

Original Paper

Examining the Effect of Online Engagement on Older Adults' Subjective Memory Capability: Cross-Sectional Path Analysis

Soohyoung Rain Lee^{1*}, PhD, MSW; Hang Liu^{2*}, MSW

¹Wurzweiler School of Social Work, Yeshiva University, New York, United States

²Selfhelp, New York, NY, United States

*all authors contributed equally

Corresponding Author:

Soohyoung Rain Lee, PhD, MSW
Wurzweiler School of Social Work
Yeshiva University
2495 Amsterdam Ave, 905
New York 10033
United States
Phone: 1 9173498419
Email: rain.lee@yu.edu

Abstract

Background: The utility of online engagement in enhancing quality of life and mitigating social isolation among older adults is well documented. However, its relationship with cognitive functioning, particularly through online engagement, requires further exploration.

Objective: This study investigated whether active online engagement via the Virtual Senior Center (VSC) program was associated with subjective memory capability among older adults and whether subjective memory capability was associated with psychological well-being and loneliness.

Methods: This study included a cross-sectional sample of 53 homebound older adults participating in the VSC program, which offers diverse online classes to promote social interaction. Path analysis was conducted to examine the associations among online engagement, subjective memory capability, quality of life, and loneliness.

Results: Increased participation in VSC activities was associated with higher subjective memory capability ($\beta=0.29$, 95% CI 0.04-0.54; $P<.02$). Subjective memory capability was associated with better quality of life ($\beta=0.29$, 95% CI 0.04-0.54; $P<.001$) and lower loneliness ($\beta=0.29$, 95% CI 0.04-0.54; $P<.003$). No direct associations were observed between online engagement and quality of life or loneliness.

Conclusions: Subjective memory capability was associated with better quality of life and lower loneliness. Although online engagement had no direct association with quality of life and loneliness, the observed indirect pattern suggests that subjective memory capability may represent a psychologically meaningful pathway through which structured online engagement relates to well-being. These findings highlight the potential of digital platforms to complement traditional forms of socialization, particularly for older adults facing physical or geographic barriers to interaction.

JMIR Hum Factors 2026;13:e73018; doi: [10.2196/73018](https://doi.org/10.2196/73018)

Keywords: online engagement; homebound older adults; subjective memory ability; social relationships; digital inclusion

Introduction

Background

In an increasingly digital society, online engagement, which is defined as active participation in digital platforms for social interaction, information sharing, and learning, has emerged as a key factor influencing the well-being of older adults.

Given the potential of digital health technologies to mitigate social isolation and promote cognitive health, understanding the impact of online engagement on cognitive function is critical, particularly for homebound or mobility-challenged older adults [1,2].

Existing research has reported that active online engagement is associated with reduced feelings of isolation, which are prevalent among older adults, and has been examined in

relation to cognitive functions such as memory. For example, older adults who use online platforms for social interaction have reported higher perceived quality of life and cognitive function [3,4]. However, there remains a notable gap in understanding the association between online engagement and subjective memory capability, defined as an individual's self-assessment of everyday memory functioning, and how these factors relate to overall well-being among older adults [5,6]. Many previous studies have focused on general internet use or access rather than participation in structured, program-based online engagement designed to promote sustained social and cognitive interaction [7,8]. As digital health and online community-based interventions continue to expand, understanding how structured engagement contexts relate to cognitive self-perception and well-being represents an important area for further investigation.

Given the growing interest in digital therapeutics and telehealth interventions, it is important to explore how online engagement contributes to cognitive self-perception and well-being among older adults. This study examined the association between participation in the Virtual Senior Center (VSC) program and subjective memory capability and social well-being among homebound older adults. Specifically, this research aimed to answer the following questions:

1. Does participation in a VSC influence older adults' subjective memory capability?
2. Does increased online engagement lead to improved social connectedness and well-being?
3. How does self-perceived memory capability mediate the relationship between online engagement and well-being?

It was hypothesized that greater participation in VSC activities would be positively associated with subjective memory capability and that subjective memory capability would be associated with higher quality of life and lower loneliness. This study contributes to the broader discussion of digital inclusion and cognitive health interventions by examining these relationships within a structured online engagement program for a homebound population. By focusing on subjective memory capability as a psychological mechanism, this study offers practical insights for designing digital health interventions and community-based programs targeting socially isolated older adults.

Literature Review

Research on internet communication technology in aging populations has highlighted the potential of online engagement to enhance social interaction, reduce isolation, and support psychological well-being [7,9]. Older adults who actively use online platforms for social interaction have reported higher life satisfaction, improved mental health, and better perceived cognitive outcomes than those who remain digitally disconnected [8,10].

Despite the recognized benefits of online engagement for mental health, studies examining its relationship with cognitive function and memory perception remain limited. Much of the literature has focused on the psychosocial aspects of general internet use, such as reducing loneliness

and enhancing social connectedness [11,12]. Less attention has been paid to structured, program-based online engagement designed to promote sustained social and cognitive interaction. More recent studies suggest that such structured online engagement may be associated with cognitive benefits, including subjective memory capability and other indicators of cognitive self-perception [13,14].

