Spring 2019

Observation and Self-Report of Fun and Social Engagement of Nursing Home Residents During Bingocize®

Lauren Rene Stevens

Follow this and additional works at: https://digitalcommons.wku.edu/theses
Part of the Exercise Science Commons, and the Speech Pathology and Audiology Commons

This Thesis is brought to you for free and open access by TopSCHOLAR®. It has been accepted for inclusion in Masters Theses & Specialist Projects by an authorized administrator of TopSCHOLAR®. For more information, please contact topscholar@wku.edu.
OBSERVATION AND SELF-REPORT OF FUN AND SOCIAL ENGAGEMENT OF NURSING HOME RESIDENTS DURING BINGOCIZE®

A Thesis
Presented to
The Faculty of the Department of Communication Sciences and Disorders
Western Kentucky University
Bowling Green, KY

In Partial Fulfillment
Of the Requirements for the Degree
Master of Science

By
Lauren Rene Stevens
May 2019
I dedicate this thesis to my family. Mom and Dad, you will never know how I value your love and support. In memory of my sweet Papaw Derrell. I can’t help but think of how much you would have loved Bingocize®.
ACKNOWLEDGEMENTS

“Alone we can do so little; together we can do so much.” – Hellen Keller

Graduate school has been a journey. It has been a journey that has required much sacrifice, diligence, and perseverance. Writing this thesis has been a large part of my graduate-level experience, and I most certainly have not done it alone.

First and foremost, I thank Dr. Neils-Strunjas, my thesis advisor, for her guidance throughout the entire process. Your guidance and support is sincerely appreciated. Thank you for always believing in me and encouraging me. As we have discussed, we made a balanced research team. It was a pleasure learning from you. I’ll always remember the experiences and memories we made during the past two years.

Secondly, I thank the rest of my committee for their steadfast support. Dr. Crandall, thank you for being a voice of reason and always reminding me that I can finish the race. I am grateful for your patience and kindness throughout the thesis process. I am so very thankful that Bingocize® was an integral part of my graduate experience. Thank you for allowing me to be a part of such an amazing project. Dr. Smith, thank you for your constant prayers, encouragement, and knowledge. Your door was always open. Your arms were always open. Thank you for helping me keep my perspective throughout the process. We serve an awesome God. Dr. Shackelford, thank you for your expertise and encouragement in the editing process. Your knowledge and guidance is so very appreciated. To my committee, thank you.

I also could not have completed this study without the wonderful students who volunteered to be research assistants. Baylee, Alexa, Chandler, Sydney, and Anna were
life-savers, and I appreciate their willingness to administer the FUSE. In addition, thank you to Mrs. Smetana, JoAnna, Nolly, and Anne for their dedication and willingness to help with data collection. Dr. Ding, thank you for your guidance and expertise regarding the statistical analyses.

Undoubtedly, I could not have completed this thesis without the incredible support system I had. To my fellow Bingocize® GAs, thank you for your encouragement and support. We were all in this together. To my dear best friends Tanya, Maddie, Ashley S., Ashley V., Anne, and Danielle, thank you for always lifting me up when I needed it most.

I also want to thank each and every participant that was involved in my research study. This study permitted me the opportunity to think about and care for people I otherwise would not have been able to. Although I did not meet each and every one of you, you are special to me. I did this study for you. As I was in the process of researching and writing, I prayed for you. Thank you for allowing me to discover your thoughts and feelings so that the Bingocize® program can serve each and every one of you in the best way possible. Although my time with Bingocize® is coming to an end, I pray that each of you, and many more, continue to be abundantly blessed through this program.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Literature Review</td>
<td>5</td>
</tr>
<tr>
<td>Method</td>
<td>25</td>
</tr>
<tr>
<td>Results</td>
<td>31</td>
</tr>
<tr>
<td>Discussion</td>
<td>37</td>
</tr>
<tr>
<td>Conclusion</td>
<td>41</td>
</tr>
<tr>
<td>References</td>
<td>43</td>
</tr>
<tr>
<td>Appendix A</td>
<td>56</td>
</tr>
<tr>
<td>Appendix B</td>
<td>57</td>
</tr>
<tr>
<td>Appendix C</td>
<td>59</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

Figure 1. Important factors of quality of life to be considered in individuals with late-life disability…………………………………………………………10

Figure 2. Rowe and Kahn’s (1997) model of successful aging……………………11

Figure 3. Sample Bingocize® session template designed to aid in improving physical fitness in older adults in nursing homes………………22

Figure 4. FUSE data collection sessions identified by presence or absence of university students…………………………………………………33
LIST OF TABLES

Table 1. Descriptive Statistics for Sample........................................32
Table 2. Average FUSE Scores Across Sessions With and Without Students.....35
Table 3. Paired Differences of FUSE Scores Across Sessions With and Without Students.................................................................35
Individuals in certified nursing facilities (CNF) often experience social isolation and have limited opportunities to exercise. Bingocize®, an evidence-based health-promotion program, is a combination of exercise and Bingo and provides opportunities for CNF resident interaction. Limited tools are available to quantify social engagement displayed by nursing home residents. Research suggests that intergenerational programming can positively affect social engagement. The present pilot study focused on the implementation of the Fun and Social Engagement (FUSE) evaluation to measure social engagement displayed by nursing home residents during Bingocize® sessions. The FUSE combined observation and self-report measures to yield a total social engagement score. Social engagement data were collected during Bingocize® sessions with university students interacting with residents and without student presence. Participants ($M$ age = 82) included 35 residents from certified nursing facilities in Kentucky that receive funding from the Civil Money Penalty grant by Centers for Medicare and Medicaid Services. The purpose of this study was to determine if participants display increased positive social engagement during Bingocize® sessions when students are present versus when they are not, as well as if there is a difference between the participants’ self-report measure of engagement versus the observational report. Data were collected across four Bingocize® sessions, two with intergenerational programming and two without. Paired t-
tests were conducted to determine overall participant engagement scores with and without student presence. Because of absenteeism, only two of the comparisons had a sufficient number of participants to analyze the effect of student presence. Comparing scores of the same residents, FUSE scores were higher in sessions with students present versus when students were not (p < .05). A two-sample t-test revealed that residents who reported happiness had higher observational scores than those who reported they were not happy. The results of this pilot study are tentative due to limited number of participants at some of the sessions. Future studies are needed to determine reliability of the FUSE. Nevertheless, this study suggests that the FUSE is a feasible tool for measuring fun and social engagement during Bingocize® and that university students have a positive effect on resident social engagement.
Introduction

For the first time in the history of the United States, it is estimated that the number of older adults aged 65 years and older will outnumber children by 2035. As the older adult population increases, it is important to consider how patient-centered care and best practice will be utilized to care for this special population. It is estimated that 1.4 million Americans reside in nursing homes (Centers for Medicare and Medicaid Services, 2015). Many nursing homes find it difficult to sufficiently care for a large number of residents, and it is probable that this dilemma will only augment as the number of residents also rises.

In addition to providing quality care and best practice for this population, it would behoove health-care professionals to consider the resident perspective (Mohler, Renom, Renom, & Meyer, 2015). Many individuals are placed in a nursing home due to the fact that they are no longer able to live independently, most often due to some level of cognitive decline. The Alzheimer’s Association indicated that 50% of individuals residing in assisted living facilities or nursing homes present with cognitive impairment, such as Alzheimer’s disease or dementia or another variation of cognitive decline. In addition to the deficits marked enough to contribute to institutionalization, the individual’s life is dramatically changed as their environment is simultaneously altered. As individuals transition into nursing facilities, their social circle suddenly becomes significantly smaller, entirely unfamiliar, or inaccessible. However, given proper environmental supports, Ericsson, Kjellström, & Hellström (2013) noted that individuals with dementia can maintain social relationships; furthermore, it is a crucial component of their overall well-being.
Social engagement is a concept of interest for many clinicians in the field of speech-language pathology. Often tied into pragmatics or the social use of language, social engagement is crucial to making and maintaining a connection with others and the surrounding environment. Research, evaluation, and intervention techniques have primarily focused on the pediatric population; however, there is rising evidence suggesting that social connectedness plays a vital role for the older adult population, especially in nursing homes. With 39% of patients with dementia residing in nursing facilities, it is important to consider the role of social engagement, which has been considered a critical component of quality of life (Mor et al., 1995). Cohen-Mansfield (2009) stated that it is alarming how a limited a number of studies regarding social engagement have been published, despite its importance and relevance to the older adult population. Kang (2012) noted the importance of understanding the factors of social engagement in order to develop programs and interventions that can meet the needs of individuals residing in nursing homes.

Furthermore, the concept of engagement is an important phenomenon in rehabilitation. Skidmore (2016) noted that cognitive decline often inhibits one’s ability to be engaged, depending on the severity of disability. Thus, interventions focusing on individualized patient needs are essential to enhance engagement in the older adult population. In fact, in her research on interventions and engagement, participants were required to obtain a specific score on an engagement scale before they could be admitted to the intervention program (Skidmore, 2016).

