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## Cross-Training Your Brain to Maintain Its Strength

With Video Games and Computer Programs, Seniors Have Fun While Keeping Their Minds Fit

By Leslie Walker  
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Glenys Dyer, 82, is drawing Queen Elizabeth on the tiny screen of her Nintendo video game player. Suddenly her instructor -- a cartoon figure on the screen -- tells her to shift gears and draw a picture of herself, then read a passage from a novel aloud.

"Our children gave this game to us," explains her husband, John Dyer, 83, as he watches his wife do her daily [Nintendo](#) "Brain Age" exercises. "The concept is to help the brain with rapid calculation and rapid reading."

The Dyers, who live in the Goodwin House retirement community in [Alexandria](#), are part of a brain health movement sweeping such communities nationwide.

Much as physical fitness buffs hit the gym daily, seniors are doing brain exercises to tone their minds. The theory -- so far with little hard science behind it -- is that mental stimulation slows memory loss and other cognitive declines associated with aging.

Encouraged by research suggesting the brain can sprout new cells and rewire existing ones late in life, senior communities are supplementing their usual lineup of bingo and art classes with new video games, Sudoku puzzles and computer activities.

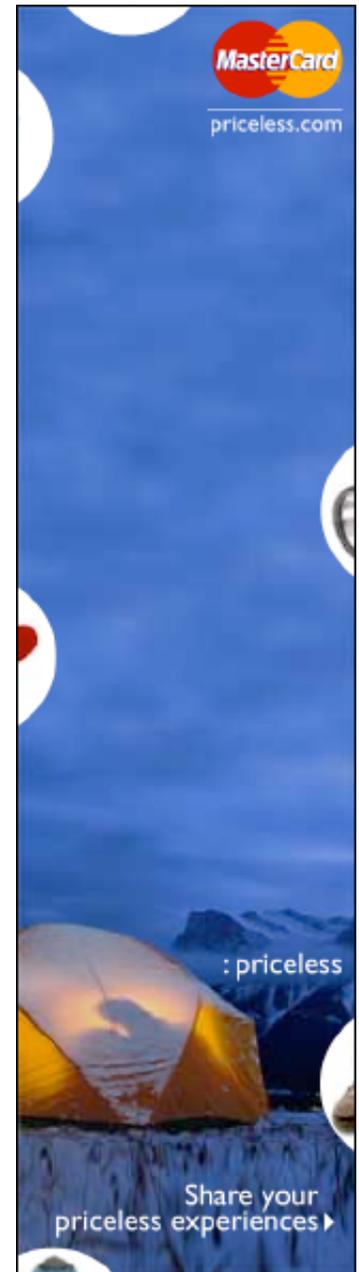
"My view is if it doesn't do any harm, we've got to try it," says John Dyer, a retired nuclear engineer. "My grandmother and mother both had dementia."

In addition to their Brain Age game, the Dyers stretch their brains with several computer programs, including one called Brain Fitness that Goodwin House offers all 400 of its residents. More than 100 other retirement communities nationwide offer the software developed by neuroscientists in [California](#), who say it improves memory by teaching the brain to interpret sounds faster and more accurately.

Over in [Bowie](#), residents of the HeartFields Assisted Living Center are doing giant crossword puzzles together and playing virtual bowling on the [Nintendo Wii](#), a video game that administrators hope will challenge residents' visual and motor skills.

"In the past year we have made a big push to get the mind working, not just stimulated, but actively

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working on topics," said Leslie Ray, the center's executive director. "That's because research is showing that keeping your brain powered up fights Alzheimer's disease."

At the senior center in [Annapolis](#), elders have participated in a collaborative Keep Your Mind Alert class and taken classes in Spanish, opera appreciation and Civil War commanders.

"We are offering more and more activities to keep the mind alert," says Becky Batta, the center's director. "The baby boomers are coming and they demand it. They are completely different from other generations of seniors."

## A Growing Market

Scientists seem to agree that at least four activities can defend the brain against age and disease -- eating fresh fruits and vegetables, doing regular aerobic exercise, performing challenging mental tasks and engaging in social pursuits.

[The Alzheimer's Association](#) has promoted all four in the 5,000 Maintain Your Brain workshops it has conducted over the past three years at senior centers and corporate workplaces, including [Lockheed Martin](#) and [Apple](#).

Physical exercise and so-called brain food have long been regarded as good for mental health -- exercise because it boosts blood circulation and gives the brain more oxygen; and foods rich in antioxidants, such as fish, fruits and vegetables, because the antioxidants attack cell-destroying agents.

But more recent attention is being focused on brain exercise because neuroscientists have been making fresh discoveries as baby boomers, worried about approaching old age, watch closely.

In fact, baby boomers may be the biggest catalyst of the brain-fitness boom. They started turning 60, and the nation's over-65 population will double between 2000 and 2030 -- from 35 million to 72 million people. That forecast has triggered an entrepreneurial rush to supply them with anti-aging products.

But retirement communities are not the only market for brain exercise. A growing body of research suggests that mental activity in middle age and earlier can help later in life. As a result, Web sites such as HappyNeuron.com are springing up to offer online games to people of all ages, while blogs like SharpBrains.com provide commentary on the fledgling industry.