The VSC program in this study was developed to provide older adults with structured online activities, including educational courses, group discussions, and interactive social experiences. Unlike passive internet browsing or unstructured social media use, the VSC emphasizes scheduled and socially interactive participation. As a community-based platform, it facilitates ongoing engagement among older adults who may face barriers to in-person interaction. Specifically, the facilitator leads each class and encourages participants to engage and lead the group. In contrast to studies focusing on general internet use, the VSC represents a structured program-based approach to online engagement, making it a useful context for examining how sustained participation in organized digital activities relates to cognitive self-perception and well-being.

Prior studies have reported that tailored digital interventions may support cognitive engagement among older adults. For example, the Internet-Based Conversational Engagement (I-CONNECT) program found that structured online socialization significantly improved cognitive performance in older adults [13,14]. In a similar way, the VSC reflects an interactive, community-based approach that may be relevant to digital health interventions targeting older adults who face barriers to in-person engagement.

Theoretical Framework

This study is grounded in 2 complementary theoretical frameworks that help explain how online engagement may relate to cognitive self-perception and well-being in older adults. Cognitive reserve theory posits that engaging in intellectually stimulating activities helps build cognitive resilience, thereby maintaining cognitive function and delaying the onset of cognitive decline [15]. Research has shown that older adults who participate in structured cognitive and social activities, such as online discussions, memory training, and digital learning platforms, demonstrate better cognitive performance and self-perceived memory capabilities [13,14]. Digital interventions, including internet-based cognitive training and virtual social engagement, have been found to foster cognitive reserve, particularly among older individuals at risk of social isolation [1,2].

Complementing this perspective, socioemotional selective theory suggests that, as individuals age, they become more selective in their social interactions, prioritizing emotionally meaningful relationships and experiences [16]. Studies have demonstrated that older adults tend to prefer digital communication tools that facilitate socially enriching interactions, such as video calls and virtual communities, over passive internet browsing or impersonal interaction [3,4]. Online platforms such as the VSC cater to these preferences by providing structured, interactive environments where participants can

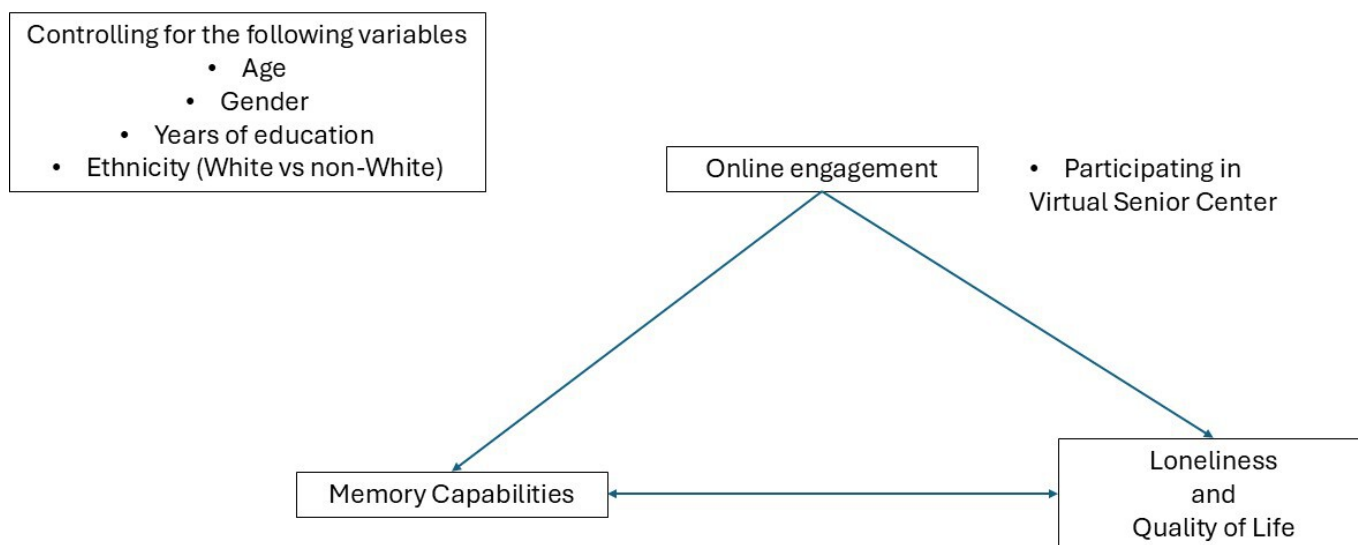
engage in meaningful social and cognitive activities. Research on digital health interventions has highlighted that programs designed around socioemotional needs and cognitive engagement, such as the I-CONNECT program, are particularly effective in maintaining cognitive function and improving emotional well-being in older populations [13,14] (see Figure 1 for the theoretical model).

Given the increasing importance of digital inclusion, addressing disparities in digital access and engagement is critical [17]. Socioeconomic status, health conditions, age, and living arrangements all influence older adults' ability to benefit from online engagement [9,18-20]. This study

examines the role of online engagement in supporting older adults who choose to age in place, particularly those with physical impairments that limit their access to in-person socialization. By facilitating virtual social interactions and providing access to cognitively stimulating activities, online engagement has the potential to enhance subjective memory capability and overall quality of life for these individuals.

By integrating cognitive reserve theory and socioemotional selective theory, this study provides a comprehensive framework for understanding the dual role of digital engagement in promoting cognitive self-perception and emotional well-being among older adults.

Figure 1. Theoretical framework.