In addition to social engagement, individuals in nursing homes are given insufficient opportunities for physical activity. The literature suggests that physical
activity can aid in preventing cognitive decline. There are several risk factors for
cognitive decline and dementia, including decreased activity, which is a modifiable factor
(Guure, Ibrahim, Adam, & Said, 2017). It has been shown that individuals who have
opportunities to be more active perform better on both cognitive and fitness tests
(Telenius, Engedal, & Bergland, 2013). In addition to increasing social engagement,
nursing homes need to focus on ways to increase physical activity in residents. In fact,
the literature suggests that individuals are more likely to engage in physical activity when
social support is available (Lindsay Smith, Banting, Eime, O’Sullivan, & Van Uffelen,
2017). Social support can come in various forms, and there is increasing evidence
suggesting the powerful impact of intergenerational programming, which includes
members from different generations interacting with one another. Research has shown
that when patients with dementia interact with children, their engagement in activities
increases (Camp, 2010). However, there have been few studies conducted on
intergenerational programming for persons with dementia and university students. It is
possible that university students would also increase social engagement displayed by
nursing home residents during activities.

Just as it is important to identify social engagement and physical activity in older
adults, it is necessary to find ways to quantify social engagement in this population.
While the literature suggests social engagement is an essential component of quality of
life, there is currently no assessment that specifically measures social engagement during
an exercise and health program. In the literature, there are several quality of life and
engagement measurements; however, none meet the need of quantifying social
engagement during an exercise program.
While it is known that social engagement has beneficial effects, it cannot be assumed that all social engagement is positive. In fact, some social interactions are detrimental to a person and stressful in nature; thus, it is necessary to develop interventions that appropriately measure social engagement in the context at hand (Carstensen & Hartel, 2006). It is the goal of Bingocize®, an intergenerational physical fitness and health promotion program, to foster positive social engagement in nursing home residents through interaction with university students.

The Fun and Social Engagement evaluation (FUSE) was developed as a means of quantifying social engagement displayed by nursing home residents during a Bingocize® session with and without student presence. This research study is considered a pilot study, as reliability and validity of the FUSE evaluation has not yet been fully established. However, the results of this study are foundational and provide a direction for future research. The purpose of this research study was to answer the following questions: 1. During Bingocize® activity, do certified nursing facility (CNF) residents display increased positive social engagement when university students are present as compared to when university students are not present? 2. During Bingocize® activity, is there a difference between the social engagement behaviors observed by university students and the residents’ self-report of happiness? We hypothesize that CNF residents will display increased positive social engagement during Bingocize® sessions in which students are present, and that residents who report they are happy will also have higher observation scores. Thus, we hypothesize that residents who report sadness or another response will have lower observation scores.
Literature Review

Aging Defined

According to the National Institutes of Health (2016), 617 million people worldwide are over the age of 65. According to the Center for Disease Control and Prevention (CDC), 1.4 million Americans reside in nursing homes (National Center for Health Statistics (U.S.), 2016). As the older adult population rapidly rises, it is important to understand how to best serve this population through evidence-based practice. There has been controversy over consistent definitions regarding when an individual has reached older age. While it is necessary to consider more than an individual’s age alone to classify him/her as an older adult (“New definition for old age,” n.d.), for the purposes of this study, an older adult is defined as one who has reached the average age of retirement in the United States of America, which is 65 years of age (“Benefits Planner,” n.d.). It is also critical to consider the changes that older adults may experience as they continue to age.

Cognitive Impairment Defined

According to the CDC (2009), cognitive impairment (CI) is defined as “confusion or memory loss that is happening more often or is getting worse during the past 12 months.” The CDC further described that individuals with cognitive decline often lose the ability to be independent (pg.1). In a study conducted to analyze negative symptoms experienced by nursing home residents, 56% of residents were dependent on others for activities of daily living (ADL), 67% presented with cognitive impairment, 48% experienced pain, and 92% presented with neuropsychiatric symptoms (Björk et al., 2016). In addition, Creighton, Davison, and Kissane (2018) found that high levels of anxiety are correlated with low cognition. It is imperative that the current and future
healthcare system are aware of cognitive challenges and changes that the older adult population may face in order to provide evidence-based treatment and practices that improve overall quality of life for the affected individual.

**Mild Cognitive Impairment**

Age is a major risk factor for mild cognitive impairment (MCI). Between 10-20% of older adults ages 65 and older have MCI (Langa & Levine, 2014). The distinguishing factor between MCI and more severe types of cognitive decline is the fact that individuals with MCI are still able to independently function throughout their daily lives with some assistance; thus, the individual does not have a dementia diagnosis. However, MCI to dementia conversion rates are 5-10% (Bayles & Tomoeda, 2014). Vascular disease, depression, Parkinson’s disease, and Lewy body disease are all causes of MCI, with Alzheimer’s disease being the most common (Bayles & Tomoeda, 2014). Individuals with MCI also have an impairment in one or more of the five cognitive domains: memory, executive function, attention, language, and visuospatial skills (Bayles & Tomoeda, 2014).

**Dementia**

Dementia is a common cognitive deficit exhibited in the older adult population, affecting approximately 500,000 people worldwide (“Dementia,” n.d.). According to the American Speech Language and Hearing Association (2018), dementia is defined as the following: “A syndrome resulting from acquired brain disease and characterized by progressive deterioration in memory and other cognitive domains (e.g., language, judgment, abstract thinking, and executive functioning).” Hugo and Ganguli (2014) identified that a dementia diagnosis is given when the individual can no longer participate
in routine social or occupational activities due to the severity of cognitive decline. Since 1982, there has been over $410 million in research devoted to Alzheimer’s prevention, as Alzheimer’s is the most common cause of dementia (“What Is Alzheimer’s?,” n.d.). In fact, Norton, Matthews, Barnes, Yaffe, & Brayne (2014) noted that the incidence of this rapidly growing disease could be decreased by addressing vascular risk factors through increased physical activity. In recent research, there is a strong evidence base to suggest that physical activity has many positive effects in the older adult population, including both individuals who are cognitively impaired and cognitively in-tact. In addition to increased physical activity, the literature suggests that socialization plays a key role in Alzheimer’s prevention. Brain autopsies have revealed that preserved cognitive function is correlated with social networks (Bennett, Schneider, Tang, Arnold, & Wilson, 2006). Social networks provide more opportunities for social engagement, which has been found to decrease stress and improve brain function (Pillai & Verghese, 2009). Physical activity and socialization, components of successful aging, have a plethora of benefits in the older adult population.

**Successful Aging and Quality of Life**

In a 1997 review, a subsequent review from their 1987 publication, John W. Rowe and Robert L. Kahn, leading researchers in the area of successful aging, described in detail what it means to age successfully, including a combination of both physiological and psychosocial components. Their model has influenced and been used by many researchers seeking to understand and improve the aging process. Although several recent reviews (Crowther, Parker, Achenbaum, Larimore, & Koenig, 2018), (Stowe & Cooney, 2015) have been conducted in order to expand upon Rowe and Kahn’s model, this model
provides a strong basis for the purpose of this study. Rowe and Kahn’s widely-known definition of the term successful aging includes the following three components: 1) the absence of chronic disease 2) absence of physical disability or mental health issues and 3) exhibiting a high level of social engagement (1997). It is clear that social functioning and engagement is a component not to be ignored and should be considered when identifying how well an individual ages (Minkler & Fadem, 2002) (Strawbridge, Wallhagen, & Cohen, 2002). Physical activity is of the same merit as social engagement, as researchers have noted, “A clear understanding of the associations between behavioral determinants, such as physical activity, and successful aging is essential in the preparation of effective measures of health promotion and disease/disability prevention in global planning for the well-being of older adults” (Gopinath, Kifley, Flood, & Mitchell, 2018). In addition, Mendes de Leon (2005) noted the importance of the relationship between social engagement and successful aging as he highlighted the coalescence between social engagement and successful aging and its value in creating interventions for older adults.

Successful aging is a continuum. The purpose of health promotion programs is to move an individual toward successful aging, and Rowe and Kahn (1997) provide a model to be considered.

