

Building Bridges: Using AI to Strengthen Social Connections for Older Adults



Novel AI-based tools can help build and strengthen social ties and reduce age-related isolation.

Americans are facing a loneliness epidemic, and older Americans are particularly at risk.¹ In a 2023 national poll, 37% of individuals aged 50–80 years reported feeling a lack of companionship in the past year.² For those not in good health, the risk is even greater: in the same poll, the proportion of individuals who reported a lack of companionship surged to 73% among those who rated their mental health as fair or poor, and 55% among those who rated their physical health as fair or poor.



26%
U.S. ADULTS
AGED 65+
LIVED ALONE
IN 2023¹⁰

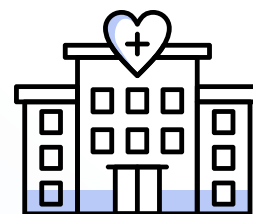
Source:
[U.S. Census Bureau](#)

in conversations.^{7,8} Among older adults living with dementia, 85% report wanting interventions to help them communicate with others.⁹

Social support networks can help older adults overcome some of these barriers, but in a potentially vicious cycle, gaps in social support networks can leave older adults without the resources they need to engage socially. The U.S. Census Bureau estimates that about 26% of adults aged 65 years and older lived alone in 2023.¹⁰ Longer lifespans, rising divorce rates, and the loss of family members and friends with aging have led to more older adults living alone, increasing their risk for social isolation.⁴ Lacking informal caregivers, older adults often rely on paid care facilities for support—a 2019 report by the U.S. Department of Health and Human Services found that 70% of adults aged 65 years and older will require long-term care services.¹¹ Older adults who move to long-term care facilities frequently experience reduced opportunities for meaningful social engagement, heightening their feelings of loneliness and diminishing their overall quality of life.¹²

Although loneliness has decreased from peak levels reported in the wake of the COVID-19 pandemic, the prevalence of loneliness among older adults represents an ongoing trend alongside decreased social engagement in this population. Since 2003, individuals aged 65 years and older have reported higher rates of social isolation than any other age group.³ Addressing social isolation and loneliness is critical, because these experiences likely exact a physical as well as an emotional toll. Loneliness is linked with a range of health risks, including cognitive decline, stroke, and risk of death by any cause.⁴ Older adults with low levels of social engagement have a greater than 50% higher risk of developing dementia within the next 10 years compared to socially engaged older adults.^{5,6}

Aging-related barriers can limit older adults' opportunities for meaningful social interaction. Reduced mobility or chronic illness can discourage attendance at social events, and older adults with speech, hearing, or cognitive challenges may struggle to engage



70%
U.S. ADULTS AGED
65+ WILL REQUIRE
LONG-TERM CARE
SERVICES¹¹

Source: [HHS](#)



Leveraging AI to foster communication and social connection among older adults

Technologies that facilitate social interaction and assist with communication have the potential to reduce loneliness among older adults, particularly when they function as social bridges that help rebuild and strengthen existing social connections.¹³ Several commercially available technologies have started to address the demand for these social bridges. For example, greater than 80% of individuals aged 50 years and older currently use or are interested in using smart home technologies, and greater than 90% own smartphones.¹⁴ Equipped with interfaces such as smart speakers and touch screens, these smart home devices can help users hold conversations about daily events (e.g., weather, holidays), make calls to friends and family, and access integrated features such as calendar reminders.

Emerging technologies may provide increasingly impactful and versatile social bridges for older adults across a range of interaction settings. a2 Pilot Awards-funded investigators are leading the development of AI-enhanced technologies that promote social connection among older adults. These technologies can assist with word finding, facilitate shared experiences via virtual platforms, and characterize individual risk for social isolation and loneliness to help target support to individuals most in need.

a2 PILOT AWARDS PROJECT HIGHLIGHT

Enhancing word-finding abilities to make social activities more enjoyable

Individuals with mild to moderate Alzheimer's disease frequently report difficulty finding the right words in conversation, which can leave them feeling frustrated and embarrassed. Those who experience this difficulty also report less enjoyment of social activities and engage in those activities less often.^{7,15-17}

Supported by funding awarded to the **Institute for Human and Machine Cognition (IHMC)** and the **University of California, Irvine**, as part of the second a2 Pilot Awards cohort, Dr. Archana Bhatia (IHMC) and colleagues at both institutions, with additional collaboration from **Northeastern University**, are developing an Intelligent Cognitive Assistant (ICA) to address these difficulties. The ICA is an AI-enabled, phone-based application that helps older adults with or at risk of Alzheimer's disease or other forms of dementia to quickly find the words they want to use in conversation.

