

**MUSIC, IMAGERY, AND MOVEMENT:
AN INTERVENTION TO IMPROVE MOOD IN OLDER ADULTS IN ASSISTED
LIVING**

“MUSIC IS LIKE A FAMILY MEMBER SITTING NEXT TO YOU”

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INTRODUCTION

Previous research suggests that integrated arts modalities, such as music, visual imagery and expression, and movement offer diverse ways of stimulating and improving cognitive and emotional functioning in a variety of older adult populations. Such findings are of significance to a variety of stakeholders, most importantly to older adult residents of long-term care facilities who may benefit from the implementation of creative arts programming, and to the families and caregivers who are involved in resident treatment planning.

STUDY AIMS

The broad aim of our study was to enhance the full participation of older adult residents in a long-term care facility through their participation in a creative arts intervention that is hypothesized to improve emotional and cognitive functioning. Our study responds to several methodological gaps in the current arts in aging literature. Methodological limitations across extant studies include lack of control groups and only vague descriptions of the creative arts interventions (Castora-Binkely, Noelker, Prohaska, & Satariano, 2010). Our study design used randomization to treatment and control conditions and employed a creative arts intervention that integrates multiple creative arts modalities – music, visual expression and movement.

LITERATURE REVIEW

Creative Arts and Aging. Engagement in creative arts activities, such as sculpting, drawing, painting, writing, music and movement, provides purpose, meaning and social connection for older adults living in long-term care facilities. Scholars discuss the importance of preserving

autonomy, sense of control and meaning-making in older adult populations who transition to assisted living facilities (Ball, Perkins, Whittington, King, & Hollingsworth, 2005; Tompkins & Sorrell, 2008), and creative arts intervention offer a space where such self-directed decision-making, autonomy, and social engagement can take place in the context of supportive relationships. The arts provide alternative means of communication and self-expression, particularly when verbal communication patterns are limited. For example, Gregory (2011) designed a reminiscence-based poetry intervention where poets met with older adult residents with dementia and helped the older adults transform their conversations into poems. The researchers found that this type of intervention helped preserve memories, facilitated communication with others, and humanized the dementia experience. Similarly, other studies have found creative expression paired with reminiscence decreases depression in community-dwelling older adults (Bohlmeijer, Valenkamp, Westerhof, Smit, & Cuijpers, 2005). A review of the arts and music in health care shows expressive arts therapies help to improve sleep, increase impulse control, increase concentration, and decrease depression and anxiety. Arts programs have been found to reduce length of hospital stay and decrease need for pain medication (Staricoff & Clift, 2011).

The literature suggests that expressive therapy interventions that are kinesthetic-sensory based, like music and movement techniques, are most effective for older adult populations when personalized/individualized, participatory, and socially interactive, allowing for maximum engagement of multiple areas of the brain (Sakamoto, Ando, & Tsutou, 2013), with studies showing such interventions may actually rewire cortical pathways in the brain leading to improved mood management (Malchiodi, 2012). Research on the neurocognitive mechanisms of emotional control suggest that interactions between the prefrontal cortex and subcortical regions

are important for modulating behaviors associated with emotional reactivity (Matto et al., 2013; Ochsner & Gross, 2004). Thus, emotional regulation later in life, when cognitive control processes and the prefrontal cortical network may be in decline due to natural aging or disease, necessitates deployment of more efficient strategies and the recruitment of different control systems to support emotional regulation. Similar to language, music, art, and dance are symbolic systems that can be marshaled in the service of regulating emotion and behavior. When language, as a symbolic system, degrades in functioning, we can help residents expand their repertoire and accessibility to these other symbolic systems to promote emotional/behavioral regulation (Winsler, Ducenne, & Koury, 2011). For example, music in the form of song-as-instruction has been used with populations who have limited executive functioning skills (e.g., child populations) to direct and redirect behavior (Kramer, 1980), and could also be an innovative instructional technique for residents living in long-term care facilities.

