

# Development of the Making the Connection Intervention to Address Loneliness and Isolation in Older Adults

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## Abstract

Fifty percent of individuals aged over 60 are reported at risk of social isolation and one-third will experience some degree of loneliness later in life. Isolation and loneliness have been reported as having negative consequences for mental and physical health and mortality. Existing supportive interventions, even when successful are not widely adopted or utilized. A developmental, mixed methods approach was taken to building and testing the components and delivery of an intervention, Making the Connection (MTC) in preparation for mounting a larger, systematic test. **Method:** The approach relied upon the six steps of 6sQuID for the development of public health interventions: 1) Define and understand the problem and its causes. 2) Clarify which causal or contextual factors are malleable. 3) Identify how to bring about change. 4) Identify how to deliver the change mechanism. 5) Test and refine on small scale. 6) Collect sufficient evidence of effectiveness to justify rigorous evaluation/implementation. Depressive symptoms, how often people felt lonely, and size of social networks were quantitatively measured and analyzed. Qualitative measures were also used. **Findings:** All six steps in the 6sQuID model were followed in building the intervention for potential testing. In an initial test within CCRC facilities, five loneliness-related areas were examined qualitatively and identified as potentially modifiable. Testing of a subsequent 10-session gamified intervention established trends for reduced reports of symptoms of depression, and increases in social connections. Pre and post-test found there was a statistically significant reduction in reports of loneliness in the past week. **Discussion:** Making the Connection manualized intervention appears both feasible and viable, a necessary first step to prepare for more systematic evaluation in a randomized control trial.

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## Keywords

Loneliness, Older Adult, 6sQuID, Intervention, Mental Health

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### 1. Background

Loneliness and social isolation are growing public health concerns. Although these experiences occur across the life span, 50% of individuals aged over 60 are at risk of social isolation and one-third will experience some degree of loneliness later in life.

#### 1.1. Key Concepts

There is an implicit assumption that subjective and objective isolation are intricately related but they are distinct concepts each with potential negative emotional health/mental health consequences. Subjective isolation is concerned with an individual's perceptions that levels of interactions with others do not meet expectations. Loneliness, or subjective isolation, more often refers to our appraisal applied to our circumstances. In other words, we may feel lonely as a result of any number of things. Loneliness can be social, transient, situational or chronic and can impact on our health and well-being, short and long term. Feeling lonely can also have adaptive qualities, for example, when we are experiencing feelings of loneliness, we are more likely to reach out or find ways to change our circumstances to better manage these feelings.

Objective isolation refers to a scarcity of contacts/social encounters of adequate quality or quantity to meet the needs of an individual. Often, objective isolation is not the result of one event but is the cumulative result of a series of events and our response to them. Therefore, objective isolation, or social isolation, is a more complex but observable and measurable state in terms of quality, type, frequency, and emotional satisfaction of social ties. Objective isolation can therefore impact health and quality of life, measured by an individual's physical, social, psychological and [spiritual] health; ability and motivation to access adequate support for themselves; and the quality of the environment and community in which they live [1] (Newman-Norland, *et al.*, 2022).

#### 1.2. Contributing Factors to Both Isolation and Health

Health, life events, vulnerability, location, mobility and sensory impairment may play roles in the experience of isolation and loneliness. That social isolation may also have detrimental effects on health including morbidity and mortality, decreased resistance to infection, increased depression and dementia and emergency admissions to hospital [2] (Landiero *et al.*, 2017), further compound effects. Furthermore, the COVID-19 Pandemic and its initial shutdowns in the US and abroad added to the concern as older adults proved particularly at risk and there was a resultant need to socially isolate that may have further engendered feelings

of loneliness [3] [4] (Miller, 2020; Rokach, 2019) and further impact on their physical and mental health [5] (Hold-Lunstad, J., 2021).

### 1.3. Challenges for Intervention

Reviews of related interventions have argued there are poor results, that the mechanisms to change loneliness are not well understood, there is over-reliance on targeted approaches to increase purposeful activity or expand objective social networks, and there is poor understanding of intervention mechanisms [6] (O'Rourke, *et al.*, 2018). Also, loneliness and isolation are experienced differently because of the needs of individuals, and specific groups and the degree of loneliness experienced [7] (Fakoya *et al.*, 2020), and interventions need to be responsive to such differences.

The literature suggests effective interventions target reducing loneliness and/or depression; increasing social network size; improving quality of supports; and/or increasing frequency of social contacts through, small group, one-on-one and technology-mediated protocols [8] (Gardner *et al.*, 2018). The literature suggests effective interventions target reducing loneliness; increasing social network size; improving quality of supports; and/or increasing frequency of social contacts [8] (Gardner *et al.*, 2018).

