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Why you shouldn't be afraid of your aging brain

Yes, our cognition slows as we grow older, but some activities and even attitudes can help.

By **Susan Moeller** DECEMBER 11, 2018

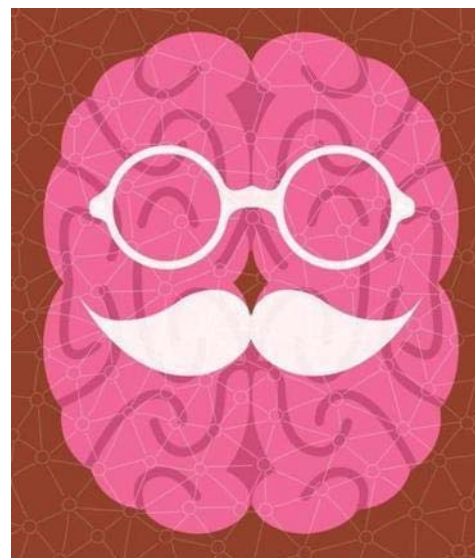
ON A WARM DAY last spring, I stop by my friend's house to meet her for a walk. I knock on the door. A strange woman answers. My brain is momentarily stumped, but I soldier on.

"Oh, I'm just here to meet Sara," I say.

"She doesn't live here anymore," the woman says, dryly. "I'm the new owner."

Suddenly the proverbial light bulb clicks on and I remember my neighbor had, indeed, moved months earlier to a nearby condo that I had actually visited. I mumble an apology, back down the front stoop, and set off for her correct address. And, like everyone over 60 who has these senior moments, I feel a surge of momentary panic that this lapse isn't just distraction or forgetfulness, but a sure sign of dementia.

That concern is surely legitimate as we face not only our own mortality, but the



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oncoming rush of approximately 74 million aging baby boomers, 28 million of whom are expected to live long enough to develop dementia, according to the Alzheimer's Association. That's sparked an increase in funding for Alzheimer's research, a cause popular with all political parties. The funding has had an important trickle-down effect: Using longitudinal studies and magnetic resonance imaging, the latest dementia research now tells us not just about damaged brains, but also about healthy ones. Research indicates interventions like exercise, social engagement, intellectual stimulation, heart-healthy diets, meditation, and even our own attitudes toward aging can postpone or possibly prevent dementia. This could lower health care costs and change how the medical community works with older people.

“Is exercise and intellectual engagement, social interaction, diet, going to cure anything? There's no evidence of that,” says Art Kramer, professor of psychology and director of the Center for Cognitive and Brain Health at Northeastern University, where he researches the effect of exercise on cognition. “Is it going to buy you high-quality time? There's evidence of that. . . . The research certainly isn't perfect. There's lots of gaps. There's lots more we need to know. But I think it's moving in the same direction.”

Kramer is one of scores of researchers in Boston and elsewhere who can now measure cognition with functional MRIs that show not just the structure of the brain but what parts of it subjects actually use when performing specific tasks. It's like a window into your brain, a 3-pound organ loaded with cells connected by nerve fibers in an intricate processing network. And healthy brains will eventually show proof of age, some more than others. And don't get cocky if you're young. Brain size peaks around age 20.

“We prune our brain to get rid of the excess, based on which nerve cells are making connections, and so the nerve cells making more connections are preserved,” says Dr. Marissa Natelson Love, assistant professor in the division of memory disorders and behavioral neurology at the University of Alabama at Birmingham.

Pruning causes our processor and recall ability to slow down. Spatial thinking, mental flexibility, and the ability to juggle multiple bits of information — compute the tip at a restaurant, for example — or block irrelevant information when multitasking, all decline. Even our innate ability to “read” people, to determine if someone is kind or rotten, may fade, too, leading some researchers to conclude that’s why older people often fall prey to scams.

And that’s just the hardware. Aging brains also deal with what Natelson Love calls “software problems,” issues that are not related to the structure of our brains but affect how well we use them — disrupted sleep, chronic pain, vascular disease, mood disorders, medications, alcohol, and stress, among others.

“So the network that’s very active in chronic pain, for example, will suppress another network,” Natelson Love said. “And because that network is not getting activity, what really happens is you get decreased connections between the nerve cells. And those decreased connections actually change the size of that part of the brain.”

Evidence shows the brains of older adults are working harder to complete a given task at the same level as younger adults, says Lauren Richmond, an assistant professor of cognitive science at Stony Brook University in New York. And there’s some evidence that older adults activate different regions than younger adults to complete the same tasks, she says. Older brains aren’t all bad news. We are able to counter some loss of speed by connecting across networks or using “crystalized knowledge,” the information that’s stored in our brains as experience or wisdom.

Meanwhile, the “positivity effect” means we tend to remember relatively more positive information than negative as we age, possibly because we see time as more limited and want to focus on the good in our lives. Most of us become more resilient, and while depression certainly exists in older people, depression rates tend to be lower than in younger ones, says Sarah Barber, assistant professor in psychology at Georgia State University’s Cognition & Aging Lab and a researcher in ageism. And it turns out

cognition is not just about how many cells we have, but how the connections between them are interacting with others, says Bonnie Wong, a board certified neuropsychologist at Massachusetts General Hospital who studies the effects on cognition of behavioral interventions like meditation.