Quality of Life

The varying components of successful aging, such as social engagement and physical health, are directly tied to quality of life. Quality of life encompasses several factors and has received considerable attention in the research realm. There is currently no concrete definition from which to base research (Ruževi, 2007). Due to its broad nature and various forms, the term quality of life tends to be subjective and to require
contextual factors specific to what is measured. The Center for Disease Control identified health-related quality of life (HRQOL) as having adequate mental and physical health. (Moriarty, Zack, & Kobau, 2003). One of the most foundational definitions of HRQOL identified in by the World Health Organization (WHO) recognized that health is not “merely the absence of disease or infirmity” and includes a “state of complete physical, mental, and social well-being” (Moriarty et al., 2003). Undoubtedly, past and current literature suggests that there is coalescence of social engagement/psychosocial factors and physical activity in successful aging as it relates to quality of life; however, few studies quantify the interrelatedness of social engagement/psychosocial factors and physical activity in the nursing home population. In fact, two researchers noted the need for further understanding and research to be conducted on the multi-component approach that encompasses successful aging, and thereby quality of life (Baltes & Baltes, 1993). In one of the few studies conducted to measure successful aging in nursing homes, only 17.6% of a rural Chinese older adult population was considered to be aging successfully. In this study the authors included direct components of QOL, such as “few chronic diseases, good cognitive and physical functioning, good mental health, and active social engagement” (Wu et al., 2017). Another study conducted to determine quality of life in nursing home residents found that older adults experienced a higher QOL living in the home environment as compared to living in a nursing home, which further identifies the need to provide interventions that will improve QOL. In fact, the authors found “significant differences in QOL, depression, and social connectedness” (Nikmat, Al-Mashoer, & Hashim, 2015). Jennifer King and colleagues also conducted a quality of life study in the older adult population. Although the participants involved in this study were
not residents of a nursing home, the QOL model the authors propose are consistent with previous models discussed, and Figure 1 and Figure 2 below provide insight to the “overlapping” of quality of life components. Understanding the importance of successful aging, it is critical that socially engaging physical activity interventions are implemented in nursing homes in order to sustain and improve quality of life for all residents. Social engagement and physical activity in the older adult and nursing home resident will be discussed in the following sections.

Figure 1: Important factors of quality of life to be considered in individuals with late-life disability. Adapted from King et. al., (2012).
Figure 2: Rowe and Kahn’s (1997) model of successful aging. Adapted from Akobeng, A. K. (2016).

Social Engagement Defined

In the current literature, there is a myriad of ways in which to define the term social engagement. Mendes de Leon (2005) describes, “There is little consistency in the usage and precise meanings of the concepts that are used for different types of social engagement, such as social networks, social support, social activity, social engagement, social integration, social participation…” More specifically, there is a lack of consistent definitions used for this term within the geriatric population. The deficit of consistency of this term is a result of many factors, including the variability of persons considered to be a member of the geriatric population, as previously noted by Rowe and Kahn (1986). When measuring social engagement, a researcher must first consider the population of interest. In this section, research studies analyzing social engagement in older adults will be reviewed.

In congruence with a study conducted by Humphrey, Montemuro, Coker, Kilgour-Walsh, Moros, Murray, & Stanners (2017) to measure engagement in persons
with dementia (PwD), this research study was also derived from the model proposed by Cohen-Mansfield, Dakheel-Ali, & Marx (2009), known as the Comprehensive Process Model of Engagement, which identifies three primary components. This model asserts that engagement is affected by environmental, person, and stimulus attributes (Cohen-Mansfield, Dakheel-Ali, & Marx, 2009). After reviewing several theories of engagement in PwD, the framework proposed by Cohen-Mansfield et al. (2009) proves to be the most consistent definition from which to provide a reliable foundation for research. In congruence with Cohen-Mansfield et al. (2009) and Kang (2012), for the purpose of this study, engagement will be defined as “the act of being occupied or involved with an external stimulus.” The study conducted by Humphrey et al. (2017) described a similar framework “that an individual with dementia could be successfully and positively engaged if three components (or pillars) are established and maintained: (1) a dementia-friendly environment; (2) supportive communication strategies; and (3) a suitable, well-planned activity.” Kang (2012) noted, “Low levels of social engagement including inactivity may contribute to producing a variety of negative health outcomes, such as a loss of physical function, social isolation, and worsening behavioral symptoms in individuals with dementia.” Although the symptoms of cognitive decline and dementia can certainly hinder one’s ability to maintain, exhibit, or experience a desirable level of social engagement, research has shown that some individuals with dementia maintain the ability to interact socially. In a case study conducted by Kolanowski, Litaker, and Catalano (2002) analyzing an older adult with dementia’s self-reported affect and mood, the individual exhibited consistent results regarding mood and his “observed ratings of affect mirrored self-reported mood states.”
Furthermore, Tak, Kedia, Tongumpum, and Hong (2016) identified, “Engagement in social and leisure activities is an indicator of quality of life and well-being in nursing homes.” It is equally important for an individual with or without cognitive decline to be socially engaged in his or her surrounding environment. Tak et al. (2016) also highlighted the importance of nursing home staff tailoring activities according to the residents’ interests, needs, and ability; however, nursing home residents are often limited in their choice of activities to engage in. Unfortunately, nursing home residents can spend up to 17 hours in bed a day (Bates-Jensen et al., 2004). Clearly, there is an identifiable and urgent need for an increased amount of activities offered and ways for nursing home residents to be socially engaged.

Positive Social Versus Negative Social Engagement

In a study designed to measure the effects of Montessori-based teaching methods for PwD, which is an approach traditionally used in children (Lillard et al., 2017), Camp (2010) identified four types of engagement. The first type, constructive engagement (CE), was noted to involve both verbal and physical direct interaction between the target at hand and the individual with dementia. If a PwD observed the targeted activity but was not actively engaged in the activity, this is defined as the second type of engagement, otherwise known as passive engagement (PE). Camp (2010) stated, “Both CE and PE are considered positive forms of engagement, and persons with dementia sometimes need to simply watch an activity before they gain the confidence to begin to actively take part at a later time.” In his study, Camp (2010) further defined the third and fourth types of engagement as self-engagement and non-engagement. Camp (2010) informed that self-engagement (SE) was defined as engagement with oneself rather than the targeted
activity, such as picking at one’s clothes, talking to one’s self, etc. Non-engagement (NE) was defined as sleeping or staring into space for 10 seconds or longer.” While CE and PE are known to be positive forms of engagement, SE and PE have been found to be the antithesis of such and represent disengagement.

Camp’s (2010) engagement model has been used throughout the literature by researchers seeking to measure engagement in the older adult population. In a study conducted to determine if nursing home residents with mild dementia could lead a small group activity consisting of nursing home residents with more severe dementia, otherwise known as Resident Assisted Programming (RAP), Skrajner et al. (2014) utilized the four types of engagement to measure residents’ participation in activities. To do so, in fact, Camp’s (2010) Menorah Park Engagement Scale (MPES), was utilized to reliably measure the resident’s type of engagement during interactions. The MPES was derived from his Montessori Program for Dementia (MPD), after he realized that “the most significant construct affected by MPD was that of engagement – connectedness with the social and physical environment” and that “engagement had different forms or aspects” (Camp 2010). Camp (2010) further describes that “the purpose of the MPES is to record the highest level of engagement that the person with dementia is capable of displaying.”

Using the MPES and analyzing CE, PE, SE, and NE specifically, Skrajner et al. (2014) found that most residents were positively engaged and exhibited constructive engagement for half of the activity (e.g. exercise, bingo, discussion groups) time. Materne, Luszcz, & Goodwin-Smith (2014) conducted a study to analyze engagement levels experienced by nursing home residents when participating in a multicomponent sensory activity program. The researchers found that of the 14 participants in the convenience sample, a significant
difference was found between participants who were positively/constructively engaged as compared to those who were not (Materne et al., 2014).

In a study conducted to determine level of engagement during a memory-bingo intervention for individuals affected by dementia (N=12), significance was found for total engagement (Clare & Woods, 2001). Total engagement was found by adding passive and constructive engagement together. In addition, the researchers noted residents displayed CE or PE throughout the entire memory bingo activity (Clare & Woods, 2001). As compared to regular activities provided by nursing home staff, memory bingo was found to have increased engagement in the residents who participated. Social engagement is a term with several components and has a wide evidence base within the literature.

**Social Engagement and Physical Activity in Older Adults**

It is important to identify the context in which social engagement was measured. In this section, measurement of social engagement and physical activity in the older adult population will be reviewed.

There is evidence that social support and engagement play a role in the physical fitness of older adults. Dong, Chen, & Simon (2014) identified the importance of categorizing activities in which social engagement was measured; thus, according to Dong et al., different types of activities lead to varying levels of social engagement. Such activities included visiting loved ones, gardening, and joining social clubs. The terms “social interaction” and “quality of life” are often simultaneously mentioned with “physical activity,” thus suggesting that these components are interconnected. It is well known that older adults often experience several life changing events as they age (e.g. death of loved ones, chronic illnesses, transitioning to nursing home, etc.), and Lindsay
Smith, Banting, Eime, O’Sullivan, & Van Uffelen (2017) noted that such life changes are often correlated with a decreased amount of physical activity. However, older adults are more likely to exercise and be engaged when social support is available even when life events could disrupt exercise routines (Lindsay Smith et al., 2017).