An intervention is proposed here that builds on preliminary work and will utilize each of these strategies to build successful support with older adults, a group prone to loneliness and social isolation. This has been a developmental project building and testing the components and delivery of the intervention and then assessing preliminary efficacy in preparation for manualizing the intervention and mounting a larger, systematic test of the intervention

## 2. Methods

The approach relied upon the six steps (6sQuID) outlined by Wight *et al.* [9] for the development of public health interventions: 1) Define and understand the problem and its causes. 2) Clarify which causal or contextual factors are malleable and have the greatest scope for change. 3) Identify how to bring about change: the change mechanism. 4) Identify how to deliver the change mechanism. 5) Test and refine on small scale. 6) Collect sufficient evidence of effectiveness to justify rigorous evaluation/implementation.

A review of relevant literature, focus groups (6 groups with n = 54 participants) and 8 individual interviews held at 5 CCRC facilities informed steps 1 - 3. Thematic analysis was applied by two members of the team to the transcripts of the focus groups and interviews, yielding key insights into what needed to be addressed in an intervention and what intervention components would potentially address experiences of undesired loneliness by older adults. Pilot delivery of different components of an emerging intervention (two groups of 6 participants each) also informed step 3 and step 4. Finally, an initial version of the emerging intervention was delivered with 57 participants in 4 workshops in step 5. To assess

both step 5 and step 6 group by time effects were assessed using two scales, the 10-item CES-D and the six-item Lubben Social Network Scale and intervention participants only completed a satisfaction survey.

The formal measures were:

The CES-D-10 is a 10-item Likert scale questionnaire assessing depressive symptoms in the past week [10] (Andresen *et al.*, 1994). Three items are on depressed affect, five items on somatic symptoms, and two on positive affect. Responses range from “rarely or none of the time” (score of 0) to “all of the time” (score of 3). Scoring is reversed for items 5 and 8, as these are positive affect statements. One of the items is a measure of how often in the last week the individual felt lonely. Total scores can range from 0 to 30. Higher scores suggest greater severity of symptoms. Test-retest reliability proved strong (0.71) and a cut-off score for depressive symptoms is well established [10] [11] (Andresen *et al.*, 1994; Lee and Chokkanathan, 2008). Findings for the “I felt lonely” item only were examined separately.

The Lubben Social Network Scale-6 (LSNS-6) is a six-item self-report measure of social engagement. The LSNS-6 is a validated instrument designed to gauge objective isolation in older adults by measuring the number and frequency of social contacts with friends and family members and the perceived social support received from these sources. Lower scores on the measure are associated with increased isolation, mortality, hospitalizations and depression [12] (Lubben & Giromda, 2003).

A satisfaction survey with semi-structured questions was administered to all intervention participants asking about the value they placed on 15 different components of the intervention; areas they would have liked to spend more or less time on and why; usefulness of the handouts, and intervention activities; and new activities they themselves engaged in during and post the intervention. Using a similar thematic analysis approach two members of the team reviewed the answers and identified additional insights into what needed to be further addressed and how and where intervention components might be adjusted to better address experiences of undesired loneliness by older adults. These insights informed a further revision of the intervention manual.

The manualized intervention tested in steps 5 and 6 consisted of 10 sessions:

Session 1: Intro to Making the Connection: Introductions; Making the Connection overview; Identifying challenges and solutions (gameplay); Goal setting and closing reflections.

Session 2: What to Do about Loneliness When I Don't Want to Be Alone: Weekly check-in and gratitude moment; Understanding loneliness, isolation, and solitude (gameplay); Reducing loneliness and isolation (gameplay); Goal setting and closing reflections.

Session 3: Healthier Me: Weekly check-in and gratitude moment; Identifying ways to stay healthy (gameplay); Identifying ways to make physical activity social (gameplay); Engaging in safe physical activities (lecture); Goal setting and closing

reflections.

Session 4: Managing Life Changes as We Age: Weekly check-in and gratitude moment; Identifying life changes as we age (gameplay); Goal setting and closing reflections.

Session 5: Self Defeating Thoughts: Weekly check-in and gratitude moment; Identifying negative thoughts and strategies for change (gameplay); Goal setting and closing reflections.

Session 6: Self-Care: Weekly check-in and gratitude moment; What is self-care? (gameplay); Developing a self-care plan for every day (gameplay); Practicing grounding as one self-care strategy; Goal setting and closing reflections

Session 7: Lost and Found: Weekly check-in and gratitude moment; Identifying and reframing losses; loss and grief first-aid; Goal setting and closing reflections.

