

February 16, 2007

The Upside of Aging

New research finds some brain functions actually improve with age. Our reporter on delayed retirement and how to stay sharp.

By **SHARON BEGLEY**
February 16, 2007; Page W1

The aging brain is subject to a dreary litany of changes. It shrinks, Swiss cheese-like holes grow, connections between neurons become sparser, blood flow and oxygen supply fall. That leads to trouble with short-term memory and rapidly switching attention, among other problems. And that's in a healthy brain.

But it's not all doom and gloom. An emerging body of research shows that a surprising array of mental functions hold up well into old age, while others actually get better. Vocabulary improves, as do other verbal abilities such as facility with synonyms and antonyms. Older brains are packed with more so-called expert knowledge -- information relevant to your occupation or hobby. (Older bridge enthusiasts have at their mental beck-and-call many more bids and responses.) They also store more "cognitive templates," or mental outlines of generic problems and solutions that can be tapped when confronting new problems.




Christoph Niemann

Eric Kandel, 77 years old, who shared the 2000 Nobel Prize in medicine, maintains an active lab at Columbia University and mentors younger scientists. "I think I do science better than I did when I was younger," he says. "In science, judgment is so important, and I now have a better understanding of which problems are important and which aren't."

Growing awareness that old brains aren't necessarily senile brains is already fueling a slew of consumer offerings. Brain exercises developed for older adults by Posit Science Corp. in San Francisco are being offered by retirement communities, senior centers and assisted-living facilities, as well as by insurers such as Humana to their Medicare enrollees. The computer-based program includes exercises intended to improve memory and attention, as well as sharpness of hearing. Continuing, peer-reviewed studies conducted by Posit scientists suggest it can roll back the mental agility calendar by at least a decade.

Some retirement communities and assisted-living centers are installing a touch-screen-based cognitive fitness program developed by Dakim Inc. of Santa Monica, Calif., that gives seniors practice on seven cognitive skills, including language and the kind of visual-spatial processing that helps you read a map. The system uses "age-appropriate" film and audio clips, such as Jimmy Stewart movies, as the basis for short-term memory exercises and adds new exercises every 24 to 48 hours.

DOW JONES REPRINTS

 This copy is for your personal, non-commercial use only. To order presentation-ready copies for distribution to your colleagues, clients or customers, use the Order Reprints tool at the bottom of any article or visit: www.djreprints.com.

- [See a sample reprint in PDF format.](#)
- [Order a reprint of this article now.](#)

Changing Public Policy

Discoveries of brain functions that hold up, or even improve, through the decades could affect corporate and public policy. As baby boomers age, many are resisting mandatory retirement. In January, a special committee of the New York State Bar Association recommended that law firms abandon the practice. Air-traffic controllers are asking federal agencies to reconsider the requirement that they retire at age 55, and the Federal Aviation Administration in January proposed pushing back the mandatory retirement age for commercial pilots, which is currently 60.

The emerging neuroscience is on their side. One of the most robust cognitive abilities is semantic memory, which is recollection of facts and figures. "Semantic memory is relatively resistant to the effects of aging," says psychology professor Arthur Kramer of the University of Illinois, Urbana-Champaign. Semantic memory includes vocabulary, which increases with age so reliably (at least in people who continue reading) that a younger person should never challenge a sharp 75-year-old to a crossword puzzle.

Expert knowledge -- information about an occupational or even hobbyist specialty -- resists the effects of aging, too, which is why mumbling "accrued postretirement liabilities" to an 80-year-old actuary makes his relevant synapses fire as robustly as they did at age 40. Synapses that encode expert knowledge "are written in stone," says neuroscientist John Morrison of the Mount Sinai School of Medicine in New York.



LOADING

Watch a video about simple exercises called "neurobics" for the aging brain.

The longevity of expert knowledge and cognitive templates lies behind the finding that air-traffic controllers in their 60s are at least as skilled as those in their 30s. When Prof. Kramer of Illinois and a colleague at the Massachusetts Institute of Technology gave older controllers standard lab tests for reaction speed, memory, attention and the like, they found the usual: Performance declined compared with that of 30-somethings.

But on more fast-paced, complex -- and hence realistic -- tests in which they juggled multiple airliners and handled emergencies, the senior controllers did as well as or better than the young ones. They kept simulated planes safely away from each other, and when they ordered planes to change their altitude, heading or speed to avoid a collision, they used fewer commands than younger ones. It was as if their experience had equipped them with the most efficient algorithm for keeping the planes safely spaced.

"Their experience and their knowledge of aircraft types and strategies they've used for years can compensate for a decline in these other abilities," says Prof. Kramer, who has submitted the study to a science journal. The findings, he says, suggest the need to revisit "the whole notion of when we need to retire people, since their ability to do these complex tasks resists decline."

That 60-somethings can mentally juggle multiple 747s seems to go against the idea that aging

hurts the ability to pay attention. But studies show that selective attention, the ability to focus on something and resist distractions, doesn't decline with age. For controllers, that means they can focus on planes in their sector despite a hubbub of activity in the control tower. For other seniors, it means no problem keeping eyes and mind on a highway despite flashing road signs or noisy passengers.



