
Chapter 3

OVERVIEW OF THE CONCEPTUAL MODEL

The study was based on Hall and Buckwalter’s (1987) Progressively Lowered Stress Threshold (PLST) Model and was informed by the music alters mood segment of the Music, Mood and Movement (MMM) theory developed by Carolyn Murrock and Patricia Higgins in 2009.

Progressively Lowered Stress Threshold (PLST)

Hall and Buckwalter’s (1987) Progressively Lowered Stress Threshold (PLST) Model proposes that when an individual’s stress threshold level is surpassed and environmental demands exceed the individual’s ability to cope, anxious and dysfunctional states become apparent. Stress is defined as a psychological state in which an individual experiences unpleasant arousal after a life-changing event. Examples of stressors include fatigue, changes in routine, caregivers or environments, internal and external demands which exceed the person’s ability to function, over stimulation from multiple stimuli, physical stress such as illness and medication reactions, and emotional responses to loss (Hall & Buckwalter, 1987).

Stress thresholds are points at which tolerance to stressors can be surpassed, resulting in physiologic, emotional, cognitive and behavioral changes (Thoits, 1983). Stress thresholds develop during adulthood and fluctuate according to cues from the environment (Smith, Gerdner, Hall & Buckwalter, 2004). Alterations in the stress threshold are the result of changes to an individual’s mechanism of coping (Smith et al., 2004). Dementia brings about difficulties in processing cues, and as a result, stress threshold (tolerance levels) are lowered as the condition progresses (Smith et al., 2004).
The PLST model originated from an understanding of behaviors within the context of a person-environment interaction and was designed to teach NH care providers to minimize stressors for persons diagnosed with dementia by modifying their environments (Hall & Buckwalter, 1987). To date, the framework has guided studies conducted in special care units (SCUs), hospitals, adult day care centers and homes, and recommendations have been made to test the theory in ALFs (Smith et al., 2004). The PLST model was formed to explain the development of anxiety states in persons with dementia in context of the person-environment fit/interaction. The model is comprised of several concepts which include acute confusion, client-centered therapy, anxiety, stress, coping and the Ecological Theory of Aging (Smith et al., 2004). All of these concepts help clarify and predict behaviors in dementia (Wolanin, & Phillips, 1981; Lazarus, 1966; Verwoerdt, 1980; Rogers, 1951).

Acute confusion is a “spectrum of nonadaptive psychophysiological responses characterized by disordered cognition (which includes alterations in perception, thinking, and memory), dysfunction of the reticular activating system (which influences both patient attention and wakefulness) and dysfunction of the autonomic nervous system (which influences both psychomotor and regulatory functions) (Neelon & Champagne, 1992, p. 242). Sometimes dementia is mistaken for acute confusion. Dementia is, however, a chronic, progressive neurological disease. The acute confusion theory is related to the PLST model at the point where stress levels surpass stress thresholds and the person with dementia reacts with nonadaptive psychophysiological responses.
Client Centered Therapy was developed by psychologist Carl Rogers (1951). The concept proposes a client-centered therapist treats clients with genuine respect, sincerity and acceptance, and encourages clients to discover solutions for themselves. Rogers (1951) used the word “client” instead of “patient” because he felt that the word “patient” implied a mentally ill person who was dependent on the therapist’s directives, whereas “client” suggested someone who needed help (Rogers, 1951). The PLST model relates to the Client Centered Therapy theory as persons with dementia are treated within context of their environment (person-centered) rather than following a one-way directive from a therapist.

Anxiety is an emotional state involving subjective feelings of tension, apprehension, nervousness, and worry (Wong, Lopez-Nahas & Molassiotis, 2001). Anxiety symptoms include ruminations, worry without a clear subject or focus, nervousness, inability to relax, irritability, restlessness, poor concentration, hyper-vigilance, acute startle reflex, increased muscle tone or tension with associated aches and pains, fine tremors, psychomotor agitation, marked sleep disturbances, and fatigue (APA, 2000). According to Chrousos and Gold, (1992), the concept of stress has evolved and varied over the past 2500 years (Chrousos & Gold, 1992; Chrousos, Loriaux, Gold, 1988; Taylor, 1922; Binger, 1941; Medvei, 1982; Selye, 1960; Witzmann, 1981; Lazarus, 1966; Hall & Buckwalter, 1987). Specific to the PLST model, stress is viewed as any internal or external demand that exceed a person’s ability to function (Hall & Buckwalter, 1987). These demands may be the result of fatigue, changes in routine, caregiver, or environment, multiple or competing stimuli and physical stress as in illness, or medication reactions (Hall & Buckwalter, 1987). According to the Lazarus (1966) model, coping involves cognitive and behavioral efforts to manage the person-environment relationship in order to reduce anxiety.
Coping responses intervene between the stimulus and coping effectiveness (Lazarus, 1966). Therefore, to help persons with dementia cope with their stress, the PLST model proposes changes to environment, supporting losses, monitoring stimulation levels, and observing and listening to persons with dementia. For caregivers, the model proposes providing education, support, care and problem solving (Hall & Buckwalter, 1987; Smith et al., 2004).

The *Ecological Theory of Aging* provides a basic starting point for the evolution of the PLST model (Nahemow & Lawton, 1973). The theory postulates that as environmental stimuli or *press* increases, the competence of an individual decreases. Graphically, the concepts (*Environmental Press* versus *Competence*) are plotted against each other to show predictions of outcomes. The PLST model refines the framework for elderly persons with Alzheimer’s disease and related disorders (Hall & Buckwalter, 1987).

The PLST model proposes that individuals with dementia are increasingly unable to cope with stress as the disease progresses (Hall & Buckwalter, 1987). Figures 3.1-A, B, and C present Hall and Buckwalter’s (1987) model in a diagrammatic form. Figure 3.1B represents a twenty-four-hour period during which an individual with Alzheimer’s disease experiences a low level of stress in the early morning. Without intervention, stress builds throughout the day. By early afternoon, the stress threshold is exceeded and remains high until early evening. Hereinafter, (Figure 3.1B) if the stress threshold is repeatedly surpassed, the patient shows signs of fluctuating anxiety in the form of dysfunctional behaviors.

As the diagram in Figure 3.1A illustrates, the theory proposes that when stress thresholds are surpassed repeatedly, environmental demands exceed the individual’s ability to cope and adjust. At that point, anxious and dysfunctional states appear in the form of negative behavioral
symptoms. Some of these behaviors are agitation, sleepless nights and combativeness as a result of psychotic events including paranoid delusions, hallucinations and misidentification syndromes (Hall, 1999). Over a 24-hour period, clinical observations and assessments have revealed persons with dementia experience lower stress levels in the early mornings (Hall & Buckwalter, 1987).

Figure 3.1
Hall & Buckwalter, (1987) – Progressively Lowered Stress Threshold (PLST) - Diagram

A. Stress threshold in a patient with Alzheimer's disease and related disorders (ADRD).
B. Effects of stress over a 24-hour period in a patient with (ADRD).
C. Suggested times to implement activities for persons with (ADRD).
However, without intervention, stressors accumulate throughout the day and by mid-afternoon are exceeded and result in problem behaviors (Hall & Buckwalter, 1987). The model includes predictions that stressors do not occur in a straight diagonal line (from none at all to dysfunctional behaviors) but cycles between anxious and dysfunctional behaviors (Figure 3.1B). Furthermore, the theory suggests that individuals with dementia benefit from modification of environmental conditions, which in turn reduce behavioral symptoms. The best times to implement interventions are before peak levels of agitation occur, but not without total reduction of the stimulus, as total reductions may lead to boredom and cause agitation (Smith et al., 2004). Music interventions are adaptable to the PLST model and represent a modification to the environment for persons with dementia.

**Music, Mood and Movement**

The Music, Mood and Movement (MMM) theory (Murrock & Higgins, 2009), describes how music affects both the psychological and physiological aspects of health outcomes and was intended to support a cross-cultural strategy for the maintenance of physical activity (see Figure 3.2 for an illustration of the model).

The components of the MMM theory are discussed in further detail in this section. Presently, there is no agreed upon definition of music among music scholars, who argue that the term music is extremely comprehensive and encompasses time (history), place, senses and culture (Grove Music Online, 2013). Musical works are viewed as composites of artfully unified sounds (Bunt, 1994). Artfully unified sounds are used within a cultural and personal perspective, as what is considered music is a product of exposure to, “broader socioeconomic and political forces which change” (Cross & Morley, 2008).
Therefore, accounting for the dynamic interplay of factors, the most appropriate definition of music for this study was “a creative play with sound” (Brandt, Gebrian & Sleve, 2012). Brandt’s (2012) definition is “inclusive” and “embraces the full range of musical expression,” implying sound frequencies and spectrums, “across time and cultures” (Brandt et al., 2012). Some of the basic musical elements for psychological and physical responses from listeners which according to the MMM theory include five elements: rhythm, melody, pitch, harmony, and interval (Bunt, 1994). The MMM theory does not mention the elements timbre, dynamics, form and texture, but
they are implied in the five elements. These elements are critical to psychological and physical responses from listeners. The MMM theory describes the meaning of each element in relation to health (Murrock & Higgins, 2009).

Just as music scholars disagree about a single definition for “music,” the same holds true for the first musical element, “rhythm” (Grove Music Online, 2013). Rhythm, which consists of a pattern of repeated sounds and silences, is fundamental to music’s structure and organization (Thaut, Kenyon, Schauer & McIntosh, 1999). Rhythm is responsible for capturing an individual’s attention, leading to synchronization of skeletal muscle movements, and is a critical component when selecting music for therapeutic purposes (Thaut et al., 1999). The relevance of rhythm to familiar or preferred music begins as newborns as research has found newborns prefer any language belonging to the same rhythmic class as their own native language (Friederici, Friedrich & Christophe, 2007). Other research has shown infants are attentive to the sonic structure (rhythmic stresses) of their native language much in the same way we listen to music (Ramus & Mehler, 1999; Ramus, Nespor & Mehler, 1999). Perhaps the phenomenon is linked to how certain musical sounds are imprinted as familiar and preferred in people.

Melody, the second element, is the sequencing of musical pitches and intervals between notes. Melody expresses a mood, thought or emotion (Schneck & Berger, 1999). A more comprehensive definition of melody accounts for the inclusion of musical rhythm with respect to a given cultural style and restrictions and represents a natural human occurrence dating back to prehistoric times (Grove Music Online, 2013). In some parts of the world such as Africa, melody is not as important as rhythm (Grove Music Online, 2013).
The third element, pitch, is defined as the number of cycles in which a particular sound vibrates per second. Without pitch, there can be no melody. It is the pace of these vibrations which are responsible for sound pitches that are heard and which thereby affect emotions. Faster vibrations produce higher pitches and are stimulating, while slower vibrations produce lower tones and are relaxing (Bunt, 1994). Musicians describe pitch as a specific tone situated in a musical scale. However, there are some pitches that do not occupy a place in scales. These are usually percussive in quality such as wooden sticks and castanets. Pitch is also affected by timbre (quality of sound), loudness and musical context (Grove Music Online, 2013). It is important to note that Western pitch and frequencies take on a musical aspect only when they are connected to pitch standards. For non-Western cultures, pitch standards may be absent, as in the Gamelan orchestras of Indonesia, and differs for every orchestral set (Sumarsam, 2010). When heard alone the non-standardized sounds are natural occurrences (Grove Music Online, 2013).

The combining of tones at the same time to produce chords or chord progressions is called harmony, the fourth musical element. Harmony may be used either descriptively, denoting chords combined artfully, or prescriptively, explaining principles governing the nature of chord combinations (Grove Music Online, 2013). However, harmony is not always a component of all musical works, especially not contemporary experimental compositions in Western or non-Western cultures around the world (Muczynski, 1976; Bartok, 1909).

Interval, the fifth musical element, is the distance between two pitches. Intervals are a vital part of melody, contributing character and evoking emotional responses (Schneck & Berger, 1999). There are two types of intervals; harmonic and melodic. Harmonic intervals are two pitches played simultaneously while melodic intervals are played one pitch at a time. Intervals
may also be distinguished by their correspondence to their ratio of sound wavelengths or frequencies. For instance, a ratio of 2:1 represents an octave or an eight pitch difference between the first and second pitch (the terms “note,” “tone,” and “pitch” are often used interchangeably); therefore, the sound frequencies of the upper pitch is two times that of the lower pitch (Grove Music Online, 2013). The MMM theory asserts that these five elements of music stimulate emotional and musculoskeletal responses from participants in therapy.

The conceptual framework for the Group Music Nursing Intervention, which aims to reduce anxiety among other outcomes, incorporates the psychological aspect proposed in the MMM theory as follows: . . . that music produces a psychological response of altered mood leading to improved health outcomes. This assertion rests on the notion that, psychological responses occur when the combined elements of rhythm, melody, pitch, harmony and interval pass through the limbic system via the auditory cortex. The limbic system is home to emotions, sensations and feelings, and as music affects this area, perhaps by tension and release, an awakening deep within the mind results (Murrock & Higgins, 2009). The response also depends on the individual’s current mood, reaction to the particular music being heard, and personal musical preference.

Further, the theory postulates that listening to soothing (relaxing or calming) music may function as an auditory distraction and improve mood by releasing beta-endorphins, the body’s natural pain relievers, during stressful moments (McKinney, Tims, Kumar & Kumar, 1997). Therefore, music is thought to have the potential to decrease blood pressure, heart rate, respiratory rate, oxygen-consumption and pain by interrupting the stress responses (Okada et al., 2009; Lazarus, 1991).
The final element of the MMM theory regarding the psychological effect of music is that music encourages social interaction or *synchronous activity*. Music boosts communication and allows individual expression of feelings and group identity (Hargreaves, Buchowski, Hardy, Rossi & Rossi, 1997). This notion is supported by research conducted in group settings that resulted in an improved social well-being, sense of belonging, companionship, and psychological well-being among stroke survivors (Jeong & Kim, 2007) and for individuals with severe brain injury (Nayak, Wheeler, Shiflett & Agostinelli, 2000). There are two other non-psychological factors which the MMM model claims music effects (Murrock & Higgins, 2009). These factors are: *Physiological Responses Movement* and *Initiation and Maintenance of Physical Activity* (Murrock & Higgins, 2009).

*Physiological responses for movement* occurs as the music passes through the auditory cortex to the limbic system. This affects the autonomic nervous system, resulting in auditory motor triggering leading to measurable changes in blood pressure, respirations, heart rate, oxygen consumption (Chan et al., 2006) and pain (McCaffrey & Good, 2000). From the auditory cortex, the neural impulses of auditory rhythm stimulate the neural motor impulses which, in turn, result in physical moves such as walking, treadmill walking, dancing and aerobics (Murrock & Higgins, 2009).

*Initiation and Maintenance of Physical Activity* is a program of physical activity continued over a period of time (Murrock & Higgins, 2009). Both physiological responses to music and the psychological response of altered mood promote the initiation and maintenance of physical activity, which is hypothesized to result in improved health. Though music is thought to affect both the psychological and physiological components of the model, there needs to be more
research regarding the physiologic effects on the psychological component to mood alteration and how music alters the effect. For instance, when experiencing muscle fatigue after sustained exercise how does music work to allow an individual to feel less discomfort. There is mention of distraction, however, but how music distraction lessens discomfort has not been fully explained.

The Active-Passive Group Music Nursing Intervention (A-PGMNI) created by the author (Ing, 2016) aims to reduce anxiety among individuals with dementia through a structured active-passive group music intervention delivered by a registered nurse in an assisted living facility. The theoretical rationale for the efficacy of the proposed intervention is Hall and Buckwalter’s (1987) Progressively Lowered Stress Threshold (PLST) model. The (A-PGMNI) content and format incorporate the psychological components of Murrock and Higgin’s (2009) Music, Mood and Movement (MMM) theory along with inspiration from established principles of music interventions as identified in the Orff’s methodology. The Orff Methodology was created by Carl Orff (1895-1982), a German composer. His works are characterized by an interplay of melody and strong rhythms which emanate from a foundation of rich language material. The method was aimed to teach young children music with an emphasis on improvisation and imagination to create musical ideas and was adopted for older persons in this study (AOSA, 2016).