Music. Stuckey and Nobel's (2010) literature review of creative arts interventions found music engagement decreased anxiety, tension and pain, and increased immune system functioning in clinical populations. Their summary found that music used therapeutically in institutionalized settings such as hospitals increases patients' sense of control, reduces stress, and promotes wellness. For example, individualized piano instruction and jazz instruction have been shown to strengthen a range of cognitive abilities and improve balance in older adults (Alpert et al., 2009; Bugos, Perlstein, McCrae, Brophy, & Bedenbaugh, 2007). Chorale group participation has been shown to decrease falls (Cohen et al., 2006) and decrease medication use and improve general health in older adult populations, with outcomes maintained at 24-month follow-up (Cohen et al., 2007). Music has been successfully used with medical populations to help control pain, anxiety, overall distress, and medication use (Chlan et al., 2013; Hartling et al., 2013). A participatory

music intervention for older adults with dementia helped increase resident behavioral engagement over time, as compared to a reading control group (Harrison, Cooke, Moyle, Shum, & Murfield, 2010). Thaut and colleagues (2009) employed a neurologic music therapy (NMT) intervention to enhance cognitive functioning and emotional adjustment for patients with brain injuries, with results showing improved cognitive functioning and decreased depression and anxiety.

Interactive and participatory music experiences that are derived from resident-specific musical selections and combined with clapping, singing, or active engagement improve emotional well-being and decrease stress in patients with dementia (Sakamoto et al., 2013). Other research shows that musical training can produce life-long benefits, preserving auditory neural precision that decreases the risk for subcortical auditory processing decline and, thus, maintaining speech ability despite typical aging patterns (Parbery-Clark, Anderson, Hittner, & Kraus, 2012a). Specifically, lifelong musical experiences help balance excitatory and inhibitory subcortical neural networks and particularly strengthen inhibitory systems linked to speech (Parbery-Clark, Anderson, Hittner, & Kraus, 2012b). Musical training has been associated with improved verbal memory, spatial skills, attention, and executive functioning (Bialystok & DePape, 2009; Ho, Cheung, & Chan, 2003).

Imagery and Visual Expression. Along with music, visual arts have shown evidence of positive effects on memory and cognitive functioning. Fraser and al Sayah (2011) reviewed the literature on the arts in health care settings, with studies focused on the visual arts (drawing and photography), poetry, and theater with results showing improvement in a range of physical and emotional functioning domains. Art and imagery experiences have been found to enhance attention, memory and concentration in populations with limited executive functioning capacity

(Guetin, Soua, Voiriot, Picot, & Herisson, 2009). Kinney and Rentz (2005) found drawing and painting increased well-being, particularly reducing sadness, among adults with dementia in a day center, as compared to a social control routine activities group. Improvement in cognitive functioning has been found in adult populations with Alzheimer's disease after participating in structured art therapy activities (Alders & Levine-Madori, 2010; Levine-Madori, 2009). And, modeling clay has been used successfully to reduce depression in people with Parkinson's diseases (Elkis-Abuhoff, Goldblatt, Gaydos, & Coratto, 2008). Other studies have shown guided imagery techniques decrease the use of pain medications in hospital populations and visual arts activities enhance short-term emotional well-being in family caregivers of hospitalized patients, improving communication and decreasing stress and anxiety (Walsh, Martin & Schmidt, 2004). The evidence-based Timeslips intervention for residents with Alzheimer's disease uses pictures to help residents generate verbal responses that are aggregated into a group-generated story, and has been shown to increase engagement, alertness and social interaction (Fritsch, et al., 2009).

Movement. Social engagement, personal well-being, balance and stability have also been shown to be affected by an increase in movement. Ideas, thoughts, and feelings can be expressed symbolically through movement. Nonverbal expression through physical movement has been found to decrease stress and increase quality of life including cognitive functioning and physical symptoms, specifically improving ambulation in clinical populations (Stuckey & Nobel, 2010). Kluge, Tang, Glick, LeCompte, and Willis (2012) found that older adult women who danced or engaged in dance movement therapy five times per week experienced decreased stress associated with moving into a retirement community by enhancing social engagement and personal well-being. Adults with Parkinson's disease improved in balance and stability after participating in a 12-week ballet intervention (Houston & McGill, 2013).

