



How Learning Protects the Aging Brain

Researchers are leveraging neuroplasticity to help older adults adapt to change and boost cognitive function

Learning is a high priority for young people who must master a host of new skills to survive and thrive in the world. What if learning is also critical in middle and older age to successfully navigate changes in areas such as health status, housing, and technology? Mounting evidence suggests that aging adults who engage in cognitively complex activities—such as learning how to use a new app or to speak a foreign language—can reduce their risk of mental decline and increase their ability to function independently longer.

These opportunities are not always readily available: Middle-aged and older adults must often take the initiative to find new ways to maximize their cognitive potential. But researchers hope to see communities increase access to affordable ways for this demographic to learn—both online and in-person.

“There seems to be a societal expectation that adults are not supposed to be learning as much as children are,” said Rachel Wu, PhD, an associate professor of psychology at the University of California, Riverside, who studies the drivers of cognitive development and decline across the human lifespan. “What if adulthood is one very long summer slide, similar to what students experience during summer break?” Wu is exploring how to counter this risk, and her recent findings suggest that older adults immersed in a supportive learning environment can significantly increase their cognitive abilities as well as their confidence in their ability to learn.

With the number of Americans age 65 and older projected to increase by 30% in the next 25 years to 82 million, psychology researchers are developing cognitive interventions to help adults boost their brain health rather than being affected by harmful stereotypes about aging (*2023 National Population Projections*, U.S. Census Bureau). “Research is showing that older adults who buy into negative messages about aging start shaping their lives consistent with those messages,” said Ann Steffen, PhD, a professor in the department of psychological sciences at the University of Missouri–St. Louis and coauthor of *Treating Later Life Depression* (Oxford University Press, 2021). “This internalized ageism can lead to beliefs that older adults are less competent, can’t learn, and must give up things that are important to them.” Research by Yale University psychologist Becca Levy, PhD, suggests that positive age

beliefs, on the other hand, can lead to better health and a 7.5-year average increase in lifespan (*Breaking the Aging Code*, William Morrow, 2023).

Psychologists are exploring different ways to engage adults in learning, including interventions delivered in-person, through tablets or computers, or through virtual reality. Their findings suggest that leveraging neuroplasticity at any age can increase confidence, motivation, and the desire to tackle new challenges—factors that ultimately help individuals adapt to change and maintain independence longer.

“People need to understand that they have some ability to influence their brain health,” said Alan Gow, PhD, a psychology professor at Heriot-Watt University in Edinburgh, Scotland, who studies healthy aging. “There are changes in lifestyle we can make at all stages of life that can affect cognition later in life.”

Learning real-life skills

Although researchers have been studying cognitive interventions for older adults for decades, the findings have been mixed about whether standard brain training exercises translate to functional gain (Wu, R., et al., *European Journal of Ageing*, Vol. 22, No. 13, 2025). Some of these brain games include processing speed training: Individuals try to find specific items on a computer screen among distracting information as quickly and accurately as possible.

“Studies showed that people become proficient at that specific task and other tasks like it, but it does not help much with learning how to navigate an online health platform, because it is too far of a leap,” said Wu. These findings reminded Wu of people who were very good at playing brain games such as sudoku but had trouble managing their online bank accounts. “I realized there were a lot of people who were not truly living independently, and I wondered if there were cognitive interventions that could help them adapt to a dynamic environment.”

To answer this question, she conducted studies in which adults ages 58–86 spent 15 hours a week on classes and homework for 3 months as they learned at least three new skills, such as how to use an iPad, speak Spanish, or draw (Ferguson, L., et al., *Aging & Mental Health*, Vol. 27, No. 11, 2023). Drawing from the factors that help children thrive in classrooms, the researchers created a supportive learning experience by providing participants with access to instructors who answered questions and conveyed to them that mistakes were part of the learning process.

By the end of the classes, participants’ scores on memory and attention were similar to middle-aged adults ranging from 35 to 51 years old. One year later, their scores were similar to those of undergraduate students. After the classes had ended, Wu heard anecdotally that many participants went on to take online courses, private lessons, or classes through community groups to pursue their interests. “There were people who had never drawn anything but a stick figure, and later they were selling their art and getting commissions,” said Wu. “They gained the confidence that they can learn something difficult and figure out solutions to problems.”