Methods

Participants and Recruitment

This study examined a cohort of 53 community-dwelling, homebound older adults participating in the VSC program, an online engagement platform designed to support social interaction and cognitive health. Participants were recruited through community aging services, older adult centers, and digital literacy outreach programs targeting older adults at risk of social isolation due to physical impairments, socioeconomic constraints, or mobility limitations.

These partnering organizations identified and referred individuals who experienced difficulty participating in in-person social activities, including those with limited mobility or chronic health conditions. Therefore, they represent a convenience sample of individuals enrolled in the VSC program during the study period.

To be eligible for the study, participants had to (1) be aged 55 years or older and residing in a community setting, (2) have access to a computer with internet connectivity (provided if necessary), (3) be enrolled in the VSC program and actively participating in its activities, and (4) report no clinically diagnosed severe cognitive impairments or neurodegenerative conditions (eg, Alzheimer disease).

Although the program primarily serves older adults aged 55 years or older, the final sample included participants ranging from 47 to 98 years, reflecting real-world enrollment patterns within the VSC program (ie, individuals with disabilities). This study focused on older adults who were dual eligible for Medicaid and Medicare, a population often characterized by low income, greater medical complexity, and increased health vulnerability [21-24]. To ensure equitable participation, participants were provided with computers; internet access when needed; and initial onboarding support, including assistance with logging into sessions and basic troubleshooting. When participants experienced technical difficulties, staff members could resolve the issues remotely without physically visiting their location to expedite the resolution process.

Study Design and Measurement

This study used a cross-sectional design, collecting data over a 6-month period (August 2017-January 2018) using a structured online questionnaire distributed through the VSC platform. Participants completed the survey after at least 3 months of engagement with the program to ensure that they had sufficient exposure to VSC activities before reporting on their experiences.

Ethical Considerations

This study was approved by the WCG institutional review board affiliated with Yeshiva University (IRB00023382). All participants provided informed consent prior to participation. Participant privacy and confidentiality were strictly maintained throughout the study, and all data were de-identified prior to analysis.

Measurement

Subjective Memory Capability

Participants' self-perceived memory function was assessed using the Metamemory in Adulthood (MIA) capacity subscale [25-27]. The MIA measures self-assessed memory performance in areas such as name recall, event tracking, and appointment remembering (eg, "I am good at remembering names," "I am good at remembering birth dates," and "I have no trouble keeping track of my appointments"). This validated measure has been widely used in aging research and has demonstrated moderate correlations with objective cognitive function [28].

Loneliness and Social Engagement

Loneliness was measured using the University of California, Los Angeles (UCLA), Loneliness Scale–Short Form [29,30], which assesses perceived social connectedness and feelings of isolation (eg, "I feel lack of companionship" and "I feel left out"). Given that older adults in this study were homebound, the short version of the UCLA scale was selected to reduce respondent burden while maintaining validity [31].

Quality of Life

Quality of life was measured using the Older People's Quality of Life Questionnaire (eg, "I enjoy my life," "I am happy most of the time," and "I feel lucky compared to most people") [32-34]. This scale captures emotional well-being, social relationships, and life satisfaction, making it a comprehensive measure for assessing the impact of online engagement.

Online Engagement

Online engagement was quantified through the number of hours per week spent on the VSC platform, categorized into 1 to 3 hours, 4 to 6 hours, and 7 hours or more of participation. These data were extracted from VSC activity logs and reflect participation in structured online sessions (eg, classes and discussions) rather than passive internet use.

Rationale for Self-Reported Measure

While objective cognitive measures (eg, neuropsychological assessments) were not included in this study, research

has shown that subjective memory capability is strongly associated with cognitive performance and can serve as a reliable predictor of cognitive decline [35,36]. This study focused on perceived cognitive capability rather than objective performance, consistent with research emphasizing subjective well-being and self-perception in the digital health context [8].

Statistical Analysis and Power Considerations

To enhance the robustness of the estimates, bias-corrected bootstrapping was used, a technique chosen for its ability to provide more accurate CIs in path analysis [37]. This procedure, based on 5000 bootstrap samples, has been shown to provide more accurate CI estimates in mediation and path models than percentile bootstrap methods [38,39]. Further, it allows for indirect effects within the model without type 1 errors, which are often associated with percentile bootstrap methods [37,40]. In the path analysis, standardized path coefficients and explained variance (R^2) were reported to describe the strength and explanatory contribution of the modeled associations [41,42]. Effect size indexes designed for mean differences (eg, Cohen d) were not applicable because the analyses focused on associations among continuous variables rather than group comparisons.

Results

Overview

Table 1 shows that the participants' average age was 77.86 (SD 11.55; range 47-98) years. The sample was approximately 72.1% (31/43) White individuals, 23.3% (10/43) African Americans, and 4.7% (2/43) Asian individuals. Only 1.9% (1/53) of the participants stated that they were Hispanic. Most participants (41/50, 82%) were female, and male individuals accounted for 18% (9/50). Participants' educational levels were as follows: 34% (16/47) had a 2-year college degree, 25.5% (12/47) had a master's degree, 25.5% (12/47) had a high school diploma, and 14.9% (7/47) had a bachelor's degree. Most participants maintained their social network or contact via phone (34/53, 64.2%), and 28.3% (15/53) reported engaging with others mainly through the VSC program. Only 7.5% (4/53) of the participants reported engaging with others in person.