As stated above, the current study set out to examine if a creative arts intervention involving music, visual expression, and movement enhanced the well-being of older adults residing in long-term care. Specifically, MiM (Music, Imagery, and Movement) was examined against a social control conversational group, with 30 participating residents at Birmingham Green.

POPULATION

Birmingham Green is the non-profit partner for Northern Virginia area local governments providing a continuum of exceptional long-term care for older adults, particularly those with limited resources. Birmingham Green evolved as a cooperative venture of the following localities: Fairfax, Fauquier, Loudoun, Prince William, and the City of Alexandria. The campus offers intermediate and skilled nursing care (180 bed capacity), and assisted living care (District Home and Willow Oaks, 64 beds and 92 beds respectively). The programs are developed to meet the long-term care needs of older adults with very low income, and serves a racially and ethnically diverse older adult population. The physical space and design of Birmingham Green is unique in encouraging artistic expression and creative engagement. There is a ceramic studio that sits separate from the main building on the resident grounds which functions as a resident art space. One resident, a professionally trained artist, paints murals on the fences in the outdoor spaces on the grounds, and on the walls of interior activity rooms. This resident has contributed to the design on the unit for persons with dementia, creating murals that look like library shelves with books, which helps to naturally deter residents from trying to leave through the doors. One of the group rooms used in the study was painted by this resident artist (See Appendix A)

METHODS

Design.

We employed a Randomized Controlled Trial (RCT) with crossover in a community-based setting, testing our Music, Imagery and Movement (MiM) intervention against a social control (conversational) group. Over the two-year study, a total of 30 residents from the two assisted living facilities at Birmingham Green (20 from Willow Oaks and 10 from the District Home) participated in the study (MiM = 15 or control group = 15). Male (n=9) and female (n=21); average age of participants was 70.07 years old. Residents were excluded from study participation if there was presence of a co-morbid mental health diagnosis or other physical or behavioral challenges that clinical staff assessed as rendering the resident unable or unsafe to participate in the groups. Eligible residents were randomly assigned to participate in the two 10-week activity conditions (MiM or control), and then each condition crossed-over to the other for the following 10-weeks. Several standardized instruments were used to better understand the cognitive functioning and mental health status (depression and mood) of the study participants.

Measures.

Mini-Mental State Exam (Folstein, Folstein, & McHugh, 1975). The MMSE is one of the most extensively used clinical assessment instruments in the world. It is a brief and objective screening test for cognitive impairment and to record cognitive changes over time (Folstein et al., 1975). The MMSE consists of 11 simple questions which are grouped into 7 domains including orientation to time, orientation to place, registration of three words, attention and calculation, recall of three words, language, and visual construction (Tombaugh & McIntyre, 1992). A MMSE consists of a total score of 30 and takes approximately 10 minutes to administer by a trained interviewer. A score of 23/24 is generally accepted as the cutoff signaling the presence of

cognitive impairment while a score of (18-24) indicates mild and (0-17) severe respectively (Tombaugh & McIntyre, 1992).

Mini-Cog Assessment Instrument for Dementia. The Mini-Cog Assessment Instrument is an assessment tool that is widely used in hospitals and long-term care settings to quickly detect cognitive impairment upon admission. This tool allows clinicians to quickly assess numerous cognitive domains including cognitive function, memory, language comprehension, visual motor-skills, and executive functions. The Mini-Cog assessment could be administered in 3 minutes and does not require any special equipment and is not influenced by level of education or language differences. A scoring of a 0-2 indicates positive screen for dementia and a scoring of 3-5 indicates a negative screen for dementia (Borson, Scanlan, Brush, Vitaliano, & Dokmak, 2000).

Geriatric Depression Scale (GDS, short form). The GDS was first developed by Yesavage et al. in 1986 and has since been tested and used with the older population. The GDS short form consist of 15 question, 10 indicating the presence of depression when answered positively and questions 1, 5, 7, 11 and 13 indicating depression when GDS is considered normal depending on age, education, and complaints; 5-8 indicating mild depression; 9-11 indicating moderate depression; and 12-15 indicating severe depression. The GDS could be used by populations with physical illness and emotional and cognitive impairments. The scale takes 5-7 minutes to administer.