Session 8: Connections: In-Person and Online: Weekly check-in and gratitude moment; Group activity idea-storm (gameplay); Virtual socialization and safety (gameplay and discussion); Goal setting and closing reflections.

Session 9: Communication and Boundaries: Weekly check-in and gratitude moment; Identifying barriers to good communication (gameplay); Identifying facilitators of good communication (gameplay); Discussing boundaries and examples (lecturette and discussion); Goal setting and closing reflections.

Session 10: Celebrating Success: Planning for the Future!: Weekly check-in and gratitude moment; Reflecting on what's we have learned and on our successes; Graduation certificates and team prizes awarded.

Each session in steps 5 and 6 was 90 minutes to provide plenty of time for interactive activities and discussion. Delivery of each session was piloted and the manual revised to ensure standardization of delivery, timing of each component and suitability of related handouts. Each session included additional resources to enhance independent learning and discovery and to support the practicing of new skills at home. As well as short lectures, delivery included game play where participants in small groups competed with the other groups for small prizes as they considered questions about loneliness, social connecting and social activities. Sessions in steps 3 and 4 were at least two hours long and there were no gamification activities.

Ethical approval for the multiple steps in the project was received from the Temple University Institutional Review Board.

### 3. Results

Results are reported under the six steps of the Wight *et al.* [9] model for intervention development.

#### 3.1. Define and Understand the Problem and Its Causes

A specifically constructed protocol was designed based upon a review of the literature including several review articles [6] [7] (e.g., Fakoya *et al.*, 2020; O'Rourke, *et al.*, 2018) to gather information on older adult's understanding of loneliness

and isolation, extent of social networks and times when loneliness was most experienced. Data was also gathered on health concerns and depression/anxiety symptoms. In urban, suburban and rural areas of one state approximately 500 residents of continuing care communities and of programs to support older adults continuing to live independently completed the survey. Respondents who were on average aged over 80 years old described themselves as largely female (67.5%), white (93.2%) and non-Hispanic (96%). In addition, over 90% reported having one or more chronic condition with hypertension (46.3%) the most commonly noted, followed by arthritis (38.2%) and high cholesterol (33.7%). Just over 20% indicated that they have depression/anxiety conditions. There was little difference in these demographic variables between those who lived in Continuing Care Retirement Communities (CCRCs) and those in supportive programs.

For both CCRCs and supportive program participants approximately two-thirds of respondents had at least three relatives and three friends they could rely upon and with whom they felt able to share their concerns. For the remaining third, there were fewer relatives and friends including some with none and all reported higher levels of loneliness and isolation as compared to the others. A majority of participants also noted that there were times when they wished to be alone and in open ended responses highlighted the benefits of solitude. Nevertheless, weekends and holidays were highlighted as time when loneliness was difficult to manage.

### **3.2. Clarify Which Causal or Contextual Factors Are Malleable and Have the Greatest Scope for Change**

Six focus groups were held in CCRCs in urban, suburban and rural communities to explore in more depth the issues and themes that appeared to be arising from the earlier survey. An interview guide addressed six areas: health conditions, contact with relatives, contact with friends, activities, desired solitude and undesired isolation.

The focus groups comprised individuals who expressed a wish to participate, and were made up of both men and women, recent as well as long term residents of the participating CCRCs and of very active as well as less active community participants including individuals with significant caregiving responsibilities. Two researchers participated in the focus groups. Notes were taken during the focus group meetings by one of the researchers and then, verified afterwards with the other researcher. Microphones were used during the meetings so that all participants could hear and participate fully.

The cross-comparative thematic analysis of the notes taken identified five themes:

- Weekend loneliness and isolation.
- Communications issues—finding and accessing opportunities to connect.
- New resident onboarding and engagement.
- Formal services for life/health transitions.
- Sensory changes, barriers and concerns.

Focus group comments that highlighted these themes included:

*“I end up talking to myself too much... dealing with hearing and memory problems I don't have people to talk to.”*

*“How do you find out about these things in a small enough group where you don't lose about 80% of what people are saying?”*

*“I like to know how things work—sometimes when you join something people don't want to tell you how it works—so either you go along or you are not too welcome.”*

*“I fear that if I lost my wife I would be very, very lonely.”*

*“There is nothing that is addressing the isolation that comes with lack of family.”*

*“We are not trying to find the holes that people are falling into.”*

*“The weekends are so lonely.”*

Quotes selected here are representative of similar issues raised by multiple participants in all of the focus groups held.

