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RETIREMENT

Exercising an Aging Brain

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ACTIVE A Learning in Retirement flower class. Credit Ed Smith

MORE and more retired people are heading back to the nearest classroom — as students and, in some cases, teachers — and they are finding out that school can be lovelier the second time around. Some may be thinking of second careers, but most just want to keep their minds stimulated, learn something new or catch up with a subject they were always curious about but never had time for.

For many, at least part of the motivation is based on widespread reports that exercising the brain may preserve it, forestalling mental decline and maybe even [Alzheimer's disease](#) and other types of [dementia](#).

Is there any truth to it? And if there is, what type of learning is best suited to the older brain?

Many studies do find that being mentally active is associated with a lower risk of Alzheimer's disease. But the standard caveat applies: association does not prove cause and effect, and there is always the chance that the mentally active people who never got Alzheimer's simply had healthier brains to begin with.

Even, so, researchers say, there is no harm in telling people to try to stay engaged.

"When you and I are having this conversation, you're taking notes, thinking, remembering pieces of it, trying to relate it to other things," said Arthur Toga, a professor of neurology and director of the laboratory of neuroimaging at the University of California, Los Angeles. "You're changing the circuitry in your brain. That is because you have changed something in your brain to retain that [memory](#)."

Dr. Toga elaborated: "The conversation requires nerve cells in the brain to fire, and when they fire they are using energy. More oxygen and sugar must be delivered, by increased blood flow to those regions.

"Why would that be good? If you are vasodilating, delivering more blood to certain regions of the brain, that is important. It increases the longevity and the health of those circuits. In adults, if I ask you to perform tasks you've never done before, the amount of brain it takes for you to try and do it is far greater than the amount of brain it takes for you to do something you're already good at. So yes, exercising the brain is good." Playing video games probably qualifies as a type of brain exercise, he said, though older people might not sharpen their skills as fast as younger ones do.

But Dr. Toga warned that while using the brain might help avert some of the mental slowing that normally comes with aging, it had its limits. "I do not believe that it forestalls degenerative disease, however," he said. "That's a different process." There is a "little bit of snake oil," he added, in the various products and programs that are being marketed with the implied promise that they will ward off Alzheimer's disease.

But research continues. Dr. William Jagust, a professor of public health and neuroscience at the University of California, Berkeley, said there were two main theories that tried to explain why exercising the brain might make it more resistant to disease.

One is the "cognitive reserve" theory, which says that if the brain is in the best possible shape with extensive neuronal connections from being used a lot, it may be able to withstand the onset of Alzheimer's disease for a while and symptoms may take longer to develop.

A hallmark of Alzheimer's is deposits in the brain of an abnormal form of a protein called amyloid.

"A paper we published showed that people who were more cognitively active over their whole life span had less amyloid," Dr. Jagust said.

Animal research, he said, shows that neural activity actually releases amyloid into the brain. How, then, could mentally active people have less amyloid?

“My interpretation is that people who are more cognitively active have more efficient brains,” Dr. Jagust said. “What seems to happen in aging is that older people seem to have less efficient brains.” A scan of brain activity on a 20-year-old being asked to remember something will show less activity needed than in an 80-year-old asked to perform the same task.

“Older people seem to activate or bring on line brain areas that young people don’t use,” Dr. Jagust said. “They have to work their brains harder. So people who stay cognitively active may use their brains more efficiently.”

That way, they may generate fewer amyloid deposits. But he emphasized that being mentally active throughout life — not just in old age — was what mattered.



SCHOOL DAYS A Learning in Retirement group planned activities with a tour guide on a trip to Florence, Italy. Credit Ed Smith

“It has to do with lifelong patterns of behavior,” Dr. Jagust said. “We tend to focus on what people do at 75 in terms of dementia. But there is more evidence that what you do in your life, at 40 or 50, is probably more important.”

Nonetheless, Dr. Jagust acknowledged, “this is all theoretical.”