Profile of Mood States (POMS2-A short). According to Heuchert & McNair (2012), the POMS2-A short instrument assesses the mood states of individuals 18 years of age and older. This tool is applicable in clinical, medical, research, and athletic settings, where its sensitivity to change makes the assessment ideal for treatment monitoring and evaluation, as well as clinical

trials. This tool is a multi-dimensional, comprehensive assessment of transient and fluctuating moods, and enduring states of effects. The POMS2-A could be effective in evaluating patterns of moods states within an individual when used in combination with other verified sources of information (Heuchert & McNair, 2012). The POMS2 contain 35 items assess anger hostility (AH), confusion-bewilderment (CB), depression-dejection (DD), fatigue-inertia (FI), tension-anxiety (TA), vigor-activity (VA), friendliness (F) and takes 3-5 minutes to complete (Heuchert & McNair, 2012).

Note: During study implementation, we found the POMS to be quite difficult for many residents to complete, even when data collection was facilitated by a study researcher. Therefore, POMS data were not ultimately included in our final analyses.

MiM

The Music, Imagery and Movement (MiM) intervention was 10 weeks in duration and met for one hour twice per week, for a total of 20 group sessions. Based on best practice of creative arts interventions with older adults, the MiM intervention was individualized in song-selection, participatory, and socially interactive, conducted in a group setting. Novel to other interventions, our MiM model integrated three modalities – music, imagery and visual expression, and movement.

Prior to beginning the 10-week group, each resident identified two to four pieces of music that elicited positive emotions. Each resident's music was played in two of the 20 sessions, during the course of the 10 weeks. Each group session began by introducing the musical selection and identifying the resident who chose the music. Examples of resident-selected songs included: "Amazing Grace"; "People" by Barbara Streisand; Neil Diamond's "America" and "Sweet Caroline"; Frank Sinatra's "I've got you under my skin"; "Come fly with

me”; “Turn, Turn, Turn” and “Hooked on a Feeling”; Louis Armstrong’s “When you are smiling” Cole Porter’s “I get a kick out of you”; Judy Garland’s “Over the Rainbow”; Johnny Mathis’s “Misty” and Patsy Cline’s “Sweet Dreams”; John Denver’s “Goodbye Again”, “Take me Home Country Road”, and “Farewell Andromeda”; Nat King Cole’s “Unforgettable” and “Sentimental Journey” by Doris Day; Buddy Clark’s “Peg O’ My Heart”; and songs “Deep in the Heart of Texas”, “Don’t Fence Me In”, and “Ava Maria”. The songs were played for the group, after which residents were guided through a mental imagery exercise, related to the musical experience, to activate visual imagery or memories that were triggered by listening to the songs. Art supplies such as clay, oil pastels, markers, colored pencils and white paper were available to the group participants who were encouraged to represent their visual imagery, using the following prompts:

You can close your eyes if you wish. Think about the music that we just heard. What colors come to mind? What parts of your body heard the music? Where did you feel the music in your body? Who came to mind when you were listening to the music? What places did you think about when you were listening to the music? We have art materials here for you to use. Please take some time to draw or color anything that comes to mind as you think about the music we heard, and how it makes you feel right now.

Next, residents were encouraged to act out movements related to the music as it was played again.

Group facilitators promoted resident-directed mobility to the music using the following prompts:

Verbal Prompt: We are going to play the music again. This time feel free to move your body to the music in any way that you would like.

Nonverbal Prompt: Played music and modeled body movements with gentle swaying motion.

Next, each resident was invited to share about the group experience. The group facilitator prompted residents to say what first came to mind about their experience in participating in the group.

Group facilitation.

MiM group facilitators were employed staff at the assisted living facility who participated in a training protocol and completed the accompanying MiM intervention competency measure. Facilitators also completed MiM fidelity measures at the end of each group session, to ensure adherence to the MiM implementation protocol. Frequent facilitator behaviors implemented in MiM sessions included: Actively motivating and encouraging body movement expression during the group; processing with residents a range of emotions that emerged during the session; and processing with residents a range of memories that were activated during the session. Facilitators shared that residents in the group tended to “work things out on their own”; “had positive interactions independent of the facilitator”; and “shared positive emotions independently”. Other facilitator behaviors employed in MiM sessions included helping residents to focus more intently during imagery processing because residents would often become unfocused, and helping “residents aggregate their individual experiences into a larger group story about the session”. MiM intervention feasibility was demonstrated in our partnership with Birmingham Green. Participant recruitment, staff training, and implementation of the MiM groups were successful over the course of the two-year RCT.