The average score on the MIA capacity subscale [25] was 39.00 (SD 10.06; range 14-61). The average score on the UCLA Loneliness Scale was 7.69 (SD 3.60; range 0-12), and the mean score on the Older People's Quality of Life Questionnaire was 13.22 (SD 3.45; range 3-19).

Table 1. Sample demographics (N=53).

	Values
Age (y), mean (SD; range)	77.86 (11.55; 47-98)
Gender (n=50), n (%)	
Male	9 (18)
Female	41 (82)
Race (n=43), n (%)	
Asian	2 (4.7)
Black or African American	10 (23.3)
White	31 (72.1)
Educational level (n=47), n (%)	
High school diploma	12 (25.5)
2-y college degree	16 (34)
Bachelor’s degree	7 (14.9)
Master’s degree	12 (25.5)
Socialization tool, n (%)	
Phone	34 (64.2)
VSC ^a	15 (28.3)
In person	4 (7.5)
OPQOL ^b score (quality of life), mean (SD; range)	7.69 (3.60; 0-12)
UCLA ^c Loneliness Scale score (reverse scored), mean (SD; range)	13.22 (3.45; 3-19)

^aVSC: Virtual Senior Center.

^bOPQOL: Older People’s Quality of Life Questionnaire.

^cUCLA: University of California, Los Angeles.

Path Analysis

Path analysis revealed, as Figure 2 shows, that online engagement significantly increased older adults’ subjective memory capability ($\beta=0.29$, 95% CI 0.08-0.50; $P<.02$). Individuals’ memory capability was positively associated with both quality of life ($\beta=0.90$, 95% CI 0.09-0.57;

$P<.0001$) and loneliness ($\beta=0.37$, 95% CI 0.18-0.57; $P<.003$). While demographic factors did not significantly influence participation in the VSC program, there were no direct effects on online engagement and quality of life and loneliness (refer to the full report in Table 2).

Figure 2. Path analysis with indirect effect. * $P<.05$. OPQOL: Older People’s Quality of Life Questionnaire; UCLA: University of California, Los Angeles.

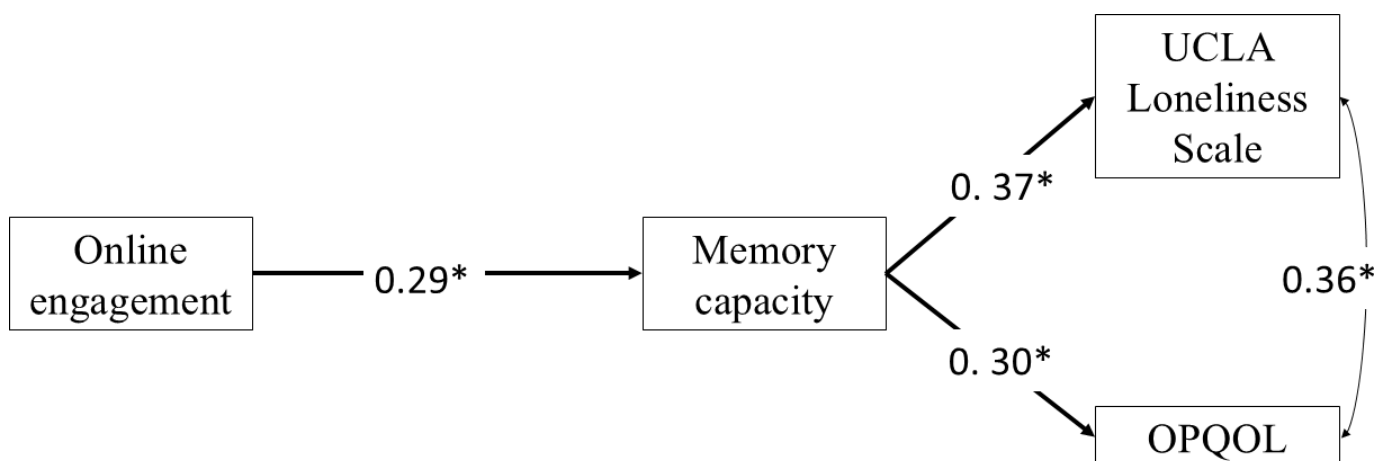


Table 2. Path analysis: effect of online engagement on loneliness and quality of life.

Variable	Coefficient (95% CI)	β (StdYX; 95% CI)
Age→online engagement	0.003 (−0.01 to 0.01)	0.05 (−0.19 to 0.29)
Gender→online engagement	1.19 (−0.09 to 2.48)	0.20 (−0.01 to 0.42)
Years of education→online engagement	0.02 (−0.08 to 0.13)	0.05 (−0.18 to 0.28)
Ethnicity→online engagement	1.77 (−2.26 to 5.18)	0.09 (−0.12 to 0.32)
Online engagement→memory capability	1.65 ^a (0.44 to 2.86)	0.29 ^a (0.08 to 0.50)
Memory capability→loneliness	0.07 ^a (0.03 to 0.12)	0.37 ^a (0.18 to 0.57)
Memory capability→quality of life	0.07 ^a (0.02 to 0.12)	0.30 ^a (0.09 to 0.50)

^a $P < .05$.

