

Study suggests how 'super aging' older adults retain youthful memory abilities

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Some loss of memory is often considered an inevitable part of aging, but new research reveals how some people appear to escape that fate. A study by Massachusetts General Hospital (MGH) investigators examines a remarkable group of older adults whose memory performance is equivalent to that of younger individuals and finds that certain key areas of their brains resemble those of young people.

The study published in *The Journal of Neuroscience* is the first step in a research program aimed at understanding how some older adults retain youthful thinking abilities and the brain circuits that support those abilities. The program is led by Bradford Dickerson, MD, director of the Frontotemporal Disorders Unit in the MGH Department of Neurology and Lisa Feldman Barrett, PhD, MGH Department of Psychiatry, who are co-senior authors of the new study.

While most older adults experience a gradual decline in [memory](#) ability, some researchers have described older adults - sometimes called "super agers" - with unusually resilient memories. For the current study, the MGH team enrolled adults ages 60 to 80 - 17 of whom performed as well as adults four to five decades younger on memory tests, and 23 with normal results for their age group - and 41 [young adults](#) ages 18 to 35.

"Previous research on super aging has compared people over age 85 to those who are middle aged," says Alexandra Touroutoglou, PhD, MGH Neurology, co-senior author with Dickerson and Barrett. "Our study is exciting because we focused on people around or just after typical retirement age - mostly in their 60s and 70s - and investigated those who could remember as well as people in their 20s.

Imaging studies revealed that these super agers had brains with youthful characteristics. While the cortex - the outermost sheet of brain cells that is critical for many thinking abilities - and other parts of the brain typically shrink with aging, in the brains of super-agers a number of those regions were comparable in size to those of young adults. "We looked at a set of brain areas known as the default mode network, which has been associated with the ability to learn and remember new information, and found that those areas, particularly the hippocampus and [medial prefrontal cortex](#), were thicker in super agers than in other older adults. In some cases, there was no difference in thickness between super agers and young adults," Touroutoglou says.

Barrett, who is also University Distinguished Professor at Northeastern University, adds, "We also examined a group of regions known as the salience network, which is involved in identifying information that is important and needs attention for specific situations, and also found preserved thickness among super-agers in several regions, including the anterior insula and orbitofrontal cortex."

Critically, the researchers showed not only that super-agers had no shrinkage in these brain networks but also that the size of these regions was correlated with memory ability. One of the strongest correlations between brain size and memory was found in an area at the intersection of the salience and default mode networks. Previous research has shown that this region - the para-midcingulate cortex - is an important hub that allows different brain networks to communicate efficiently. "We believe that effective communication between these networks is very important for healthy cognitive aging," Touroutoglou says.

Understanding which factors protect against memory decline could lead to important advances in preventing and treating age-related memory loss and possibly even various forms of dementia, says Dickerson, who is an associate professor of Neurology at Harvard Medical School. "We desperately need to understand how some [older adults](#) are able to function very well into their seventh, eighth, and ninth decades. This could provide important clues about how to prevent the decline in memory and thinking that accompanies aging in most of us."

More information: *The Journal of Neuroscience*, [DOI: 10.1523/JNEUROSCI.1492-16.2016](https://doi.org/10.1523/JNEUROSCI.1492-16.2016)

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