RESULTS

Quantitative data.

IBM SPSS statistical analytic package version 22 was used to analyze the quantitative data. Analysis of Covariance (ANCOVA) for the sample as a whole (N=30) showed a statistically significant reduction in depression, as measured by the GDS-SF, for the MiM group ($\bar{x} = 2.33$) as compared to the social control conversation group ($\bar{x} = 4.27$), at the end of the ten week treatment ($p < .05$), controlling for pre-treatment GDS-SF scores (see Table 1).

Table 1

Average GDS-SF Scores at Post-Treatment, after controlling for pre-treatment scores

| | Post-Treatment |
|-----------------------|-----------------------|
| Condition | \bar{x} SD |
| MiM (n=15) | 2.33 (3.20) |
| Social Control (n=15) | 4.27 (3.22) |

F= 5.719 (p<.05)

Similarly, repeated measures Analysis of Variance (ANOVA) showed a statistically significant reduction in depression scores for participants in the MiM treatment at end of first 10-weeks, and at the end of the second 10-weeks for MiM crossover participants (See Table 2). These results are consistent with other studies that have found participation in creative activities reduces depression (Bohlmeijer et al., 2005); and that social interaction and social support affects health and quality of life in older adults (Hawkey et al., 2008). Also, see Matto, Tompkins, Ihara, Inoue and Byrd (2015) for first-year MiM study results.

Table 2

Average GDS-SF Scores at Pre-Treatment, Post-Treatment and Cross-Over at Willow Oaks Assisted Living

| | Pre-Treatment | Post-Treatment | Pre-Treatment (Crossover) | Post-Treatment (Crossover) |
|----------------------|----------------------|-----------------------|----------------------------------|-----------------------------------|
| Condition | \bar{x} SD | \bar{x} SD | \bar{x} SD | \bar{x} SD |
| MiM (n=8) | 3.63 (2.83) | 1.50 (1.51) | 2.89 (3.86) | 1.78 (3.07) |
| Social Control (n=9) | 2.20 (2.10) | 1.80 (1.62) | 2.25 (2.25) | 2.63 (2.83) |

F = 6.063 (P<.01)

Process evaluation.

Individual semi-structured interviews were conducted with participants to understand resident experiences of their group participation and their perception of the role of the creative arts in their care at Birmingham Green. In addition, observational assessments were made at three different group sessions (one in weeks 1-3; one in weeks 4-6; and one in weeks 7-10). Observations occurred during the entire 60-minute session and were parceled by 20-minute assessment intervals, with observers completing a checklist and open-ended behavioral observation questionnaire for each of the beginning, middle and last 20-minute intervals. Table 3 shows the themes that emerged out of these behavioral observations. Enjoying, supporting and remembering were similar themes across the MiM and social control groups. Themes of sharing and expressing were specific to MiM, and enjoying, remembering and expressing were consistently observed across all 10 weeks of MiM.

Table 3: Behavioral Observations of Treatment and Control Groups

Themes from Researchers' Observations of the Treatment & Social Control Groups

| | Intervention Group | Social Control Group |
|-------------------|---|---|
| Weeks 1-3 | Enjoying Supporting Sharing Remembering Expressing | Longing Feeling Gratitude Supporting |
| Weeks 4-6 | Enjoying Remembering Expressing | Connecting Engaging |
| Weeks 7-10 | Enjoying Supporting Remembering Expressing Engaging | Enjoying Supporting Remembering Current Events |

MiM resident experiences

The literature suggests music can elicit images connected to memories and can trigger emotional response via limbic system activation (Krout, 2007). In line with such research, our study's MiM participant experiences revealed the power of music to evoke memories, elicit emotions, and initiate physical movement.