Although some commercially available technologies help with word finding using predictive text, the ICA aims to provide personalized word-finding support by using person-specific associations between contexts and words. This personalization represents a critical innovation in word-finding support because word association is highly emotion- and memory-driven and thus highly individualized.^{18,19}

The ICA gathers a user's distinctive vocabulary through open text entry as well as guided data entry using an intake questionnaire on topics such as neighbors, medicines, coworkers, professional terminology, family, friends, and entertainment. Users can describe words and contexts relevant to them. These data enable the ICA to develop a user-specific database to add to its preexisting dictionary. If granted permission, the ICA could also be expanded to gather vocabulary data from the user's emails or other textual input in future versions.

The ICA provides real-time word-finding support: users can describe the word they are looking for, and the ICA will provide a list of likely words, saving older adults time, frustration, and embarrassment. Planned enhancements include more interactive prompts and personalized daily practice exercises to help users improve their word-finding abilities, such as prompting the user to recall a word they have previously forgotten—an exercise research has shown to be effective in improving word-finding ability among older adults.²⁰ This approach strengthens the ICA's potential to support sustained social engagement.

a2 PILOT AWARDS PROJECT HIGHLIGHT

Testing new virtual reality (VR) experiences to foster social connections

AI-enhanced VR technology has the potential to immerse older adults in social settings they may be otherwise unable to access while leveraging devices that older adults already find highly usable.^{21–23} VR platforms can not only expand older adults' ability to connect with friends and family, but also enable them to participate in novel social interactions.

As part of the first a2 Pilot Awards cohort, funding awarded to **Virtual Apprentice** supported Dr. Ellie Giles and colleagues in developing ReTreatVR, a VR platform that provides immersive, interactive social experiences for individuals or groups, stimulating cognition and conversation. Users can explore beach, garden, or mountain scenes; follow guides for meditative breathing exercises; or take a city tour with a knowledgeable guide. The experiences are designed to facilitate engaging and memorable social interactions by providing a place to meet and offering topics for conversation after participants arrive. To keep the experiences fresh and engaging, ReTreatVR updates its content quarterly.



ReTreatVR employs a range of innovative features to facilitate use by older adults. Research has found that reducing the risk of dizziness and accounting for potential mobility challenges can improve the usability of VR technology for older adults.²⁴ To help mitigate the potential for dizziness, ReTreatVR utilizes all-original content specifically designed to be older adult-friendly and adjusts the refresh rate (the rate at which new images appear) to ensure smooth transitions and a comfortable, enjoyable experience. In addition, ReTreatVR can be used by individuals across a wide range of mobility levels, from active to bedridden; user input is detected by tracking eye movements, so users move through the experience by looking around the

virtual environment rather than moving physically in space. To ensure accessibility, ReTreatVR runs on a single standalone device and does not require connection to a smartphone, tablet, or the internet.

ReTreatVR's developers plan to pilot test the device in community-based day programs and residential programs that support wellness for older adults. The pilot project team will assess its usability and mood-related impacts, as well as its effects on the frequency with which older adults engage in social interactions.

a2 PILOT AWARDS PROJECT HIGHLIGHT

Assessing for loneliness and tailoring interventions

In addition to technologies that can help older adults engage in meaningful social interaction, researchers are developing evidence-based tools to assess social disconnection and loneliness in older adults and identify those most in need of support.²⁵ By identifying and analyzing social disconnection, these tools may help alert caregivers, friends, and family members of unmet needs, and inform targeted interventions to increase social connectedness.

Supported by funding awarded to **Weill Cornell Medicine** as part of the fourth a2 Pilot Awards cohort, Drs. Nili Solomonov and Logan Grosenick are developing SOCIAL-Q, a tool powered by novel AI models that assesses and quantifies social disconnection and loneliness among older adults. SOCIAL-Q analyzes facial expressions, gaze, word use, and voice in video interviews with older adults using recent advances in the computational analysis of facial and vocal features. SOCIAL-Q identifies patterns in these features to provide a rapid and precise assessment of individuals' social and emotional functioning, including how they might be affected by social disconnection. After validating SOCIAL-Q, the study team plans to work with residential care facilities to develop tailored activities to improve residents' social connectedness based on their inferred social-emotional profiles. Depending on the inferred social-emotional profile, tailored activities might focus, for example, on developing emotional regulation skills or on expanding social networks through community involvement opportunities.