Discussion

Interpreting the Role of Subjective Memory Capability

This study examined the association between structured online engagement and subjective memory capability among older adults participating in a VSC program. The findings suggest that increased participation in VSC activities was positively associated with subjective memory capability, which, in turn, was significantly linked to higher quality of life and reduced loneliness. However, online engagement was not directly associated with well-being measures, indicating that subjective memory capability plays a key mediating role.

A central finding of this study is the indirect effect of online engagement on well-being through subjective memory capability. While previous research has examined the benefits of online engagement for reducing social isolation and loneliness [8,11], our findings highlight a different pathway. Online engagement may be associated with cognitive self-perception, which may, in turn, relate to emotional and social well-being.

This aligns with prior studies showing that a positive self-view of memory capability can improve confidence in cognitive abilities, leading to greater social participation and engagement in intellectually stimulating activities [1,35]. The VSC program may provide an environment where older adults can reinforce their cognitive self-efficacy through structured interactions, online discussions, and virtual socialization.

Given the increasing emphasis on digital health interventions for aging populations, this study underscores the need for more tailored cognitive engagement programs that explicitly target memory self-perception and self-efficacy rather than focusing solely on social connectedness.

Comparisons With Prior Digital Interventions

Our findings align with results from the I-CONNECT study that demonstrated that internet-based social interaction interventions can enhance cognitive functions in older adults [13,14]. Similarly, research on cognitive training apps and digital learning platforms has suggested that active digital

engagement can reinforce cognitive reserve and maintain subjective cognitive function in aging populations [3,6].

However, this study differs in its approach by focusing on a blended intervention integrating social and cognitive engagement. Unlike traditional cognitive training programs emphasizing memory exercises or problem-solving tasks, the VSC model incorporates structured discussions, interactive virtual activities, and peer-to-peer engagement. This approach may provide a more sustainable and engaging format for older adults, particularly those who may not actively seek cognitive training but can benefit from embedded cognitive engagement within social participation. These findings suggest that digital health interventions targeting cognitive well-being should combine socialization, structured engagement, and cognitive stimulation to maximize effectiveness [7, 8].

Implications for Digital Health and Aging Care

The results have several implications for digital health initiatives and gerontological practice. Structured online engagement programs such as the VSC could be incorporated into broader telemedicine and aging care strategies to support older adults in maintaining cognitive and social well-being. Given the growing prevalence of digital health platforms, integrating online engagement as a recognized intervention in aging services may help address social isolation and support cognitive well-being among older adults, particularly those who are homebound or facing mobility challenges [9,17].

Beyond integration into health care, the findings also emphasize the need for more user-centered digital platforms designed specifically for older adults. Digital interventions should prioritize features that enhance cognitive self-efficacy, such as interactive discussions, virtual memory exercises, and personalized engagement experiences. Ensuring accessibility and ease of use is equally critical as digital literacy and technological barriers remain challenges for many older adults. Addressing disparities in digital access through training programs, affordable technology, and support networks will be essential in expanding the reach and effectiveness of online engagement programs [18,19,43].

Limitations and Future Research

While this study provides valuable insights, several limitations should be considered. The cross-sectional design limits

the ability to establish causality among online engagement, subjective memory capability, and well-being. Future research using longitudinal data would clarify how sustained digital participation influences cognitive and emotional outcomes over time. Additionally, while subjective memory capability is a widely used measure in cognitive aging research, incorporating objective cognitive assessments would strengthen the findings and allow for a more comprehensive evaluation of the impact of online engagement [36,44].

The relatively small sample size presents another limitation as it restricts the generalizability of the findings to broader populations of older adults. Given the modest sample size, the findings should be interpreted as exploratory and hypothesis generating, and replication in larger samples is warranted. Future research should also explore comparative analyses of different online engagement models, including cognitive training applications, telehealth platforms, and interactive digital communities, to determine which

approaches are most effective in supporting cognitive and social well-being.

Conclusions

This study examined the potential of structured online engagement programs to enhance cognitive self-perception, influencing emotional and social well-being among older adults. The findings reinforce the importance of subjective memory capability as a key mediator in the relationship between digital engagement and overall well-being. As digital health and telemedicine evolve, integrating interactive and cognitively engaging online experiences into aging care models may provide scalable solutions for promoting cognitive and social health in older populations. Expanding access to well-designed and inclusive digital programs will ensure that older adults can fully benefit from the advancements in digital health and online interventions.

Funding

The authors declared no financial support was received for this work.

Conflicts of Interest

None declared.