To date, there is no research documenting the Orff inspired methods implemented in this study. Increased self-concept an expected outcome of the Orff Methodology for children provided the inspiration for using familiar and preferred music enmeshed with simple Orff techniques to decrease anxiety levels in persons with dementia, and by decreasing anxiety levels, it was thought increased participant self-concept would result as reflected in engaged
participation, and a calm, relaxed disposition at the end of interventions. Although inconclusive, video coverage of the *music and movement* interventions and the *acapella singing* sessions appear to support this assertion, as shown in the video recording results section of Chapter 5.

The Orff method is also designed to employ individual and group behavioral reinforcements. This idea is demonstrated using a quick thumb up or down evaluation from all participants on how well the group did on a particular musical activity. However, for persons with dementia, it is not known whether incentives to do better as an individual or group exist at this time. While the Orff Methodology has proven to be successful with children, there is little research investigating the effects of Orff methods on older persons with dementia. Therefore, further research regarding its use for individuals with cognitive impairments is encouraged.

The goal of the (A-PGMNI) model is decreased anxiety, as demonstrated by reduced symptoms of nervousness, inability to relax, irritability, restlessness, poor concentration, hyper-vigilance, acute startle reflex, increased muscle tone or tension with associated aches and pains, fine tremors, psychomotor agitation, marked sleep disturbances and fatigue. Some if not all of these symptoms were measured using RAID. Figure 3.3 summarizes the model for the proposed intervention.

Through use of the A-PGMNI model, making group music was hypothesized to result in changes to anxiety levels among individuals with dementia. The A-PGMNI is described in more detail in Chapter 4. The methods used in this model included listening to preferred music, moving to music while listening, singing songs, active playing on percussive musical instruments, creating/improvising music and mirroring musical symbolisms on percussive instruments.
Chapter three reviews and details theoretical frameworks guiding this study. There are two major theories which inform and comprise a larger, author created model, the A-PGMNI model. A description of the Orff methodology which inspired this study was provided. The A-PGMNI model provides a scientific basis on how the music interventions delivered by RNs will effect anxiety among individuals with dementia.

**SUMMARY**

Chapter three reviews and details theoretical frameworks guiding this study. There are two major theories which inform and comprise a larger, author created model, the A-PGMNI model. A description of the Orff methodology which inspired this study was provided. The A-PGMNI model provides a scientific basis on how the music interventions delivered by RNs will effect anxiety among individuals with dementia.
Chapter 4

METHODS

Design

This study was conducted from August 2015 through November 2015 and used a quasi-experimental cross-over design with a cluster randomization strategy that was simplified because there were only two sites. The cross over-design consisted of two groups of individuals exposed to more than one condition (Polit & Beck, 2012). During the first arm, one group of residents residing in an assisted living facility (ALF) received the music intervention first, while the other group residing in a sister ALF engaged in care-as-usual. After a four-week wash-out period, these groups were switched for the second arm of the study. The group which received care-as-usual became the intervention group, and the group which formerly received the music intervention became the care-as-usual group. Care-as-usual was defined as daily facility activities excluding events out of the ordinary, such as a response to natural disasters. This was a pilot study guided by 2 specific aims. Specific aim 1 was to test the hypothesis that a combined active-passive group music nursing intervention (A-PGMNI)s would decrease anxiety among individuals diagnosed mild to moderate dementia in assisted living facilities (ALFs). Specific aim 2 was to describe the feasibility and acceptability of an A-PGMNI delivered by an RN without a university or college degree in music intervention techniques to individuals with mild to moderate dementia in ALFs. Feasibility evaluation for specific aim 2 was based on RN-RA post study questionnaire responses, Family Caregiver post study questionnaire responses and data from the Video Analysis. Similarly, acceptability evaluation of specific aim 2 was based on the RN-RA post intervention questionnaire responses, post intervention Family Caregiver

64
responses and the Intervention Video Analysis data. The study was approved by the University of California Los Angeles Internal Review Board (IRB). Site assurances for both ALF sites were acquired in advance of the IRB approval. (See appendix – Supplemental Documents - 4.1)

Sample

A power analysis with 80% effect size yielded a sample size of 16-20 participants, consisting of eight to ten participants from each site. Residents with mild to moderate dementia and their family caregivers were recruited from the two ALF facilities.

Fifteen elders were screened by the Primary Investigator (PI) and student-nurse (SN) research assistants (RAs). Thirteen qualified for inclusion. Of the two excluded participants, one did not have a diagnosis of dementia and the other was not able to remain awake and follow simple instructions.

Inclusion criteria for this study consisted of: 1) ability to speak English; 2) being 65 years of age or older; 3) having a diagnosis of mild to moderate dementia confirmed by stage 2 to 5 on the GDS for at least 3 months as verified by an on-site RN; 4) presence of anxiety based on a score of 11 or higher on the Rating Anxiety in Dementia (RAID) scale as measured by the PI and SN-RAs; 5) ability to follow simple directions based on a Global Deterioration Scale (GDS) stage of 3 to 5 as assessed by the PI and SN-RAs; 6) demonstration of no hearing impairment by passing the Whisper Test, a gross test for hearing loss as assessed by the PI and SN-RAs, and 7) stability on psychotropic medications for a period of no less than 3 months as verified by an on-site RNs. In order to assure subject safety, and lessen study attrition, elders with advanced cardio-pulmonary diseases, cancers, acute fevers, pain, delirium, or exhibition of disruptive behaviors such as shouting, screaming or physical aggression were excluded.
Setting

The study sites were in Los Angeles and belong to a large chain of ALFs located in the United States and parts of Europe. The sites were approximately 11.3 miles from each other and were built in affluent Los Angeles locations. Each site offered assisted living and specialized memory care with a Licensed Vocational Nurse (LVN) on site 24 hours daily. Residents received engaging activities, individualized attention, three home-cooked meals a day and other services based on personally tailored care options. The ALF sites were selected because of their similarities in business operations and practices. One site was licensed for 127 bed and no more than 90 residents reside at the facility at any given time. At the time of the study, the site had 88 residents and of the 88, 22 had been diagnosed with dementia and resided on a special memory-care unit (Sunrise Senior Living, 2016). At the other site there are 99 residents of which 44 belong to a special memory care unit. The site was licensed for 100 beds (Sunrise Senior Living, 2016).

Intervention

The Active-Passive Group Music Nursing Intervention (A-PGMNI) was designed to decrease levels of anxiety among persons with dementia. The A-PGMNI was created based on premises of the Progressively Lowered Stress Threshold (PLST). The intervention was informed by the music alters mood segment of the Music, Mood and Movement (MMM) model developed by Murrock and Higgins (Hall & Buckwalter, 1987; Murrock & Higgins, 2009). The melding of the two theories was discussed in detail in Chapter 3.

Together with the PLST and the MMM theories, the A-PGMNI supports the argument that anxiety is a response to environmental stress building throughout the day in persons with
dementia, and that Active-Passive Group Music Interventions inspired by the Orff methodology could affect stress thresholds and lead to decreases in anxiety levels in persons with dementia.

The A-PGMNI group music intervention was comprised of passive, passive-active and active music activities. The group intervention was delivered by a registered nurse – research assistant (RN-RA) for 3 weeks. In each week, two group intervention sessions were delivered. Each intervention session lasted for 30 to 45 minutes. Originally, it was intended that only 1 or at maximum 2 RN-RAs would deliver all twelve interventions. However, it did not work as planned, as reported in detail in the results section in Chapter 5. Music was selected based on participants’ preferences by the study principal investigator (PI), although several exceptions to this were made. Non-preferred exceptions were accommodated as past research shows melodies encompassing characteristics similar to music that was preferred by the participants produces similar therapeutic effects (Ho et al., 2011; Lai, 2004; Lai & Good, 2005). For example, a subject may have preferred music with soft slow tempos from a certain era, but the facilitator may not have been able to acquire the composition or recording. When that occurred, music either composed by the facilitator or music comprised of similar musical elements from another time period was substituted (Ho et al., 2011; Lai, 2004; Lai & Good, 2005). All music selections were made with best efforts to accommodate specific music requests from all participants. However, this was not possible because the intervention was geared to a group and not individual participant preferences. Therefore, music favorites were accommodated by music era rather than by specific song preferences.

Interventions were conducted in the mid-afternoon for two reasons. First, some elderly persons with dementia sleep late in the mornings, because their negative behavioral symptoms at
sundown prevent regular night time sleeping. Second, the PLST model recommends three best times to implement interventions before peak levels in dysfunctional behaviors are reached. These three peak level periods are illustrated in Figure 3.1C in Chapter 3. Two are morning times, and the third, mid-afternoon. Since Cooke and colleagues’ (2010) study was conducted in the late mornings without significant anxiety decreases, a decision was made to conduct interventions for this study during mid-afternoons.

Each group music session was sequenced as follows: 3 minutes of passive music listening with lights dimmed to foster relaxation and calmness; 5 minutes of active music, movement, and beat with lights bright to foster alertness and optimal visibility; 10 minutes of passive-active acapella singing with lights bright to foster alertness and optimal visibility; 10 minutes of passive-active call and response with lights bright to foster alertness and optimal visibility; and finally, 3 minutes of passive music listening with lights dimmed to foster relaxation and calmness during cool down. The music activity transition time of no more than 3 to 4 minutes included settling time, movement from one music activity into another, intervention instructions, or the facilitator allotting more time on a particular intervention if needed.

Engagement was estimated based on the ability of the participants to respond correctly to RN-RA instructions and prompts. Other participant behaviors exhibiting understanding of RN-RA directives include clapping bars with the RN-RA pointing at brightly colored bars placed on a power point slide during the call and response activity.

Display of positive group or individual responses to RN-RA prompts were reinforced using inexpensive tokens such as small water bottles, picture calendars, or neck pillows. Each token was presented to participants at the discretion of the RN-RA interventionist.
**Intervention Setting**

Throughout the study period, intervention activities were delivered in a designated room within each ALF. The RN-RA was provided with a large computer containing intervention music accompaniments and visual materials connected to a television (TV) monitor. A portable compact disc (CD) player, portable music stand, amplification system, plastic tub filled with a set of non-pitched percussive instruments, and an assortment of token incentives were also provided.

**Training of 4 RN-RAs and 4 Research Assistants (RA)**

All RAs were trained by the PI. All RAs completed and passed Collaborative Institutional Training Initiative (CITI) training prior to participation in the study. It was not possible to recruit RN-RAs from within the ALF facility because unlike acute care hospitals or nursing homes (NH)s, ALFs are not required to have RNs, physicians, or certified nursing assistants on location (CANHR, 2008). The lack of RNs on site made it difficult to recruit and schedule the interventions. Therefore, a total of four RN-RAs (N=4) were recruited from the community to deliver 3 interventions each. However, despite these accommodations, scheduling difficulties still occurred. Two RN-RAs were unable to facilitate 3 sessions as planned, instead completing only 2 out of the 3 allocated sessions. One of the four RN-RAs facilitated an additional 3 sessions (totaling 5) in order for all planned study intervention sessions to be led and supervised by an RN-RA.

The four intervention RN-RAs were recruited from nurse practitioner classes at a local university and had bachelor’s degrees in nursing, but no formal music education as defined by possessing a music degree from an accredited music program at the college or university level.
Two RN-RAs were of Asian ancestry and the other two were White. Their ages ranged from late twenties to thirties, and each had at least three years or more of acute or long term care nursing experience. Each RN-RA training session consisted of three days for two hours per day. The RNs were trained on facilitating five music interventions: Listening, music and movement, a cappella singing, Call and Response and Cool Down (See Table 4.1 – RN Intervention Training Plan). Each RN was given a chance to practice and demonstrate the music interventions on the other participating RN-RAs or on the PI.

Two SN-RAs were assigned to assist the RN-RAs and received training on music intervention fidelity documentation and how to use the intervention checklists. Training was done in two days for two hours each day. They were instructed to check each RN-RA action corresponding to the check list during the intervention sessions. The SN-RAs were also responsible for setting-up the intervention rooms according to the planned version (see appendix Instrument 4.1 – Intervention Check-list), providing technical assistance to the RN-RAs, and videotaping each session with two stand-alone action video cameras.

Two RAs, trained in how to administer the RAID scale and “blinded” as to whether the participants were in the intervention or usual care group, were assigned to measure the study outcomes. These Blinded RAs (B-RAs) were made aware that in addition to interviewing the participants, they might need to interview the facility caregivers to capture a clearer picture of the participant’s anxiety state. Background information on the RAID and alerts about the need to re-phrase or choose simpler words for some of the questions without loss of the actual meanings were included in the training.
Procedures

The study commenced with a “one-time-only” recruitment day held at each site. Presentations were made to family members and potential participants using power point slides. However, the one day presentations did not influence recruitment. Individuals other than those who participated attended. Therefore, recruitment took up to a month after initial family presentations to achieve the resultant sample size.

Consent to Screen

A list of who could be eligible in the study was provided by the Reminiscence Coordinator from the ALF sites in the beginning of the study. Thirteen potential participants were asked to consent, and screening was explained through the Reminiscence Coordinators to family caregivers ahead of the screening day. Consents to screen were signed by proxy or family caregivers prior to the screening day. Potential participants met in designated areas at each site on different days. Some of the potential participants were screened alone (n = 3), while others were accompanied by Family caregivers (n = 7) or by paid non-facility caregivers (n = 1).

