


How an Intergenerational Book Club Can Prevent Cognitive Decline in Older Adults: A Pilot Study

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Abstract

Older adults are at higher risk for social isolation because of widowhood, loss of friends, retirement, physical limitations, geographic relocation, and caregiving demands. Behavioral interventions aimed at increasing social contact may help to maintain cognition and prevent cognitive decline. The purpose of this pilot study was to examine a novel intervention for social isolation with an intergenerational book club that had weekly in-person and virtual meetings of college students and older adults. We wanted to know whether the study was feasible and if our methods would be likely to generate meaningful results should it be expanded to a larger number of participants. We predicted that wellbeing and cognition would improve following participation in the book club. Results found that while measures of quality of life and affect were not statistically different before and after participation in a book club, scores on a measure of cognition (the Montreal Cognitive Assessment) were statistically significant between groups (intervention and control) showing greater improvement among book club participants.

Keywords

cognitive decline, aging, prevention, intergenerational, dementia

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Introduction

Prevention of Cognitive Decline in the Elderly

Public health initiatives that target prevention or maintenance of cognition in its earlier stages are important for older adults because age is the number one risk factor for dementia (Crous-Bou et al., 2017; Prince et al., 2014). The initial (preclinical), asymptomatic stage of Alzheimer's Disease (AD) begins with a silent, asymptomatic phase, encompassing a sequence of pathophysiological hallmarks that begin approximately 20 years before the onset of symptoms, progressing to a final stage characterized by dementia (Dubois et al., 2014; Giacobini & Gold, 2013). Research suggests that intervening prior to the clinical onset of dementia may be most effective (Dubois et al., 2014; Jansen et al., 2015; Villemagne et al., 2013) and interventions for healthy individuals at risk of AD (without symptoms) have been

effective in reducing the risk of developing AD (Crous-Bou et al., 2017). The growing body of research on the risk factors for AD and its preclinical stage supports the development of AD prevention programs (Crous-Bou et al., 2017). Delaying the onset of Alzheimer's dementia for only a few years could have a significant impact on public health.

There is general agreement on modifiable risk factors for cognitive decline and dementia that include smoking, low physical activity, sedentary lifestyle, poor diet, excessive alcohol consumption, midlife obesity, high

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blood pressure, midlife high cholesterol, diabetes, depression, low social engagement, and low cognitive engagement (Lincoln, 2014; Peters et al., 2019; Prince et al., 2014); many of these risk factors may be prevented by a healthy, active lifestyle (Crous-Bou et al., 2017). In the 2020 Lancet report, Livingston et al. (2020) list additional risk factors that include education. While education is often set earlier in life, older adults who engage in stimulating activities such as reading, crossword puzzles, and discussion of local/national issues were reported to experience better cognitive outcomes (Chang, et al., 2021; Devanand et al., 2022; Parisi et al., 2015). The degree to which the cognitive activity has a social aspect is also important to consider.

Social activities require the use of language, attention, memory, and orientation and will therefore naturally incorporate cognitive stimulation, which may build cognitive reserve and/or stimulate neural networks (Kelly et al., 2017). Evidence suggests that social engagement and participation can help reduce cognitive decline in old age. One longitudinal study (James et al., 2011)^[OBJ], over the course of 5.2 years, found that individuals who are frequently socially active had a 70% reduction in cognitive decline when compared to individuals who are not frequently socially active. Individuals who are cognitively, socially, and intellectually active have shown to have higher levels of cognitive reserve, thus decreasing their risk of cognitive decline and dementia (Stern, 2012). Perry et al. (2022) discuss social bridging, which refers to social enrichment that occurs in the context of casual relationships that cut across or link different social groups. This might include groups of different ages and races that provide opportunities for exposure to a diversity of ideas and activities.

A longitudinal cohort study of risk factors for incident AD and cognitive decline was conducted by Wilson et al. (2002) within a religious orders study of a total of 801 older Catholic nuns, priests, and brothers without dementia at the time of enrollment in the study. The frequency of participation in cognitive activities, such as reading, was obtained at baseline. Results suggested that frequent participation in cognitively stimulating activities is associated with reduced risk of Alzheimer's dementia. It should also be noted that given the communal living situation for Catholic clergy, social contact and connectedness would be comparatively higher than for other older adults living with families, spouses, or alone.