There is also considerable research that analyzes the relationship between physical fitness and the older adult population with dementia, and social support and engagement certainly plays a role. Lam et al. (2018) conducted a systematic review to analyze “strength, flexibility, gait, balance, mobility, walking endurance, dual-task ability, activities of daily living, quality of life, and falls” in older adults with cognitive impairment and dementia. They concluded that most older adults with cognitive impairment are able to tolerate approximately an hour of exercise per day, 2-3 days per week.

In a study consisting of data collected from the Health and Retirement Study, participants aged 65 years and older and part of a Medicare Part A or B plan, 14% of the participant population was socially isolated and were at greater risk for mental illness, medical illness, and low functioning in areas of activities of daily living (ADL), thus illustrating that this population is in need of more regular physical activity interventions that includes opportunity for social interaction and engagement (Flowers et al., 2017). In fact, it has been documented that higher levels of physical activity are achieved by nursing home residents when social support is available as compared to when there is a lack of such (Giles-Corti & Donovan, 2003). In a physical activity program designed for older adults in nursing homes with a game approach, nursing home resident’s level of physical activity and social connectedness increased (Jansen, Claßen, Hauer,
Diegelmann, & Wahl, 2014). In a follow-up study, Rebecca A. Lorenz, PhD, and colleagues conducted a 7-week study measuring high intensity resistance training, walking, and social activities in the long-term care population. Physical fitness was measured in the high intensity resistance training and walking with and without social interaction for residents who presented with and without cognitive impairment. The researchers found a significant improvement in physical functioning of the residents who were able to participate in both social and physical interventions, thus suggesting the possible reliance and importance on one another (Lorenz et al., 2012).

Research has also been conducted in regards to the effect that physical activity has on cognitive impairment itself; research, although limited, is promising. There is evidence to suggest that cardiovascular exercise can improve both procedural and visual memory depending on the type of stimulus presented and time of exercise performed (Roig et al., 2016). In a recent study, a physical intervention program with a focus on ADLs was implemented for nursing home residents with mild dementia, and significant differences between groups in the areas of motor control and cognition were found (Lee & Kim, 2018). Tak, Kedia, Tongumpun, & Hong (2015) noted how “nursing homes are required to provide a sufficient and ongoing activity program that accommodates individual residents' interests and enhances their physical, mental, and psychosocial well-being.”

**Defining and Measuring Fun**

It has been shown that social engagement is a critical component of healthy aging and quality of life; therefore, it would seem logical to measure social engagement in nursing home interventions. However, even though an individual may be socially engaged, it is not safe to assume that he or she had “fun”. Positive social engagement
does not necessarily equate fun or pleasure. Currently, there is a lack of literature to systematically define fun. Consequently, there are also a lack of measurements to quantify how much fun a nursing home resident has during a physical fitness intervention. Most view fun as a subjective measure, which is why some researchers stray away from delving into the topic. However, when fun is examined in relation to the context of social engagement and adherence in nursing home interventions, its significance is revealed. Fincham (2016) noted that the following terms are related to and provide insight into fun: enjoyment, happiness, and pleasure. If one is positively socially engaged, there is a greater chance that he or she is more likely to enjoy themselves and exhibit feelings of happiness. Just as successful aging and quality of life are interrelated, so is social engagement and fun. One researcher noted that individuals who experience fun together create an environment where social relationships can be formed (Fincham, 2016). Podilchak (1991) noted that feelings of fun are present in social bonds. In a qualitative study designed to analyze the dignity of nursing home residents, one resident explained that he “felt forgotten by family and friends” and “it’s not much fun” and “You are alive but you aren’t really living anymore” (Oosterveld-Vlug, Pasman, Gennip, Willems, & Onwuteaka-Philipsen, 2013). Qualitative statements such as these provide an overt need for socially engaging and fun nursing home interventions and a means to measure whether the interventions are having the desired effect.

In addition, exploration of adherence to interventions provides insight into the importance of fun for nursing home residents. In a randomized control trial consisting of a one-time per week exercise intervention designed to improve ADLs in nursing home residents with Alzheimer’s disease, 41.8% had low adherence to the program, 10.4% did
not participate, and 35% were completely unwilling (Rolland et al., 2007). The mean adherence rate was 33.2% of the 88 intervention sessions, and the authors discussed the need for ways to improve adherence in the exercise intervention. While illness, disease, and low tolerance can play a role in low adherence in the nursing home population, the concept of fun is important to explore in regards to this topic. In a study designed to promote proper nutrition in patients, the researchers noted the importance of making required activities fun (Beto, Schury, & Bansal, 2016).

Much of what is known about measuring the concept of fun is derived from Scanlan and Lewthaite’s (1986) model of enjoyment. This model constitutes a five-point Likert scale to determine the level of fun experienced by young males involved in physical activity, with a number one meaning the most fun and number five meaning the least amount of fun experienced (Scanlan & Lewthaite, 1986). The way this study used the terms enjoyment and fun, this piece of literature suggests that the two terms are interchangeable, which further affirms Fincham (2016) idea that they are related. While the results of Scanlan and Lewthaite’s (1986) study cannot be generalized to the nursing home population due to highly contrasted participant demographics and research objectives, one item can be compared in order to further explore the concept of measuring fun in the nursing home population. Likert scales have been used as a research tool in the nursing home population in order to gather QOL data. However, when administering the emotional well-being section of the QOL measure, Kane et al. (2003) noted that a “yes/no” response format was implemented in order to reduce demands on the participant and increase reliability of responses.
In addition, Reis, O’Keefe, & Lane (2017) suggest that there is a relation between fun, socialization, and positive affect/emotion. Consistent with the lack of literature available on fun itself, there is a lack of evidence on the relationship between fun, social engagement, and positive emotion. However, there is some evidence suggesting how to measure positive affect itself in the older adult population. The Philadelphia Geriatric Rating Scale (PGRS) is widely used in measuring positive and negative affect in patients with dementia, including happiness and sadness (Lawton, Van Haitsma, & Klapper, 1996). Participants are observed by trained nursing home staff and positive or negative affect is determined by the mood states listed on the scale. The specifications of both affect ratings can be seen in Figure 3. In addition to the PGRS, visual stimuli have been noted to elicit positive and negative affect in nursing home residents with dementia (Chou, Waszynski, Kessler, & Clarkson, 2015). The researchers note the importance of individualization when using visual stimuli to measure affect in nursing home residents. In a study conducted to determine how older adults respond to various assessment formats, Chernoff faces, which are facial line drawings often used in conjunction with Likert scales, were found to be an unsuccessful response format (Castle & Engberg, 2004). Although Chernoff faces have been utilized in nursing home settings to measure satisfaction of residents, it is possible that less abstract photographs could be a successful self-report tool in the nursing home population (Norton et al., 1996).

Bingocize®

Current and past literature undoubtedly identifies the need for health intervention in the older adult/nursing home population. Cohen-Mansfield (2017) noted how there has been a recent research focus on group activities in the dementia population and how social stimuli can improve affect and lessen the existence of challenging behaviors. K.
Jason Crandall developed an exercise program that falls into this category. Bingocize®, an evidence-based health intervention for older adults, combines the traditional game of Bingo and exercise to improve the overall quality of life in older adults. Bingocize® involves nursing home residents seated at a table with the traditional bingo card and chips placed in front of them. After every two to three Bingo rolls, an exercise is introduced and modeled by a Lead Facilitator (LF), a nursing home staff member, who is certified in the Bingocize® program via an online certification, which provides extensive training and information regarding the environment and physical aspects in order to make the program beneficial to the participants. Exercises in which the nursing home resident can participate fall within the following categories: warm up, cardiovascular, strength, balance, hand, and cool-down. In a 10-week study consisting of 18 participants ($M$ age=75.1), there were significant improvements seen across all functional performance tasks (Crandall, Fairman, & Anderson, 2015). In another 10-week study, Bingocize® was also found to improve residents’ functional performance, and “improvements were found in all dependent variables except lower body flexibility, systolic blood pressure, and health knowledge” (Crandall & Steenbergen, 2015). A sample Bingocize® exercise template is seen in below in Figure 3.
Figure 3: Sample Bingocize® session template designed to aid in improving physical fitness in older adults in nursing homes.

Buettner (1999) found that when higher-level cognitive and memory tasks are involved in an activity, people with dementia are more likely to feel uncomfortable. Bingo is often a beloved game by the older adult population, and the game activates a level of procedural memory, which is often preserved to some extent in those with dementia (Dick, 1992). Furthermore, Tak et al. (2015) described the importance of providing a visual model for nursing home residents, whether they present with a moderate or severe cognitive impairment. The authors further noted the role that repetition can play in an activity, in order to reduce the cognitive strain and anxiety in
nursing home residents (Tak et al., 2015). Bingocize® involves visual models, as the Lead Facilitator models how to complete the exercises. In addition, Bingocize® involves an intergenerational component, which will be reviewed in the next section.