Eligibility Screening

Names of individuals who consented to be screened from both sites were compiled and given to the B-RA to begin screening as delineated in the study protocol. Because there were fewer names than required by the estimated power analysis, all residents from both ALF sites were invited to be screened. Screening was sequenced as follows: 1) Decision Making Capacity (DMCAT) (UCLA, 2012), 2) Whisper Test, 3) Global Deterioration Scale (GDS) (Reisberg, Ferris, de Leon & Crook, 1982), 4) Rating Anxiety in Dementia (RAID) (Shankar, Walker, Frost & Orrell, 1999), 5) Music Preference Survey-United States (MPS-US) (Gerdner, Hartsock &
<table>
<thead>
<tr>
<th>TIME</th>
<th>RN Music Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 minutes</td>
<td><strong>LISTENING/REMINSCENCE</strong></td>
</tr>
<tr>
<td></td>
<td><strong>RN turns down lights</strong> and instructs participants to <strong>close their eyes and listen</strong> to the music being played <strong>until a “ring” sound (finger cymbals) are heard</strong>. (RN Demonstrates).</td>
</tr>
<tr>
<td></td>
<td><strong>RN adds, movement should be minimal</strong> if listening to the music and attempting to reminisce and <strong>guess the name of the song</strong>.</td>
</tr>
<tr>
<td></td>
<td><strong>RN observes</strong> for all eyes closed and minimal movement among participants. RN may then sound the finger cymbals or wait until the music stops completely to sound the finger cymbals. Participant may then open their eyes and move.</td>
</tr>
<tr>
<td></td>
<td><strong>RN turns the lights back up.</strong></td>
</tr>
<tr>
<td></td>
<td><strong>RN assesses</strong> reminisce/song recognition. Ask participants does anyone know the name of the music? If no one knows, tell them.</td>
</tr>
<tr>
<td></td>
<td><strong>RN/Participants evaluate</strong> the activity showing thumbs up, down or sideways, whichever way describes participant’s opinion of how well the group did. (RN facilitates this evaluation)</td>
</tr>
<tr>
<td></td>
<td><strong>RN leads handclapping for efforts</strong> made to do a good job of group listening/reminisce.</td>
</tr>
<tr>
<td></td>
<td><strong>MOVEMENT/REMINSCENCE/BEAT</strong></td>
</tr>
<tr>
<td></td>
<td><strong>RN instructs</strong> participants to mirror chosen leader moves for as many beats desired before moving to the next leader moves at the sound of the “ring” (finger cymbals) which the RN plays the entire time unless RN asks whether one of the participants would like to count the specified beats and play the finger cymbals on specified beats.</td>
</tr>
<tr>
<td></td>
<td>If music stops and another one comes on RN may take over to set the beats which may transition to waitz time or beat/movement changes on every 6 beats. (Caution speed of music may also change so RN emphasizes participants to listen intently!)</td>
</tr>
<tr>
<td></td>
<td>After the last song plays or RN stops CD/Tape, all participants must freeze in their positions until the “ring sound” is heard to release participants from the movement freeze.</td>
</tr>
<tr>
<td></td>
<td><strong>RN/Participants assess</strong> how well the group did with the thumbs up, down or sideways and so on method.</td>
</tr>
<tr>
<td></td>
<td><strong>RN leads clapping and praising group for their efforts and everyone else to join in clapping for themselves as a group.</strong></td>
</tr>
<tr>
<td>Time (minutes)</td>
<td>Activity Description</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>10</td>
<td><strong>ACAPPELLA SINGING</strong> (Maximum 5 rounds)</td>
</tr>
<tr>
<td></td>
<td>RN introduces a song to the group by singing it by herself on the first round to the participants. RN instructs participants not to sing with her unless instructed.</td>
</tr>
<tr>
<td></td>
<td>RN asks group to assist with the song by filling in the holes on the second round that she purposely leaves out for participants to fill in. RN continues to leave chunks of words out until the entire song is done by the participants, usually by the fourth round for simple familiar songs triggering reminiscence and knowledge of knowing it.</td>
</tr>
<tr>
<td></td>
<td>On the 5th round RN plays an accompaniment instrument and everyone sings the entire song once or twice.</td>
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<tr>
<td></td>
<td>RN leads the evaluation with thumbs up, down and so on.</td>
</tr>
<tr>
<td></td>
<td>RN leads the praise and clapping joined by all group members for their efforts.</td>
</tr>
<tr>
<td>10</td>
<td><strong>CALL &amp; RESPONSE</strong></td>
</tr>
<tr>
<td></td>
<td>RN passes percussive instruments out preferably before beginning the activity.</td>
</tr>
<tr>
<td></td>
<td>RN may have the &quot;roll-out&quot; symbols attached to the walls before the session begins or tape the roll-out to the wall or appropriate furniture for visibility. (Power Point substitution ok).</td>
</tr>
<tr>
<td></td>
<td>RN instructs participants to echo her sounds back softly.</td>
</tr>
<tr>
<td></td>
<td>1. Loudly, &quot;Hello down there.&quot; Softly, Participants, &quot;Hello down there.&quot;</td>
</tr>
<tr>
<td></td>
<td>2. Loudly, &quot;Are you having fun?&quot; Softly, Participants, &quot;Are you having fun?&quot;</td>
</tr>
<tr>
<td></td>
<td>3. Loudly, &quot;Yes!!!&quot; Softly, Participants, &quot;Yes!!!&quot;.</td>
</tr>
<tr>
<td></td>
<td>RN instructs participants to mirror her clap patterns as follows:</td>
</tr>
<tr>
<td></td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td>2.</td>
</tr>
<tr>
<td></td>
<td>3.</td>
</tr>
<tr>
<td></td>
<td>RN instructs participants to clap the patterns as she points to the last three patterns. RN instructs participants to clap the extended patterns below while she points and plays the keyboard on the first round. Second round have participants pick up their percussive instruments to play the patterns while RN points and plays the keyboard.</td>
</tr>
<tr>
<td></td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td>2.</td>
</tr>
<tr>
<td></td>
<td>3.</td>
</tr>
<tr>
<td>CALL &amp; RESPONSE</td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td></td>
</tr>
<tr>
<td>RN instructs participants to clap “roll out” patterns attached to the wall or furniture to accompany a song while pointing to the patterns and playing a percussive instrument. RN asks participants to pick up their instruments and play the same pattern while again pointing to the patterns and playing a percussive instrument.</td>
<td></td>
</tr>
<tr>
<td>RN plays a pre-recorded accompaniment from the computer while pointing to the patterns. RN may add and conduct dynamics to the accompaniment using appropriate gestures for soft and loud.</td>
<td></td>
</tr>
<tr>
<td>RN facilitates evaluation, praises, and everyone plays their instrument praising each other for their efforts.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3 minutes</th>
<th>COOL DOWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN puts on “calming music” and instructs participant to close their eyes once again listening intently (no movement) to music being played.</td>
<td></td>
</tr>
<tr>
<td>RN turns down the lights and goes to the front and demonstrates “cool down” activity.</td>
<td></td>
</tr>
<tr>
<td>RN observes for intent listening and if done promptly, picks up the finger cymbals to “ring” the end of the activity and allow everyone to open their eyes.</td>
<td></td>
</tr>
<tr>
<td>RN turns on lights and allows participants to leave encouraging “until we meet again”</td>
<td></td>
</tr>
</tbody>
</table>
Buckwalter, 2000), 6) Demographic Data, 7) Establish eligibility, and 8) Sign consent to participate. The RAID was also used to measure the outcome of the study. Potential participants who did not meet the inclusion criteria during any point of the screening protocol (n = 2) were not invited to participate. The screening questionnaires were administered by the PI, SN-RAs, and site reminiscence coordinators.

**Tools to determine eligibility.** These measures were used during screening to determine subject eligibility: the DMCAT, see appendix – instrument – 4.2, GDS see appendix – instrument – 4.3, and RAID see appendix – instrument – 4.4. The RAID was also used to measure the outcome of the study.

The DMCAT was administered first to assess the decision-making capacity of participants diagnosed with dementia. It was authored by the University of California at Los Angeles (2012). The IRB requested its use. The DMCAT contains seven questions measuring potential subjects’ understanding of their participation in the study. All potential subjects were to respond to all questions with a “yes” or be excluded from the study, unless surrogate consent from legally authorized representatives had been approved by the IRB. Currently, there is no reliability or validity information regarding the use of this instrument. Surrogate consent was given on behalf of 15 participants.

The goal of using the GDS was to determine the severity of potential participants’ dementia. The GDS is specific for staging individuals diagnosed with dementia and is widely used, taking about 2 to 15 minutes to administer (Rikkert et al., 2011). The GDS incorporates broader terms followed by detailed descriptions of actual levels of behavioral and functional impairments (Eisdorfer, Cohen, Paveza, 1992; Paveza, Cohen, Jankowski & Freels, 1995).
There are 1-7 levels of dementia classification corresponding to 1-7 dementia stages (refer to appendix – Instrument 4.3 for the actual instrument and descriptions). Participants meeting criteria for stages 2 thru 5 based on clinical characteristic or descriptors were accepted into the study. The GDS is a combination tool of mental status questions, Activities of Daily Living (ADL) s and Instrumental Activities of Daily Living (IADL) items. When compared and validated using ventricular dilation \( r=.62 \), and sulcus enlargement \( r=.53 \) biomarkers appearing in computerized tomography (CT) scans, the GDS was shown to be significantly correlated. Furthermore, it was significantly correlated with the Clinical Dementia Rating (CDR) scores \( r=.69-.83; \ p=.05 \) considered the best scale from an international perspective because of its availability in many languages (Rikkert et al., 2011). However, feasibly, the CDR requires more time (20 to 40 minutes) to administer than the GDS (Rikkert et al., 2011). The GDS was therefore selected because it was shown to be the quickest to administer to persons with dementia (Rikkert et al., 2011). Despite its speed in administration and usefulness, the instrument along with twelve other staging instruments listed by Rikkert et al., (2011) in a review article comparing, validity, reliability and feasibility of the available dementia staging tools has been criticized for the inability to accurately stage Alzheimer’s disease in the preclinical and pre-dementia stages. As found by inter-rater reliability between the PI and SN-RAs, in at least 90% of the time, difficulties in rating the dementia stage accurately for potential participants were because of lengthy clinical descriptors and the need to honor time constraints of potential participants and their families. This resulted in the preparation of an easier-to-read version of the GDS by the PI which highlighted key clinical characteristics (see appendix. Instrument 4.5 – GDS Simplified).
The RAID tool was used to confirm that potential subjects were experiencing anxiety before acceptance into the study. Each participant needed to have anxiety scores equal to or greater than 11. The Rating Anxiety in Dementia tool consists of 18 items clustered into six subgroups: Worry, Apprehension and Vigilance, Motor Tension and Autonomic Hypersensitivity, Phobias, and Panic Attacks (Shankar et al., 1999). Rating Anxiety in Dementia was selected over other anxiety measuring instruments for the following reasons. Raid Anxiety in Dementia has demonstrated moderate to good reliability with inter-rater reliability ranging from 0.51-1 and a test-retest reliability range from 0.53-1 (Shankar et al., 1999). Shankar and colleagues (1999) found a significant correlation between RAID and the Clinical Anxiety Scale (p <0.001) and the Anxiety Status Inventory (p <0.001). The internal consistency of RAID was found to be high according (Shankar et al., 1999). Rating Anxiety in Dementia showed restlessness to be a useful and an observable sign of anxiety in persons with dementia and is quick to administer, approximately 5 to 10 minutes (Sansoni et al., 2007; Shankar et al., 1999).

**Consent to Participate**

Prior to the first arm of music intervention delivery, a second consent-to-participate in the study was then distributed to the eligible participants (n=13) by the site reminiscence coordinators and collected by the PI. Site reminiscence coordinators assisted in collecting the consent-to-participate as the actual study start date was shorter than the two weeks originally planned due to delays in initial recruitment at the sites.

**Intervention Delivery**

All music interventions were facilitated and delivered by one RN-RA during each session. Each session commenced in the mid-afternoon and was held twice a week. Music
interventions were given 6 times to the experimental group during the first arm of the study while the control group engaged in care as usual.

Name tags were distributed to participants before each session to monitor their attendance and to allow them entry into the intervention room. Family caregivers were welcome to observe the interventions, but it was not mandatory. Most participants attended the interventions by themselves, but two (n = 2) from one study site attended the sessions with paid caregivers who were not employees of the facility.

Initial plans were for quiet intervention rooms away from any unit traffic and void of furniture except for portable chairs. This was not possible, although each study site made its best efforts to accommodate the study room requirements.

The intervention rooms provided were both sizeable and comfortable. However, at one site, the existing sofas and chairs were too large to remove and had to be made part of the intervention session plan. The room was also situated next to a major hallway trafficked by many individuals living or working within the unit. During the second week of interventions, permission to close a large door was given in order to contain participants with consent to participate from those without. Closing the door allowed the participants to better focus on the music interventions. The other site provided a quiet room away from distractions. The room was equipped with movable chairs which allowed a semi-circle set-up with the RN facilitator near or at the front middle as intended. Large TV monitors were used at both sites to display power-point slides of songs or music intervention visuals. Light dimmers were available for “listening” and “cool down” interventions, although during the first intervention session at one
site, one participant did not follow the RN-RA prompt to close her eyes prior to yelling out, “it’s too dark in here!”.

Two SN-RAs assisted with technical difficulties during the interventions and also monitored the intervention fidelity using an intervention fidelity checklist (see appendix Instrument 4.1). The checklist provided more advanced RN-RA delivery expectations than the RN Intervention Training Plan. SN-RAs were expected to check-off only those activities they observed during the interventions sessions and the PI compared the observations checked with the RN-RA Intervention Training plan (see appendix Table 4.1) during analysis. Video action cameras were used during each intervention session to record participant and RN-RAs interactions. Data were collected by the SN-RAs except for in two of the sessions in which technical difficulties prevented the video cameras from being operated. Two “blinded” SN-RAs measured anxiety levels weekly using RAID after the last intervention for a week and before the start of the following week’s set of interventions. However, one exception occurred between the second arm of week 1 and week 2 because the RN availability for interventions were scheduled back-to-back on a Saturday and Sunday resulting in RAID measurements for week 1 to occur before intervention 2 for week two.

Data Collection Instruments

Sociodemographic Data

Sociodemographic data consisted of, stage of dementia (GDS score transferred onto the demographic form), age, sex, ethnicity, education, primary language spoken, religious preferences, the ability to follow simple instructions and marriage status (see Instrument 4.6 – Demographic Questionnaire). Demographic data were collected during the eligibility screening.
MPS-United States

Music selections were compiled once only from subject preferences at screening using the modified MPS-United States (Gerdner et al., 2000), a survey used to assess music importance and preferences in life. The survey is 2 pages long and consists of ranking scales and open-ended questions about favorite music styles and instruments. See appendix, Instrument 4.7. The survey is used to compile appropriate music based on the preferences of the participants. First preferences under each category of the survey from each participant were considered first. Thereafter, since it was not possible to accommodate individual preferences for every intervention, music selections were compiled from different eras and genres of music from the survey such as “big-band”, “patriotic” or “country”.

Post Screening - Persons with Dementia

RAID data were collected at 8 points. Screening RAID data were collected by the PI and Student-nurse RAs and because the collection was close to the study start, those data also served as baseline data for the study. Baseline data collection was followed by data collection after the last weekly intervention by the “Blinded”-RAs. Data could not be collected on anxiety levels at point 5 for several participants because of illness which resulted in missing data.

RN-RA Questionnaires. The questionnaires were developed by the PI and distributed soon after completion of the last scheduled music intervention session for the designated RN. Questionnaires were completed and returned to the PI. The RN-RA survey consisted of 12 questions, 10 in the Likert-Scale format and two open-ended, regarding their intervention delivery experiences. The RN questionnaire was developed by the PI to assess the RN experience on delivering the group music intervention (Refer to appendix – Instrument 5.1 for
the actual Feasibility/Acceptability assessment instrument). It was thought that the assessment would answer questions regarding the acceptability and feasibility of RNs delivering A-PGMNIs.

**Family Caregiver Questionnaires.** The PI developed the questionnaires requesting feedback on family caregivers’ perceptions of the persons with dementia after music interventions and their thoughts on RNs delivering the A-PGMNIs. The questionnaires were emailed to the site coordinators after all sessions were completed. The site coordinators then disbursed the questionnaires to the family caregivers. Because one family caregiver lived outside of California (n=1), direct delivery by the PI was not possible. Permission from some family caregivers was given to the site coordinators to complete the questionnaires on their behalf. Seven out of 11 questionnaires were completed and returned. Family caregivers were selected to complete the questionnaires as they were thought to be ultimately responsible for the social and financial well-being of the participant. Family caregiver presence though encouraged during interventions was not necessary. After completion, data were retrieved from the Reminiscence Coordinators by the PI. Family caregiver surveys were one page with six questions regarding observations of respective resident’s post-completion of the intervention study and RN delivery of the interventions. The family caregiver surveys were one page with six questions regarding observations of respective resident’s post-completion of the intervention study and RN delivery of the interventions. Four of the questions were in the Likert-Scale format and the remaining two were in an open-ended format.
**Post Intervention**

The interventions were completed at the end of week 10, at which time content analysis of the video recordings began and remaining RNs who did not complete the post interventions questionnaires (see appendix Instrument 4.8) and the family caregiver questionnaires (see appendix Instrument 4.9) were distributed. All RNs and family caregivers were given one week to complete and return the questionnaires.