Two groups were then purposively targeted for individual interviews (n = 8): 1) those previously participating in other data collections who indicated a desire to be interviewed individually and in addition, 2) individuals identified by staff and other interviewees as having a particular perspective on loneliness who have not previously participated in other data collections. Interview participant age ranges and other demographic features (over 80 years old, female and male, and with more than one chronic condition) were consistent with earlier samples.

The findings from individual interviews were consistent with both survey and focus group data and provided some unique though anecdotal thoughts. A Key Informant Interview Guide asked participants to respond to themed questions that reflected issues previously raised in focus groups and reflection of an emerging understanding of factors both leading to and impacting loneliness and isolation as one ages; and offering insight into what might be malleable. The themes emerging were: depth of social networks and relationships, caregiving, sensory changes, life transitions, self-perception, and environmental barriers. There was also a prompt for self-guided responses.

### **3.2.1. Social Network**

Each of the interview participants was able to describe social contacts that they found helpful to their well-being. Although some identified wider networks, most networks described were largely family based, and one person mentioned having a good friend they stay in regular contact with but also expressed a desire to build a larger social network. Much of the loneliness reported by the group in terms of social network was caused by losses in the network, usually a spouse or significant other. Several did report attending grief groups or counseling but expressed that while these activities were helpful, they were unable to meet their resulting social needs. Several indicated an inherent desire to be alone and a preference for solitude. As one respondent stated: “I feel quite comfortable mostly being alone” and that there are “so many people who are lonely and the interactions in [groups] are great but not sufficient for me.”

### 3.2.2. Caregiving

Several of the interview participants expressed having had caregiving responsibilities that were isolating though none were actively caregiving at the time of the interview. Some provided caregiving to spouses and others to parents or family members. The caregivers interviewed expressed intense feelings of loneliness and isolation during that period. One respondent stated caregiving is “one of the loneliest existences in the world” and another saying “I came through the experience knowing that I would need someone to be there for me.”

The caregivers described both instrumental support challenges such as needing rides, assistance with hands-on-care, etc. as well as the need for emotional support. One participant expressed frustration with family and friends who “just stay away.” Furthermore, caregivers also expressed they were not able to address their own health concerns due to their caregiving responsibilities; although each also described strategies they used to stay engaged, including virtual support groups and spending time at the gym. Finally, one caregiver added that “there are some universal experiences for caregivers. It is so difficult and lonely.”

### 3.2.3. Sensory Changes

Several interview participants noted sensory changes that limited their ability to connect socially. Vision loss, and in particular its impact on one’s ability to drive was noted as a confounding issue for some socializing. Hearing loss was also mentioned, and one participant expressed frustration with knowing they were “missing parts” of conversations, television, etc. The participant also noted they had not had a hearing test and were not interested in having one until it was “necessary.” An impression that hearing aides are not helpful was also expressed. Finally, several participants noted that chronic pain related to injury or deterioration impacted mobility and in one case was associated with a fear of falling such that the participant was no longer interested in attending some social engagements.

### 3.2.4. Life Transitions

As previously noted, many of the interview participants stated that losing a spouse or significant other had a profound effect on their feelings of loneliness and/or isolation. Participants noted feeling very alone even when a supportive and wide social network was in place. Several again mentioned joining grief groups and/or seeing private counselors for support as well. One member stated: “I have a good support network but that didn’t stop me from missing the early morning and end of day conversations with my wife.” These losses were not the only life transition mentioned.

Career changes were also noted as limiting social connectedness. One participant noted that becoming a full-time caregiver resulted in the end of their careers and as severely limiting social and instrumental supports. Another participant described retiring before their partner and the disconnect that left in their relationship. Although these life transitions presented challenges most participants felt that the transition period was most challenging and when they needed the most support. One participant described this as finding their “new normal.”

### 3.2.5. Self-Perception

None of the participants noted concerns in this area. While most could point to a time or circumstance where they might have experienced negative or self-defeating thoughts, each described finding supports to assist them. Several participants mentioned how helpful it was to be connected to social and instrumental supports as a member of their continuous care retirement community or through a service coordinator. One participant said “I’m impressed with how people have dealt with changes in their lives. People are so vibrant, and you can see it here,” Others also pointed out that the example of others was a helpful support and changed their own perception of their situation.

### 3.2.6. Environmental Barriers

The most notable concern environmentally for interview participants was related to transportation. One participant said that as they now have difficulty driving because of vision loss they did feel more isolated; however, they also noted that learning to navigate public transportation has helped to resolve this. Several participants were still driving their own vehicles and one reported moving to the city where public transportation was more readily available. Another participant noted the challenges living in a three-story home but rather than move, preferred to add adaptive equipment (grab bars, railings, etc.) and choose to see the stairs as a good form of exercise.