Wu also recognized that economically or physically disadvantaged older adults often lack access to learning opportunities, which may include fees and require transportation to in-person classes or access to devices for online courses. To reach this population, Wu recently launched an intervention at a senior

center in her community of Riverside. The participants—whose primary language was Mandarin or Spanish—studied English and learned how to use a tablet.

Although the intervention could only be conducted at one center due to research funding cuts, Wu hopes her work will influence policymakers to increase support for similar programs. “We found that lower income older adults were particularly motivated to learn useful skills that could help them earn more money,” she said. “They don’t typically retire after 65.”

Adapting to change at work

Data suggest that an increasing number of older adults have to work longer than previous generations—and that they will need to learn new skills to remain competitive. Roughly 19% of U.S. adults age 65 and older are employed today, nearly double the percentage from 35 years ago, according to the Pew Research Center. One reason for this trend is the fact that more people are struggling to build up enough savings to retire. A recent AARP survey found that 1 in 5 adults age 50 and older has no retirement savings, and more than half are worried they will not have enough money to support themselves in retirement. Compounding the challenge is the time pressures faced by many middle-aged and older workers who must also juggle responsibilities related to children, aging parents, or other commitments, meaning less time for learning.

Learning also takes longer as people age. “The ability to reason through novel problems and memory starts to decline in middle age,” said Margaret Beier, PhD, a psychology professor at Rice University in Houston (*Personnel Psychology*, Vol. 75, No. 4, 2022). “Learning anything feels more effortful as we age, which affects self-efficacy and motivation.” In a recent study, Beier’s data showed that participants’ self-efficacy—the belief that they could successfully engage in the learning activity—was the highest predictor of whether they stayed engaged in an online class.

For older workers to overcome barriers to learning, they often need to know upfront how training will benefit them. “If you are older, you usually need to see the utility of investing your focus to learn something new,” Beier said. These workers tend to be more selective about what they want to learn. They typically prefer to acquire skills that are aligned with their expertise, which may be different than the younger workers who are constantly learning new skills in a range of areas.

Beier also worries about people who are under or unemployed or contractors in the gig economy, who may not have access to on-the-job training or practice with current technologies. In a recent paper, she called for a shift from organization-centered training to person-centered training that encourages lifelong learning in the labor force (*Industrial and Organizational Psychology*, Vol. 18, No. 1, 2025). She hopes to see more industrial/organizational psychologists develop interventions that help workers of all ages understand their skills and abilities and how to access training programs to learn new skills.

“Many people need to work longer because they do not have enough money to retire,” she said. “We need to find better ways for them to learn new things to stay employable, or I worry that they will be displaced because of technology and innovation.”

Tech-savvy older adults

Evidence also suggests that people are capable of mastering new skills even after they start experiencing declines in memory, attention, executive function, and other areas associated with mild cognitive impairment. In a recent study, older adults with and without mild cognitive impairment received in-person training on how to use a tablet, followed by online training 2 hours a week for 8 weeks to learn online banking and medication management (*Innovation in Aging*, Vol. 8, No. 7, 2024). The intervention utilized effective learning strategies by breaking the tasks into steps and allowing people to practice what they had learned. “Processing speed tends to slow with age, and there may be changes in vision and hearing, so the intervention allowed people to go at their own pace,” said Sara Czaja, PhD, director of the Center on Aging and Behavioral Research at Weill Cornell Medicine.

When people made an error, they received feedback that became increasingly helpful as they attempted to complete the task again. Task performance improved significantly for people with and without mild cognitive impairment, and participants reported greater confidence with online banking and medication management in the real world. “We found that the participants were not technophobic,” Czaja said. “They were very adherent, and there was a low dropout rate.”

Now her team is launching an intervention that will help older adults learn how to use Uber and Google Maps. They predict that participants who learn to use these apps will have better access to community resources. “We know that people who are socially isolated have poorer cognitive outcomes, and through technology we can reduce the risk of loneliness,” said Walter Boot, PhD, associate director of the Center on Aging and Behavioral Research at Weill Cornell Medicine. A recent study of more than 13,500 adults age 50 and older revealed that increased isolation was associated with increased risk of mortality, disability, and dementia (Lyu, C. et al., *JAMA Network Open*, Vol. 7, No. 7, 2024).

Boot and Czaja are also part of a team that developed an intervention for people with minimal tablet proficiency. In a recent study, participants learned how to use tablets to video chat with friends, find community events through a calendar feature, search for information, and engage in online learning. They reported less loneliness and social isolation and greater social support and quality of life 6 months after the study (*Innovation in Aging*, Vol. 8, No. 6, 2024).