"No technology trend in fitness has gotten more media attention than cognition training," said Andrew Carle, a [George Mason University](#) professor who studies brain-training products. "What's driving it is the jump we are seeing in Alzheimer's, which is an age-related disease."

More than 5 million Americans have Alzheimer's, the most common form of dementia, in which a large number of the brain's 200 billion nerve cells degrade and die. The Alzheimer's population is projected to jump to 7.7 million Americans by 2030, by the time the last of the baby boomers have reached 65.

Brain decay actually is wider, because all human brains lose nerve cells as they age. Brain neurons typically start dying when people are in their 20s, a loss that accelerates and eventually causes cognitive declines that tend to show up first in memory and hearing.

## Mental Challenges

Scientists have known for decades that brain decay is not inevitable, because long-term studies have shown that some minds stay relatively sharp while others decline dramatically, notes Shlomo Breznitz, psychology professor and former president of Israel's University of Haifa. More recent studies suggest a key difference may be the extent to which each brain is challenged throughout life.

"People who engage in very challenging tasks -- not just in work but during leisure activities such as reading, crossword puzzles, bridge, chess and travel -- tend to slow down their mental aging process very significantly," says Breznitz, who is also a member of [Israel](#)'s legislature and has developed a brain-training program called MindFit.

To be effective, scientists say mental activity must become progressively more challenging. Otherwise, the brain adjusts and learns to perform repetitive tasks with less effort.

Also contributing to the brain workout boom are state-of-the-art imaging techniques that have allowed scientists to validate a theory developed decades ago. By taking detailed pictures of brain neurons, scientists watch parts of the brain that had seemed dormant light up and assume new responsibilities in response to stimuli. Theoretically, this means brain decay can be halted or even reversed.

"The brain is constantly rewiring and recalibrating itself in response to what you do," says Henry Mahncke, who holds a PhD in neuroscience and is vice president of Posit Science, the [San Francisco](#) developer of the Brain Fitness software. "It remakes itself into a more efficient operation to do the things you ask it to do."

The trick, of course, is finding the right stimuli -- no trivial task.

Posit Science developed auditory exercises by piggybacking on years of research showing the brain's listening ability gets fuzzier with age. In an attempt to prove that its products work, the company has been funding clinical studies, including one published in a [National Academy of Sciences](#) journal last year which purported to show that healthy people over 60 who used Brain Fitness turned back their memory clocks by 10 years.

Other scientists remain skeptical, noting that most basic research in this area so far has involved animals.

"There is not a lot of empirical evidence yet," says Molly V. Wagster, chief of the neuropsychology of aging branch at the [National Institute on Aging](#). "That is not to say these ideas don't have plausibility. We all hope this may be the case, but in humans there have not been a lot of randomized clinical trials."

## **A Well-Rounded Workout**

The fact that the brain-fitness neuroscience remains in its infancy isn't holding back entrepreneurs, who are experimenting to develop a mental gym that will give brain cells a well-rounded workout.

The idea makes sense to [George Mason](#)'s Carle, who has tested many brain-exercise products. "Much as a gym or personal trainer is better than simply walking," he says, "using training software is better than just doing crossword puzzles. With push-ups, you may get strong arms, but how about your legs? You have to train all the brain processes."

More than two years after releasing their auditory trainer, the makers of Brain Fitness are preparing to release a visual training version early next year. Glenys Dyer has been testing it and finds the visual

exercises much harder.

Dyer also is working through the rival program made in Israel, MindFit, which offers 20-minute workouts in hand-eye coordination, visual and auditory short-term memory, multitasking and word recall.

In the computer room of her apartment, Dyer demonstrates a MindFit exercise that displays two square rooms on the screen, each with a ball inside ricocheting off walls of different colors. Her assignment is to match the colors of the ball and the wall before the two collide, by clicking on the wall if the colors don't match.

Her husband says MindFit and Brain Fitness each have their pluses and minuses, but that "MindFit training is more fun, while Brain Fitness is hard work."

Others find Brain Fitness frustrating, especially the way it asks people to distinguish "doe" and "boe" over and over, a seemingly simple task that proves extremely difficult for aging brains.

But the 23 Goodwin House residents who finished the 40 sessions of Brain Fitness seem mostly pleased with their results.

"I was so enthused and happy I had passed this thing, I felt I could conquer anything," said Phyllis Evans, 86, adding that she considers herself "eagle-eyed" and more able to notice things around her.

Stella Byers, 82, says her memory seems sharper. "At bridge I can remember more high cards that have been played."

Bob Edge, an 82-year-old retired Air Force general, says the only place he notices a difference is in his crosswords: "I found it speeds me up a bit."

Like many seniors, Edge does all he can to slow the side-effects of aging. In addition to brain exercises, he takes Spanish lessons and walks more than a mile a day, lifts weights every other day, hits golf balls several times a week and sometimes climbs the stairs to his sixth-floor apartment.

The Dyers also aren't betting their brains on software alone. They're heeding scientists who say learning anything new can help brain cells stay alive. John Dyer is studying computer programming; he and his wife are learning phrases in Amharic, the language of [Ethiopia](#).

The Dyers say they agree with Edge that remembering things remains a never-ending struggle.

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