References

1. Glatt RM, Amos A, Merrill DA, et al. Neurocognitive effects of an online brain health program and weekly telehealth support group in older adults with subjective memory loss: a pilot study. *Geriatrics (Basel)*. Mar 14, 2024;9(2):37. [doi: [10.3390/geriatrics9020037](https://doi.org/10.3390/geriatrics9020037)] [Medline: [38525754](https://pubmed.ncbi.nlm.nih.gov/38525754/)]
2. Ramos H, Alacreu M, Guerrero MD, Sánchez R, Moreno L. Lifestyle variables such as daily internet use, as promising protective factors against cognitive impairment in patients with subjective memory complaints. Preliminary results. *J Pers Med*. Dec 14, 2021;11(12):1366. [doi: [10.3390/jpm11121366](https://doi.org/10.3390/jpm11121366)] [Medline: [34945838](https://pubmed.ncbi.nlm.nih.gov/34945838/)]
3. Benge JF, Kiselica AM, Aguirre A, et al. Technology use and subjective cognitive concerns in older adults. *Arch Gerontol Geriatr*. Mar 2023;106:104877. [doi: [10.1016/j.archger.2022.104877](https://doi.org/10.1016/j.archger.2022.104877)] [Medline: [36459914](https://pubmed.ncbi.nlm.nih.gov/36459914/)]
4. Cho H, Choi M, Lee H. Mobile internet use and life satisfaction among older adults: the moderating effect of living alone. *J Appl Gerontol*. Jul 2024;43(7):841-849. [doi: [10.1177/07334648231216383](https://doi.org/10.1177/07334648231216383)] [Medline: [37982396](https://pubmed.ncbi.nlm.nih.gov/37982396/)]
5. Ward AF. Supernormal: how the internet is changing our memories and our minds. *Psychol Inq*. Oct 2013;24(4):341-348. [doi: [10.1080/1047840X.2013.850148](https://doi.org/10.1080/1047840X.2013.850148)]
6. Firth JA, Torous J, Firth J. Exploring the impact of internet use on memory and attention processes. *Int J Environ Res Public Health*. Dec 17, 2020;17(24):9481. [doi: [10.3390/ijerph17249481](https://doi.org/10.3390/ijerph17249481)] [Medline: [33348890](https://pubmed.ncbi.nlm.nih.gov/33348890/)]
7. Hunsaker A, Hargittai E. A review of internet use among older adults. *New Media Soc*. Oct 2018;20(10):3937-3954. [doi: [10.1177/1461444818787348](https://doi.org/10.1177/1461444818787348)]
8. Stockwell S, Stubbs B, Jackson SE, Fisher A, Yang L, Smith L. Internet use, social isolation and loneliness in older adults. *Ageing Soc*. 2021;41(12):2723-2746. [doi: [10.1017/S0144686X20000550](https://doi.org/10.1017/S0144686X20000550)]
9. Shi JG, Liu M, Fu G, Dai X. Internet use among older adults: determinants of usage and impacts on individuals' well-being. *Comput Hum Behav*. Feb 2023;139(C):107538. [doi: [10.1016/j.chb.2022.107538](https://doi.org/10.1016/j.chb.2022.107538)]
10. Tian Y, Zhang S, Wu R, Wang P, Gao F, Chen Y. Association between specific internet activities and life satisfaction: the mediating effects of loneliness and depression. *Front Psychol*. 2018;9:1181. [doi: [10.3389/fpsyg.2018.01181](https://doi.org/10.3389/fpsyg.2018.01181)] [Medline: [30050484](https://pubmed.ncbi.nlm.nih.gov/30050484/)]
11. Cotten SR, Anderson WA, McCullough BM. Impact of internet use on loneliness and contact with others among older adults: cross-sectional analysis. *J Med Internet Res*. Feb 28, 2013;15(2):e39. [doi: [10.2196/jmir.2306](https://doi.org/10.2196/jmir.2306)] [Medline: [23448864](https://pubmed.ncbi.nlm.nih.gov/23448864/)]
12. Jun JS, Galambos C, Lee KH. Information and communication technology use, social support, and life satisfaction among Korean immigrant elders. *J Soc Serv Res*. 2020;47(4):537-552. [doi: [10.1080/01488376.2020.1848969](https://doi.org/10.1080/01488376.2020.1848969)]