Finally, several participants mentioned the need for more technology support as they believed this to be a way to stay connected but acknowledged the barrier that they have limited experience and/or equipment. The COVID-19 pandemic definitely demonstrated the need to such supports and participants followed-up with later stated that technology support proved both more critical and more available as a result of the pandemic.

### 3.2.7. Self-Guided Responses

The interviews concluded with an open-ended question: What else would you like to tell me about your experiences with isolation and loneliness and/or the experiences of your loved ones?

Thematically responses fell into two categories of expressing a positive perspective or a focus on a personal challenge. One participant who spent many years as a caregiver described a desire to help others in a similar situation but also found that difficult to do and did not find the experience of trying to help supportive of building the types of social contacts desired. Several participants noted that being alone was often preferred, and their experience of loneliness was driven more by the loss of a loved one; also noting nevertheless, that they understood why they might need a broader social network. A participant experiencing chronic pain identified this as a barrier to living their life to the fullest, but also reported that they still felt they were able to find the supports they need despite being concerned about a decreasing ability to walk unsupported.

In the words of interview participants:

*“I do know that the group experience was never for me so I have to find other ways to build my social networks but I am also quite comfortable being alone.”*

*“Knowing that I am aging can be depressing at times, but I am still grateful to wake up every day.”*

*“I always try to find the bright spot or the humor in everything.... people who are a part of your life leave you and we don't have any control over the people we lose – hopefully (the provider) will be there when you are feeling socially isolated.”*

### **3.3. Identify How to Bring about Change: The Change Mechanism**

The responses to the survey and the insights offered through the focus groups and the interviews all pointed to both a need for interventions for many older adults but also a determination to be self-managing and the need to tailor to individual needs. The discussions around solitude versus isolation (desired and undesired being by oneself) also suggested that what was needed was more about acquiring skills than being helped. A self-efficacy theory approach (Bandura, 1997) appeared most responsive to data collection themes given its emphasis on one's confidence in achieving something and predicting one's level of success. Also, self-efficacy has been shown to be enhanced by processes of building skills, modeling, reinterpreting and re-examining ones assumptions and understandings of a situation, and the currency of social persuasion of peers [13] [14] (Bandura, 1997; Williams & Rhodes 2016). With this in mind, three experienced coaches/leaders of other evidence-based interventions addressing health promotion needs were engaged in designing a series of sessions that focused upon skills building, encouraged feedback and support from other participants, utilized mechanisms that encouraged the building of confidence and offered suggestions, not solutions when difficulties were encountered.

An initial eight session intervention was identified: Session 1: Introduction; Session 2: How we socialize; Session 3: Identifying and managing change; Session 4: How our thinking impacts or ability to connect; Session 5: Physical health, loneliness and isolation; Session 6: Finding support and managing change; Session 7: Self-care; and session 8: Planning for the future and Celebrating Success.

Scripts were written and handouts were devised for each session; two hours were allocated per session and sessions were offered on a weekly basis.

### **3.4. Identify How to Deliver the Change Mechanism**

The initial iteration of the intervention was delivered to four groups of approximately 7 individuals each. Participants were aged between 74 and 92 years, were mostly but not exclusively female (every group but one had male participants) and all participants had one or more chronic conditions. Because COVID-19 restrictions occurred during this period the intervention was offered virtually rather than in-person.

Participants were invited to participate in key informant interviews to help project researchers better understand the experience of intervention participation

and to provide feedback about the experience. The interviews were semi-structured and were conducted by a researcher independent of the pilot delivery. Responses were transcribed and analyzed resulting in recurring themes of general feedback, program sessions, program strategies, program benefits, and program strengths and weaknesses. There was also an opportunity to provide open ended comments which were analyzed separately.

#### **3.4.1. General Feedback**

Overall feedback from program participants was positive. Most of those interviewed reported that they enjoyed the group and in particular getting to know new people. Several participants mentioned how important the program was during the height of the COVID-19 pandemic as opportunities to socialize were more limited. In addition, most participants reported lasting connections with some members of their group. This was not true for all members who expressed a desire to stay connected. Participants in one of the intervention groups continued to meet on a regular basis post-intervention (as reported by several participants). When asked what they liked most about the program one participant said, “I think the connection with people. We’re still meeting!”

#### **3.4.2. Program Sessions**

Of participants interviewed most could not point to a single session, rather they described self-management strategies utilized throughout the program. These will be described under *Program Strategies*. One respondent did mention the session that included content on cognitive restructuring (session 4) as a favorite.