“When I started graduate school, the idea was that you’re born with as many brain cells as you’re ever going to have, and it’s basically a downward spiral from there,” Wong, 44, says. “And then, after a while, it was, wait a minute. We can actually see now that the brain does make new brain cells in adulthood, but it has to be certain activities that will promote the production of new brain cells.”

For reasons that aren’t yet understood, some older people’s memory functions look amazingly like that of younger people. Dr. Brad Dickerson, a neurologist and colleague of Wong’s at MGH and a Harvard Medical School associate professor, has studied these “super agers,” a term coined by researchers at Northwestern University. Not only do super agers’ brains have the memory networks of younger brains, but those networks seem to help keep super agers motivated and engaged.

“We started out by measuring the structure, the size and shape, and thickness of certain parts of the brain, within networks of the brain we know are important for memory or important for motivated performance and attention,” Dickerson says.

“Because obviously if you’re going to remember something well, you have to be motivated and focus your attention on it. So we looked at those two specific networks and found several parts of them that were bigger in the super agers than they were in typical older adults.”

It’s not yet clear if super agers, he says, are better at staving off network decline, or if they perform better because they start out with more brainpower and are therefore more protected from the usual decline. But one message from the research is clear: Even if we aren’t super agers, we can do things to at least postpone some cognitive aging. For starters, what’s good for your cardiovascular system is good for your brain,

so try to stick to a Mediterranean or DASH (Dietary Approaches to Stop Hypertension) diet that's rich in fresh fruits and vegetables and low in sugar, saturated fats, and processed foods. Here are more strategies, based on conversations with researchers:

1. Exercise.

This was No. 1 on almost every researcher's list, particularly aerobic exercise, for improving memory and executive functions such as scheduling, planning, multitasking, and dealing with ambiguity. As one researcher put it, exercise is low-cost, non-pharmacological, and noninvasive. Try to increase your heart rate 20 to 30 minutes at least three to five times a week, says Dr. Tamara G. Fong, a neurologist at Beth Israel Deaconess Medical Center and assistant professor at Harvard Medical School. Research also indicates the benefits of resistance training and skill-based or mindfulness exercise like yoga and tai chi, even for longtime couch potatoes. "It used to be [physicians] told folks over 75, don't bother to lift weights, you're going to hurt yourself," Kramer says. "That was a stupid statement."

2. Socialize.

Get out of the house and away from the TV. Join a walking group, a book group, or a lunch group. Super agers seem to see benefits from social networks, including reduced stress levels, says Wong. "When you have better positive emotional well-being, essentially you can see a reduction in inflammatory markers in the body and the brain," she says. If you can find an activity that combines socialization and exercise, even better, says Margie E. Lachman, a psychology professor at Brandeis University. People who show the best cognitive function and least decline have high levels of social support, exercise regularly, and have a strong sense of control over their lives, according to her research.

3. Stimulate.

Forget websites like Lumosity, which promises to build brain fitness through cognitive games (and was fined by the Federal Trade Commission for deceptive advertising), and

concentrate on taking on new cognitive challenges, whatever they might be, says Richmond. That includes the core skills important for problem solving, reading comprehension, mental arithmetic, and memory retrieval. Play cards, join a choral group, or volunteer.

4. Meditate.

Research has shown meditation helps with short-term memory, attention, and working memory, Wong says, and now researchers want to find out what it actually does for long-term memory. Wong is a co-investigator with Dickerson and Sara Lazar, an associate researcher in psychiatry at MGH and an assistant professor at Harvard Medical School, on a two-year study of healthy people and how meditation might increase the activation of the brain's hippocampus, which is important for memory.

5. Fight ageism.

This might be the hardest task, partly because ageism is so ingrained in our culture — and ourselves — from fairy tale witches to Facebook comments. “Stereotype threat,” what we believe about ourselves, also weakens the positivity effect, our inclination to remember good things, Barber says. Becca Levy, professor of epidemiology and psychology at the Yale School of Public Health, found that older research subjects who were exposed to negative aging stereotypes performed worse on cognitive tests than those who were given positive stereotypes. And, among the general population of older adults, Levy found that those who have taken in more negative age stereotypes were more likely to experience stress and develop dementia. Recently, Levy and her colleagues estimated that ageism costs the health care system \$63 billion annually. She recommends fighting ageism as you might any other stereotype. “You know, if you see a message about aging, you could ask, ‘If that were said about women, or, you know, a certain group, would that feel like it was expressing prejudice, or does it seem fine?’ ”

Will these techniques prevent me from knocking on the wrong door again? Who knows, but I find it reassuring that researchers are taking their own findings to heart.

Wong is taking flamenco lessons. Dickerson is trying to get back into running.

Lachman switched to regular aerobic, strength, and balance routines. Meanwhile, I'll continue to ring with my handbell choir, try harder to get to the pool, and will take regular walks with my friend — provided I can be mindful and go to the right house.

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