Community engagement can potentially encourage older adults to be more cognitively and physically active in social settings while facilitating their health and independence (Government Office for Science, 2016). Due to COVID-19 social distancing guidelines, older adults reported beneficial effects of social groups using the technology *Zoom* (O'Connell, 2022). Fazeli et al. (2022) report a community-based intervention to prevent cognitive decline that includes social activity and cognitive activity such as reading and taking classes. Reading is

an activity that is cognitively stimulating and has been correlated with fewer neuropathological changes in the brain with aging (Wilson et al., 2013). Book reading may stimulate neuronal connections (Berns et al., 2013). Chang et al. (2021) found that older adults with low, middle, and high educational backgrounds benefited from reading and showed less risk for cognitive decline.

In addition to social connectedness, this study attempted to add an additional level of engagement, *intergenerational engagement*. Intergenerational engagement (IE) programs are a specific form of community participation developed to provide resources and infrastructures that engage older adults and younger generations in innovative ways. Research shows intergenerational programs are associated with a positive impact on social, mental, and physical health outcomes (Krzeczkowska et al., 2021; Ronzi et al., 2018).

Our study focused on two components: cognitive stimulation from shared book reading and discussion and social engagement through an intergenerational book club.

Purpose of the Study

The purpose of this pilot study was to examine how weekly meetings in an intergenerational book club could affect older adults' subjective well-being and cognition. We predicted that well-being and cognition would improve following participation in the book club.

Research Questions

- (1) Do senior adult participants in an intergenerational book club show improvements in pre-post standardized measures of cognition (Montreal Cognitive Assessment; MoCA and the Semantic Fluency Test)?
- (2) Do senior adult participants in an intergenerational book club show improvements in pre-post standardized measures of depression (Geriatric Depression Scale; GDS), anxiety, or stress (Depression, Anxiety and Stress Scales: DASS21)?
- (3) Do senior adult participants in an intergenerational book club show improvements in pre-post standardized measures of quality of life (the Older People's Quality of Life-brief; OPQOL-brief)?
- (4) What are the themes of qualitative responses of participants who participated in a post book club focus group?

Methods

This study was approved by a University Institutional Review Board [details omitted for double-anonymized peer review].

Table 1. Demographics of Senior Participants.

	Number of participants (n = 14)	Number of controls (n = 14)
Age	$M = 70.71 \pm 8.86$	$M = 71.36 \pm 4.77$
Female	12	12
Male	2	2
White	9	9
Black	3	3
Some college	3	2
Associate's	0	0
Bachelor's	4	4
Master's	5	8
PhD	2	0

Participants

Participants include 14 senior adults (ages 60–89, $M = 70.71$), 6 college students (ages 19–24, $M = 20.31$), and 14 senior controls, which were matched as closely as possible to the ages of the intervention group. Survey and focus group results from college students will be reported in a separate study. One control participant was excluded because of a hand tremor that limited their ability to take written measures of cognition. There was no significant difference in age ($t = 0.239$, $p = .813$) or education level ($t = -0.154$, $p = .879$) between the intervention group and control participants. See Table 1 for demographics.

Participants were recruited through a newsletter distributed to members of a senior community center, and flyers posted on the university campus and surrounding city area. A \$10 gift card for Amazon was offered as an incentive for both participants and controls.

Procedures

Prior to participating, all participants and controls were provided with a written letter of informed consent.

Participants who responded positively to flyers describing the research and through word of mouth were included in the study if they met the age requirement of age 60 and older, reported having a COVID-19 vaccine, and had transportation to one of the book club locations. Community stakeholders including a social worker, a senior public librarian, and a state department official concerned with health disparities participated in book club planning meetings and the selection of the book with two graduate students spearheading the project. Book club participants met once weekly for 1 hour, for 8 weeks. Two community locations were available, one on the university campus and one at a senior community center close to campus. Participants selected the book club that was in the most convenient location and fit their schedules. The two book clubs were each led by a graduate student in speech-language pathology who had previous clinical practice and research experience with

older adults. Both leaders followed the same script with questions to guide conversations. Additionally, one of the investigators joined one to two sessions for each group to assure that the two groups were following the same procedure. The first book club meeting was in person and then alternated between in-person and *Zoom* every other week. The research team, which included two certified speech-language pathologists, predicted that the alternating format would provide participants the opportunity to lay the foundation for a rich social network during in-person meetings. Alternatively, the *Zoom* sessions reduced travel and parking requirements and provided older adults the opportunity to practice the use of a technology. Attendance was taken at the beginning of every meeting to measure adherence. It should be noted that all participants provided verbal input in all sessions and at least 50% of the exchanges were directed to the other generation; for example, an older adult commenting on a college student's reflection or a student commenting on an older adult's observation.