**Video Action Camera Recordings**

After the interventions, data were extracted from the video tape recordings by one, SN-RA and analyzed by the PI. Data extraction by the SN-RA involved looking for behavioral themes or responses for each video recording and noting them by day of appearance. The PI then created a chart with each observation by the SN-RA vertically listed on the far left side and twelve intervention days noted horizontally across the top. Below each twelve days, two boxes were assigned. One box was for the participant and the other for the RN-RA. Regarding inter-rater reliability, the PI then looked at each video recording and marked an “X” in boxes for each SN-RA behavior observed on respective days. Marking an “X” in the boxes for observed behaviors by the PI signified an agreement between the SN-RA and the PI regarding the particular observed behavior. For participant responses that followed the RN-RAs prompts and appeared frequently according to the RN-RA training plan a color was assigned. Blue was assigned to the participants and yellow, the RN-RAs. More filled-in blue-yellow paired boxes horizontally, (greater than or equal to 5 out of 8 pairs across all intervention days) were indicative of a successful music intervention by the RN and the point in time when participant anxiety levels are thought to be at their lowest. A total of six intervention weeks (twelve
intervention days) were noted horizontally and two intervention days were not video-taped because of technical difficulties.

**DATA ANALYSIS**

Data were numerically coded and de-identified. Data were then stored according to IRB protocols. Data analysis was done visually as well as statistically using IBM SPSS as follows.

*Specific Aim 1:* Analysis involved several different steps. First, descriptive statistics were used to describe the sample including age, sex, ethnicity, education, and religious preferences. Next, RAID scale scores were constructed for intervention, control, and over time conditions. To test the hypothesis, a mixed model was used the test for significant differences in RAID scores over time between the intervention and control conditions. Analysis included RAID scores of participants for whom data from at least some time points were available for both conditions. A sensitivity analysis considered multiple imputation for 4 participants missing one control condition observation each. The procedure produced consistent results of non-significant condition-by-time interaction and significant main effect of time across 10 imputations. The mixed-model also adjusted for repeated measures across time and allowed inclusion of all available data even if observation were missing for specific individuals. A maximum likelihood estimation was used and a compound symmetric covariance matrix was assumed. The model included effects for order (intervention followed by control or control followed by intervention), period (first set of measures of anxiety or second set), condition (intervention/control), time (baseline and 3 follow-up time points within a period), and interaction of condition and time. The test of the hypothesis was based on a significant interaction between condition and time by site. Additional analyses were performed by visual
inspection of trends in the outcome measures by condition over time and in site were analyzed visually. Similarly, visual analysis of the video data was comprised of looking for notable behavioral actions of the RN interventionist and the participants by one SN-RAs and the PI.

Specific Aim 2: Feasibility of an RN delivering A-PGMNIs was evaluated based upon RN feedback from the RN Feasibility/Acceptability Questionnaire. If over half of the RNs were able to respond favorably to the questionnaire, then the results were indicative that RNs delivering A-PGMNIs with minimal music education techniques was feasible. Descriptive statistics were used to compile the results.

To evaluate the acceptability of RNs delivering A-PGMNIs, both the family caregiver questionnaire associated with the RN delivery of active-passive group music interventions and RN answers to questions 4, 11 and 12 of the RN feasibility/acceptability questionnaire were examined. Responses from family caregivers and RNs justifying how the A-PGMNI elicited positive effects on the participants and how RNs contributed to the positive experience showed acceptability of RNs with minimal music education techniques delivering A-PGMNIs. All narrative responses for both the RN and Family caregiver questionnaires were evaluated, and common themes extracted by the PI.
Chapter 5

RESULTS

Chapter 5 chronicles the results of the study and relates the results to the specific aims. There is frequent reference to instruments and tables used to gather the data in this chapter.

Sample

Best intentions were made to recruit sufficient participants to achieve an effect size of 80% based on the estimated power analysis (n = 8-10/site). However, significant difficulties in recruitment occurred. Because of site administrative changes, fewer sites within the Los Angeles county were available to participate in the study. There were also process related external factors which delayed the study start such as study clearance which resulted in less time for the PI to conduct the study without encountering economic constraints. Altogether, 13 residents were consented to participate by their surrogates or family caregiver during a 3-month period, from August 2015 to November 2015. (See Figure 5.1 Study Flow Chart). Eight, were recruited from one site and 5 residents were recruited from the other. During RAID data collection, two participants were not available for all 8 data collection points and because of this were excluded from final data analysis. Thus, RAID data was analyzed from for 11 participants. Seven (n=7) family caregivers provided consents for their own participation in the Family Caregiver Questionnaires segment of the study. The remaining family caregivers did not respond to the request for their participation by the PI. Each session was comprised of 3 to 6 participants, although attempts were made to keep participant counts at no less than 5 individuals during any given session. During the intervention period, participant attendance fluctuated for
reasons such as, illness as reported by the blinded RAs and Reminisce Coordinators, dementia medications side effects, as reported to the PI by the site licensed professional and participant expression of fears reported to the PI before an intervention session. Despite these drawbacks, none of the participants withdrew.
The were eight female and three male subjects, ranging from age 74 to 98 with a mean age of 87 (sd = 6.788). The age of the males was as follows: 74, 89 and 98. All participants were of non-Latino White ancestry except for one person who was of Asian ancestry. Five participants identified themselves as Jewish, five as Protestant and one as an atheist. Most participants (n = 7) had either bachelor’s degree or some college. Three completed high school and one had a doctorate. Ten participants were categorized as having forms of moderate dementia and one person had mild dementia. Three participants were on psychotropic medications other than anti-anxiety medications. All participants on psychotropic medications were assumed stable on their medications for more than 3 months as verbal assurance was given from the corporate site administration that licensed healthcare professionals at each respective site would verify medications profile of each participant. Only one consented to participate not knowing an anti-anxiety medication would be prescribed during the study. The PI was not made aware of the anti-anxiety medication situation until after the study by the site licensed professional. The new medication caused major side effects and led to the participant being absent several times during planned sessions. Refer to Table 5.1 - Sample Characteristics, for a demographic summary. Nevertheless, the participants RAID data did not show any notable difference in scores over time and were therefore, counted in the RAID final analysis.

**Data Analysis Results**

**Specific Aim 1:** To test the hypothesis that an active-passive group music intervention would decrease anxiety among individuals diagnosed with mild to moderate dementia in assisted living facilities (ALFs) as compared to a control group engaged in care as usual.
Table 5.1 – Sample Characteristics

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dementia Stage (GDS) (N=11)</td>
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<td>1</td>
<td>9.1</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>5</td>
<td>45.5</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5</td>
<td>45.5</td>
</tr>
<tr>
<td>Music Importance (N=10)</td>
<td>Moderately</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Important</td>
<td>7</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Very</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Important</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No answer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (N=11)</td>
<td>74</td>
<td>1</td>
<td>9.1</td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>1</td>
<td>9.1</td>
</tr>
<tr>
<td></td>
<td>82</td>
<td>1</td>
<td>9.1</td>
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<td>1</td>
<td>9.1</td>
</tr>
<tr>
<td></td>
<td>88</td>
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<tr>
<td></td>
<td>89</td>
<td>1</td>
<td>9.1</td>
</tr>
<tr>
<td></td>
<td>90</td>
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<tr>
<td></td>
<td>98</td>
<td>1</td>
<td>9.1</td>
</tr>
<tr>
<td>Gender (N=11)</td>
<td>Male</td>
<td>3</td>
<td>27.3</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>8</td>
<td>72.7</td>
</tr>
<tr>
<td>Ethnicity (N=11)</td>
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</tr>
<tr>
<td></td>
<td>White</td>
<td>12</td>
<td>90.9</td>
</tr>
<tr>
<td>Religion (N=11)</td>
<td>Jewish</td>
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<td>45.5</td>
</tr>
<tr>
<td></td>
<td>Protestant</td>
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<td>45.5</td>
</tr>
<tr>
<td></td>
<td>Atheist</td>
<td>1</td>
<td>9.1</td>
</tr>
<tr>
<td>Education (Years) (N=11)</td>
<td>High School</td>
<td>3</td>
<td>27.3</td>
</tr>
<tr>
<td></td>
<td>Post High</td>
<td>7</td>
<td>63.6</td>
</tr>
<tr>
<td></td>
<td>School, &lt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>than a</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Doctorate</td>
<td>1</td>
<td>9.1</td>
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<tr>
<td>On anti-anxiety Medications (N=11)</td>
<td>Yes</td>
<td>1</td>
<td>9.1</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>10</td>
<td>90.9</td>
</tr>
<tr>
<td>On psychotropic Medications other than anti-anxiety medications (N=11)</td>
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<td>3</td>
<td>27.3</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>8</td>
<td>72.7</td>
</tr>
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</table>
Overall, no statistically significant intervention effect was found using group music interventions to reduce anxiety between the intervention and control groups, although a trend was evident showing decreased anxiety over time for both groups (p=.002) existed. Therefore, the hypothesis that an active-passive group music intervention would decrease anxiety among individuals diagnosed with mild to moderate dementia as compared to a control group engaged in care as usual was rejected.

Mean measurement outcomes for anxiety are reported in Table 5.2 – Rating Anxiety in Dementia (RAID). Outcome Measures for the intervention and control groups are shown at four points in time and do not reflect that some participants were not present during scheduled site interventions. Figure 5.2 - Intervention Group First (received the intervention during the first arm, drawn in light blue), followed by the group functioning as controls during the second arm (shown as black dashed lines) and figure 5.3 – Control Group First (functioned as controls during the first arm, shown with black dashed lines and as the intervention group during the second arm drawn in light blue), illustrate these data in graphic form.

While there was no treatment effect, visually, there appeared to be a site effect. Despite site similarities in business operations, the participants belonging to each site were different, as reflected in their RAID scores. The site receiving the intervention first measured low mean RAID levels in anxiety at both pre-intervention (18.00, sd=6.149) and pre-control periods (13.33, sd=7.394), followed by a spike upward at RAID measurement 2 (intervention = 23.33, sd=6.772; control=17.67, sd=3.386) and a dramatic decrease downward at RAID measurement 3 (intervention = 13.50, sd=2.950; control = 12.67, sd=2.733) (Figure 5.2). At RAID 4, a slight split into different directions occurred with the intervention group higher at RAID 4 (intervention
<table>
<thead>
<tr>
<th>GROUP</th>
<th>Description</th>
<th>Pre-Study or Post Wash-out RAID 1</th>
<th>RAID 2</th>
<th>RAID 3</th>
<th>RAID 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Order</td>
<td>1 2 Total</td>
<td>1 2 Total</td>
<td>1 2 Total</td>
<td>1 2 Total</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td></td>
<td>18.00 13.33 15.67 23.33 17.67 20.5</td>
<td>13.50 12.67 13.085</td>
<td>14.83 10.83</td>
<td>12.83</td>
</tr>
<tr>
<td><strong>Std.</strong></td>
<td></td>
<td>6.419 7.394 6.91 6.772 3.386 5.079</td>
<td>2.950 2.733 2.841</td>
<td>7.223 6.242</td>
<td>6.7325</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td></td>
<td>6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Order</strong></td>
<td></td>
<td>1 2 Total</td>
<td>1 2 Total</td>
<td>1 2 Total</td>
<td>1 2 Total</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td></td>
<td>17.20 13.60 15.4 12.60 13.20 12.9</td>
<td>10.80 10.40 10.6</td>
<td>12.00 12.60</td>
<td>12.3</td>
</tr>
<tr>
<td><strong>Std.</strong></td>
<td></td>
<td>5.310 7.436 6.373 5.505 3.768 4.365</td>
<td>5.891 3.209</td>
<td>4.55 7.517</td>
<td>4.93 6.2235</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td></td>
<td>5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 5.2 – RAID Means – Intervention Group First
Graphic Form

Estimated Marginal Means of raid
at Order of the intervention = Intervention first

Figure 5.3 – RAID Means – Control Group First
Graphic Form

Estimated Marginal Means of raid
at Order of the intervention = Control first
Furthermore, the intervention mean RAID scores were consistently higher for this site than during the control period scores.

In contrast, the site receiving care-as-usual first received higher mean anxiety scores both during pre-intervention and pre-control periods with anxiety levels higher for the pre-intervention (17.20, sd=5.310) versus pre-control (13.60, sd=7.436) periods (figure 5.3). Thereafter, a downward trend occurred during both conditions with a slight upturn at mean RAID measurement 4 with the intervention score slightly lower than the control score (intervention=12.00, sd=7.517; control=12.60, sd=5.505). By condition, the intervention scores were slightly lower than the control scores except at RAID measurement 3 (intervention=10.80, 5.891; control=10.40, 3.209) where a slightly higher anxiety score existed during the intervention period.

**Video Recordings Analysis.** Records of videotaping were for 10 sessions only as technical difficulties were encountered within the third week of interventions during the first arm. Video analysis was conducted by the Primary Investigator (PI) and the one, Student-Nurse RA (SN-RA). Inter-reliability rater (100%) was based on agreement of observed behaviors listed by the SN-RA and PI after reviewing each video recording for those behaviors. The more occurrence of paired boxes colored with both blue and yellow horizontally across time, meant behavioral interactions were “in sync” with the objectives of the RN training plan and were awarded a color for both the participant and the RN-RA. To be considered leaning toward a positive effect, at least 5 out of 8 total intervention days (> than 63%) needed to be blue-yellow color-blocked as pairs across time. Colored blocks appearing in pairs were not only significant for a 100% agreement between raters but also the success of the particular music intervention in
decreasing anxiety. Refer to Table 5.3 – Intervention Video Analysis. Successful interventions were determined when participants responded in unison or individually according to the RN-RA prompts and RN Training Plan objectives. Behaviors observed by the SN-RA and the PI were listed in the far left column. The RN intervention prompts are colored yellow in the table and blue for participants when they followed the RN-RA prompts. The assumption was the more “x” colored blocks over time, the greater the likelihood of engaged interaction and understanding between participants and the RN-RAs, which presumably resulted in an increased sense of self and a decrease in anxiety. This phenomenon is graphically presented in Table 5.3 – numbers 9, 12, 18 and 23. Observations in which the “x” boxes appeared more frequently were most apparent during the creative movement, acapella singing, and call and response - focused beat intervention segments. Graphically, color blocks were minimal during the listening and cooling down interventions. In the video, it was noted that participants experienced the greatest difficulties following RN-RA intervention prompts during those interventions. During the “listening” and “cool down” periods, the study subjects were instructed to keep their eyes closed, but instead kept them open. It is not known whether the observed behaviors are ineffective components of the music intervention or caused by the dementia condition. The RN Training Plan encouraged modeling by the RN-RAs while instructing the participants with dementia. Therefore, the lack of RN-RA behavior modeling during instruction may have had an effect on increasing RAID scores. But, it may also be that because of progressing dementia, the participant’s ability to understand behaviorsmodeled by people without dementia becomes worrisome for them. The use of tokens and the meaning of the tokens to the participants
<table>
<thead>
<tr>
<th>Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observations</td>
<td>P</td>
<td>RN1</td>
<td>P</td>
<td>RN1</td>
<td>P</td>
<td>RN2</td>
<td>P</td>
<td>RN2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. All enrolled participants attended.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Some participants not in attendance</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Introductions RN/Participants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>4. &quot;Listening&quot; (Environment unchanged) Lights still on.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>5. &quot;Listening&quot; (Environment changes) Lights off/participants engaged with RN prompts.</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. &quot;Listening&quot; Unable to follow instructions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>7. &quot;Listening&quot; Able to identify music.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. a. Distractions b. Disruptions</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. &quot;Movement&quot; Clear instructions, RN changes moves and participants copy.</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 5.3