13. Wu CY, Yu K, Arnold SE, Das S, Dodge HH. Who benefited most from the internet-based conversational engagement RCT (I-CONNECT)? Application of the personalized medicine approach to a behavioral intervention study. *J Prev Alzheimers Dis.* 2024;11(3):639-648. [doi: [10.14283/jpad.2024.41](https://doi.org/10.14283/jpad.2024.41)] [Medline: [38706280](https://pubmed.ncbi.nlm.nih.gov/38706280/)]
14. Dodge HH, Yu K, Wu CY, et al. Internet-based conversational engagement randomized controlled clinical trial (I-CONNECT) among socially isolated adults 75+ years old with normal cognition or mild cognitive impairment: topline results. *Gerontologist.* Apr 1, 2024;64(4):gnad147. [doi: [10.1093/geront/gnad147](https://doi.org/10.1093/geront/gnad147)] [Medline: [37935416](https://pubmed.ncbi.nlm.nih.gov/37935416/)]
15. Stern Y. What is cognitive reserve? Theory and research application of the reserve concept. *J Int Neuropsychol Soc.* Mar 2002;8(3):448-460. [Medline: [11939702](https://pubmed.ncbi.nlm.nih.gov/11939702/)]
16. Carstensen LL. Social and emotional patterns in adulthood: support for socioemotional selectivity theory. *Psychol Aging.* 1992;7(3):331-338. [doi: [10.1037/0882-7974.7.3.331](https://doi.org/10.1037/0882-7974.7.3.331)]
17. Kwok AOJ, Treiblmaier H. No one left behind in education: blockchain-based transformation and its potential for social inclusion. *Asia Pacific Educ Rev.* Sep 2022;23(3):445-455. [doi: [10.1007/s12564-021-09735-4](https://doi.org/10.1007/s12564-021-09735-4)]
18. Seifert A. The digital exclusion of older adults during the COVID-19 pandemic. *J Gerontol Soc Work.* 2020;63(6-7):674-676. [doi: [10.1080/01634372.2020.1764687](https://doi.org/10.1080/01634372.2020.1764687)] [Medline: [32401181](https://pubmed.ncbi.nlm.nih.gov/32401181/)]
19. Yoon H, Jang Y, Vaughan PW, Garcia M. Older adults' internet use for health information: digital divide by race/ethnicity and socioeconomic status. *J Appl Gerontol.* Jan 2020;39(1):105-110. [doi: [10.1177/0733464818770772](https://doi.org/10.1177/0733464818770772)] [Medline: [29661052](https://pubmed.ncbi.nlm.nih.gov/29661052/)]
20. Ang S, Lim E, Malhotra R. Health-related difficulty in internet use among older adults: correlates and mediation of its association with quality of life through social support networks. *Gerontologist.* Jul 13, 2021;61(5):693-702. [doi: [10.1093/geront/gnaa096](https://doi.org/10.1093/geront/gnaa096)] [Medline: [32744310](https://pubmed.ncbi.nlm.nih.gov/32744310/)]
21. Ornstein KA, Leff B, Covinsky KE, et al. Epidemiology of the homebound population in the United States. *JAMA Intern Med.* Jul 2015;175(7):1180-1186. [doi: [10.1001/jamainternmed.2015.1849](https://doi.org/10.1001/jamainternmed.2015.1849)] [Medline: [26010119](https://pubmed.ncbi.nlm.nih.gov/26010119/)]
22. Vu LN, Dean MJ, Mwamburi M, Au R, Qiu WQ. Executive function and mortality in homebound elderly adults. *J Am Geriatr Soc.* Dec 2013;61(12):2128-2134. [doi: [10.1111/jgs.12545](https://doi.org/10.1111/jgs.12545)] [Medline: [24479144](https://pubmed.ncbi.nlm.nih.gov/24479144/)]
23. Walsh EG, Clark WD. Managed care and dually eligible beneficiaries: challenges in coordination. *Health Care Financ Rev.* 2002;24(1):63-82. [Medline: [12545599](https://pubmed.ncbi.nlm.nih.gov/12545599/)]
24. Xu D, Simpson VL. Subjective well-being, depression, and delays in care among older adults: dual-eligible versus Medicare-only beneficiaries. *J Appl Gerontol.* Jan 2022;41(1):158-166. [doi: [10.1177/07334648211000920](https://doi.org/10.1177/07334648211000920)] [Medline: [33736521](https://pubmed.ncbi.nlm.nih.gov/33736521/)]
25. Dixon RA, Hulstsch DF. Structure and development of metamemory in adulthood. *J Gerontol.* Nov 1983;38(6):682-688. [doi: [10.1093/geronj/38.6.682](https://doi.org/10.1093/geronj/38.6.682)] [Medline: [6630902](https://pubmed.ncbi.nlm.nih.gov/6630902/)]
26. Dixon RA, Hulstsch DF. Metamemory and memory for text relationships in adulthood: a cross-validation study. *J Gerontol.* Nov 1983;38(6):689-694. [doi: [10.1093/geronj/38.6.689](https://doi.org/10.1093/geronj/38.6.689)] [Medline: [6630903](https://pubmed.ncbi.nlm.nih.gov/6630903/)]
27. Dixon RA, Hulstsch DF, Hertzog C. The Metamemory in Adulthood (MIA) questionnaire. *Psychopharmacol Bull.* 1988;24(4):671-688. [Medline: [3249770](https://pubmed.ncbi.nlm.nih.gov/3249770/)]
28. Hertzog C, Dixon RA, Schulenberg JE, Hulstsch DF. On the differentiation of memory beliefs from memory knowledge: the factor structure of the Metamemory in Adulthood Scale. *Exp Aging Res.* 1987;13(1-2):101-107. [doi: [10.1080/03610738708259308](https://doi.org/10.1080/03610738708259308)] [Medline: [3678344](https://pubmed.ncbi.nlm.nih.gov/3678344/)]
29. Russell D, Peplau LA, Ferguson ML. Developing a measure of loneliness. *J Pers Assess.* Jun 1978;42(3):290-294. [doi: [10.1207/s15327752jpa4203_11](https://doi.org/10.1207/s15327752jpa4203_11)] [Medline: [660402](https://pubmed.ncbi.nlm.nih.gov/660402/)]
30. Pontinen HM, Swails JA. UCLA Loneliness Scale. In: Zeigler-Hill V, Shackelford T, editors. *Encyclopedia of Personality and Individual Differences.* Springer; 2017:1-3. [doi: [10.1007/978-3-319-28099-8_95-1](https://doi.org/10.1007/978-3-319-28099-8_95-1)]
31. Hays RD, DiMatteo MR. A short-form measure of loneliness. *J Pers Assess.* 1987;51(1):69-81. [doi: [10.1207/s15327752jpa5101_6](https://doi.org/10.1207/s15327752jpa5101_6)] [Medline: [3572711](https://pubmed.ncbi.nlm.nih.gov/3572711/)]
32. Bowling A. The psychometric properties of the Older People's Quality of Life Questionnaire, compared with the CASP-19 and the WHOQOL-OLD. *Curr Gerontol Geriatr Res.* 2009;2009:298950. [doi: [10.1155/2009/298950](https://doi.org/10.1155/2009/298950)] [Medline: [20168974](https://pubmed.ncbi.nlm.nih.gov/20168974/)]
33. Bowling A, Stenner P. Which measure of quality of life performs best in older age? A comparison of the OPQOL, CASP-19 and WHOQOL-OLD. *J Epidemiol Community Health.* Mar 2011;65(3):273-280. [doi: [10.1136/jech.2009.087668](https://doi.org/10.1136/jech.2009.087668)] [Medline: [20719807](https://pubmed.ncbi.nlm.nih.gov/20719807/)]
34. Bowling A, Hankins M, Windle G, Bilotta C, Grant R. A short measure of quality of life in older age: the performance of the brief Older People's Quality of Life questionnaire (OPQOL-brief). *Arch Gerontol Geriatr.* 2013;56(1):181-187. [doi: [10.1016/j.archger.2012.08.012](https://doi.org/10.1016/j.archger.2012.08.012)] [Medline: [22999305](https://pubmed.ncbi.nlm.nih.gov/22999305/)]
35. Zuniga KE, Mackenzie MJ, Kramer A, McAuley E. Subjective memory impairment and well-being in community-dwelling older adults. *Psychogeriatrics.* Jan 2016;16(1):20-26. [doi: [10.1111/psyg.12112](https://doi.org/10.1111/psyg.12112)] [Medline: [25737426](https://pubmed.ncbi.nlm.nih.gov/25737426/)]