Cognitive function, quality of life and mood were assessed with pre- and post-test measures, incorporating a qualitative/quantitative mixed methods design. Pre- and post-testing was completed for the adult participants, using the Montreal Cognitive Assessment (MoCA), Semantic Fluency subtest, and various surveys assessing mental health including the Depression Anxiety Stress Scales (DASS21) and the Geriatric Depression Scale (GDS), and an assessment of quality of life, the Older People's Quality of Life-brief (OPQOL-brief). Additionally, qualitative data were collected using responses from focus group discussions which were led by a Social Work professor in the last book club meeting. A phenomenological qualitative approach (Neubauer et al., 2019) was employed. In accordance with this approach, we wanted to determine how individuals experience a phenomenon (the intergenerational book club) and how they felt about it. While all participants had a slightly different perspective, we were able to derive a set of findings from verbatim transcripts with field notes. Four researchers independently reviewed the transcripts from the focus groups and identified their top five themes with supporting statements. Of those, three themes were selected that all four reviewers independently identified and discussed for refinement. Specifically, the focus group discussions focused on participants' overall attitudes about the book club, their attitudes about the inclusion of college students, and the feasibility of the book club intervention. The post-testing and the focus group data was collected approximately 9 to 10 weeks after the pre-testing was completed.

MoCA. The MoCA is a measure of cognition developed as a rapid screening tool to detect the presence of mild cognitive impairment. It has been found to have high reliability (Brujnen et al., 2020), sensitivity and specificity (Nasreddine et al., 2005; Smith et al., 2007). The

MoCA contains subtests in attention, concentration, executive functions, memory, language, visuospatial skills, abstraction, calculation, and orientation.

Semantic fluency. Semantic fluency involves asking participants to recall as many items as possible in each category in a set amount of time. In this study, participants were asked to name as many animals, fruits, and vegetables as they could remember in a minute for each category (Holtzer et al., 2008). These tasks are widely used as a measure of executive function and to assess semantic memory (Reverberi et al., 2014).

DASS21. The DASS21 is a 21-item self-report instrument used to measure negative emotional states, including depression, anxiety, and stress. It has been found to be correlated with the Beck Depression Inventory ($r=.74$) and the Beck Anxiety Inventory ($r=.81$; Lovibond & Lovibond, 1995).

GDS (short form). The GDS (short form) is a 15-item self-reported measure of depressive symptoms in older adults. The questionnaire is a derivative of the long form, which is based on the 100 most common questions used to diagnose depression (Rinaldi et al., 2003). The GDS has been found to demonstrate high reliability and validity. Most sensitivity and specificity scores have remained over 80% in studies examining the GDS long form (Stiles, 1998).

OPQOL brief. The OPQOL brief is a self-reported survey used to assess older adults' overall life satisfaction. It has been found to have high reliability and validity (Bowling et al., 2013).

Results

Adherence

During the book club, no participants dropped out. Adherence rates to weekly book club meetings averaged 88%, and sessions attended ranged from 7 to 10. Two participants missed no sessions, eight only missed one, and four missed more than one.

- (1) Do senior adult participants in an intergenerational book club show improvements in pre-post standardized measures of cognition (Montreal Cognitive Assessment; MoCA and the Semantic Fluency Test)?

MoCA

Possible MoCA scores range from 0 to 30. Scores less than 25 indicate the potential presence of cognitive decline (Nasreddine, 2022). All the participants, but one (MoCA score=22), scored above 25 at baseline testing.

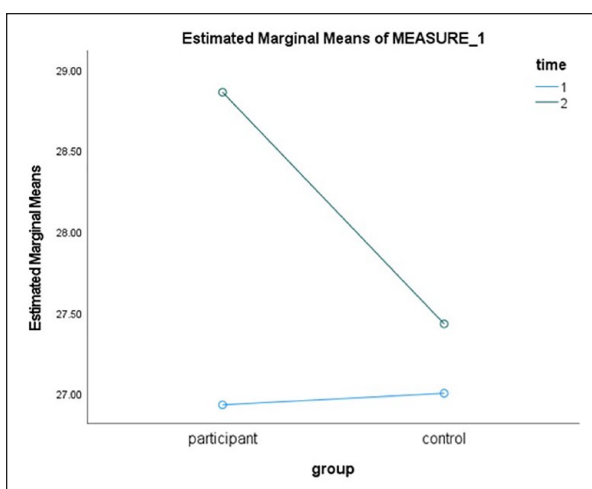


Figure 1. This graph demonstrates the differences between participants and controls at pre- and post-testing on the MoCA. Participants improved significantly from Time 1 (pre-testing) to Time 2 (post-testing) while controls only slightly improved.