Advancing accessible AI for sustainable social connections

These a2 Pilot Awards projects showcase varied approaches to enhancing social connectedness for older adults—reducing communication barriers, engaging older adults in new interactive experiences, and personalizing methods of assessing and addressing social support needs. To realize their full potential, these and other technologies aiming to assist older adults must be easy to use, protect privacy, and seamlessly integrate into users' lives.²³ With innovative and thoughtfully designed approaches to personalized support, AI-based technologies can strengthen and reinforce social connections to help older adults lead socially rich, stimulating, and healthy lives.

References

1. U.S. Department of Health and Human Services, Office of the Surgeon General. *Our epidemic of loneliness and isolation: The U.S. Surgeon General's advisory on the healing effects of social connection and community*. 2023. Accessed July 24, 2025. <https://www.hhs.gov/sites/default/files/surgeon-general-social-connection-advisory.pdf>
2. Malani P, Singer D, Kirch M, et al. *Trends in Loneliness Among Older Adults from 2018-2023*. University of Michigan National Poll on Healthy Aging; March 2023. doi:10.7302/7011
3. Kannan VD, Veazie PJ. US trends in social isolation, social engagement, and companionship – nationally and by age, sex, race/ethnicity, family income, and work hours, 2003–2020. *SSM - Popul Health*. 2023;21:101331. doi:10.1016/j.ssmph.2022.101331
4. National Academies of Sciences, Engineering, and Medicine; Division of Behavioral and Social Sciences and Education; Health and Medicine Division; Board on Behavioral, Cognitive, and Sensory Sciences; Board on Health Sciences Policy; Committee on the Health and Medical Dimensions of Social Isolation and Loneliness in Older Adults. *Social Isolation and Loneliness in Older Adults: Opportunities for the Health Care System*. National Academies Press; 2020. Accessed March 6, 2025. <https://www.ncbi.nlm.nih.gov/books/NBK557972/>
5. Donovan NJ, Wu Q, Rentz DM, Sperling RA, Marshall GA, Glymour MM. Loneliness, depression and cognitive function in older U.S. adults. *Int J Geriatr Psychiatry*. 2017;32(5):564-573. doi:10.1002/gps.4495
6. Lazzari C, Rabottini M. COVID-19, loneliness, social isolation and risk of dementia in older people: a systematic review and meta-analysis of the relevant literature. *Int J Psychiatry Clin Pract*. 2022;26(2):196-207. doi:10.1080/13651501.2021.1959616
7. Farrell MT, Zahodne LB, Stern Y, Dorrejo J, Yeung P, Cosentino S. Subjective word-finding difficulty reduces engagement in social leisure activities in Alzheimer's disease. *J Am Geriatr Soc*. 2014;62(6):1056-1063. doi:10.1111/jgs.12850
8. Shukla A, Harper M, Pedersen E, et al. Hearing loss, loneliness, and social isolation: A systematic review. *Otolaryngol Head Neck Surg*. 2020;162(5):622-633. doi:10.1177/0194599820910377
9. Reilly ST, Harding AJE, Morbey H, et al. What is important to people with dementia living at home? A set of core outcome items for use in the evaluation of non-pharmacological community-based health and social care interventions. *Age Ageing*. 2020;49(4):664-671. doi:10.1093/ageing/afaa015
10. U.S. Census Bureau. *B09020: Relationship by household type (including living alone) for the population 65 years and over* [data table]. American Community Survey 5-Year Estimates. 2023. Accessed July 24, 2025. <https://data.census.gov/table/ACSDT5Y2023.B09020>
11. U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation. What is the lifetime risk of needing and receiving long-term services and supports? Published April 3, 2019. Accessed May 29, 2025. <http://aspe.hhs.gov/reports/what-lifetime-risk-needing-receiving-long-term-services-supports-0>
12. Gardiner C, Laud P, Heaton T, Gott M. What is the prevalence of loneliness amongst older people living in residential and nursing care homes? A systematic review and meta-analysis. *Age Ageing*. 2020;49(5):748-757. doi:10.1093/ageing/afaa049
