

Normal brains, waning with age



Murray Grossman, left, studies degeneration of the brain's frontal and temporal lobes at Penn.

Some elderly become vulnerable to scams. The losses can be high.

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The patient was in his 80s. He didn't have dementia, but this smart, sophisticated man had made a series of baffling, devastatingly bad financial decisions of a sort that are all too common at his age.

He had been told he'd won a contest and would get a big prize if he sent some money in first. His daughter caught on after the man had lost "tens of thousands of dollars," said Murray Grossman, a University of Pennsylvania neurologist who studies degeneration of the brain's frontal and temporal lobes.

Even after the patient's daughter changed his phone numbers and took control of his bank account, even after he knew the contest was a scam, he tried to give the con artists more money. "The guy would literally call the scammer and give him the new phone number," Grossman said.

As far as Grossman could tell, the man had "normal" aging, which is cold comfort. Just as our muscles and eyes typically decline with age, so too do our brains. They shrink and show other signs of wear. And that process often plays disproportionate hell with the frontal lobes.

Located behind your forehead and above your eyes, the frontal lobes are the seat of what doctors call executive function - abilities that help you assess new situations, perform complex, multistep tasks, and make decisions.

Jason Karlawish, a geriatrician and bioethicist at the Penn Memory Center, said there's growing interest in changes in judgment and decision-making that go along with aging but "right now don't map onto any disease."

Last year, the FINRA Investor Education Foundation and Stanford University's Center on Longevity jointly launched the Research Center on the Prevention of Financial Fraud. The National Endowment for Financial Education met with researchers this month to lay groundwork for a project on diminished financial capacity and cognitive decline.

University of Iowa researchers recently published a study showing that people with damage in the ventromedial prefrontal cortex - a part of the frontal lobe that often degrades in the elderly - were more vulnerable to misleading advertising. A Vanderbilt University study this year traced older people's problems with making decisions in novel situations to a decline in the white matter that connects the medial prefrontal cortex with the striatum deeper in the brain.

Another group from Harvard and New York Universities and the Federal Reserve Bank and Board studied real-world decisions involving mortgages and credit cards. The quality of decisions peaked at age 53.

"This kind of research," said David Laibson, a Harvard behavioral economist and one of the authors of that study, "is . . . going to be an explosively important topic."

The obvious reason is demographics. Baby boomers are getting old. The rise in obesity and diabetes also does not bode well. Both increase the odds of dementia caused by vascular problems, which not only lead to more frontal lobe dysfunction than Alzheimer's, but also make Alzheimer's worse.

Laibson said the demise of pensions is another reason the research is important. In the old days, a con artist could steal only so much at a time. Now, older people can easily have retirement accounts with half a million dollars in them. "Boy, is that a juicy target," he said.

Laibson is worried about fraud, but he's even more concerned about bad, but legal, investments.

As scientific studies of the aging brain reveal more about how structural damage affects thinking, they raise thorny, as-yet-unanswered questions. How do we protect the vulnerable elderly? How do we make sure that aging CEOs, investment managers, and politicians can handle their demanding jobs? One researcher recommends annual cognitive tests, a slippery slope if ever there was one.

There's ample evidence that people can make stupid decisions or be victims of fraud at any age.

"All of us can be taken," said Anthony Pratkanis, a University of California Santa Cruz psychology professor who studies persuasion.

Laura Carstensen, director of Stanford's Center on Longevity, said the trick will be finding ways to safeguard the vulnerable without restricting people who can still make their own financial decisions. "There are a lot of older people who I would turn to in a heartbeat for financial advice," she said, including her 92-year-old father. Suggesting she should take over for him would be "truly offensive and ridiculously stupid."

Researchers on all sides, though, agree that older people are disproportionately targeted, in part because they have more assets.

Those who study the aging brain, however, think some older people are at special risk. About half of adults in their 80s, Laibson said, suffer from either dementia or cognitive impairment without dementia.

"People who throughout their life have not been vulnerable to scams do become vulnerable in their later years," said Daniel Marson, a neuropsychologist and lawyer who runs the

University of Alabama at Birmingham's Alzheimer's Disease Center. "We think that financial abilities are exquisitely vulnerable to early cognitive changes."

Psychologists have known for decades that executive function declines with age. Some aspects peak in the 20s. Luckily, the decline is balanced by wisdom. Overall knowledge rises throughout adulthood. As Scott Huettel, a neuroscientist at Duke University, put it, older people can't respond as fast to a changing streetlight, but they're less likely to put themselves in situations where they make mistakes.

The question of what's normal and what's an early symptom of dementia has taken on more urgency as doctors have come to realize that Alzheimer's and other dementias may start decades before symptoms become disabling.

The aging brain remains a vast frontier, vulnerable to time, vascular problems that can rob it of vital energy, and errant proteins associated with Alzheimer's disease and, Grossman's specialty, frontotemporal dementia. These conditions can occur alone or together in a complex mishmash. Some of the "normal" changes doctors see may, in fact, be early signs of dementia. A recent Penn study found that the first symptoms of Alzheimer's in patients with a particular genetic profile were problems with attention, language, and executive function.

If you look at average performance on tests of what Laibson calls fluid intelligence - the ability to solve new problems - by age group, the changes are striking. The average for all age groups would be at the 50th percentile, meaning that half are above and half below. The average 20-year-old is at the 75th percentile on that scale, Laibson said. The average 80-year-old is at the 25th.

"That's just a huge change," he said.

The "normal" changes, however, are highly variable. Some 80-year-olds still have better executive function than some 20-year-olds. People with more "cognitive reserve" - typically the better-educated - can decline a fair amount before they get into trouble. Doctors suspect that everyone declines.

William Milberg, a neuropsychologist at Harvard, thinks people with high blood pressure and diabetes likely accelerate the process of deterioration by damaging blood vessels that supply the brain.

What signs indicate executive function problems?

Karlawish said doctors talk about an easy test: "Ask your older patients when was the last time they were able to organize a dinner party."

Frontal lobe damage does indeed impair organization. It also affects working memory, or the ability to hold multiple ideas in your head while you work with them. Inhibiting an extraneous thought while trying to focus on another becomes harder, as in attention deficit disorder. People with damaged frontal lobes are more likely to do risky things.

Here are some tests that people find more difficult as they age: hearing a list of numbers and then reciting them backward, saying the color of letters used to spell the name of a different color (think the letters RED written in yellow ink) or ordering the digits in your phone number from smallest to largest in your head.

Frontal lobe decline can also make people more impulsive and prone to false memories. The elderly are less likely to remember where they learned something, a problem if the source was shady.

Marson cites these danger signs of diminished financial capacity: new memory lapses about bills, new disorganization of financial paperwork, trouble doing math such as figuring tips and

less understanding of things like fluctuating interest rates or reverse mortgages. This is the most important one: a new interest in get-rich schemes.

The National Institute of Aging has made understanding normal aging one of its initiatives. Molly Wagster, chief of the behavioral systems neuroscience branch, is interested in how older brains compensate for some of the negative changes. The NIA has funded small pilot studies that look at whether cognitive aging can be affected by exercise, brain training, and diet.

"I don't think that this is an irreversible course that everyone is on," she said.

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