Intervention Video Analysis Data – Arm 1 - BH

RN actions affecting participant response

Video Data Unavailable
<table>
<thead>
<tr>
<th>Day</th>
<th>Observations</th>
<th>Expected participant responses</th>
<th>RN actions affecting participant response</th>
<th>Video Data Unavailable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>&quot;Movement&quot;</td>
<td>RN Prompts:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. Participants fully interested.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Up and dancing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Look very happy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>&quot;Interactions increased with name tags.&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>&quot;Movement&quot;</td>
<td>Participants able to create moves different from RN or another participant w/wo RN prompts.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>&quot;Movement&quot;</td>
<td>Participants supportive of others in the group with RN prompts.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Able to evaluate at least 1 intervention with RN prompts.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Some participants exhibit movement or playing an instrument with music but not with the beat.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>Expected participant responses</td>
<td>RN actions affecting participant response</td>
<td>Video Data Unavailable</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>---------------------------------</td>
<td>------------------------------------------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td>16. Purpose of incentives unclear.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. “Acapella Singing” – Participants do not follow instructions and sing along with RN.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. “Acapella Singing” – Some or all participants following through with RN instructions and did not sing with RN. (Includes able to fill in the blanks as directed).</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day</td>
<td>Expected participant responses</td>
<td>RN actions affecting participant response</td>
<td>Video Data Unavailable</td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>--------------------------------</td>
<td>------------------------------------------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>P</td>
<td>P RN1</td>
<td>P RN3</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>P RN1</td>
<td>P RN1</td>
<td>P RN3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>P RN2</td>
<td>P RN2</td>
<td>P RN3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>P</td>
<td>P RN2</td>
<td>P RN4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

20. “Call & Response” – Participants unclear on how to use percussive instruments. Instruction not given.
   a. Incentive potted plant used to hit tambourine.
   b. RN3

   b. RN3

22. “Call & Response” – Using instruments, eventually able to follow RN in unison.
   b. RN3

23. Participants show difficulties with clapping bars without focused pointing.

24. Participants able to clap bars with RN focused pointing.
<table>
<thead>
<tr>
<th>TABLE 5.3</th>
<th>Intervention Video Analysis Data – Arm 1 -BH</th>
<th>Intervention Video Analysis Data – Arm 2 - PV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected participant responses</td>
<td>RN actions affecting participant response</td>
<td>Video Data Unavailable</td>
</tr>
<tr>
<td>Day</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Observations</td>
<td>P</td>
<td>RN1</td>
</tr>
<tr>
<td>25. Some percussive instruments played correctly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. Unable to identify songs during &quot;Listening or Cool Down&quot;</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

98
created behavioral responses that were not expected. In the videos, it was apparent that when presented with tokens that were meant to reinforce exemplary responses, many participants seemed to not understand what the tokens were for or what to do with them. For instance, one participant used the token, a small air-plant anchored to a plastic container filled with dirt, to hit a tambourine instrument.

Specific Aim 2: To describe the feasibility and acceptability of active-passive group music interventions delivered by an RN without a university or college degree in music intervention techniques to individuals with mild to moderate dementia in an ALF.

RN Feasibility/Acceptability. All four RNs completed the 12-question survey, and all felt that because of their whole-person knowledge, dementia care was made safer with RNs delivering the music interventions. Only one out of the four RNs indicated she would not facilitate music interventions again because she was expecting “formal music lessons.” However, given the lack of time in the RN schedules to take “formal music lessons,” the RNs considered the intervention training just right to somewhat challenging. All RNs agreed the participants were relaxed after the intervention deliveries. However, two RNs observed the participants did not exhibit any anxiety prior to or during interventions. Registered Nurses reported, the most time they allotted for practice of the intervention was less than 45 minutes for a maximum of 2 days a week. The easiest interventions to deliver were those requiring verbal prompts without the need for singing, playing an instrument or conducting music. Only one RN thought formal music lessons would have made the intervention delivery easier. The others felt they could have increased their practice time. The actual document and RN responses to each
<table>
<thead>
<tr>
<th>Question</th>
<th>Valid</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid %</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate the intervention training.</td>
<td>Just right</td>
<td>2</td>
<td>50.0</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td>Somewhat Difficult</td>
<td>2</td>
<td>50.0</td>
<td>50.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Rate your intervention delivery.</td>
<td>Average</td>
<td>3</td>
<td>75.0</td>
<td>75.0</td>
<td>75.0</td>
</tr>
<tr>
<td></td>
<td>Excellent</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Rate your perception of the subjects before intervention delivery.</td>
<td>Relaxed</td>
<td>2</td>
<td>50.0</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td>Somewhat Anxious</td>
<td>2</td>
<td>50.0</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Rate your perception of the subjects after intervention delivery.</td>
<td>Relaxed</td>
<td>4</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>How many hours did you spend practicing the intervention delivery before the study?</td>
<td>&lt; 30 minutes/day</td>
<td>2</td>
<td>50.0</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td>30 to 45 minutes/day</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>75.0</td>
</tr>
<tr>
<td></td>
<td>3 days prior to interventions</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>100.0</td>
</tr>
<tr>
<td>How many days a week did you spend practicing the intervention delivery before the study?</td>
<td>Practiced the night before the intervention and on the same day.</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>25.0</td>
</tr>
<tr>
<td></td>
<td>1 day/week</td>
<td>2</td>
<td>50.0</td>
<td>50.0</td>
<td>75.0</td>
</tr>
<tr>
<td></td>
<td>2 days/week</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Which intervention/s were the easiest to deliver?</td>
<td>Cool down</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>25.0</td>
</tr>
<tr>
<td></td>
<td>1, 3-5</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td>Introduction (Listening)</td>
<td>2</td>
<td>50.0</td>
<td>50.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Which intervention/s were the most difficult to deliver?</td>
<td>Call &amp; Response</td>
<td>3</td>
<td>75.0</td>
<td>75.0</td>
<td>75.0</td>
</tr>
<tr>
<td></td>
<td>Singing</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>100.0</td>
</tr>
<tr>
<td>What would make the interventions easier to learn?</td>
<td>More Practice</td>
<td>3</td>
<td>75.0</td>
<td>75.0</td>
<td>75.0</td>
</tr>
<tr>
<td></td>
<td>Formal Music Lessons</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Would you do this again</td>
<td>No</td>
<td>1</td>
<td>25.0</td>
<td>25.0</td>
<td>25.0</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>3</td>
<td>75.0</td>
<td>75.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 11. Why or why not to question 10?                                       | RN 1 - Even though it was nerve wracking to sing and lead, I could see how much the participants enjoyed the study. Even if they didn't remember the names of the songs with their minds, they often remembered with their bodies and their faces lit up.  
RN 2 – Fun, and I loved seeing the elderly people with dementia engaged in the music interventions.  
RN 3 – I enjoyed doing it and watching the residents enjoy the music.  
RN 4 – There was not enough structure or teaching. I was expecting to be taught more and have the intervention completely standardized. |
| 12. In your opinion, how is dementia care made safer with an RN delivering the intervention after undertaking proper intervention training as compared to a Music Therapist or anyone engaged in music interventions under your supervision? | RN 1 – An RN can not only deliver the music adequately, but can assess the safety and well-being of the participants and distinguish red flags from normalcy in their overall health.  
RN 2 – An RN would be able to handle dementia patients better, or understand them more.  
RN 3 – RNs have a background in dementia and a better understanding as to what is going on.  
RN 4 – The RN understands the needs, risks, and concerns of the dementia patient compared to a music therapist or anyone else engaged in the interventions. The RN understands that the participants are at risk for falls, anxiety, depression, etc., and has the knowledge base to effectively intervene during music interventions if these problems arise. |
question is provided in Table 5.4. Video analysis was also used to evaluate the feasibility/acceptability and was suggestive of the intervention success.

**Family Caregiver Post Intervention Questionnaire.** Eight of 11 family caregivers completed the family caregiver questionnaire. Six family caregivers were from one site; two from the other site. Three family caregivers could not be contacted and did not provide feedback. Five family caregivers felt safe with RNs delivering music interventions, two felt somewhat safe and one was unsure. Two of the three family caregivers who responded to the open-ended questions felt safer with RNs delivering the interventions as compared to Music Therapist because they thought nurses were better trained. One family caregiver felt safer with RNs delivering music interventions as compared to Music Therapist because RNs were perceived as more professional. Seven family caregivers were not aware of any differences in training between the bachelors prepared RNs and the certified bachelor prepared Music Therapists. After the music intervention sessions, six family caregivers thought the participant behaviors were neither relaxed nor anxious (question 1), and in answer to question 2, seven family caregivers thought the music sessions were helpful. The actual survey is shown in appendix - Instrument 5.2 and the results of the family caregiver or their designated proxy are summarized in Table 5.5.
<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Valid</th>
<th>Frequency</th>
<th>%</th>
<th>Valid%</th>
<th>Cum%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>What was the participant's behavior like after music intervention sessions? n=8</td>
<td>Neutral</td>
<td>6</td>
<td>54.5</td>
<td>75.0</td>
<td>75.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relaxed/Content</td>
<td>2</td>
<td>18.2</td>
<td>25.0</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disruptive/Frustrated</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing Data</td>
<td>3</td>
<td>27.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>How were the music sessions helpful to the participant and to you? n=7</td>
<td>No difference before or after</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Helpful</td>
<td>7</td>
<td>63.6</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Very helpful</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing Data</td>
<td>4</td>
<td>36.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Do you feel safer that an RN with music training was delivering the music interventions over someone else without a science intensive healthcare background to the participant? n=8</td>
<td>Not sure</td>
<td>2</td>
<td>18.2</td>
<td>25.0</td>
<td>25.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Somewhat safe</td>
<td>1</td>
<td>9.1</td>
<td>12.5</td>
<td>37.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Safe</td>
<td>5</td>
<td>72.7</td>
<td>62.5</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Extremely safe</td>
<td>0</td>
<td>0</td>
<td></td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing Data</td>
<td>3</td>
<td>27.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Can you describe why you would feel safer with an RN having music training and providing music interventions? n=3</td>
<td>FCG 2 – It feels more professional</td>
<td>1</td>
<td>36.4</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FCG 6 – Better training</td>
<td>3</td>
<td>27.3</td>
<td>37.5</td>
<td>87.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FCG11 – Because an RN is trained and have studied behavioral signs that are positive or negative in regards to the musical stimulation. Missing Data - 8</td>
<td>1</td>
<td>9.1</td>
<td>12.5</td>
<td>100.0</td>
</tr>
<tr>
<td>5</td>
<td>How aware are you of the current differences in training and practice that a Bachelors prepared RN must have versus a certified Music Therapist regarding healthcare? n=8</td>
<td>No knowledge</td>
<td>4</td>
<td>36.4</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Somewhat knowledgeable</td>
<td>3</td>
<td>27.3</td>
<td>37.5</td>
<td>87.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Very knowledgeable</td>
<td>1</td>
<td>9.1</td>
<td>12.5</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing Data</td>
<td>3</td>
<td>27.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Are there any further comments you’d like to add regarding an RN providing delivery of music interventions in dementia care? n=4</td>
<td>FCG 2 – It was nice.</td>
<td>1</td>
<td>25.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>FCG 4-6 – Great!</td>
<td>3</td>
<td>75.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing Data</td>
<td>1</td>
<td>25.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Acronym Key: FCG = Family Care Giver   RN = Registered Nurse
Chapter 6

DISCUSSION

The results of the study outlined in Chapter 5 were affected by several factors such as the sample recruitment, sample size, outcome measures, the type of music intervention, RN music education and internal and external characteristics of the Assisted Living Facilities (ALF) sites themselves. Chapter 6 discusses these factors and how the study may have been impacted them.

Ultimately, this study was designed to:

1) *Test the hypothesis that an active-passive group music intervention would decrease anxiety among individuals diagnosed with mild to moderate dementia in assisted living facilities (ALFs) as compared to a control group engaged in care as usual.*

2) *Describe the feasibility and acceptability of active-passive group music interventions delivered by an RN without a university or college degree in music intervention techniques to individuals with mild to moderate dementia in an ALF.*

To date, there is only one other study conducted in Australia by Cooke et al., (2010), that found no significance with group music interventions on anxiety experienced by individuals with dementia. The study by Cooke and colleagues (2010) used professional musicians to deliver the music interventions. In this study RNs with no formal music education were used to deliver the Active-Passive Group Music Nursing Interventions (A-PGMNI). A search across the literature base for information regarding nurses delivering A-PGMNIs yielded no evidence.

**Issues Related to Hypothesis 1**

Although a downward trend in anxiety levels existed by time for the two ALF sites, there was no significant finding comparing the 2 ALFs sites by group and time. This study’s results
align with the Cooke and colleagues’ (2010) study results. Cooke and colleagues (2010) found no significant effect of using group music interventions on anxiety levels. Therefore, the first hypothesis was rejected. Issues related to the study design, sample size and characteristics, setting, screening instruments, the intervention itself and measurements of the outcome could have influenced the effect of the intervention and are discussed below.

**Study Design**

The cross-over design was selected because of its advantage in securing the highest possible equivalence among participants since the participants serve as both experimental subjects and their own controls (Polit & Beck, 2012). The attractive multi-role feature in cross-over designs combined with consideration of Yalom’s (1975) small group definition (5-10 individuals), formed the basis of recruiting a small number of potential subjects/per site. However, it is unclear how the 4 weeks wash out period may have affected those elders in the assisted living facility (ALF) who received the intervention first. It is possible that a carry-over effect may have existed for the participants who received the intervention first. As controls prior to the start of the second arm, the anxiety level scores were quite low. However, because of illness resulting in a small sample size (n=2) prior to the first session of the second arm, it wasn’t possible to detect any carry-over effect in this group of participants.

**Sample and Setting**

There are two studies documenting the use of group music interventions within ALF settings to effect anxiety levels in people diagnosed with dementia (Cooke et al., 2010; Sung et al., 2011b). The study led by Cooke (2010) used a cross-over design and yielded no significant changes to anxiety levels with group music interventions. In contrast, the study by Sung and
colleagues (2011b) did show a significant reduction in anxiety. The Cooke and colleagues’ (2010) did not report ethnic characteristics. Sung and colleagues (2011b) reported the study was conducted in Taiwan. It could be ethnic differences in the amount of anxiety experienced existed. Moreover, although both were conducted in ALFs, perhaps there were differences in the types of ALFs used. Clearly, however, these studies are not enough to conclude group music interventions and what kinds of group music interventions to effect anxiety will work within ALFs. This study was planned with intent to contribute to this parse area of research.

This study sample was recruited from ALFs where about 42% of residents had Alzheimer’s disease or other dementias (NCAL, 2010). Assisted Living Facilities are considered non-medical facilities which allow “greater resident control over his or her environment, including what services are received, when, and how” (Chapin & Dobbs-Kepper, 2001, p. 43). This is quite a contrast to facilities incorporating medical models such as nursing homes or acute care hospitals which often dictate the patient’s care according to institutional scheduling (Chapin & Dobbs-Kepper, 2001). This contributed to major problems with recruitment and also to problems with attendance since residents could choose to freely “come and go” as they pleased, whether alone or with family caregivers. In most instances, because of their dementia, participants did not know when to attend the intervention sessions and had to be brought to the sessions by care staff or family caregivers. During the planning stages, arrangements had been made with the facility Reminiscence Coordinators to have the participants brought to the sessions by staff caregivers. Often, however, the staff caregivers either were not told that planned intervention sessions were being held on a certain day and time, or had not been informed that intervention sessions were being held at all. To remedy this, in future research staff
members in facilities need to be informed that interventions are occurring, and reminded of which days and times study personnel would be in the facility. Staff and family caregivers’ lack of awareness regarding the intervention day/time, and the substitution of unfamiliar study personnel to bring participants to the room where the intervention was being offered, may have created an unstable environment and resulted in increased participant anxiety levels.

During initial planning, site administrators from the both ALFs were to actively assist in recruitment. Their active involvement may have resulted in an increased number of participants and perhaps different anxiety results as the sample size for both sites would have met the power analysis measures. However, for the protection of potential subjects, the Institutional Review Board (IRB) restricted their involvement in the study. Therefore, administrators were asked only to assist in distributing advertisement flyers made by the Primary Investigator (PI).