13. Balki E, Hayes N, Holland C. Effectiveness of technology interventions in addressing social isolation, connectedness, and loneliness in older adults: systematic umbrella review. *JMIR Aging*. 2022;5(4):e40125. doi:10.2196/40125
14. Kakulla B. 2025 *Tech Trends and Adults 50+*. Washington, DC: AARP Research; December 2024. <https://doi.org/10.26419/res.00891.001>
15. Condret-Santi V, Barbeau EJ, Matharan F, Le Goff M, Dartigues JF, Amieva H. Prevalence of word retrieval complaint and prediction of dementia in a population-based study of elderly subjects. *Dement Geriatr Cogn Disord*. 2013;35(5-6):313-324. doi:10.1159/000342594
16. Montembeault M, Brambati SM, Joubert S, et al. Naming unique entities in the semantic variant of primary progressive aphasia and Alzheimer's disease: towards a better understanding of the semantic impairment. *Neuropsychologia*. 2017;95:11-20. doi:10.1016/j.neuropsychologia.2016.12.009
17. Taler V, Phillips NA. Language performance in Alzheimer's disease and mild cognitive impairment: a comparative review. *J Clin Exp Neuropsychol*. 2008;30(5):501-556. doi:10.1080/13803390701550128
18. Planchuelo C, Buades-Sitjar F, Hinojosa JA, Duñabeitia JA. The nature of word associations in sentence contexts. *Exp Psychol*. 2022;69(2):104-110. doi:10.1027/1618-3169/a000547
19. Francis WS, Strobach EN, Penalver RM, Martínez M, Gurrola BV, Soltero A. Word-context associations in episodic memory are learned at the conceptual level: Word frequency, bilingual proficiency, and bilingual status effects on source memory. *J Exp Psychol Learn Mem Cogn*. 2019;45(10):1852-1871. doi:10.1037/xlm0000678
20. Mewborn CM, Lindbergh CA, Stephen Miller L. Cognitive interventions for cognitively healthy, mildly impaired, and mixed samples of older adults: a systematic review and meta-analysis of randomized-controlled trials. *Neuropsychol Rev*. 2017;27(4):403-439. doi:10.1007/s11065-017-9350-8
21. Nikitina S, Didino D, Baez M, Casati F. Feasibility of virtual tablet-based group exercise among older adults in Siberia: findings from two pilot trials. *JMIR MHealth UHealth*. 2018;6(2):e7531. doi:10.2196/mhealth.7531
22. Frank AR, Sheehy L. Virtual reality companion for dementia patients in long-term care: a feasibility study. *Alzheimers Dement*. 2023;19(S19):e071704. doi:10.1002/alz.071704
23. Chan JY, Tsoi KK. Virtual reality-based cognitive and exercise intervention for people with mild cognitive impairment. A systematic review and meta-analysis. *Alzheimers Dement*. 2025;20(Suppl 4):e085515. doi:10.1002/alz.085515
24. Kupczik L, Farrelly W, Wilson S. Appraising virtual technologies' impact on older citizens' mental health—a comparative between 360° video and virtual reality. *Int J Environ Res Public Health*. 2022;19(18):11250. doi:10.3390/ijerph191811250
25. Card KG, Skakoon-Sparling S. Are social support, loneliness, and social connection differentially associated with happiness across levels of introversion-extraversion? *Health Psychol Open*. 2023;10(1):20551029231184034. doi:10.1177/20551029231184034

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The a2 Pilot Awards competition funds technology demonstration projects that use AI-based or emerging technology approaches to improve care, quality of life, and health outcomes for older adults, including those with dementia, and their caregivers. Combining nondilutive funding for early-stage technology development with guidance and resources provided by world-class academic research centers, the a2 Pilot Awards offer technologists from varied sectors and disciplines a unique environment to accelerate innovation that is grounded in scientific rigor. Visit a2collective.ai/awardees for more information about the a2 Collective's funded pilots.

This publication series aims to highlight both scientific and programmatic areas of need being addressed by members of the a2 Collective. These reports can be accessed at a2collective.ai/resources.

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