In the participant group, 10 individuals increased scores from pre-to-post-test measures. One of these participants increased by 7 points. Three individuals' scores remained the same, though their initial scores were already high, ranging from 26 to 30.

In the control group, eight participants also showed improved scores by 1 to 2 points, two remained the same, and four of the participants' scores decreased.

A repeated measures ANOVA with a Between-Subjects Factor was conducted to see if there was a statistical difference in pre-and post-MoCA scores between the participant and control groups. There was a statistical significance $F(1, 13)=4.635, p=.041$. Cohen's d was calculated as 0.844 (Lenhard & Lenhard, 2016) (Figure 1).

- (2) Do senior adult participants in an intergenerational book club show improvements in pre-post standardized measures of depression (Geriatric Depression Scale; GDS), anxiety, or stress (Depression, Anxiety and Stress Scales; DASS21)?

GDS

The GDS scale ranges from 0 to 15. Scores greater than or equal to five indicate the presence of more moderate to severe depressive symptoms.

In the participant group, four participants had a decrease in GDS scores, indicating a decrease in reported depressive symptoms, and nine participants' scores remained the same. However, it should be noted that eight of these participants had an initial score of 0, which is the lowest score possible and therefore, would not be able to decrease between pre- and post-testing.

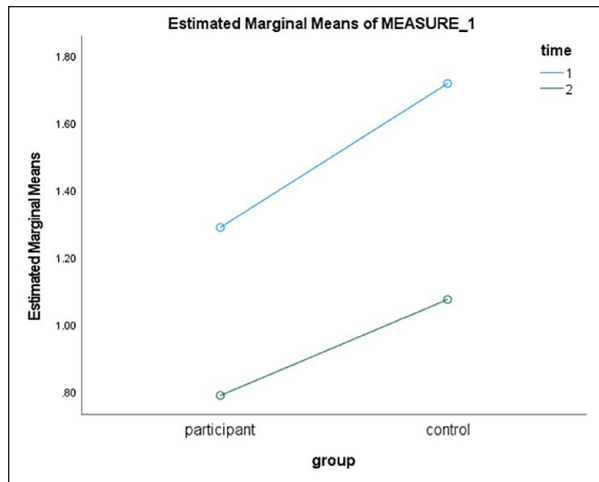


Figure 2. This graph demonstrates the differences between participants and controls at pre- and post-testing on the GDS. Both groups improved at similar rates between Time 1 and Time 2.

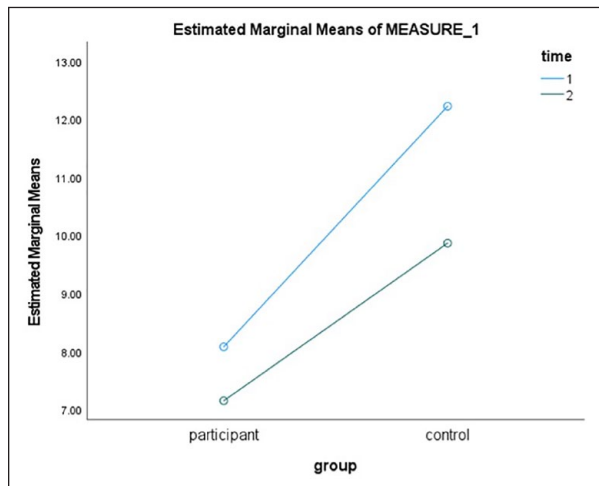


Figure 3. This graph demonstrates the differences between participants and controls at pre- and post-testing on the DASS21. While a significant difference was not found, the participant group, on average, scored lower than the control group indicating fewer reported affective symptoms.

Six control participants also decreased in GDS scores, and three of the control participants increased in GDS scores between pre- and post-testing.