As to what kinds of things older people tend to be best at learning, the researchers said there were no hard and fast rules. Memory usually does diminish, even in people who do not have dementia, and reaction time slows.

“You’re not going to learn to hit a fastball,” Dr. Jagust said.

Over time, he said, the best-preserved abilities seem to involve vocabulary and knowledge about the world, what researchers call “crystallized intelligence.” Problem-solving and math ability, part of “fluid intelligence,” do not seem to stick as well.

The slippage in memory may make it tough to learn a new language. But people who already know more than one language may be more adept than others, because the process of learning different rules of syntax and grammar, especially early in life, seems to program extra skills into the brain, ones that people appear to retain.

Dr. Toga said that the sensorimotor parts of the brain that control the senses and muscle movement did not tend to shrink later in life the way the cognitive centers did. So in theory, learning physical skills like dancing ought to come easily. But nature can be cruel: where the brain is strong, the flesh may be weak. Failing [eyesight](#) and hearing, weakened muscles and stiff joints may all sabotage the signals the brain needs to choreograph smooth moves on the dance floor.

“Everything is sliding downward, unfortunately,” he said, laughing.

But it is still a good idea to try something new.

“A variety of things is important,” Dr. Toga said. “We try to encourage people to do certain things because it couldn’t hurt and may be good. Retaining lots of social interaction is really important. It involves so much of the brain. You have to interpret facial expressions and understand new concepts. If you want to learn to ride a monocycle or do acrobatics at 75, it’s probably not a good idea. But exercising more geography in the brain, I think that’s important.”

[Columbia University](#) has had a program for “lifelong learners” since 1986. About 200 participants take regular Columbia courses. They are expected to keep up with the reading, but there are no term papers, homework, exams or grades.

The older students tend toward history courses, renowned professors and language classes that they hope will help in their travels.

“A lot of the time, when seniors are in history classes, specially if it’s relevant to the topic, they are often used by professors as sort of experts to give testimony to events that actually occurred during a certain period,” said Kristine Billmyer, the dean and a professor at Columbia’s school of continuing education. “That’s pretty cool, and I think it’s something that’s highly valued by the students as well as the faculty.”

Programs geared to older people also exist at many other colleges and universities. An organization based in California, the [Bernard Osher Foundation](#), supports lifelong learning programs at 117 colleges and universities, at least one in every state, based on the idea that many older students go back to school for the joy of learning.

One of the largest programs for retirees is at the [University of Wisconsin](#), Green Bay (it is not associated with Osher). Called [Learning in Retirement](#), it is sponsored by the university, with more than 1,000 members and more than 240 courses a year. Classes — mostly short, a few two-hour sessions — include painting, jazz, travel, eBay, [osteoarthritis](#), Zumba, the periodic table, the history of the earth, building with straw bales and “motorcycling and aging awareness.” Most require no outside reading, homework or exams. Some are taught by college faculty, some by members of the group or others in the community.

Michael W. Murphy, who spent more than 30 years as an English professor, said this program had brought him some of the greatest joy he had experienced in the classroom. Since 2001, when he stepped down from his post as acting dean at the university, he has been teaching poetry and other subjects to Learning in Retirement members. It is an unpaid position.

“I’ve always enjoyed teaching, and the idea of teaching without having to read papers, correct tests and worst of all, give out grades, was really appealing,” Dr. Murphy said.

To his delight, the students actually want to be there. They take the time to tell him how much they appreciate him and sometimes even break into applause after his lectures. One of his courses filled a hall with seats for 120 and had 130 more people on the waiting list. The students include doctors, lawyers, professors and high-school dropouts, who have all been around the block a few times, and every so often someone challenges him — a kind of mental jousting he enjoys.

“The biggest problem I had teaching 18-year-olds was a kind of general apathy,” Dr. Murphy said. “They were looking forward to a career in high finance and I was trying to teach them to appreciate Tennyson. The fact that these people show up, and toddle in or waddle in, some with their walkers or wheelchairs, it’s heartwarming.”