#### **3.4.3. Program Strategies**

Much of the feedback from respondents was focused on the self-management strategies used throughout the program and in particular the encouragement to set goals. One participant said that “learning to set goals that were manageable,” a concept that is introduced in the first session and repeated in each subsequent session was one of the most helpful strategies. Another participant noted that the goal setting was important but felt the program did not create enough accountability for goal success.

#### **3.4.4. Program Benefits**

The feedback on program benefits included much of the prior noted topics but also included a great many comments about the weekly resources/handouts. Several participants noted the resources as one of their favorite things about the program. Another said that “I knew a lot about accessing resources, but the group had so many wonderful things and of course [the facilitators] had a lot of stuff, so the combination was great.”

In addition, most people interviewed felt that the program provided important opportunities to meet new people. Noting that the program “...people helped me to see that I wasn’t the only one that was struggling” according to one respondent. Another stated that “as people talk and we really talk, even though there is a

certain amount of considerate reserve, there was a lot of intimate things that we discussed and that you would trust each other with.” This respondent also noted that the sharing of personal stories that took place in the workshop helped them to connect with other members more.

#### 3.4.5. Program Strengths and Weaknesses

When considering strengths of the program, again, respondents noted previously mentioned strategies like setting goals and the relationships built during the time together and beyond. Many respondents noted that the structure of the program allowed for discussion and sharing, and that the virtual platform worked for some participants more than others. The majority of respondents felt they benefitted from their participation and felt enriched by the new relationships even if they did not continue much beyond the program.

In terms of weaknesses there were two themes among those interviewed. The first was related to desiring follow-up sessions with the same group members, or, at least adding more sessions or stretching the sessions out over more time. There was a desire for an ongoing connection for most people interviewed. One respondent captured this by stating “[the program] was such a wonderful [program], and I guess that it, it is a shame not to follow up on it in some way because it brings people together...”

The second theme focused on the lack of depth allowed by the program structure. Some participants would have liked more in-depth discussions and time to process with a more robust accountability structure. One respondent noted that they “would have liked a little more depth in places...I thought it was really well organized and it was designed for people to kind of build on what they learned, which I really appreciate.”

#### 3.4.6. Free Response/Notable

As the interviews were semi-structured, respondents were encouraged to elaborate on or add commentary that went beyond the scope of the questions. While most comments are reflected in prior sections participants did expand on several themes.

1) Participant comments included the following:

- “It would have been lovely to be in person, but I did not feel deprived in any way of the experience, in fact, I would even add that, in some ways it’s easier to listen.”
- “Yes, I would say [I make more connections now]. I’m not the most social person. It’s a struggle, you know, and I still work on that. I work more consciously.”
- “You know, it was certainly an enjoyable experience and I think the two facilitators really worked hard you know, to make it a good experience.”
- “It just made me realize how I became kind of a hermit and I wasn’t doing those kinds of things and it made me open up more.”
- “It was really, really great to hear what other people were doing and to meet some new faces and see who live in a similar environment.”

2) Leader Comments and Session transcripts. Interviews with the leaders of the four intervention groups and an independent review of the tapes made of the sessions (with participant permission) revealed that:

- Sessions were delivered as intended.
- Goals were made and often were carried across several sessions as the process of reconnecting with family and others proved challenging, but many participants persevered.
- Self-management and self-efficacy concepts were quickly grasped by participants.
- handouts and other resources appeared to be helpful to participants, were used between sessions and were referred back to in other sessions.
- Self-care content appeared valuable, but participants indicated more time was needed to help build self-care habits.
- Conversely sessions appeared a little too long for some participants.
- Recruitment for the sessions was difficult initially and there were some drop-outs in the early sessions; leaders talked about a need to initially build some enthusiasm for the activities.
- Some participants had difficulties with the technology and as COVID restrictions were lifted returned to other in-person activities meaning some groups became too small for the mutual support intended in the intervention.

The research team considered all of this input and concluded that the intervention was seen as valuable by the participants but recognized that perhaps more and shorter sessions were needed, and wondered if delivery in person, the addition of some gamification with the chance to compete and win small prizes, and the recruitment of larger groups would improve what appeared to be a promising approach.

### **3.5. Test and Refine on Small Scale**

A revised 10-week version of the intervention (see description in Methods) was offered by two trained leaders for 90 minutes per week. A written manual provided scripts and handouts for each session and the sessions were delivered at one senior center with four groups of 10 - 15 older adults. The intervention revisions focused upon supporting older adults in understanding/addressing experiences of loneliness and disconnection through group discussion, education, and game-based skill building. The game-based component was new but responsive to input from participants and was intended to encourage participants to stay through the initial sessions and hopefully encourage their continued attendance throughout the 10 weeks.