36. Jonker C, Geerlings MI, Schmand B. Are memory complaints predictive for dementia? A review of clinical and population-based studies. *Int J Geriatr Psychiatry*. Nov 2000;15(11):983-991. [doi: [10.1002/1099-1166\(200011\)15:11<983::aid-gps238>3.0.co;2-5](https://doi.org/10.1002/1099-1166(200011)15:11<983::aid-gps238>3.0.co;2-5)] [Medline: [11113976](https://pubmed.ncbi.nlm.nih.gov/11113976/)]
37. Hayes AF, Scharkow M. The relative trustworthiness of inferential tests of the indirect effect in statistical mediation analysis: does method really matter? *Psychol Sci*. Oct 2013;24(10):1918-1927. [doi: [10.1177/0956797613480187](https://doi.org/10.1177/0956797613480187)] [Medline: [23955356](https://pubmed.ncbi.nlm.nih.gov/23955356/)]
38. Bollen KA, Stine R. Direct and indirect effects: classical and bootstrap estimates of variability. *Sociol Methodol*. 1990;20:115-140. [doi: [10.2307/271084](https://doi.org/10.2307/271084)]
39. Shrout PE, Bolger N. Mediation in experimental and nonexperimental studies: new procedures and recommendations. *Psychol Methods*. Dec 2002;7(4):422-445. [Medline: [12530702](https://pubmed.ncbi.nlm.nih.gov/12530702/)]
40. Fritz MS, Mackinnon DP. Required sample size to detect the mediated effect. *Psychol Sci*. Mar 2007;18(3):233-239. [doi: [10.1111/j.1467-9280.2007.01882.x](https://doi.org/10.1111/j.1467-9280.2007.01882.x)] [Medline: [17444920](https://pubmed.ncbi.nlm.nih.gov/17444920/)]
41. Kenny DA. SEM: path analysis. DavidAKenny.net. 2011. URL: <http://davidakenny.net/cm/pathanal.htm> [Accessed 2026-04-13]
42. Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J Pers Soc Psychol*. Dec 1986;51(6):1173-1182. [doi: [10.1037//0022-3514.51.6.1173](https://doi.org/10.1037//0022-3514.51.6.1173)] [Medline: [3806354](https://pubmed.ncbi.nlm.nih.gov/3806354/)]
43. Seifert A, Hofer M, Rössel J. Older adults' perceived sense of social exclusion from the digital world. *Educ Gerontol*. 2018;44(12):775-785. [doi: [10.1080/03601277.2019.1574415](https://doi.org/10.1080/03601277.2019.1574415)]
44. Gilewski MJ, Zelinski EM, Schaie KW. The Memory Functioning Questionnaire for assessment of memory complaints in adulthood and old age. *Psychol Aging*. 1990;5(4):482-490. [doi: [10.1037/0882-7974.5.4.482](https://doi.org/10.1037/0882-7974.5.4.482)] [Medline: [2278670](https://pubmed.ncbi.nlm.nih.gov/2278670/)]

Abbreviations

I-CONNECT: Internet-Based Conversational Engagement

MIA: Metamemory in Adulthood

UCLA: University of California, Los Angeles

VSC: Virtual Senior Center

Edited by Karthik Adapa; peer-reviewed by Ali AL-Asadi, Gail Wallace, Varalakshmi Manchana; submitted 23.Feb.2025; final revised version received 19.Mar.2026; accepted 27.Mar.2026; published 06.May.2026

Please cite as:

Lee SR, Liu H

Examining the Effect of Online Engagement on Older Adults' Subjective Memory Capability: Cross-Sectional Path Analysis
JMIR Hum Factors 2026;13:e73018

URL: <https://humanfactors.jmir.org/2026/1/e73018>

doi: [10.2196/73018](https://doi.org/10.2196/73018)

© Soohyoung Rain Lee, Hang Liu. Originally published in JMIR Human Factors (<https://humanfactors.jmir.org>), 06.May.2026. This is an open-access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR Human Factors, is properly cited. The complete bibliographic information, a link to the original publication on <https://humanfactors.jmir.org>, as well as this copyright and license information must be included.