By ethnicity, all participants from both sites were White except for one person who was of Asian ancestry. Research shows that individuals of Asian and Hispanic heritage experience more anxiety than individuals belonging to any other ethnic culture (Seignourel et al., 2008). This research evidence may be an important consideration when explaining anxiety outcomes for certain ethnic cultural groups. However, for this study, ethnicity may have had a small to no effect at all because the individual of Asian ancestry missed several sessions due to her new anti-psychotic medication started just after interventions began for her site.

Four participants were on anti-anxiety medications during the course of the study. One was newly prescribed an anti-psychotic after signing-on to the study and the participant’s new medication resulted in missed attendance at several intervention sessions. Moreover, on a visit to escort the participant to an intervention session, the participant appeared extremely lethargic and
refused to attend the session. Study personnel were not notified of the participant’s new prescription and the PI found out by coincidence after speaking with a Licensed Vocational Nurse (LVN) at the site regarding other study related questions. Should study personnel have known earlier, before recruitment, the participant would have been eliminated from the study. However, the PI allowed the participant to remain because fear of under powering may have resulted and have affected the outcomes measures negatively.

**Screening Instruments**

Initial screening of subjects was complex and difficult. The Global Deterioration Scale (GDS) *dementia stage* rating tool lacked specificity in distinguishing between moderate dementia and moderately severe dementia. Rikkert and colleagues (2011) noted that correct staging depends on definitions of the stages which varies by individuals and is very challenging to capture. This phenomenon parallels with the confusion experienced as attempts were made to distinguish between criteria of “moderate” and “severe” which are paired together under the category “moderate”. This over-lapping may have led to the erroneous application of the instrument and the recruitment of persons with severe rather than moderate dementia, and may have had an effect on the RAID scores. One study showed both passive and active *individual* music interventions work best with for those severe rather than those with mild to moderate dementia (Sakamoto et al., 2013). If some of the participants were classified as moderate when they were actually “severe,” perhaps this is why the *group* music intervention did not produce the anticipated reduction in anxiety levels. The intervention was intended for *groups* rather than *individuals*. All study participants except for one were classified within the moderate dementia stage. However, it is possible that some participants should have been classified as moderately
severe rather than as moderate, which would have made them ineligible for the study. This is important as one criteria for study inclusion was the ability to follow through with simple instruction. For persons with stage 6 moderately-severe dementia, the ability to follow through with simple instruction is diminished considerably (Reisberg et al., 1982).

Stage of classification for persons with dementia using the GDS (description of clinical characteristics) proved too long and difficult without the PI breaking down the descriptors into a check-list, quick-scan format for the research team. Furthermore, the graded descriptors were too wordy and added to the confusion toward quick task completion, as seen in Table 6.1 – Stage 6 – Clinical Characteristics from GDS. With only 1 SN-RA and the PI interviewing at each site, several potential participants and their families were waiting to be screened. Therefore, to simplify the reinterpretation of the language, and to prevent the possibility of recruiting an insufficient sample size, it was thought that by quickening the screening tasks, the less chance of potential participant loss happening.

A better tool is needed for assessing the decision making capacity for individuals with dementia. The IRB mandated use of the Decision Making Capacity Tool (DMCAT) for this study. However, the DMCAT was difficult to administer to potential participants. The language used was written for persons with extremely mild dementia or for individuals who are not cognitively impaired. As a consequence, The PI needed to reword the questions to make them comprehensible to persons being assessed. For example, the following question from the DMCAT asks, “Does the individual understand he/she would be participating in research and that research is voluntary?” Although the PI or SN-RA substituted simpler words for the more difficult ones in the questions, it was unclear if the questions were simplified so much that they
bore little resemblance to the original questions. If so, it would be difficult for evaluators to declare a potential participant unable to make decisions.

**Intervention**

In a search for literature investigating Orff inspired techniques with dementia patients, nothing was found. Thus, as much as parts of the techniques were appropriate during music and movement, acapella singing and call and response, perhaps some of them were not, such as during the listening and cool down segments. Participants experienced most difficulties in closing their eyes when instructed “verbally” by the RN-RA facilitators. Perhaps closing their eyes made them feel less secure and increased their anxiety levels. However, on the other hand, some RN-RAs forgot to “demonstrate” how to close one’s eyes after instruction was given. With young children, this technique works well when modeled by the facilitator and all aspects of following-through with instructions are involved.

Intervention *room size and set-ups* are critical to the success of group music interventions. As suggested in the PLST theory, environments strongly influence stress levels in persons with dementia (Hall & Buckwalter, 1987). Originally, a multi-purpose room away from heavy foot traffic and fitted with dimmer lights and modular furniture to accommodate wheelchairs was planned. This type of design or play with space could have influenced anxiety levels much differently. Perhaps the idea of “a less furnished room is more “useful” regarding group music interventions” with respect to intervention environments that work best for persons with dementia when engaged in group music interventions.
Table 6.1 – **Stage 6 – A Clinical Characteristics from GDS**  
(An example of how the GDS clinical descriptions are structured)

<table>
<thead>
<tr>
<th>Level</th>
<th>Clinical Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Sever cognitive decline (Moderately Severe Dementia)</td>
</tr>
</tbody>
</table>

May occasionally forget the name of the spouse upon whom they are entirely dependent for survival. Will be largely unaware of all recent events and experiences in their lives. Retain some knowledge of their past lives but this is very sketchy. Generally, unaware of their surroundings the year, the season, etc. Will require some assistance with activities of daily living, e.g., may become incontinent, will require travel assistance but occasionally will be able to travel to familiar location. Diurnal rhythm frequently disturbed. Almost always recall their own name. Frequently continue to be able to distinguish familiar from unfamiliar persons in their environment. Personality and emotional changes occur. These are quite variable and include: (a) delusional behavior, e.g., patients may accuse their spouse of being an impostor, may talk to imaginary figures in the environment, or to their own reflection in the mirror; (b) obsessive symptoms, e.g., person may continually repeat simple cleaning activities; (c) anxiety symptoms, agitation, and even previously nonexistent violent behavior may occur; (d) cognitive abulla, i.e., loss of willpower because an individual cannot carry a thought long enough to determine a purposeful course of action.

Participant reactions to positive reinforcement was also an issue faced in this study. The participants appeared perplexed by the tokens used for behavioral reinforcements. Perhaps in persons with dementia there is a point in the disease progression when behavioral reinforcements such as tokens are meaningless.
It was not possible to schedule regular intervention session days during particular times of the week. Sessions were scheduled according to RN-RA availability rather than by participant consideration, and this led to varied meeting days. The ALFs were given one to two weeks’ notice of the RN-RA intervention scheduled sessions prior to the start of each intervention arm to assure residents were available for participation. One family caregiver mentioned in passing that sometime the intervention scheduling conflicted with other planned site activities. This observation provides insight into why the erratic scheduling may have affected the participants with dementia, perhaps causing them to feel less secure and increasing their anxiety levels. Other possible reasons for feeling less secure may include being pulled-out of favorite ALF activities by family caregivers or staff, not wanting to leave for music sessions based on RN-RA schedules, or being interrupted in routine activities. However, according to Hamer and Orrell (2008), the setting of routines for persons diagnosed with dementia is related more to the convenience of staff or caregivers within care homes rather than the needs of the persons with dementia (Hamer & Orrell, 2008). Therefore, it may be that the site staff caregiver’s lack of awareness to the needs of the participants scheduled A-PGMNIIs may have influenced participant anxiety levels, as study personnel unfamiliar to the participants were sent to escort the participants to the intervention sessions.

**Outcome Measurements**

The participant anxiety scores might have been quite different if participants had been able to rate their own anxiety levels using the RAID or some other instrument. Bradford and colleagues (2013) found that individuals diagnosed with Alzheimer’s disease and suffering from anxiety are equally as accurate as proxies in rating their anxiety. This study initially allowed for
self-reporting, but during screening, potential participants were not able to understand most of the RAID questions. As a result, surrogates who were given authority to represent these individuals answered questions for them. This method of rating was used throughout the study by blinded-RAs who integrated the opinions of site staff caregivers in imputing anxiety score. Within this context, the outcome measures could be biased from both the blinded RAs and site staff caregivers in their ratings of participant anxiety levels. Ultimately, methods assessing individuals with dementia who are experiencing anxiety from their own perceptions rather than someone else’s are needed.

Gauging from the plotted RAID scores, it may be that the sites were very different. Two ways they were very different is in the floor plans of the intervention rooms and in the way they were furnished (the interventions room settings were described earlier in Chapter 4 under Intervention Settings). Though a quiet room to deliver interventions was requested, it was not possible at the site receiving the intervention first. It is therefore not surprising that the control RAID scores for this group were much lower than the music intervention scores, as participants were not placed in an ideal music intervention environment. In contrast, the site receiving the intervention second was a designated quiet room situated far away from the noise and distractions of the busy facility.

The RAID scores may also reflect the RN-RAs experience in delivering the interventions. One RN-RA delivered interventions during both the first and second arm. This RN-RA may have been more experienced and confident by the second arm. The RN-RA delivering the intervention during the second arm appeared to be better prepared given the number of colored blocks appearing over time in the analysis of the video tapes. For the site receiving the
intervention first, the anxiety scores were higher during intervention and lower as controls. In contrast, the site receiving the intervention second during the second arm, showed decreases in anxiety levels slightly below and slightly over the controls over time. This phenomenon was unexpected. It could be the result of two causes. First, the intervention room was almost ideal. It was located on an upper floor away from main traffic and some of the furniture could be moved to form semi-circles as planned. Secondly, the RNs were more confident and practiced in their music delivery during the second arm as compared to the first resulting in better responses from the participants.

**Hypothesis II - RNs as Music Interventionist**

This study provided some evidence for the feasibility and acceptability for implementing a group music intervention delivered by RNs without university or college degrees in music intervention techniques to individuals with dementia living in ALFs. The RN-RA delivery of the music interventions must be considered in light of typical music education training. A relationship exists between intervention training, music lessons and practice time to the feasibility and acceptability of nurses delivering A-PGMNIs. Registered Nurses were not given any *true* music lessons. *True* music lessons usually consist of weekly meetings no less than 30 minutes to an hour under the coaching of an expert professional musician. There was no intent to provide weekly music lessons to these RNs given their other responsibilities and time constraints. Though allotting time for practice was highly encouraged, it was not expected. Requiring “practice” hours might have deterred them from participating. However, the RNs were able to learn the techniques in the intervention because certain modifications were made that simplified learning. For example, the *acapella* song selections were simple and did not
require technical voice training. Similarly, the beat notations during *Call & Response* were not drawn in universal music notation, which would have required formal music lessons to learn.

The major requirement for the RNs was to actively engage in making music instead of simply playing CDs. This they were able to do successfully and the type of music training given the RNs busy schedules only enhanced the feasibility and acceptability of nurses delivering the A-PGMNIs. This discussion focuses on feasibility first, and acceptability second.

**Feasibility**

Feasibility of RNs as Music Interventionist consists of three measures. The measures are the: RN Post-Intervention Feedback, Family Caregiver Feedback and the Intervention Video Analysis Data.

*RN Post-Intervention Feedback.* Three RN-RAs stated they would deliver the music interventions again and that with more practice the interventions would have been easier. This substantiates the feasibility of RNs learning and delivering group music interventions. In addition, the RN-RAs regarded the interventions as “just-right” to “somewhat-difficult”, and thought their delivery of the interventions were average to excellent. This is added confirmation that RN delivery of group music interventions can be done.

*Family Caregiver Feedback.* Family members had no negative feedback regarding the group music intervention. There were no reports that residents were disruptive or frustrated after the intervention. Family caregivers observed the participants were either relaxed or neutral in behaviors after the intervention. Furthermore, most family caregivers thought the music sessions were helpful to their participating family member with dementia. Thus, it can be said, that family
caregiver feedback provides added justification that it is feasible for RNs to deliver group music interventions.

**Intervention Video Analysis.** The intervention video analysis data showed that during observations 9 (music and movement), 12 (music and movement), 18 (acapella singing) and 23 (call and response) that participants were following the RN-RA prompts as reflected in their faces and engaged body language. These observations support the feasibility that RN-RAs can deliver the majority of the A-PGMNI (3 out of 4 intervention activities) successfully.

**Acceptability**

**RN Post-Intervention Feedback.** All RN-RAs were unanimous that it was safer for RNs to provide music intervention delivery in healthcare with proper training than Music Therapists or anyone engaged in music interventions under their supervision (see question 12 of the RN Feasibility/Acceptability Responses). The key theme was that because of their scientific backgrounds, RNs have a greater understanding of the needs, risks and concerns of the dementia patient as compared to a music therapist or anyone else engaged in the interventions. The RN understood participants were at risk for falls, anxiety and depression, and had the knowledge base to effectively intervene during music interventions if these problems arose. In summary, the RN-RAs provided favorable feedback on the provision of group music interventions to persons with dementia who were experiencing anxiety by RNs. Therefore, the provision of active-passive group music interventions delivered by RNs may be thought as acceptable to the nurses.

**Participants Acceptability.** Original plans were for all participants to provide feedback on RN delivered music interventions. However, this was not possible after screening for each
participant’s decision making capacity which showed difficulties in understanding the instrument questions. This resulted in abandoning use of the participant post-interventions questionnaire and assessing for participant acceptability.

Family Caregiver Feedback. Several family caregivers expressed feeling safe with RNs delivering group music interventions over someone else without a scientific-healthcare background. However, the answers may be thought of as a social desirability issue. Specific explanations on why they felt safe were based on RN professionalism, better education and because RNs are equipped to recognize positive and negative behavioral signs when participants may be experiencing serious events such as, stroke, myocardial infarction, and insulin reactions if diabetic and be ready to handle the emergency situation. This thinking may be different for other age brackets, for example younger individuals who rarely are not at risk for cardiovascular events. It may be that perhaps music therapists are best to deliver music interventions for people without physical health related problems.

Limitations of the Study

Because of the freedom to “come-and-go” for individuals living within ALFs, research recruitment was difficult resulting in smaller sample numbers than expected. Yet, the dilemma is, research has shown individuals with dementia experience the greatest amount of anxiety when living in ALFs versus other types of facilities (Neville & Teri, 2011). Clearly, there is a need to find better ways of recruitment within ALFs before any research may be realized. Furthermore, weekly changes to intervention scheduling days combined with the freedom to “come-and-go” resulted in missing data for two individuals and resulted in their elimination from the study. This was not a desired action, as it resulted in a smaller sample.
Different individuals were at times used to measure outcomes on different occasions such as at baseline RAID for specific aim 1. Inter-rater reliability was implemented to account for these differences, however, even with inter-rater reliability, because the participants with dementia were not able to rate their anxiety experiences, scores may not have been true.

The use of several RNs to deliver the interventions also could have affected the consistency and the familiarity of individuals with dementia to the RN delivery of the interventions. Perhaps persons with dementia need to have the same person delivering the interventions and to receive consistency in the delivery of the interventions. Furthermore, some RNs may have practiced the intervention delivery more than others and the participants were not always receiving all the interventions as planned.

**Future Research Recommendations**

*Individual versus group music interventions.* According to previous research, group music interventions remain far superior to individual music interventions especially when done actively for individuals diagnosed with mild to moderate dementia (Hanser, 1999; Raglio et al., 2008). This study used a group music intervention to reduce anxiety but a significant effect was not found as compared to a control group engaged in care-as-usual. This study parallels with results found in the study by Cooke and colleagues (2010) study. However, further examination, reveals the study results must be considered in context of limiting factors internal and external to the study. Perhaps, if these factors were controlled, the results may have been quite different. Future researchers may want to repeat the design strategy but control for the limiting factors.