**Intergenerational Programming**

Intergenerational programming (IP) is a unique and vital component of Bingocize®. Herrmann, Sipsas-Herrmann, Stafford, & Herrmann (2005) defined IP as a way for members of different generations to foster meaningful relationships and purpose through a shared activity. There is a wide-evidence base within the literature discussing IP in older adults. IP has been shown to improve positive social engagement in nursing home residents. In a study analyzing the effects younger children had social engagement in residents with dementia, the residents displayed a more positive affect when the children were present as compared to when they were not, and statistical differences were found (Ward, Kamp, & Newman, 1996). In fact, the researchers found that the residents’ negative social engagement was lowered when the children were present. Using a Montessori-based approach, Lee, Camp, & Malone (2007) also evaluated the level of social engagement displayed by individuals with dementia during interactions with preschool-aged children. Using post-hoc paired sample t-tests, the researchers found that residents demonstrated higher levels of CE and significantly less NE during the IP activities as compared to typical activities provided by the care center without the presence of children.

While children are known to have positive effects on older adults’ social engagement, little is known about the effect that young adults may have. There is a new phenomenon making its way into senior adult care: college students are now living in
nursing homes, which has been suggested to provide a positive reciprocal relationship between the two generations. While there is little to no evidence-based research on this topic, it would behoove researchers to take note of the reasoning behind its growing popularity. One study focused on the involvement of students during an exercise program for wheelchair bound individuals of all ages, “Free-Wheelers” (Romack, 2004). Out of 24 participants, 10 out of 11 improved in some area of physical fitness and 8 out of 11 reported to be more hopeful. With students present, there was an adherence rate of 78.6%. The National Institute on Aging explains that interleukin-6, an inflammatory agent in Alzheimer’s disease, has been found to be lower in individuals who participate in social relationships. The social relationship between college students and nursing home residents is one that should be explored. In semblance with Krout & Pogorzala (2002), Neils-Strunjas et al. (2018) found that college students reported more positive perceptions of older adults after participating in an intergenerational program, Bingocize®. Bingocize®’s aim is to improve the physical abilities of nursing home residents while improving overall QOL. In efforts to further improve QOL, the effect that college students play on nursing home residents’ level of social engagement should be explored. Eckstrom et al. (2016) and Lachman, Lipsitz, Lubben, Castaneda-Sceppa, & Jette (2018) noted that a team-based approach is beneficial when providing services and intervention to the older adult population. The Bingocize® program, funded by the Centers for Medicare and Medicaid Services (CMS), incorporates students from various disciplines, such as communication sciences and disorders (CSD) and exercise science (EXSCI). These students are trained in Bingocize® and work closely with residents to provide physical fitness instruction and social interaction. While it is noteworthy that research
found a positive student perspective, there is currently no quantifiable evidence to support college students’ effect on social engagement displayed by nursing home residents. Thus, this study aims to bridge the gap and assess social engagement displayed by nursing home residents during an intergenerational fitness/health promotion program.

**Method**

**Measures**

In order to measure social engagement displayed by nursing home residents, the Fun and Social Engagement evaluation (FUSE) was utilized (see Appendix A). Due to the lack of available evidence-based evaluations designed to quantify social engagement experienced by nursing home residents during an intergenerational exercise program, the FUSE was developed. The FUSE was comprised of two portions: an observational measure and a self-report measure. It included a designated section to identify the CNF residents’ identification number, whether or not students were present during the Bingocize® session, and date of the session. As a measure of construct validity, the observational portion of the FUSE was a modified version of the Menorah Park Engagement Scale (MPES) (Camp, 2010). See Appendix B. The MPES outlined several observational characteristics that reflected either positive or negative engagement, and such items were modified and incorporated into the FUSE in order to meet the unique needs of this research study and the participants involved.

The FUSE self-report measure included a simple self-report question, which was designed to further identify the participant’s social engagement. Two photographs were used in association with the self-report section of the FUSE. One photograph depicted an older adult smiling, thus indicating a happy expression. A second depicted an older adult with a somber expression/frown, thus indicating a sad expression. Male photographs
were shown to male participants, and female photographs were shown to female participants. Participants were then asked, “Do you feel happy or sad? Point to the picture.” Both verbal and pointing responses were acceptable. If the participant did not indicate happy or sad, the FUSE included an “other” response. An “other” response was indicated if the resident was sleeping, closed their eyes, refused to respond, left the session, did not understand the question, or provided another response.

Addition of the observational and self-report scores yielded a total FUSE score. The observation portion yielded a range of scores from -8 to 8. The self-report portion yielded a range of scores from -2 to 2 (see Appendix A). For statistical analyses purposes, 10 points were added to each score. Thus, without the weighted points, FUSE scores range from -10 to +10. After the addition of the 10-point weight, total FUSE scores could range from 0-20. A higher FUSE score was indicative of a higher level of social engagement displayed, whereas a lower total FUSE score was indicative of a lower level of social engagement and fun displayed by the participant. The combination of observational and self-report measures was utilized in order to obtain a comprehensive view of the participant’s social engagement during a Bingocize® session.

Participants

Study participants were individuals across Kentucky residing in nursing homes participating in the Bingocize® program. Inclusion and exclusion criteria are included below.

**Inclusion Criteria.** Participants included in this research study were required to reside in a certified nursing facility (CNF) with an active Bingocize® program under the Civil Monetary Penalty (CMP) grant funded by the Centers for Medicare and Medicaid
Services (CMS). Participants were also required to have adequate receptive and expressive language skills in order to understand and respond, either gesturally or verbally, to a simple question as measured by Lead Facilitator (LF) judgment. The LF is one who is trained and certified to lead Bingocize® sessions. There were no limitations placed on participant age. Although nursing home residents typically fall within the older adult, ages 65+ category, studies show that early onset dementia can occur as early as age 35; thus, all ages were accepted for this study (Harvey, 2003). In this study, two females from two different CNFs in separate cities were 46 years of age, thus aligning with Harvey (2003). Participants of any race, ethnicity, or socioeconomic status were also included.

**Exclusion Criteria.** Participants residing in a nursing home outside of the state of Kentucky were excluded from this study. This exclusion criteria was mandated due to the fact that the CMP grants solely funded the Bingocize® program in Kentucky CNFs. Participants who attended less than two of the Bingocize® sessions were excluded from the study. Residents who were bedbound were also excluded.

**Participant Characteristics.** A convenience sample of 38 participants were recruited. Three participants were excluded from the study due to an insufficient attendance record, thus leaving a total sample size of 35 participants. There was missing data due to the death of a participant, resulting in N of 34 for the first research question. Participant ages ranged from 46-96, with a mean of 82 years of age. A Brief Interview for Mental Status (BIMS) score was obtained for participants, and scores ranged from 3 to 15. BIMS scores are categorized into the following three levels: intact/borderline cognition (scores ranging from 13-15), moderate cognitive impairment (scores ranging
from 8-12), and severe cognitive impairment (scores ranging from 0-7) (Saliba et al., 2012). The average participant’s BIMS score was 10, which indicated moderate cognitive impairment. Seven participants held scores in the severe range (3-7). Both men and women were included in the sample; with five males and 33 females identified.

**Procedure**

**CNF and Participant Recruitment.** This study was approved under the Western Kentucky University IRB (IRB # 17-457). The CNFs included in this study were recruited from the CMP grant. Three CNFs indicated a willingness to participate in the study. The Bingocize® Lead Facilitator, LF, at each CNF was contacted via email by the lead investigator to explain the nature of the study, and a written agreement to participate was obtained. Two CNFs were located in Bowling Green, Kentucky. The third CNF was located in Murray, Kentucky.

Residents from participating CNFs were recruited. Along with tracking participant adherence via REDCap™, a software used by the Bingocize Implementation® Team that tracks each CNF participant’s monthly Bingocize® attendance rates, the lead investigator determined through phone and/or email communication with the LFs which CNF residents had the highest Bingocize® adherence rates to date. This was done in order to determine which participants were more likely to consistently attend sessions, which would maximize data collection and is thus a convenience sample. Since each participant in this research study was a CNF resident under the CMP, each participant had been assigned an individualized identification (ID) code in REDCap™. The ID code was used to view attendance rates, age, and BIMS score in REDCap™. The ID code was also recorded on the FUSE, which will be further discussed later in this section. Participants
signed a consent document, which allowed them to participate in the study (Appendix C). The LF provided verbal and tactile assistance if needed to ensure participants understood the consent form.

**Student Recruitment and Assistance.** In order to facilitate the intergenerational component of this study, the lead researcher also contacted the CNF’s Bingocize® university faculty partner in order to recruit students to engage and interact with participants during Bingocize® sessions in which FUSE data were collected. Students who engaged with CNF residents during Bingocize® and FUSE data collection participated in Bingocize® as part of a university course requirement as designed by the university faculty partner. The university partner/students involved at the two Bowling Green CNFs were from WKU. The university partner/students involved at the Murray CNF were from Murray State University (MSU). In semblance with the LF, participating university students were trained on how to conduct and participate in Bingocize® via an online certification module.