In the “game” portion, participants practiced problem solving in team-based game play covering challenges making connections and feelings of loneliness or isolation. Participants were randomly assigned to teams weekly, and questions were posed. Buzzers were provided to each team and teams buzzed in with their

answers. The team with most correct answers in each session won a prize. Changing the composition of teams each session was designed to have participants meet and sit with different people each week, and to reduce the likelihood that the same group of participants always won the prizes.

Sessions were observed to ensure fidelity in delivery and leaders were interviewed after each session to address questions and concerns and to emphasize fidelity points.

### **3.6. Collect Sufficient Evidence of Effectiveness to Justify Rigorous Evaluation/Implementation**

Quantitative data was collected in person at commencement of the 10-week intervention and after intervention completion and was compared pre to post intervention. The group of 57 participants was aged sixty and older (69% were over 70 years), and included women and men (85% were women) and white (90%) and black participants. A t-test analysis pre to post for those who participated in the intervention indicated that there were trends (but not significance) for reduction in depression symptoms (as measured by the CES-D) and increases in social connections (as measured by the Lubben scale). These improvement trends were sustained but smaller at a second timepoint, three months after delivery of the intervention. Further analysis looked at the one item loneliness question in the CES-D which established how often in the last week a participant felt lonely. Here, participants in the intervention reported significantly less loneliness at the second time point ( $P = 0.026$ ).

1) Attendance and Outcomes. Attendance at sessions was found to be related to improved outcomes. Of the 57 persons in the intervention, 78% attended 8 or more sessions out of 10 and a logistic regression analysis found that those who attended 8+ sessions were seven times more likely to report improvements at time 2 assessment.

2) Satisfaction Surveys. In satisfaction surveys participants expressed that they first joined the program out of curiosity, interest in the topic, and wanting something to do. Others stated that it was the prize incentives that first drew them in, but “after first few classes would have come anyway,” that they “quickly saw how the class offered so much more,” and felt “then it was the interesting conversations.” That sustained their attendance.

Participants identified the top five most valuable aspects of the program as: Group discussion (59.8%,  $n = 73$ ), goal sharing (58.2%,  $n = 71$ ), goal setting (51.6%,  $n = 63$ ), gratitude moments (46.7%,  $n = 57$ ), and solution searching (41%,  $n = 50$ ). For 98% of respondents the activities were relevant and informative.

After taking the workshop, 91.4% ( $n = 106$ ) of respondents reported having made new connections with people, 40.9% ( $n = 47$ ) reported having started new hobbies, and 46.4% ( $n = 77$ ) reported having joined new clubs, groups, or programs. 93% of respondents expressed that they were likely to recommend the program to a friend.

Participants shared the following statements on the satisfaction survey:

- a) “Enjoyed program it has helped me to be more positive about doing things and meeting new people.”
- b) “I decided to join the class because I lost my spouse. And the class helped me to connect with others.”
- c) “Wanted to find out what it was about and after attending the class, I enjoyed every bit and learned a lot, I’m grateful.”
- d) “The program has given me a chance to observe how I feel about the topics we discussed. The chance to hear the answers of others broadened my understanding and made me view making new and nourishing existing friendships (contacts) differently.”
- e) “I think it has benefitted me as a person.”
- f) “I felt that all [topic/activity] areas were well covered. I enjoyed the group exchange and the new people that I got to know better.”
- g) “I really enjoyed the workshop and became friends with some other participants.”
- h) “Wonderful-connecting with others, making and sticking with goals, hearing other people’s goals which also lead me to making other important goals.”
- i) “It helped me to look into myself and realize I am very lucky to have the old and new friends that I have.”

3) Participant Reflections Three Months After the Intervention. Three months after the program concluded, participants in small focus groups elaborated on their experiences and takeaways from the program, noting in particular that they liked the opportunity to do or think about things that they normally wouldn’t, to meet new people, and to learn more about themselves and others. Participants discussed how they looked forward to attending the classes; they “couldn’t wait to come here on [workshop days]” because “getting out and doing things and staying active, you know, just kind of helps the mind and body.”

Participants valued the connections they made within the group. One participant “enjoyed just meeting everybody and hearing what they had to say. I think that helped me, just to get along with other people.” Despite coming from the same community, they “met a whole lot of people” and by the end of the 10 weeks, “took down names and addresses.” Some participants said they “started off as strangers, but we became friends.”

How much participants valued the experiences, insight, and advice that their classmates shared, and how that contributed to the connections they made was also described.