The implementation of an *Orff inspired method* in dementia care is relatively new and warrants further research. The custom design was quite simple for nurses to implement without
typical music lessons which often takes at least a few years to incorporate theory and instrument application. Therefore, one major concern that evolves from over-simplification of music theory and instrument applications is, how long can this be done without learning the universal music notation typically associated with formal music lessons. This could be either a major limitation or precedes a new way of writing and learning music.

Behavioral reinforcements (tokens) were used throughout the intervention. Though the reinforcements are thought to work well with most people, they were not understood by participants with dementia in this study. Is there a point in dementia when reinforcements do not work and if there is, what can be done? This phenomenon needs to be explored.

The A-PGMNI was created to explain how active-passive group music interventions would affect anxiety in individuals diagnosed with mild to moderate dementia. The theory works well with the PLST (to explain how anxiety states evolve in persons with dementia) and the MMM (how music generally effects health outcomes) theoretical models. The A-PGMNI adds to the MMM theory a “group” music making component. The group music making component is thought to effect music making by entrainment (in which rhythmic signaling originates from another individual, such as seen in marching bands) and therefore, a pleasurable experience evolves for all (Phillips-Silver et al., 2010). The A-PGMNI model together with the PLST and the MMM theories is a necessary component to explain how anxiety is affected in those who are diagnosed with dementia when using active-passive group music interventions delivered by nurses. Future research may want to test the A-PGMNI effects for other BSD.
Future research should investigate ways to increase recruitment within ALFs first before attempting any kind of research. It may be that certain types of research such as “cross-over” designs are not suitable for ALFs.

More frequent communication between site licensed staff in keeping the PI aware of medication changes or prescribed medications pending for participants may have helped in reducing or preventing bias concerning prescribed medications during the study. Thus, a one-time only medications status at screening is insufficient. Perhaps a weekly “medications-review” is warranted.

Only one Family Caregiver with authority over a study participant with dementia lived out-of-state. Since family members are thought to be ultimately responsible for the social, physical and financial well-being of the participants, it was thought their feedback regarding respective participants would be far more beneficial than paid staff or hired personal caregivers. However, this was not possible for one of them resulting in permission for the site reminisce coordinator to answer on their behalf. For the future, other means to acquire direct feedback from out-of-state Family caregivers are needed especially if a study sample is small. Maybe skyping for families out-of-state opens a new way to observe their loved one’s participation during interventions.

According to Riddert and colleagues (2011), the GDS takes between two to 15 minutes to administer. However, the criteria for each stage are very lengthy and may need to be memorized in order to administer in 15 minutes or less. Easier versions with less “wordiness” are needed if raters are to translate criteria into questions into an easier that are easier for individuals with dementia to understand as they are being assessed for their stage of dementia.
Furthermore, easier to quickly classify definitive criteria that differentiate between moderate and moderately severe dementia category are needed. Easier readability and a quicker classifying system may assist researchers in speeding the screening process and prevent loss of potential participants. Similarly, better tools to assess the decision-making-capacity of potential participants with dementia are needed. The current instrument was difficult to read and translate quickly into language persons with mild to moderate dementia could understand.

Future studies need to consider intervention physical environments and spaces which enhance persons with dementia’s capacity to relax and decrease anxiety during music interventions. It may be that less furniture or modular furnishings are most conducive to achieving best results with A-PGMNIs. Perhaps this is one reason why the site RAID scores showed noticeable differences. However, this area of research is new and will need attention in the future.

When compared to other studies researching the effects of group music interventions on anxiety among individuals with dementia, this study has contributed to new knowledge in several areas. For one, this is the first study to investigate nurses delivering active-passive group music nursing interventions with minimal music education. Secondly, a new model to explain how group music interventions affect anxiety has resulted. The model integrates the PLST and MMM theories. Third, nurses delivered the A-PGMNIs within ALFs. This has never been done before by nurses within ALFs. Fourth, a new method of charting and analyzing video events was created by the PI which was effective in measuring the success of nurses delivering A-PGMNIs. Finally, Orff techniques inspired the custom music intervention created for the RN-RAs.
delivering them for the study. With the exception of using xylophone bars, the literature base is void of information on the use of Orff inspired techniques in dementia care.

Plans to implement studies of this type may take up to two years to prepare as governing boards ultimately decide its course. Allow for governing body review-time in plans to carry through the study and ask study personnel who wish to participate to commit for up to 2 years in case of delays.

**Implications for Nursing**

Despite a positive nod toward nurses delivering group music interventions, nurses may need to be careful in the use of proper therapeutic terminology until the exact mechanism of how music affects people is known. Music Therapists argue the term “music therapy” should be associated with formal schooling and certification (Fischer, 2013). At least in healthcare, the idea of non-certified Music Therapy persons delivering Music Therapy may be distressing for Music Therapist for two reasons: First, it threatens or breaks apart the usefulness of their discipline. But, until the exact mechanism of how music affects people has been conclusively demonstrated (Sackett et al., 1997; Vink et al., 2003) the existence of Music Therapy delivered by Music Therapist as a profession is unstable. Second, Music Therapists are not able to diagnose, and must report to other healthcare providers such as nurses for supervision. However, conflict arises between Music Therapists and nurses because Music Therapists have argued that licensed healthcare professionals do not understand what Music Therapy is or how to deliver it (Kennelly, Daveson & Baker, 2016). Furthermore, one music therapist claimed that a patient’s medical crisis was revolved by their ability to choose an appropriate music intervention (Fischer, 2013). For nurses, this is contradictory to best nursing practice. Supervision without
knowledge or skills regarding an intervention and its effects is unsafe and risky to individuals on the receiving end. Therefore, until the exact mechanism of how music affects people is known, it may be beneficial to provide RNs and other healthcare professionals involved in supervision with music intervention awareness and training.

Group music interventions delivered by the four RNs in this study provides a starting point for further research in the area. Conducting studies with a larger sample of RNs may provide a more accurate idea regarding the acceptability of RNs delivering group music interventions. For some nurses it may not be acceptable. For nurses who express interest in implementing music interventions in their patient care, it would be prudent to enroll in formal music training or, because of time constraints, hire a Nurse-Music Educator or Music Therapist to teach creative musical techniques requiring the least amount of rehearsal. There have been suggestions of team approaches to nursing care in order to receive services which nurses are not able to do themselves. However, in consideration of patient safety and liability, the approach is debatable. Perhaps music may have a place in the future of nursing curricula. Maybe adding complementary and alternative medicines (CAM) courses, or music alone if nursing students choose can be an option. With backgrounds in both health and CAM, specifically music, nurses will be able to supervise and teach both assistive personnel and patient family members music techniques to relax and calm their anxious loved ones and more.

CONCLUSION

Despite the insignificance changes in anxiety levels, new knowledge evolved from this study. The A-PGMNI was developed specifically for nurses to explain the effect of group music interventions on anxiety. The model was visually inspired by Linda Gerdner’s (1997) An
Individualized Music Intervention for Agitation, and was informed by the classic PLST and contemporary, MMM theories. Regarding patient safety in healthcare, the study showed nurses can deliver more complex music interventions if given proper training, time and encouragement. They are warmly regarded and welcomed by families of persons with dementia because they are alert to other health conditions that may affect their elderly loved ones. In ALFs the evidence is strong that these facilities are home to residents with dementia experiencing the highest levels of anxiety and more research is needed within to develop interventions to address the problem. Yet conducting ALF studies, is difficult because residents are allowed the freedom to come-and-go at their choosing. Using Orff inspired methodology which is commonly used for children seems to work for individuals diagnosed with dementia too. The group music intervention which was inspired by the Orff methodology was personalized for the nurses without any formal music background and proved successful in three intervention segments as noted in the intervention video analysis chart. The intervention video analysis chart was a unique creation made by the PI to monitor how many segments of the intervention training plan was followed by the RN and responded to by participants as intended.

Into the future, it is recommended that future studies allow more preparation time working through study preliminaries, especially regarding institutional policies. To avoid loss of personnel and because the research governing bodies require a list of study personnel at the time of application, it may be best to ask for a two-year commitment from potential individuals prior to any research governing board approval.

Results of this pilot study suggested group music interventions delivered by nurses are feasible to provide and acceptable to family members despite an insignificant amount of change
to anxiety levels for participants in this study. Credit is due to the RNs in this study who braved the unknown and delivered A-PGMNI with minimal training. Each of them provided valuable insights into their intervention delivery experiences and how RNs can make dementia care safer into the future.
Instrument 4.1 – RN Pre-Interventions Checklist

PRE-INTERVENTION CHECKLIST

Room/Equipment/Supplies:

1. Quiet Room
2. Dimming Lights
3. 10 Chairs (8 for participants, 1 for the RN, 1 for the PI)
4. Piano or Ukulele for accompaniment or both; at least one.
5. CD Player
6. Selected CDs
7. Percussive Instruments – (10 percussive instruments – assorted or all maracas or shakers; finger cymbals or triangle for RN)
8. Intervention Assistive Media - Diagrams or pictures etc. placed on back of upright piano.
9. 3 Video Cameras
10. Flipchart with easel

Pre-intervention Room Set-up:

11. [Diagram of room setup with symbols for RN, subjects, camera, piano, and flip chart]
Instrument 4.1 – RN Pre-Interventions Checklist - continued

RN CHECKLIST

PRE-INTERVENTION
1. _____ Places selected music on CD player before subjects come in.
2. _____ Dims lights
3. _____ Greets subjects and directs subjects to a chair.

REMINISCING/FOCUSBING
4. _____ Directs subjects to close eyes hear the music.
5. _____ Directs subjects to reminisce about the music.
6. _____ Stops music.
7. _____ Puts lights on.
8. _____ Observes for no movement and directs subjects to continue with closed eyes until a finger cymbal or triangle sound is heard.
9. _____ Directs subjects to open their eyes.
10. _____ Asks subjects to identify the songs and instruments heard.
11. _____ Gives generous praise whether wrong or right answers and asks for a thumbs up or down evaluating how everyone did on the activity. (Subject is participating)
12. _____ Leads subjects in clapping for themselves in job well done for Reminisce.

MOVEMENT/CREATIVITY/MIRRORING/BEAT/SOCIAL
13. _____ Changes CD to Patriotic Medley Songs.
14. _____ Sits down in a chair and places beats on lap.
15. _____ Asks subjects to copy moves on their laps.
16. _____ Switches moves after so many beats (at RN discretion)
17. _____ Stop music momentarily and ask if someone else would like to lead moves and beats. (RN may call on those individuals who showed ability at screening)
18. _____ RN allows subject “leader” to practice moves with other subjects for at least 3 cycles of beats.
19. _____ RN stops music momentarily and asks all subjects to clap for the new leader and for themselves in following the new leader’s moves/beats.
20. _____ RN directs leader to switch moves upon hearing the triangle or finger cymbal. (May be played by the RN or another subject from the group)
21. ____RN puts patriotic or upbeat music on and allows subject/leader another 3 to 4 cycles of movement/beats.
22. ____RN stops music.
23. ____RN praises all group subject participants and leads everyone in clapping for themselves and the subject leader and evaluating how everyone did with a thumbs up or thumbs down indication.

**SONG SINGING/REMINISCE**

24. ____RN asks subjects to listen without singing along to a song sung *acapella* by the RN.
25. ____RN asks subjects to make a thumbs up signal if they know the song and a thumbs down if they don’t.
26. ____RN asks subjects to listen again but this time, fill in the blanks whenever the singing stops.
27. ____RN sings the song again leaving a few more words out and allows subjects to fill in the blanks. . .Repeat the cycle until all words of the song have been filled in by the subjects.
28. ____RN may put on accompaniment music or perform live on piano or ukulele of choice if can and as the subjects sing the entire song.
   (Optional: RN may ask subjects to pick up a PMI and play along on beats previously in their hands)
29. ____RN ends activity with generous praises via hand clapping and verbal cues to subjects and asks everyone to evaluate how they did as a group with a thumbs up or thumbs down.

**CALL AND RESPONE/BRAIN STIMULATION**

30. ____RN directs subjects to move into 2 rows of 4 chairs each as shown on flipchart diagram propped on easel.
31. ____RN assists subjects in setting chairs into position of 2 rows with 4 chairs each while recorded music is played on the CD.
32. ____Once chairs and subjects are in position, RN stops recorded music.
33. ____RN points to large rhythmic patterns on the flipchart and introduces “call and response” activity. (For weeks 2 and 3 RN reviews previous week’s patterns and adds more difficult ones as subjects show competence.
34. ____RN informs subjects to clap back sound patterns heard.
35. ____RN gives generous praise after the rhythms are clapped back correctly and especially in unison. Everyone also claps for themselves.
36. ____RN passes percussive instruments out and asks subjects to imitate rhythm patterns on instruments.
37. ____RN gives generous praise and everyone claps for themselves.
38. ____RN asks if any subject would now like to lead the group. (a subject may be picked from Music Preference screening time)
39. ____RN directs the new subject leader to the front of the group.
40. ____RN practices with the subject leader if needed.
41. ____Once subjects are adept; RN allows subject leader to lead the group and RN plays accompaniment music with the piano at the same time.
42. ____After completed, RN encourages generous praise and clapping from and to all subjects involved and asks for a fun evaluation of how everyone did with a thumbs up or thumbs down.

**COOL DOWN**

43. ____RN asks subjects to close their eyes and focus on music that will play in a minute and do not open them until a triangle or cymbal is heard.
44. ____RN puts on easy listening pre-recorded music on CD player.
45. ____RN dims lights.
46. ____RN observes for focused listening; and plays triangle or finger cymbals once subjects are focused.
47. ____RN releases subjects from the session.
Instrument 4.2
Decisions Making Capacity Tool

UCLA Office of the Human Research Protection Program

DECISION-MAKING CAPACITY ASSESSMENT TOOL

INSTRUCTIONS: This form may be used to assess the decision-making capacity of potential subjects who may have or may be experiencing cognitive impairments.

Who should assess capacity? In general, the consent assessor should be a member of the research team or consultant familiar with dementias and/or cognitive impairments, and qualified to assess and monitor capacity to consent on an ongoing basis.

Potential Subject Name: ___________________________  IRB Protocol #: ____________
Study Title: ________________________________________

ASSESSMENT QUESTIONS:
1. Does the individual understand he/she would be participating in research and that research is voluntary?
   □ Yes   □ No
2. Does the individual understand what will happen to him/her if he/she decides to participate?
   □ Yes   □ No
3. Does the individual know how long he/she will be in the research study?
   □ Yes   □ No
4. Can the individual explain one or two risks associated with the research study?
   □ Yes   □ No
5. Can the individual explain what he/she should do to stop being in this research study?
   □ Yes   □ No
6. Does the individual know who to contact if he/she experiences problems or has questions about the study?
   □ Yes   □ No
7. Interventional studies: Can the individual explain what alternatives there are if he/she chooses not to participate?
   □ Yes   □ No

INVESTIGATOR EVALUATION:
8. Does the individual express a choice about whether or not to participate?
   □ Yes   □ No
9. Does the individual have the decision-making capacity to give informed consent for this study?
   □ Yes   □ No

Printed Name of Investigator ___________________________  Signature of Investigator ___________________________  Date ____________

* NOTE: Potential subjects who are found to have diminished capacity must be excluded unless the UCLA IRB has approved the use of surrogate consent from legally authorized representatives for the study in question.

Version 8-22-2012
The Global Deterioration Scale for Assessment of Primary Degenerative Dementia

Code Number  

The Global Deterioration Scale (GDS), developed by Dr. Barry Reisberg, provides caregivers an overview of the stages of cognitive function for those suffering from a primary degenerative dementia such as Alzheimer's disease. It is broken down into 7 different stages. Stages 1-3 are the pre-dementia stages. Stages 4-7 are the dementia stages. Beginning in stage 5, an individual can no longer survive without assistance. Within the GDS, each stage is numbered (1-7), given a short title (i.e., Forgetfulness, Early Confusion etc. followed by a brief listing of the characteristics for that stage. Caregivers can get a rough idea of where an individual is at in the disease process by observing that individual's behavioral characteristics and comparing them to the GDS.