Undergraduate research assistants (URA) were recruited to administer the FUSE evaluation. Four students from WKU were recruited to administer the FUSE at the two CNFs in Bowling Green, KY, and four students from MSU were recruited to administer the FUSE at the CNF in Murray, KY. The URA were recruited based on faculty partner suggestion. The lead investigator of this study trained each URA on the purpose of this study and on the administration of the FUSE evaluation. The four WKU URA received face-to-face training from the lead investigator due to convenience of location. The WKU URAs received training on how to administer the FUSE by the author of this thesis without a faculty member present. Each WKU URA was given a folder containing
necessary materials for the research study, which included FUSE evaluation protocols, two male photographs (happy/sad facial expressions), two female photographs (happy/sad facial expressions), and a resident identification form, which was designed to assist the URA in remembering the ID code of their assigned participants. The lead investigator held an online training using GoToMeeting™ for the four MSU URA’s and faculty partner. The MSU URA’s folders and materials were mailed. The content and training materials were the same for both WKU and MSU URA.

**FUSE Administration.** The FUSE procedures were identical across the three participating CNFs. For reliability, each URA was assigned the same four participants to observe and administer the FUSE across four Bingocize® sessions. In a pilot study, the lead investigator and research mentor found that observing any more than four participants at a time would not yield reliable data. FUSE data were collected twice with the presence of university students and twice without the presence of university students. The four sessions at each CNF during which data were collected were determined by URA availability.

Each URA observed their assigned participants for the entire Bingocize® session, which lasted approximately 45 minutes. Due to their involvement in the Bingocize® program, LFs had a list of participant names and associated ID numbers. The LF placed non-obtrusive stickers with the participant’s ID code on the back of each participant’s chair so the URAs were aware of which participants to observe. The URAs distanced themselves from the participants as much as possible while still being able to observe them, in order to avoid interaction. If any behaviors listed on the FUSE were observed at any point during the session, the URA marked the corresponding behavior on the FUSE.
protocol. Twenty minutes into the session, the URA used the gender-appropriate facial cards to ask the participant, “Do you feel happy or sad? Point to the picture.” Both verbal and gestural responses were accepted. Observers could also mark “other” if a definitive response was not provided.

**FUSE Data Collection.** FUSE data was collected during the Spring 2018 semester over an 18-week time frame. Responses were recorded in a Microsoft Excel document and later transferred to the Statistical Package for the Social Sciences (SPSS) and Statistical Analysis System (SAS). Two statistical programs were used based on the lead investigator’s mentors’ preference. Scores were analyzed using paired t-tests to compare performance of the same participants across sessions. A two-sample t-test and examination of a box plot were completed to analyze the difference between observed social engagement behaviors and resident self-report of happiness.

**Results**

Paired samples t-tests yielded information regarding CNF residents’ social engagement during select Bingocize® sessions with and without the presence of students and intergenerational programming. A two sample t-test yielded results regarding the relationship between the observational and self-report sections of the FUSE assessment. Data were analyzed using the Statistical Package for the Social Sciences (SPSS, version 23.0) and the Statistical Analysis System (SAS, version 9.4). Significance was set at $p < 0.05$.

Descriptive statistics were analyzed in order to determine participant demographic information. See Table 1 for information regarding participant characteristics, including facility, age, gender, and BIMS score.
Mean FUSE scores were compared from the three facilities using a one-way ANOVA, and were found to be >.05 thus suggesting that the data from the three facilities could be pooled to compare the two conditions of Students Present and Not Present.

In order to analyze the data collected to answer our first research question, *During Bingocize® activity, do certified nursing facility (CNF) residents display increased positive social engagement when university students are present as compared to when university students are not present?*, paired t-tests were utilized in order to measure the same participants’ scores across two sessions. Paired t-tests compared FUSE scores from one session with students interacting with residents to one session without student
interaction. For clarification as to which Bingocize® sessions included student involvement, refer to Figure 4.

<table>
<thead>
<tr>
<th>STUDENTS PRESENT</th>
<th>STUDENTS NOT PRESENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUSE 1</td>
<td>FUSE 2</td>
</tr>
<tr>
<td>FUSE 3</td>
<td>FUSE 4</td>
</tr>
</tbody>
</table>

*Figure 4: FUSE data collection sessions identified by presence or absence of university students*

The literature states that the most reliable way to decrease the chance of random errors and provide sufficient statistical power is to ensure that analyses are conducted on the largest sample size of collected data (Norton & Strube, 2001; (Akobeng, 2016)). Thus, the pair of sessions with the largest number of participants was analyzed. Across all Bingocize® sessions, the comparison of FUSE 2 to FUSE 3 was comprised of the largest sample size (N = 28). Leon, Davis, & Kraemer (2011) asserted that the purpose of a pilot study is to solely evaluate procedures of a novel intervention or assessment and to determine feasibility of that particular assessment. Because pilot studies often include small sample sizes based on feasibility of recruitment of participants, power analyses typically are not conducted (Leon, Davis, & Kraemer, 2011). However, a post hoc power analysis was completed in order to determine sufficient statistical power. Power of 80%-90% is typically enough to determine a clinically significant difference (Leon, Davis, & Kraemer, 2011). A power analysis yielded a power value of 0.908, which suggests that 28 participants are sufficient to test the significance of the findings. A power analysis yielded a power value of 0.487 for 23 participants, suggesting that there is not enough statistical power, even though the findings were statistically significant. Thus,
combinations of sessions with less than 28 participants were not used in analyses due to the inability to adequately represent the population.

Although data were collected on a total of 34 total participants, the number of residents present at each session was variable due to inevitable factors, such as resident illness, doctors’ appointments, involvement in other activities, etc. Participants were not required to attend the Bingocize® game. In addition, out of the 34 total participants, only 13 residents were present at all four sessions; furthermore, this small sample size was not sufficient to yield reliable results.

FUSE scores could range from 0-20, thus yielding continuous, interval data. Comparison of FUSE 2 (Students Not Present) to FUSE 3 (Students Present) yielded significant findings (N = 28). Comparison of FUSE 1 (Students Present) to FUSE 2 (Students Not Present) also yielded significant findings. The comparison of the other Bingocize® sessions in which the FUSE was administered did not yield significant findings. See Table 2 and Table 3 for session results.
Table 2

*Average FUSE Scores Across Sessions With and Without Students*

<table>
<thead>
<tr>
<th>Compared Session</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>FUSE 2 to FUSE 3</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FUSE 2</td>
<td>28</td>
<td>15.1</td>
<td>2.3</td>
</tr>
<tr>
<td>FUSE 3</td>
<td>28</td>
<td>16.4</td>
<td>1.7</td>
</tr>
<tr>
<td><strong>FUSE 1 to FUSE 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FUSE 1</td>
<td>23</td>
<td>16.0</td>
<td>2.1</td>
</tr>
<tr>
<td>FUSE 2</td>
<td>23</td>
<td>14.6</td>
<td>2.9</td>
</tr>
<tr>
<td><strong>FUSE 3 to FUSE 4</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FUSE 3</td>
<td>20</td>
<td>16.7</td>
<td>1.4</td>
</tr>
<tr>
<td>FUSE 4</td>
<td>20</td>
<td>16.6</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>FUSE 1 to FUSE 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FUSE 1</td>
<td>20</td>
<td>16.2</td>
<td>1.9</td>
</tr>
<tr>
<td>FUSE 3</td>
<td>20</td>
<td>16.0</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Note: * denotes combined sessions with sufficient statistical power for analyses

Table 3

*Paired Differences of FUSE Scores Across Sessions With and Without Students*

<table>
<thead>
<tr>
<th>Compared Session</th>
<th>M</th>
<th>SD</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>FUSE 2 to FUSE 3</em></td>
<td>1.3</td>
<td>1.9</td>
<td>0.002*</td>
</tr>
<tr>
<td><strong>FUSE 1 to FUSE 2</strong></td>
<td>1.4</td>
<td>2.3</td>
<td>0.007*</td>
</tr>
<tr>
<td><strong>FUSE 3 to FUSE 4</strong></td>
<td>0.1</td>
<td>2.1</td>
<td>0.837</td>
</tr>
<tr>
<td><strong>FUSE 1 to FUSE 3</strong></td>
<td>0.3</td>
<td>1.6</td>
<td>0.480</td>
</tr>
</tbody>
</table>

Note: * denotes significance at p < 0.05
In order to answer our second research question, *During Bingocize® activity, is there a difference between the social engagement behaviors observed by university students and the residents’ self-report of happiness?*, an independent t-test was used. An independent t-test was used because the observational and self-report sections of the FUSE are independent measures with a different range of scores. For statistical method purposes, two groups were formed in regards to the self-report response: “happy” and “not happy.” Comparison of “happy” and “sad” at Time 2 yielded power of 20%, which was not enough statistical power to determine statistical significance; thus, data were grouped into “happy” and “not happy”.