Memories evoked

Participants vividly discussed memories from years ago that were evoked when listening to the songs in group. Many memories were related to a resident's own past musical experiences:

"I love classical music and could listen to it for hours. I played the piano as a child, which may account for my love of this music. One can listen to the music which I love to do or use it as background and think of anything!"

"When I was in my country we would sing the songs off the radio!"; "Reminds me of listening to music when I was little"; "Sitting at home listening to the radio"; "Sitting in the park listening to music"

For others, the songs transported residents back in time to other earlier life experiences and relationships:

"I think of love, trees, and nature when listening to the song. The trees make you feel happy for what you have and be thankful for the nature you can enjoy." "We use to go hiking when I was younger and look at the fish. I always enjoyed the nature God gave us."

One song reminded a resident of an old friend: *"It reminded me of the stationary he would use to write me on. He was in the Army."*

"Song reminded me of nature, the birds, rainbows, and trees."

"Made me think of being 18 years old and listening to this song with my girlfriends. Makes me think of lasting love and being with one person for a long time. Makes me think of an ever green."

"This made me think about my first love and the memories."; "Taking the bus to visit relatives"; "Making chicken soup";

The songs also triggered colors and images of nature:

“I felt the color purple”; “Two people dancing in the sunshine with the music floating in the air;” “I think of orange, yellow, and brown when listening to this song.” “Driving down the open road, green grass, daisies, trees”; “Walking in the country”;

Emotions elicited

The songs elicited a variety of emotions in the residents, bringing the residents back in time to both positive and challenging emotive states related to prior experiences, as well as bringing them into current feeling states. Residents said of the groups: *“A lot of feelings come to you”;* *“This music pulls feelings from inside one to outside!”;* *“I hate this music! It twangs! If this was the only music I could listen to I would not listen!!! It does have a good beat....”;* *“Song made me feel free.”* *“Song made me feel like a lost soul. I can't grasp anything.”;* *“Song made me feel freedom.”;* *“I feel like I have nothing to hope for.”;* *“This song made me feel wonderful.”;* *“Made me sad because I could only have the music for a moment.”* *“I feel like I'm in heaven.”*

Others were able to experience emotions even when they could not necessarily connect the feelings to specific thoughts: *“I get so taken away with the music I can't even think.”*. One resident shared that it is *“hard to express things at this age”*, but the music was *“nice and happy”;* *“I felt the music in my heart.”;* *“I felt kind of sad at first listening to the song, but then I felt happy because that is what dancing makes you feel. I was thinking of the color red because sometimes it makes you happy and sad and that is how I felt.”*

One resident said the music moved her back to an easier, happy time. Another resident felt good because she grew up with that music and always had music on; she felt relaxed and happy. Another said it reminded her of God's creation – outside at night with the stars and at

peace. The music helped residents forget their troubles for a bit; another said that listening to the music of Louis Armstrong “*makes you forget things that bother*”.

Physical movement initiated

Residents shared that the group sessions initiated physical movement:

“It makes you move in spite of yourself”; *“Great beat! In spite of one self...your feet and body bounce to the beat! You just can’t not move or sing”*; *“The beat is easy to move to. You don’t have to listen and you can just move.”*; *“Perfect moving music”*; *“I thought of the colors blue and orange. Made me think of listening to this music when I was younger and how soothing it always made me feel. For some reason it made me want to dance.”*

One group member got up and danced but worried about balance. Other residents were clapping knees and tapping feet, or swayed to the music. One resident said the music energized spirit and body. Residents shared that music makes one feel alive and connected to positive memories, emotions and relationships:

“One of the all-time greatest...It makes one feel very tied to God and all hymns. Takes one back to childhood...when one learned hymns in Sunday school...one never forgets them!!”; *“Music makes you laugh, move, smile. Music is like a fresh flower!!”*; *“Music is like a family member sitting next to you”*.

For many residents, the music experience brought back memories of special meaningful experiences from long ago. Many of the memories were nature focused. Other residents had difficulty formulating their thoughts in the MIM group because of their level of cognitive impairment. These residents listened to the songs and enjoyed the lyrics, but the lyrics did not trigger specific memories. They used available art supplies to respond to the songs, but they could not discuss how the lyrics or imagery connected to a memory. However, even though there was a range of cognitive ability, the group itself became a place where the music brought out the desire to move and relate to other residents in new ways.