A repeated measures ANOVA with a Between-Subjects Factor was conducted to see if there was a statistical difference in pre-and-post GDS scores between the participant and control groups. A statistically significant difference was not found $F(1, 13)=0.076, p=.785$ (Figure 2).

DASS21

The DASS21 measures self-reported states of depression, anxiety, and stress. Negative emotional symptoms are assessed using a 4-point Likert scale, ranging from 0

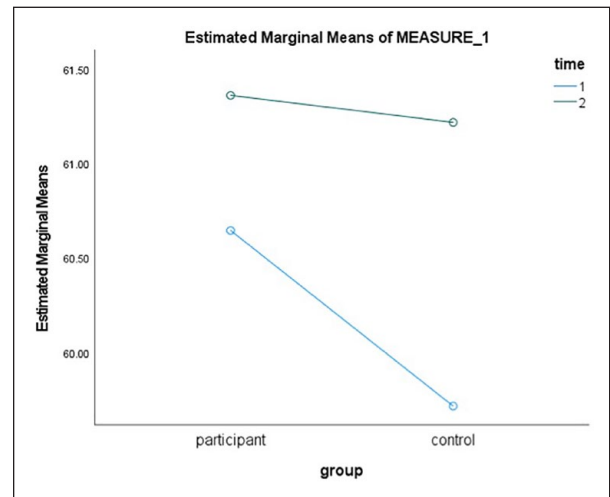


Figure 4. This graph demonstrates the differences between participants and controls at pre- and post-testing on the OPQOL. While this graph shows controls increased, on average, more than participants, it should be noted that participants started with higher scores, leaving less room for improvement.

to 3. These items are then subdivided into measures of depression, anxiety, and stress. Higher scores indicate a greater frequency of negative emotional states, with the maximum score being 63. Between groups, self-reported scores on all three emotional states were highly variable between pre- and post-testing. All participants scored relatively low on the scale, with the highest score being 20.

A repeated measures ANOVA with a Between-Subjects factor found no statistical difference between DASS21 scores, $F(1,13)=0.493, p=.489$ (Figure 3).

- (3) Do senior adult participants in an intergenerational book club show improvements in pre-post standardized measures of quality of life (the Older People’s Quality of Life-brief; OPQOL-brief)?

OPQOL

The OPQOL-brief scale is a subjective measure of life satisfaction based on responses to survey questions. Potential scores range from 0 to 65, with higher scores indicating higher life satisfaction. Scores were variable between pre- and post-testing in both the participant and control groups.

A repeated measures ANOVA with a Between-Subjects Factor was conducted to see if there was a statistical difference in pre-and-post OPQOL scores between the participant and control groups. Note that the scale in the above table represents 1 to 2 point mean differences with the mean scores ranging from 59 to 61.50. All participants scored slightly higher at Time 2. A statistical difference was not found $F(1,13)=.159, p=.694$ (Figure 4).

Table 2. Book Club Qualitative Themes from Focus Groups.

Themes	Supporting quotes
The book club was a positive and engaging experience.	<p>“I really looked forward to it. It was wonderful. . .the book was great, and the privilege of coming here on the campus and meeting everyone. I mean, that’s a privilege.”</p> <p>“Another thing I really enjoyed was seeing another side of my husband who does not speak out in groups. . . he came out so much.”</p> <p>“I retired in February, so this was something interesting to do for me and different. . . I was looking forward to a new experience, and that’s exactly what it was for me.”</p>
Participants enjoyed sharing ideas and perspectives.	<p>“And then hearing. . . I have other African American friends. . . but hearing some of the things [deleted] has been through was very helpful.”</p> <p>“I was very pleased when they were sharing about their experience in 2008 when we went through the economic crisis because that – they’re about the age of my children, so my children have never talked to me about that. . . it was really enlightening for them to share their experience.”</p> <p>“When you’re reading you want someone to discuss it with, and this is what it allows you to do.”</p>
Participants enjoyed connecting with younger adults.	<p>“I’ve read about communities where young people and old people live together and do things together. . .I’d love to see something like that happen.”</p> <p>“Being around young people, if you can really get to know them, makes you feel younger.”</p> <p>“I’m just watching with wide eyes to see what they [young people] do to change this world . . . I really feel fortunate to be a part of their group.”</p> <p>“The whole ambience of having the generations and getting to talk and getting the different perspectives was great.”</p>