“Not happy” comprised both “sad” and “other” responses on the FUSE. Observational responses and self-report responses were pulled from an Excel document and entered into SAS. FUSE 2 was chosen as the session from which to analyze data, as this session only lacked two observational or self-report responses in total. FUSE 2 yielded a total of 35 participants. Sessions that were not analyzed due to fewer participants included FUSE 1, which lacked 12 responses; FUSE 3, which lacked eight responses; and FUSE 4, which lacked 13 responses.

Out of 35 participants, 27 participants indicated they were happy, and 8 participants indicated they were sad. “Happy” scores could range from 0-8. “Not happy” scores could range from -8 to 0. The mean “happy” score was 4.19 (SD = 1.64). The mean “not happy” score was 2.38 (SD = 2.07). The median “happy” score was a 5, and the median “not happy” score was a 2. The two-sample t-test yielded a p-value of 0.014. Thus, statistical significance was found. See Figure 4 for distribution of scores.
**Discussion**

The purpose of this study was to determine the intergenerational effect on the amount of positive social engagement displayed by CNF residents during Bingocize®, an evidence-based health promotion program strategically designed to improve overall quality of life in older adults. The following combination of sessions did reach statistical significance: FUSE 2 to FUSE 3; FUSE 1 to FUSE 2; however, only the comparison with 28 participants, FUSE 2 to FUSE 3, was considered to have sufficient power. Furthermore, FUSE scores were highest (and most positive) when students were present in the Bingocize® session where the same participant was observed and questioned when students were present than when students were not present.

*Figure 4*: Boxplot distribution of observational and self-report scores on the FUSE evaluation. *Note*: obs = observation score; grp = happy or not happy group
Camp (2010) found that engagement is a critical component of successful intergenerational programming. Although his research involved patients with dementia and young children, his ideas can be generalized to other intergenerational populations, such as nursing home residents and university students. The results of this study align with those of Camp (2010) who found that patients with dementia responded in a more positive manner to activities with intergenerational programming as compared to activities without the involvement of a younger generation.

A correlation was used to determine if participants’ BIMS scores were correlated with the FUSE. There were no statistically significant findings across FUSE scores, meaning that anyone with any mental ability can participate in the FUSE. This notion aligns with Clare & Woods (2001) in their study of engagement in residents with dementia during a memory-bingo activity. Significance was found in total engagement scores, and all participants (N = 12) displayed positive engagement throughout the duration of the activity. In congruence with this pilot study, the vast majority of residents displayed positive engagement and happiness.

It is important to note that participants were not forced to attend any of the Bingocize® sessions throughout the study. In an exercise intervention designed to improve ADLs in individuals with Alzheimer’s, 10.4% of residents did not participate and 35% were completely unwilling. While this study did not expound upon the reasons residents chose not to participate, several factors can be inferred that could also be valid in the context of this research study. Older adults in nursing homes, especially those with various levels of cognitive decline, experience several health related problems that could keep them from attending activities on any given day. Residents’ doctor’s appointments
or family visits could also have interfered. There are numerous reasons why a resident may not attend a session, but they are also outside of the researcher’s control.

Figure 4 shows the distribution of “happy” versus “not happy.” The statistically significant findings revealed that there was a difference between the two independent groups. One reason that could explain the statistically significant findings was the larger sample size (N=35/38 total possible participants). The statistically different findings between “happy” and “not happy” align with Kolanowski, Litaker, and Catalano (2002). They reported subjective affect ratings, similar to the research assistants’ observation ratings in this study, were similar with the late-stage dementia patient’s self-report of mood. In addition, the authors indicate the authenticity of a person with dementia’s ability to self-report their mood, as it does not require retrospective, episodic, or other higher-level forms of memory (Kolanowski, Litaker, Catalano, Higgins, & Heineken, 2002).

As seen in Figure 4, the median “happy” score was approximately 5. The median “not happy” score was approximately a 2. Thus, the “not happy” score was lower than the “happy” score. The literature identifies the plethora of reasons that could contribute to an older adult or nursing home resident indicating feelings of sadness. (Oosterveld-Vlug, Pasman, Gennip, Willems, & Onwuteaka-Philipsen (2013) noted that individuals in nursing homes often feel uneasy and uncomfortable without social supports. Ericsson, Kjellström, & Hellström (2013) noted that residents’ social circles become significantly smaller or nonexistent when residing in a nursing home. With 77% of residents reporting happiness on the FUSE, this suggests that some level of positive social interaction during Bingocize® could have contributed in some way to resident happiness. Kolanowski,
Litaker, Catalano, Higgins, & Heineken (2002) further support this idea as self-report tools in individuals with dementia are measured on a moment-by-moment basis.

This research study has several limitations. One limitation was the small sample size. Akobeng (2016) noted the importance of conducting a power analysis in order to determine the sample size needed to obtain significance. This study included a convenience sample. It was a pilot study and included several scheduling challenges. It was difficult for the undergraduate research assistants to align their schedules with the CNFs. In addition, a limitation of conducting research in the nursing home population are the inevitable participant absences. In this study, there was a 42% absent rate; thus, 16 out of the total 38 recruited participants missed one or more session(s). Although this is a common problem when conducting research in the geriatric population, future studies should focus on ways to ensure a larger sample size (Kang, 2012). When conducting future studies, the researcher should also attempt to eliminate bias by randomly selecting CNF facilities and residents. While this was a pilot study, it is probable that the sample could have been biased due to selection of facilities and participants based on feasibility.

The administration of the FUSE was another limitation of this study. Undergraduate research assistants were trained to administer the FUSE evaluation, but it can only be assumed that the evaluation was administered the same way every session. Reliability of this study could possibly be improved if a form of inter-rater reliability could be established such as using trained professionals, such as speech-language pathologists, to administer the FUSE evaluation. In addition, socioeconomic status (SES) and demographic data were not collected. Hasselgren et al. (2018) suggest that SES is a critical factor to be considered when working with individuals with dementia; thus, future
studies should gather this important data piece, which could yield information about specific participants and how they socially engage. In a study examining social engagement among the older adult population in China, the authors suggest a causal relationship between SES and positive social engagement experiences (Liu, Rozelle, Xu, Yu, & Zhou, 2019).

Future research related to measuring social engagement in nursing home residents during Bingocize® should focus on ways to ensure validity and reliability of the study. One way of doing this would be to replicate this research study with a larger sample size. In addition, the FUSE should be evaluated in order to ensure its reliability and external validity in measuring social engagement. In addition, reliability of the FUSE should be established in order to identify a range of scores that could correlate with an individuals’ BIMS score. For instance, if a participant has a low BIMS score, what FUSE score would the researcher expect to see? BIMS scores did not correlate with the FUSE; however, some qualitative evidence suggests that low BIMS scores relate to “sad” or “other” responses. However, knowing that a participant with a low BIMS score can receive a high score on the FUSE can be a positive result and an important finding for future studies. Future directions should also focus on ways to increase adherence in order to reveal sufficient power to analyze the comparison of “happy” and “sad” resident self-report.

In conclusion, the Bingocize® program allows CNF residents opportunities to be socially engaged. The Fun and Social Engagement (FUSE) evaluation is a novel assessment to measure social engagement behaviors during a social activity. It allows a holistic approach to measuring social engagement and fun through observational and self-
report. This pilot study alone does not yield sufficient information to definitively ascertain that student presence increases social engagement in nursing home residents during Bingocize®. However, based on the findings yielding sufficient statistical power, university students may have a positive impact on the social engagement behaviors displayed by nursing home residents. The vast majority of participants indicated positive social engagement behaviors and happiness.
References

https://doi.org/10.1111/apa.13384


https://doi.org/10.1097/00006199-200407000-00009


commentary. *International Journal of Nephrology and Renovascular Disease*, 9, 21–33. https://doi.org/10.2147/IJNRD.S76831


https://doi.org/10.1093/geront/44.3.358


https://doi.org/10.1016/j.promfg.2015.07.364


https://doi.org/10.1038/s41598-018-28526-3

https://doi.org/10.1155/2017/9016924

https://doi.org/10.1080/03601270590891522

https://doi.org/10.1016/j.cger.2014.04.001


https://doi.org/10.1136/jnnp.74.9.1206


https://doi.org/10.1093/gerona/58.3.M240

https://doi.org/10.1016/j.anr.2012.05.006


Appendix A

**Fun and Social Engagement Evaluation (FUSE)**

Date ___________________   Facility ____________________  Participant ID _______________