Getty Images

The biggest benefit of an older brain is that fewer real-life challenges require deliberate, effortful problem-solving. Where once it took hours of methodical scrutiny to understand a prospectus, for instance, older lawyers and investment bankers can zoom in on crucial sections and fit them into what they already know.

Elkhonon Goldberg, a neuropsychologist who has a private practice and is a professor at New York University School of Medicine, finds that he can also grasp the essence of data presented in scientific papers more readily than he once could, something that more than makes up for losses in other mental realms. "I am not nearly as good at laborious, grinding, focused mental computations," he says, "but then again, I do not experience the need to resort to them nearly as often."

While younger brains solve problems step-by-step, older brains call on cognitive templates, those generic outlines of a problem and a solution that worked before. It's the feeling you get when you see that a new situation or problem belongs to a class of situations or problems you have encountered before, with the result that you don't have to attack them methodically. Yes, older people forget little things, and may have occasional attention lapses, but their cognitive templates are so rich that they more than hold their own. Their brains can keep up even with a diminished supply of blood and oxygen.

Professional Benefits

As a result, older professionals can readily separate what's important from what's not, a big reason so many of them fire on all cognitive cylinders well past age 65. "I'd say that the ability to make a significant contribution as a lawyer actually increases with time, experience and age," says attorney Mark Zauderer, 60, a partner in the New York law firm Flemming Zulack Williamson Zauderer.

In complex business litigation, he says, where pretrial discovery can yield enough documents to fill a warehouse, "a lawyer must be able to sort the wheat from the chaff, to take all these facts and extract only those that support winning themes. A senior lawyer is in the best position to do that, and to have the courage to discard facts -- even those on your side -- that will only distract the court or the jury."

"Some things you just need to grind into your system for many years until they become automatic and seemingly effortless," says Naftali Raz of the Institute of Gerontology at Wayne State University in Detroit. "That may be the key. Automatic functions are least sensitive to aging. So, if the decisions are based on knowledge and skill, older folks may have an advantage over younger decision makers just because they have to do less mental heavy lifting."

More research is coming. Although studies on aging have long focused on diseases such as

Alzheimer's, scientists are increasingly investigating healthy aging, trying to discover which factors allow some people to resist the usual ravages of time, and to get a better sense of how well older adults can function. The National Institutes of Health, the nation's leading funder of biomedical research, doesn't break out "healthy aging" as a separate budget item, but spokeswoman Linda Joy says that more funding is going to studies of people who reach their 60s, 70s and beyond with little or no disease. Scientists hope that by identifying which mental functions are largely untouched by aging, they will be able to develop treatments or exercises to shore up functions that do deteriorate.

The benefits that come to the mind and brain with age extend beyond thinking. They also include a greater ability to put yourself in another person's mind, empathizing and understanding his thought processes -- emotional wisdom. Civil engineer Samuel Florman, 81, remains active in his Scarsdale, N.Y., construction company and says that as he has grown older, he "has gotten better with people, more understanding of young people and more patient with aggressive ones. I'm more savvy about when to rush and when not to."

Controlling Anger

That likely reflects the older brain's greater control over emotions, especially negative ones such as impatience and anger. A 2006 study of 250 people ranging in age from adolescence to their late 70s documented for the first time "positive changes in the emotional brain," according to the Society for Neuroscience, which publishes the Journal of Neuroscience. In the experiment, Leanne Williams of the University of Sydney showed the volunteers pictures of faces expressing emotions. Using fMRI brain imaging, it was found that circuits in "medial prefrontal" areas -- right behind the forehead -- were more active in older people than younger people when processing negative emotional expressions. The greater activity suggests better control of reactions to other people's anger, fear and the like. This greater sensitivity seems to translate into decreasing neuroticism, and greater emotional equanimity.

That doesn't mean older brains flatline when it comes to sensitivity. Instead, they often show a keen emotional intelligence and ability to judge character. Elderly volunteers given a list of behaviors that describe a made-up person ignored irrelevant information (favorite color, place of birth) when asked to judge the person's character and focused on revealing traits better than younger people did, according to research by Thomas Hess, a professor of psychology at North Carolina State University. They were more likely to infer correctly that the person was dishonest, kind or intelligent -- a skill that is arguably more important than the ability to memorize a list of words in a lab experiment.

Write to Sharon Begley at sharon.begley@wsj.com³

URL for this article:

<http://online.wsj.com/article/SB117159082888010600.html>

Hyperlinks in this Article:

(1) <http://online.wsj.com/article/SB117159408862110719.html>

(2) <http://online.wsj.com/article/SB117159149681310636.html>

(3) <mailto:sharon.begley@wsj.com>

Copyright 2007 Dow Jones & Company, Inc. All Rights Reserved

This copy is for your personal, non-commercial use only. Distribution and use of this material are governed by our **Subscriber Agreement** and by copyright law. For non-personal use or to order multiple copies, please contact Dow Jones Reprints at 1-800-843-0008 or visit www.djreprints.com.