Now Boot and Czaja are exploring interventions that use virtual reality to help older adults connect with others while boosting cognitive and physical skills. Their team trained people who were older than 60 on how to use a headset, controller, and VR program to communicate with a partner in a different state (*Innovation in Aging*, Vol. 7, No. 4, 2023). Together, the pairs then chose a city anywhere in the world to tour virtually and created a collage with photos displaying their virtual travels. “People reported that they really enjoyed the experience,” said Czaja. “And it was easy to find participants because they thought it sounded fun, so this busts the myth that older people are not interested in technology.”

A lifestyle that boosts brain health

The latest studies are also shedding light on cognitive health’s connection to other lifestyle factors beyond social connectedness. In Finland, researchers led a 2-year intervention for people at higher risk of dementia. Participants were educated and supported in areas of diet, physical activity, cognitive training, social activity, and monitoring of cardiovascular risk factors (Ngandu, T., et al., *The Lancet*, Vol. 385, No. 9984, 2015). The control group received only regular health advice. The people in the

intervention group experienced significantly greater improvements than the control group in executive function, complex memory tasks, and psychomotor control.

In a similar study in the United States, participants in the structured intervention attended 38 facilitated peer team meetings over 2 years with education, goal setting, and accountability to support behaviors related to fitness, following the Mediterranean diet, and learning (Baker, L. D., et al., *JAMA*, Vol. 334, No. 8, 2025). The unstructured comparison group received publicly available information materials, engaged in fewer peer meetings, and were encouraged to make lifestyle changes that met their personal needs and schedules. After the intervention, the structured group showed greater benefits in executive function and processing speed than the comparison group.

While these findings build the case for a holistic approach to brain health, many people do not have access to intensive, in-person support to make lifestyle changes. Researchers are already exploring how to use this evidence to help them develop scalable digital tools. “The opportunities for personalization are only going to increase to support these brain health interventions,” said Gow. There are many lifestyle factors involved, and AI could help individuals assess which ones to target and how to make behavioral changes, he said. For example, people who are physically active but do not have a social group could receive information about group activities in their area and reminders about events they signed up to attend. “Boosting cognitive function is a global issue, especially as people live longer,” Gow said. “Not everyone has the same access to resources, and digital applications can help more people protect their brains.”

The role of clinical psychologists

More good news: People refine their learning techniques as they age. “Metacognition, which is the awareness of our own abilities, improves with age,” said Alan Castel, PhD, a psychology professor at the University of California, Los Angeles, and author of *Better With Age: The Psychology of Successful Aging* (Oxford University Press, 2018). “Older adults may be slower to learn new tasks, so they selectively focus on learning what is important.” Castel saw this pattern in a study in which older adults struggled to remember a broad range of medication interactions, but they selectively remembered interactions that were associated with the most severe outcomes (*Memory*, Vol. 26, No. 8, 2018).

Older adults are also more likely to remember things that engage their curiosity, said Castel. Contrary to prior psychology literature that showed curiosity declined with age, Castel’s team found that there are two types of curiosity—and one type increases with age. Trait curiosity, the personality trait of being inquisitive by nature, tends to decline across the lifespan, but state curiosity—the momentary feeling of curiosity people experience when they encounter something unfamiliar or interesting—increases sharply after middle age and continues to increase into old age (*PLOS ONE*, Vol. 20, No. 5, 2025). “We can recruit cognitive mechanisms to focus on remembering what is important and interesting,” said Castel. “Curiosity keeps brains stimulated and helps us learn.”

Clinical psychologists are poised to help older adults identify their curiosities and what matters most to them and then take steps to acquire new skills in these areas. “Therapy is about learning new ways of relating to people, managing the challenges of daily life, and developing healthy habits,” said Steffen. She has worked with many older adults who have assumed new caregiving roles while aging themselves.

Some of these older partners are struggling not only to learn how to support a family member with a neurocognitive disorder, but also to navigate health care portals, telehealth visits, transportation, and other details for the loved one. By helping her patients prioritize the areas of daily life that need change, set goals, and break tasks into pieces, she has seen older adults successfully overcome seemingly impossible challenges.

“Cognitive behavioral therapy is grounded in the science of learning,” Steffen said. “Research has shown that older adults can be as active and engaged in therapy as younger adults and benefit equally. This is a good example of how learning is possible as we age.”