1. Were students present during this Bingocize® session? Yes                       No
   How many? _________

2. Please circle one based on who administered the FUSE® to this participant:
   - Student
   - Staff member
   - Faculty

3. Please check the boxes below that you observe at least one time during the Bingocize® session.

<table>
<thead>
<tr>
<th>Positive Observations</th>
<th>Negative Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participated in Bingo</td>
<td>Made negative comments</td>
</tr>
<tr>
<td>Participated in exercise</td>
<td>Pushed away activity materials</td>
</tr>
<tr>
<td>Laughed</td>
<td>Frowned</td>
</tr>
<tr>
<td>Smiled</td>
<td>Yelled</td>
</tr>
<tr>
<td>Helped out another resident</td>
<td>Cried</td>
</tr>
<tr>
<td>Talked to another resident</td>
<td>Did or attended things other than targeted activity (ex. Fidgeting)</td>
</tr>
<tr>
<td>Talked to student</td>
<td>Asked or attempted to leave</td>
</tr>
<tr>
<td>Talked to staff member</td>
<td>Sleeping</td>
</tr>
</tbody>
</table>

Total # of positive boxes checked _____ /8

Other:

Total # of negative boxes checked _____ /-8

Other:

*PLEASE ADMINISTER #4 20 MINUTES AFTER THE BINGOCIZE® SESSION BEGINS.*

4. Show the participant the male or female faces according to the same gender as the resident participant. Ask the participant: “Do you feel happy or sad? Point to the picture.” Circle the correct choice based on the participant’s response:

(1) Happy (+2)
(2) Sad (-2)
(3) Other (0)

If other, please circle or write the specific response:
- Sleeping or Eyes Closed
- Refused
- Left Session
- Did not understand the question
- Provided other response (e.g. tired)

For researcher use ONLY: #3 Total _____ + #4 Total _____ = _____ + 10 = FUSE Score: _____

©Western Kentucky University 2017
Appendix B

<table>
<thead>
<tr>
<th>Observation #</th>
<th>Activity ID #</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant’s ID</td>
<td>Facilitator</td>
<td></td>
</tr>
<tr>
<td>Name of activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ID # of person filling out form</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of observation:</td>
<td>1 = Baseline</td>
<td>2 = Treatment</td>
</tr>
<tr>
<td>Time of day:</td>
<td>1: A.M. or 2: P.M. (circle one)</td>
<td>Observation length (minutes)</td>
</tr>
</tbody>
</table>

1. **Participated in target activity (either constructively or passively)**
   - Did he/she take part in the activity?
     - 0 = No
     - 1 = Yes
   - Tried to leave on own (do not include staff who removed the client)
     - 0 = No
     - 1 = Yes
   - Left activity on own or with staff
     - 0 = No
     - 1 = Yes

   Code no more than one “2” for items 1, 5, 6, and 7.

2. **Did the target activity and/or commented on the activity**
   - How long did he/she participate in the activity by making comments, answering questions, talking about memories, discussing ideas, making gestures in response to the activity, or physically manipulating the materials? (Do not include looking and listening.)
     - 0 = Not at all
     - 1 = Up to half of the observation
     - 2 = More than half of the observation

3. **Listened to and/or watched target activity (code after 3 seconds, but do not code if sleeping)**
   - How long did the participant remain generally alert and spend time listening to and watching the target activity?
     - 0 = Not at all
     - 1 = Up to half of the observation
     - 2 = More than half of the observation

4. **Did he/she attend to things other than target activity (code after 2 seconds, but do not code if sleeping)**
   - How long did he/she attend to something besides the target activity? Include listening, watching, commenting, gesturing, talking, or physically manipulating any item not associated with the activity, including self-engagement activities, such as nonverbal finger-rapping, pointless manipulation of clothing or other belongings, etc. If the client is listening to or watching the target activity while manipulating an item not associated with the activity (e.g., a walker, bag, or shirt sleeve), code for listening to/watched target activity.
     - 0 = Not at all
     - 1 = Up to half of the observation
     - 2 = More than half of the observation

5. **Sits/kept eyes closed/stood in space (code after 3 seconds)**
   - How long did the participant sit or keep his/her eyes closed during the observation?
     - 0 = Not at all
     - 1 = Up to half of the observation
     - 2 = More than half of the observation

---

*Assessment Scales for Alzheimer’s Patients* by Wolter Kalmar and Ann C. Helson
Copyright © 2013 by Health Professional Press, Inc. All rights reserved. www.healthprofessionalpress.com
8. Pleasure
How long did he/she express pleasure (laugh or smile) during the observation?
0 = Not at all  1 = Up to half of the observation  2 = More than half of the observation

9. Anxiety/sadness
How long did he/she display anxiety or sadness during the observation? Include obvious displays of sadness through tears, conversation, or clearly observable depressed affect. Anxiety should be coded for items such as handwringing, rocking, anxious vocalizations, or other psychomotor activity if seen in combination with anxious facial display.
0 = Not at all  1 = Up to half of the observation  2 = More than half of the observation

10. Helped others
How long did he/she help another player during the observation? Include behaviors such as pointing out answers on another player's card; assisting with the covering mechanism of the card holder, giving clues to another player ("you have the word MOON"), helping the player read his/her card, etc.
0 = Not at all  1 = Up to half of the observation  2 = More than half of the observation

Frequency:
0  1-2  2+

11. Acted inappropriately
How long did he/she say or do something inappropriate, disruptive, or aggressive during the observation?
0 = Not at all  1 = Up to half of the observation  2 = More than half of the observation


Assessment Scales for Acheived Outcomes by Isadore Stellen and Ann C. H梃ley
Copyright © 2015 by Health Professors Press, Inc. All rights reserved. www.healthprofessors.com
Appendix C

INFORMED CONSENT DOCUMENT
(Student Helpers/Observers)

Project Title: A novel game for improving engagement in older adults with dementia
Investigators: Dr. Jason Crandall, Western Kentucky University, School of Kinesiology, Recreation and Sport; Jason.crandall@WKU.edu or 270-745-2077 or Dr. Jean Neils-Strunjas, Western Kentucky University, Department of Communication Sciences and Disorders; jean.neils-strunjas@WKU.edu or 270-745-8998.

You are being asked to participate in a project conducted through Western Kentucky University. The University requires that you give your signed agreement to participate in this project.

The investigator will explain to you in detail the purpose of the project, the procedures to be used, and the potential benefits and possible risks of participation. You may ask any questions you have to help you understand the project. A basic explanation of the project is written below. Please read this explanation and discuss with the researcher any questions you may have.

If you then decide to participate in the project, please sign this form in the presence of the person who explained the project to you. You should be given a copy of this form to keep.

1. Nature and Purpose of the Project: The purpose of the project is to study the impact of Bingocize on persons with dementia. As part of this research, we would like to understand the impact of students’ participation in the Bingocize program. Specifically, we are interested in whether students’ attitudes toward older adults and persons with dementia change as a result of implementing or observing Bingocize.

2. Explanation of Procedures: Participation is voluntary. If you agree to be in this study, you will be asked to fill out a survey and write about your experience with Bingocize. We anticipate that your completion of the survey and two open-ended questions will take no more than 10 minutes.

3. Discomfort and Risks: There are no known discomforts or risks associated with participating in this study. However, if any of the questions make you feel uncomfortable, you may stop the survey or decide not to answer the open-ended questions.

4. Benefits: Your participation in this project will contribute to the body of knowledge about student attitudes toward older adults and how they may be impacted by experiences with older adults in the community.

5. Confidentiality: Your responses will be strictly confidential and data from this research will be reported only in the aggregate. Data will be collected via a paper and pencil survey and open-ended questions to which you will freely write your response. You will not be asked to identify yourself. Data will be entered into a spreadsheet and will be stored on a password-protected server. Data used for analysis will be maintained on the password-protected server for three years.

WKU IRB# 16-242
Approval - 10/2/2017
End Date - 10/2/2018
Expedited
Original - 1/5/2016
6. **Refusal/Withdrawal:** Refusal to participate in this study will have no effect on any future services you may be entitled to from the University. Anyone who agrees to participate in this study is free to withdraw from the study at any time with no penalty.

You understand also that it is not possible to identify all potential risks in an experimental procedure, and you believe that reasonable safeguards have been taken to minimize both the known and potential but unknown risks.

Signature of Participant ___________________________ Date ____________

Witness ___________________________ Date ____________

THE DATED APPROVAL ON THIS CONSENT FORM INDICATES THAT THIS PROJECT HAS BEEN REVIEWED AND APPROVED BY THE WESTERN KENTUCKY UNIVERSITY INSTITUTIONAL REVIEW BOARD

Paul Mooney, Human Protections Administrator
TELEPHONE: (270) 745-2129

WKU IRB# 16-242
Approval - 10/2/2017
End Date - 10/2/2018
Expedited
Original - 1/5/2016