One member “learned a lot about the people that attended the class that I really didn’t know as individuals, and I really met some nice, sweet people that I’ve really gotten to know better. And you find out there’s some people that really are in need that come here, and you can help them out in any little way. It has brought that to light for me.”

Another “learned that I wasn’t the only one sharing or having the thoughts that

I did, and other people had the same thoughts and feelings about things... It was a good program, it was really interesting hearing everybody's different points of view and know that, 'yeah, I know what she means.'"

When these statements were shared, others in the group murmured in agreement. Gratitude Moments and Goal Setting were two subareas of note during these sessions.

4) Gratitude Moments. Other highlights noted for the class included the gratitude moments, which "always set us off on a positive note," as well as goal setting and gameplay. The friendly competition and interactive discussions were reported as exciting and educational. Reflecting on goal setting discussions, one participant shared that she was inspired by her classmates: "We listened to other people's goals and went 'oh that sounds like a good goal' and we changed them."

5) Goal Setting. The goal setting was a popular favorite and, months later, many "still set goals." Another activity that some participants continued to practice were the breathing exercises and meditations, whether it be to help them fall asleep at night or to improve their health. One participant talked about the positive impact the breathing exercises have had on her heart condition, with her doctor telling her that if she continued the breathing exercises, she would not have to start a new heart medication.

When asked what has changed for them since taking the program, participants shared that they were more understanding of others, more social, and more likely to say hi first.

"It made me reach out more to others... I find myself more talkative now."

"The sessions taught me to become more understanding of people. I'm not going to say [I'm] judgmental, but maybe regimented thinking. But this has taught me to be more flexible. Because we were in a group of total strangers, and yet we made it like a safe space and people were okay, like, *saying* things. Whereas you wouldn't tell a stranger, but it felt safe enough. And that was really, a really good thing."

"Attending that class made me more aware that I need to keep in contact with my relatives more often, even ones that I'm not that close with. I do find that, you know, our days are numbered and as you get older, boy you really feel the pressure"

Participants also noted changes in how they viewed themselves and operated in relationships. One participant said, "I'm learning to let my feelings come out, instead of making it about [others] all the time. So I feel better about myself, instead of putting myself down."

## 4. Discussion

Interventions need to begin with a full understanding of what is to be targeted, what intervention components are needed both to address the concerns and to attract and retain participants (feasibility) and then to be described in a manner that ensures that regardless of leader assigned, the same intervention is delivered each time in terms of components, language handouts and timing (manualization).

To achieve this the NIH Stage Model for the development of behavioral interventions argues that an iterative, recursive, and multidirectional approach is needed and one where the focus is on understanding the focus of the intervention, its potential for potency and the development of an intervention that may be successfully implemented with large numbers of the population or group toward whom it is targeted.

The Wight *et al.* [9] 6sQuID model for intervention development is designed to address all of these issues and was successfully implemented here. Each component of this approach and the mixed methods used here also ensured that effectiveness and efficacy were both addressed, the intervention considered concerns expressed by older adults themselves and involved them in multiple stages of the intervention design. An intervention was developed where people wanted to attend, returned to each session and reported enjoying while completing the work of making changes (which they also reported). There is preliminary quantitative data through small scale testing that supports that feelings of loneliness were less frequent, qualitative data through the semi-structured satisfaction survey where participants described desired changes as having occurred and that the addition of the game component was appreciated.

The systematic approach undertaken also ensured that the intervention development resulted in 1) a feasibility tested manualized version of the intervention being achieved with useable and appreciated scripts and handouts; and 2) through the observation of deliveries by research team members, fidelity in delivery was both feasible and capable of being successfully monitored. These achievements were the primary purpose of this study, and were consistent with the 6sQuID approach to intervention development and creating circumstances where more systematic testing of an intervention with potential for success may be undertaken.

There were limitations. The groups who helped with initial design efforts were primarily living independently in senior housing in CCRCs. However, the testing of the intervention occurred in senior centers who ensured more economically and race/ethnicity diverse groups. More work is needed on looking at these diversity issues and whether further modification of intervention components is then needed. The gamification undertaken did appear helpful in maintaining participation. Future research should look at other “game” approaches—for all interventions ensuring that participants obtain a sufficient “dose” so that positive change is reasonably expected remains an elusive concept that needs more specification. Here some new ground was broken but more work is needed. The quantitative results were limited however this was an uncontrolled design. Not having a control group may mean that it was not possible to explore whether an intervention such as MTC may reduce decline and not just lead to improvement as compared to those not in the intervention.

The Making the Connection intervention appears ready for more systematic evaluation such as in a randomized control trial and such a step would better test the range of possible effects.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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