POLICY IMPLICATIONS

Creating interventions that are person-centered, such as those that involve individualized music preferences, may enhance well-being in older adult populations by tailoring a group experience with individual preferences that effectively personalizes the treatment intervention in a meaningful way for the resident. Our results suggest that a person-centered approach should be at the forefront of policy decisions in long-term care. Our intervention is easily translated to different types of facilities, and because it is delivered as a group intervention, can be a cost-efficient way to bring creative arts into long-term care facilities and other facilities serving older adults, as feasibility was demonstrated in the training and implementation of MiM with existing facility staff. As the population needing long-term care and supportive services continues to grow, effective interventions that directly improve mood, social interaction, and emotional functioning will become critical in creating places where older adults can thrive.

FUTURE DIRECTIONS

Creative processes that take place within the context of positive social relationships can offer both interpersonal and neural integration (Siegel, 2012). In future research, we will examine **how** participation in MiM treatment allows for enhanced social engagement, seeking to identify the specific process-oriented components of change (e.g., activation of memories, sharing of stories, connecting around areas of strength, offering encouragement to one another, etc.) impact mood and behavior. In addition, future studies will include biomarkers of stress reactivity (e.g., cortisol levels) to examine link between physiological stress and social engagement, effected by MiM participation. Finally, we plan to track medication usage over the course of treatment, specifically pain medication, to examine the effect MiM participation may have on reduction in such pharmacological use, as other studies have found pain medication use

reduced with music and visual arts participation for populations in health care settings (see Staricoff & Clift, 2011).

At post-study, the MiM facilitators felt that the resident-specific music selection process worked well and that residents felt empowered when their songs played during the group. It was their impression that the residents felt they had something to share and give to the other group participants, by sharing their personal musical selections. The facilitators felt that the movement component of MiM was least impactful and needed the most facilitator-initiated encouragement. They suggested that this may have resulted from where the movement piece came in the MiM protocol, and it was suggested that if it were moved to second in the protocol, right after the music played, rather than after visual expression, movement might more naturally occur and spark the flow of creative imagery better as well. In our future work, we will further explore these changes to our current MiM protocol.

CONCLUSION

Passive/receptive music listening contributes health-enhancing effects via its influence on the autonomic nervous system functioning (Krout, 2007). Music may induce a relaxed state or may contribute to wellbeing by decreasing attention to distressing environmental stimuli (Krout, 2007). Music acts on the limbic system, particularly in areas such as the hippocampus responsible for memory and the amygdala responsible for the emotional reaction to stimuli; therefore, music has the power to influence memory and emotion at a neurobiological level (Krout, 2007). Our study's quantitative and qualitative data offer empirical support to this understanding of the impact of music on mind and body.

The group process itself can facilitate health-promoting behaviors in older adults in assisted living settings by allowing residents to share a range of elicited memories, feelings, and

stories, fostering enhanced sense of belonging and positive social connectivity. For residents living with limited executive functioning capacity, creative arts groups can be helpful in facilitating these human connections. Music and art activities draw residents out of their rooms and into community spaces that become socially comfortable and familiar through song and its powerful influence on mood, memory and movement. In our study, we witnessed the power of the creative arts, particularly personalized resident-selected music, to transform the community space in assisted living to one that encouraged residents to connect with one another. We found that familiar music motivated interpersonal connection via dancing, humming, singing, smiling, tapping feet; and in the subsequent sharing of memories and stories that were triggered by the music.

Unfortunately too often public perception of assisted living conjures up images of loneliness and social isolation. This, however, should be viewed as the exception, rather than the norm. Our study shows that residents in assisted living have a continued capacity to engage interpersonally, creatively and meaningfully together. Music and the creative arts can be the social lever that potentiates this capacity and maximizes resident interpersonal engagement. Although there were different music preferences, likes and dislikes, the group itself responded to the music experiences in ways that fostered a sense of community and promoted emotional expression and physical movement (e.g., dancing, tapping feet, nodding the head). As one resident said about herself and her other group members: “*We never go out of style!*”

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Appendix A