<table>
<thead>
<tr>
<th>Level</th>
<th>Clinical Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No cognitive decline</td>
</tr>
<tr>
<td></td>
<td>No subjective complaints of memory deficit. No memory deficit evident on clinical interview.</td>
</tr>
<tr>
<td>2</td>
<td>Very mild cognitive decline</td>
</tr>
<tr>
<td></td>
<td>(Age Associated Memory Impairment)</td>
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<tr>
<td></td>
<td>Subjective complaints of memory deficit, most frequently in following areas: (a) forgetting where one has placed familiar objects; (b) forgetting names one formerly knew well. No objective evidence of memory deficit on clinical interview. No objective deficits in employment or social situations. Appropriate concern with respect to symptomatology.</td>
</tr>
<tr>
<td>3</td>
<td>Mild cognitive decline</td>
</tr>
<tr>
<td></td>
<td>(Mild Cognitive Impairment)</td>
</tr>
<tr>
<td></td>
<td>Earliest clear-cut deficits. Manifestations in more than one of the following areas: (a) patient may have gotten lost when traveling to an unfamiliar location; (b) co-workers become aware of patient's relatively poor performance; (c) word and name finding deficit becomes evident to intimates; (d) patient may read a passage or a book and retain relatively little material; (e) patient may demonstrate decreased facility in remembering names upon introduction to new people; (f) patient may have lost or misplaced an object of value; (g) concentration deficit may be evident on clinical testing. Objective evidence of memory deficit obtained only with an extensive interview. Decreased performance in demanding employment and social settings. Denial begins to become manifest in patient. Mild to moderate anxiety accompanies symptoms.</td>
</tr>
<tr>
<td>4</td>
<td>Moderate cognitive decline</td>
</tr>
<tr>
<td></td>
<td>(Mild Dementia)</td>
</tr>
<tr>
<td></td>
<td>Clear-cut deficit on careful clinical interview. Deficit manifest in following areas: (a) decreased knowledge of current and recent events; (b) may exhibit some deficit in memory of ones personal history; (c) concentration deficit elicited on serial subtractions; (d) decreased ability to travel, handle finances, etc. Frequently no deficit in following areas: (a) orientation to time and place; (b) recognition of familiar persons and faces; (c) ability to travel to familiar locations. Inability to perform complex tasks. Denial is dominant defense mechanism. Flattening of affect and withdrawal from challenging situations frequently occur.</td>
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<tr>
<td>5</td>
<td>Patient can no longer survive without some assistance. Patient is unable during interview to recall a major relevant aspect of their current lives, e.g., an address or telephone number of many years, the names of close family members (such as grandchildren), the name of the high school or college from which they graduated. Frequently some disorientation to time (date, day of week, season, etc.) or to place. An educated person may have difficulty counting back from 40 by 4s or from 20 by 2s. Persons at this stage retain knowledge of many major facts regarding themselves and others. They invariably know their own names and generally know their spouses' and children's names. They require no assistance with toileting and eating, but may have some difficulty choosing the proper clothing to wear.</td>
</tr>
<tr>
<td>6</td>
<td>May occasionally forget the name of the spouse upon whom they are entirely dependent for survival. Will be largely unaware of all recent events and experiences in their lives. Retain some knowledge of their past lives but this is very sketchy. Generally unaware of their surroundings, the year, the season, etc. May have difficulty counting from 10, both backward and, sometimes, forward. Will require some assistance with activities of daily living, e.g., may become incontinent, will require travel assistance but occasionally will be able to travel to familiar locations. Diurnal rhythm frequently disturbed. Almost always recall their own name. Frequently continue to be able to distinguish familiar from unfamiliar persons in their environment. Personality and emotional changes occur. These are quite variable and include: (a) delusional behavior, e.g., patients may accuse their spouse of being an impostor, may talk to imaginary figures in the environment, or to their own reflection in the mirror; (b) obsessive symptoms, e.g., person may continually repeat simple cleaning activities; (c) anxiety symptoms, agitation, and even previously nonexistent violent behavior may occur; (d) cognitive abulia, i.e., loss of willpower because an individual cannot carry a thought long enough to determine a purposeful course of action.</td>
</tr>
<tr>
<td>7</td>
<td>All verbal abilities are lost over the course of this stage. Frequently there is no speech at all -only unintelligible utterances and rare emergence of seemingly forgotten words and phrases. Incontinence of urine, requires assistance toileting and feeding. Basic psychomotor skills, e.g., ability to walk, are lost with the progression of this stage. The brain appears to no longer be able to tell the body what to do. Generalized rigidity and developmental neurologic reflexes are frequently present.</td>
</tr>
</tbody>
</table>


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Instrument 4.4
Rating Anxiety in Dementia (RAID)

TO ASSESS FOR ANXIETY ON PERSONS WITH DEMENTIA

Rating Anxiety in Dementia (RAID) (Shankar et al 1999)

CODE NUMBER

Patient’s Name:  Date of Birth:  Male/Female
Rater’s Name:  Occupation:  Date:

Patient’s Status at Evaluation:
1. inpatient  2. outpatient  3. day hospital/day centre patient  4. Other (specify) ____________

Scoring System: U=unable to evaluate, 0=absent 1=mild or intermittent 2=moderate 3=severe
Rating should be based on symptoms and signs occurring during two weeks prior to the interview.
The items are rated after interviewing the patient, carer/ward staff and checking clinical notes.
No score should be given if symptoms result from physical disability or illness. Total score is the sum of
the items 1 to 18. A score of 11 or more suggests significant clinical anxiety.

<table>
<thead>
<tr>
<th>RAID Category</th>
<th>#</th>
<th>Anxiety Condition</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worry</td>
<td>1.</td>
<td>Worry about Physical Health.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.</td>
<td>Worry about cognitive performance (falling memory, getting lost when goes out, not able to following conversation.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.</td>
<td>Worry over finances, family problems, physical health of relatives.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.</td>
<td>Worry associated with false belief and/or perception.</td>
<td></td>
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<tr>
<td></td>
<td>5.</td>
<td>Worry over trifles (repeatedly calling for attention over trivial matters)</td>
<td></td>
</tr>
<tr>
<td>Apprehension and Vigilance</td>
<td>6.</td>
<td>Frightened and Anxious (keyed up and on the edge)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.</td>
<td>Sensitivity to noise (exaggerated startle response)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.</td>
<td>Sleep disturbance (trouble falling or staying asleep.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.</td>
<td>Irritability (more easily annoyed than usual, short tempered and angry outbursts)</td>
<td></td>
</tr>
<tr>
<td>Motor Tension</td>
<td>10.</td>
<td>Trembling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11.</td>
<td>Motor Tensions (complain of headache, other body aches and pains.)</td>
<td></td>
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<tr>
<td></td>
<td>12.</td>
<td>Restlessness (Fidgeting, cannot sit still, pacing, wringing hands, picking clothes)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13.</td>
<td>Fatigue ability, tiredness</td>
<td></td>
</tr>
<tr>
<td>Autonomic Hypersensitivity</td>
<td>14.</td>
<td>Palpitations (complaining of heart racing or thumping)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15.</td>
<td>Dry mouth (not due to medications), Sinking feeling in stomach.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16.</td>
<td>Hyperventilating, shortness of breath (even when not exercising)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17.</td>
<td>Dizziness or light-headedness (complains as if going to faint)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18.</td>
<td>Sweating, flushes or chills, tingling or numbness of fingers and toes.</td>
<td></td>
</tr>
</tbody>
</table>

Phobias: (fears which are excessive, that do not make sense and tend to avoid- like afraid of crowds, going out alone, being in a small room, or being frightened of some kind of animal or heights, etc.) **Describe**

Panic Attacks: (feelings of anxiety or dread that are so strong that think they are going to die or have a heart attack and they simply have to do something to stop them, like immediately leaving the place, phoning relatives etc.) **Describe**

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Instrument 4.5 – GDS Simplified

GLOBAL DETERIORATION SCALE
Questions and answers in RED to help discriminate between the stages

STAGE I: No Cognitive Decline

• Are you experiencing any problems with bathing, dressing, eating, toileting or getting around? No, then ineligible.

STAGE II: Very Mild Cognitive Decline

• Do you experience problems with remembering names or where you placed objects? Yes.
• Do you have trouble finding words? Yes.

STAGE III: Mild Cognitive Decline

• Do you often get lost in new locations? Yes.
• Do you experience problems remembering what you read? Yes.

STAGE IV: Moderate Cognitive Decline

• Are you able to do math problems? No. Can you subtract backwards from 10 by 2s?
• Are you able to plan activities for others? No.
• Can you tell me when we celebrate new years? Unable to answer.

STAGE V: Moderately Severe Cognitive Decline

• Are you able to select what you wear? No.
• Do you need reminders to bathe? Yes.
• What high school did you attend? Unable to remember.
• What is your name, the name of your spouse or partner or closest family or responsible person for you? They frequently know the names of those closest to them.
• Do you need help in toileting? If yes, ineligible.
Instrument 4.6

DEMOGRAPHIC QUESTIONNAIRE

1. Name: _______________________
2. Age: _______
3. Gender: _______________________
4. Ethnicity: _____________________
5. Religion: _______________________
6. Education: _______________________
7. Language: _____________________

8. WHISPER TEST - Hearing Score = _____

CARDIOPULMONARY DISEASE LEVEL


CANCERS

12. Type ________________ 13. Stage ______

MEDICATIONS

14. Psychotropic Medications Stability < 3 months   Y   N
23. Anti-anxiety medications   Y   N

OTHER

16. GDS Dementia Score (circle one)   3   4   5
17. RAID Anxiety Score ____________
18. Dx of Dementia > or = to 3 months (circle one)   Y   N
19. Able to follow simple directions (circle one)   Y   N
20. Engage in simple activity (circle one)   Y   N
TO ASSESS MUSIC PREFERENCE FOR SUBJECTS WITH DEMENTIA

ASSESSMENT OF PERSONAL MUSIC PREFERENCE (FAMILY VERSION)
©Linda A. Gerdner, Jane Hartsock, & Kathleen C. Buckwalter (2000) (reproduced with permission)

Music is often a very important part of people's lives. Please complete the questionnaire based on your personal music preference.

Before your illness, how important was music in your life?

1. Very Important
2. Moderately Important
3. Slightly Important
4. Not Important

Specify your favorite instrument (examples: piano, guitar).

Do/did you enjoy singing?
If yes, please specify (examples: around-the-house, church choir).

Does/did you enjoy dancing?
If yes, please specify (examples: attended dance lessons, participated in dance contests)

The following is a list of different types of music. Please indicate three (3) of your most favorite types with 1 being the most favorite, 2 the next, and 3 the third favorite.

1. Country and Western
2. Classical
3. Spiritual/Religious
4. Big Band/Swing
5. Folk
6. Blues
7. Jazz
8. Rock and Roll
9. Easy Listening
10. Cultural or Ethnic Specific (examples: Czech polkas, Ravi Shankar Indian sitar)
11. Other: ____________________________
Please put a check (✓) beside the most correct choice to the following questions.

What musical form do you like to listen to?

_____ 1. Vocal
_____ 2. Instrumental
_____ 3. Both

Please identify specific songs/selections which make you feel happy.

Please identify specific artist(s) / performer(s) that you enjoyed listening to the most.

Please identify specific albums, audio-cassette tapes, or compact discs contained in your personal music collection.
Instrument 5.1

RN FEASIBILITY/ACCEPTABILITY QUESTIONNAIRE

1. Rate the intervention training (circle one):
   Difficult    Somewhat Difficult    Just Right    Easy    Too Easy

2. Rate your intervention delivery (circle one):
   Excellent    Above Average    Average    Fair    Poor

3. Rate your perception of the subjects before intervention delivery (circle one):
   Extremely Anxious    Somewhat Anxious    Neither Anxious or Relaxed    Relaxed

4. Rate your perception of the subjects after intervention delivery (circle one):
   Extremely Anxious    Somewhat Anxious    Neither Anxious or Relaxed    Relaxed

5. How many hours did you spend practicing the intervention delivery before the study (circle one)?
   3 to 4 hours/day    1 to 2 hours/day    30 to 45 minutes/day    < 30 minutes/day    None

6. How many days a week did you spend practicing the intervention delivery before the study (circle one)?
   Daily    4 to 6xs/wk    3xs/wk    2xs/wk    1xs/wk    None

7. Which intervention/s were the easiest to deliver?
   Intro    Movement    Singing    Call and Response    Cool Down    None

8. Which intervention/s were the most difficult to deliver?
   Intro    Movement    Singing    Call and Response    Cool Down    None

9. What would make the intervention easier to learn?
   Formal Music Lessons    A Degree in Music    Reading a How To Book    More Practice

10. Would you do this again?
    Yes    No

11. Why or why not to question 10?

12. In your opinion, how is dementia care made safer with an RN delivering the intervention after undertaking proper intervention training as compared to a Music Therapist or anyone engaged in music interventions under your supervision?
1. **What was the participant’s behavior like after music intervention sessions (circle one)?**
   - Disruptive/Frustrated
   - Neutral
   - Relaxes/Content

2. **How were the music sessions helpful to the participant and to you (circle one)?**
   - Very Helpful
   - Helpful
   - No difference before or after

3. **Do you feel safer that an RN with music training was delivering the music interventions over someone else without a science intensive healthcare background to the participant (circle one)?**
   - Extremely safe
   - Safe
   - Somewhat Safe
   - Not sure

4. **Can you describe why you would feel safer with an RN having music training and providing music interventions?**

5. **How aware are you of the current differences in training and practice that a Bachelors prepared RN must have versus a certified Music Therapist regarding healthcare (circle one)?**
   - Very knowledgeable
   - Somewhat knowledgeable
   - No knowledge

6. **Are there any further comments you’d like to add regarding an RN providing delivery of music interventions in dementia care?**
June 18, 2015

Ms. Avis Ing-Randolph
ing.randolph@aol.com

Re: Doctoral Thesis Research

Dear Ms. Ing-Randolph:

You recently contacted Sunrise Senior Living Management, Inc. (“Sunrise”) to discuss the research for your doctoral dissertation to earn your PhD in Nursing from the Regents of The University of California, on behalf of its Los Angeles campus (“UCLA”). You have told us that your research study will focus on the effect of music on individuals diagnosed with mild to moderate dementia, that all required departments of UCLA, including their Office of the Human Research Protection Program, have approved your research study protocol. The dissertation research study is chaired by Dr. Bumice Lee, PhD, RN, Associate Professor,, UCLA School of Nursing Faculty.

You would like to offer Sunrise residents the opportunity to participate voluntarily in your doctoral research study. Sunrise is amenable to inviting you to present at a “family night” at two of our communities, Sunrise of Beverly Hills and Sunrise of Playa Vista, and if there is interest from the residents of these communities and their legal decision makers, to permitting you to conduct your research study in these two. Such permission is subject to the conditions set forth in Exhibit 1 to this letter.

Please indicate your acceptance in the space provided below.

Very Truly Yours,

Rita Altman, RN
Senior Vice President
Sunrise Senior Living LLC
Corporate Care and Programming

Andrew Sheppard
Director of Operations
Sunrise Senior Living Management, Inc.

ACCEPTED AND AGREED this 26th day of June, 2015.

Karla Zepeda
Assistant Director, ISR
The Regents of The University of California, on behalf of its Los Angeles campus

READ AND ACKNOWLEDGED
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DOI: 10.1177/1533317510385807


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