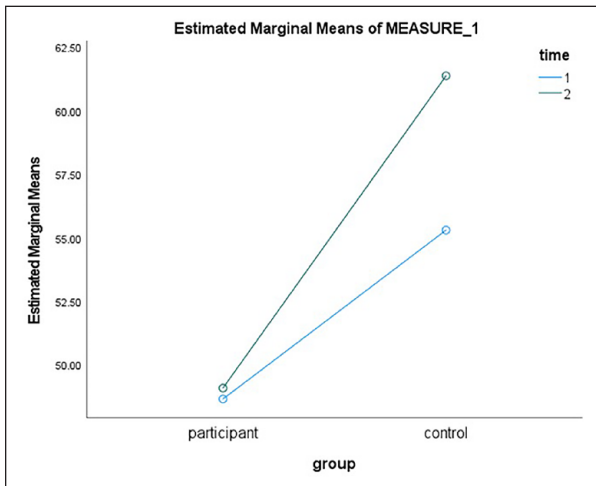


Figure 5. This graph demonstrates the differences between participants and controls at pre- and post-testing on Semantic Fluency.

Semantic Fluency

Semantic fluency is used as a measure of executive function and language and included participants naming as many fruits, vegetables, and animals they could think of in 1 minute each.

Like OPQOL scores, semantic fluency scores varied between pre- and post-testing in both the participant and control groups. Some individuals decreased, while others increased or remained stable. The controls showed more improvement than the participants from Time 1 to Time 2. A repeated measures ANOVA with a Between-Subjects

Factor was conducted to see if there was a statistical difference in pre-and-post semantic fluency scores between the participant and control groups. A statistical difference was not found $F(1, 13) = 3.48, p = .074$ (Figure 5).

- (4) What are the themes of qualitative responses of participants who participated in a post book club focus group?

Qualitative Analysis

Responses to focus group questions were rated among four researchers. The following themes were agreed upon following analysis of the senior book club participant focus groups (Table 2).

Discussion

This study demonstrated that the intergenerational book club was a feasible community-based intervention with eight alternating between in-person and virtual sessions. Graduate students led the sessions with older adults and college students participating in the intervention. All but one volunteers were within the normal range of cognition and reported few symptoms of depression, anxiety, and stress at baseline. The combination of alternating sessions was well-accepted and provided a good balance of personal contact and ease of delivery through electronic means. It was notable that although affective symptoms showed no significant change, a standardized measure of cognition did show improvement in book club participants that was not observed for the control

participants. Scores on the MoCA were found to be statistically significant between participants and controls from pre- to post-testing.

Scores on the GDS, DASS21, OPQOL-brief, and semantic fluency were not found to significantly differ from baseline to post book club intervention. Generally, the participants in the present study had high normal scores in mood and quality of life; therefore, it was difficult to demonstrate improvement on these measures.

Participants reported the book club to be an overall positive, stimulating, and enlightening experience. Senior participants stated that the inclusion of students in the book club stimulated discussion.

Limitations

Given this was a pilot study, there is a need for future research to see how weekly social intergenerational meetings can contribute to improvements in cognition and engagement in older adults (In, 2017). The results of this study are not only limited to sample size but to the overall diversity represented in this sample (UCLA Statistical Consulting Group, n.d.). Most participants were white, college-educated females. Future directions should include larger, more diverse sample sizes to be more representative of the population. The current study is limited by the small number of participants. Future research should include more concurrently run groups with possibly more data points built in with mid-testing.

Conclusion

Though future research is needed, the results of this study are promising and contribute to existing research on how to improve cognition in the aging population. The present study addressed two potential preventative strategies for cognitive decline in older adults: social engagement and cognitive stimulation. Perry et al. (2022) discuss a hypothetical neuroprotective mechanism of social bridging which refers to social enrichment occurring in the context of expansive networks with casual relationships that cut across or link different social groups beyond the family. The use of alternating sessions may be beneficial for other interventions developed for older adults. These implications are important because the prevention of cognitive decline is critical in older adults due to increasing rates of aging and cognitive decline. Through preventative measures we can help older adults continue to have a good quality of life. The challenge for future research will be to recruit older adults who are experiencing significant social isolation. Managers of senior housing and primary care physicians could develop referral methods that would allow for the identification of socially isolated older adults and the provision of interventions such as the intergenerational book club (Due et al., 2018, Taylor, 2020).

Declaration of Conflicting Interests

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