



How to Make ‘Brain Gain’ Happen

By Elaine Floyd, CFP®

It's not true what they say about aging and the brain. Good thing, too. Now that you likely will live (and work) longer than previous generations, it's imperative that you understand how to maintain and improve your most valuable asset.

Exciting research going on in the field of neuroscience is finding that the human brain does not have to shrivel up and die in old age, but that it continues developing so that older people can—if they work on it—become even more proficient in certain areas than when they were younger.

This has important implications in retirement planning as it suggests that people doing cognitive work can continue working long past the traditional retirement age—an age established when labor was largely physical and the human body was forced to stop due to the sheer inability to perform the tasks at hand.

Brain research is taking place on several levels. Scientists looking at the physical brain have long known that some weight and mass is lost during the aging process. But the most exciting new research has found that neurons—the



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building blocks of mental activity—keep forming all throughout life.

For decades scientists maintained that once its physical connections were completed during childhood, the brain was hardwired: any neuron could die, but none could grow stronger, reorganize, or regenerate. That axiom was blown apart in the 1960s by animal studies that proved that rats' brains change physically as a result of learning. Later studies proved that the same phenomenon occurs in human beings. This plasticity allows the brain to continually resculpt itself in response to experience and learning.

"The complex neural architecture of older brains, built over years of experience, practice, and daily living, is a fundamental strength of older adults," writes Gene D. Cohen, M.D., Ph.D., in *The Mature Mind: The Positive Power of the Aging Brain*. Perhaps this is why some of the most important contributions to the world of art, education, and the humanities were made by people near the end of their lives.

- Sigmund Freud published his well-known work *The Ego and the Id* at age 67 and *The Future of an Illusion* at age 74.
- Michelangelo was appointed architect of St. Peter's in Rome at age 72. From that time until his death at age 88 he designed the dome of St. Peter's.
- Antonio Stradivari made more than 1,000 violins, violas, and cellos between the ages of 22 and 93. Two of his most famous violins—the "Habeneck" and the "Muntz"—were made when he was 92.
- Oscar Hammerstein II was 65 when he wrote the lyrics to accompany Richard Rodgers's music for *The Sound of Music* in 1959.
- Oliver Wendell Holmes Jr. was appointed associate justice of the U.S. Supreme Court at the age of 61. He served for the next 30 years, retiring just before his 91st birthday.
- Frank Lloyd Wright designed the Guggenheim Museum at age 91, the year he died.
- Giuseppe Verdi composed his operatic masterpiece *Otello* at age 74.

- Clara Barton founded the American Red Cross at age 60.
- Martha Graham continued to dance until she was 75. She choreographed her last work, *Maple Leaf Rag*, at the age of 96.

Granted, these are exceptional individuals who led extraordinary careers throughout their lives. But it's worth noting that if any of them had retired at so-called normal retirement age, the world would have been deprived of many significant contributions.

RETAINING THE BRAIN'S PLASTICITY

Once it was discovered that the brain retains its plasticity into old age, researchers began studying the conditions that must be present (or absent) in order for it to do so. In a nutshell, we must continue to learn and have new experiences so we can actively maintain, build, and remodel our brains for more effective and creative tasks, says Cohen. Inactivity, stress, excessive alcohol and drug use, smoking, obesity, malnourishment, and social isolation all weaken the brain's neural superstructure. In fact, these are some of the real culprits behind age-related mental decline, not aging itself, he says.

People who want to keep their brains sharp, either because financial circumstances dictate that they must keep working well into their 60s and 70s, or simply because they want to maintain a high quality of life as they get older, may be interested in the following tips for avoiding age-related neurodegeneration.

MANAGE STRESS

When the body reacts with a fight-or-flight response—whether warranted or not—it releases a number of chemicals designed to protect the organism. After an initial flood of adrenaline, the adrenal gland pumps out three powerful stress hormones—cortisol, hydrocortisone, and corticosterone, together known as the glucocorticoids (GCs)—which go directly to the brain, says Jeff Victoroff, M.D. in *Saving Your Brain*. Their purpose is to help us remember emotional events so we can avoid dangerous threats in the future.

But GCs also kill neurons. A high, sustained level of GCs can cause lasting brain damage, and their harsh impact becomes worse with aging. New research suggests that those with high stress symptoms in response to low stress loads are in the most danger, but everyone can work to defend themselves against stress. Techniques may include:

- **Mindfulness meditation.** A state of detached observation and awareness of the contents of our consciousness
- **Willful relaxation.** A mind/body relaxation response that acts as the opposite of the stress response
- **Aerobic exercise.** This is what our bodies and brains are crying out for when they're filled with the nervous energy of stress
- **Stronger medicine.** Including psychotherapy, drugs, and supplements where warranted

SEEK NOVELTY

A groundbreaking experiment in 1997 showed that mice reared in an enriched environment not only had more neurons in their brains, they had new neurons—as many as 40,000 in one tiny section. This was the first proof that an intellectually challenging environment can literally build new neurons in an adult brain.

The crucial point about mental stimulation is that passive experience does little to build the adult brain. To keep the brain learning and growing, it needs to generate active responses to cognitive challenges. As Victoroff puts it, encountering and embracing novelty—diving into new seas of neural natation—is the key to enhancing lifelong synaptic plasticity. He says: “The best neurobiological evidence of real synapse-building comes from studies of the benefits of active, energetic learning, responding to the flung-down gauntlet of a cognitive challenge.

“Care about what you learn passionately, and apply it daily in a newly challenging lifestyle, and the brain will thrive.”

He recommends the following:

- Go back to school
- Learn a game that you haven't mastered yet, such as chess or bridge

- Change your career at age 50
- Create a website
- Learn to speak Spanish
- Take up a musical instrument
- Volunteer in a fresh environment
- Write a book
- Polish the poems and paintings that hint at your wit and passion
- Travel
- Compose
- Invent
- Teach

PAY ATTENTION

“The faculty of voluntarily bringing back a wandering attention, over and over again, is the very root of judgment, character, and will,” wrote William James in *Principles of Psychology* in 1890. People who claim to forget a lot may never have learned those things in the first place, because they failed to pay attention when the learning supposedly took place.

As people get older they do more things on autopilot, such as driving a car, cooking a meal, or even carrying out highly specialized tasks on the job, which once required great concentration but now can be done virtually in their sleep. When we act automatically, our neurons are communicating and acting in the background. This is natural and frees the brain for other pursuits, but the downside is that we may forget to pay attention when something worth remembering occurs, such as where we parked the car or the name of the person we just met.

Most of our daily experiences stay in short-term memory just long enough to be useful. In order to become lasting memories, we must reorganize our neural networks by transferring those memories to another part of our brain, primarily the hippocampus, an area embedded deep within the brain.

Studies have shown that the hippocampus keeps developing well into old age, but we have to work at making the necessary connections. Associating

an experience with an emotion or with a previously established memory assists in the necessary neural reorganization. Brain research—particularly studies on the aging brain—is still in its infancy and promises to deliver exciting news in the decades to come. The key finding—that the human brain does not wear out over time—holds great promise for the future of work and individual contributions to society.

While certain brain functions do slow down with the passage of time, primarily the speed at which information is processed, other functions become better developed with age, including the ability to

synthesize knowledge (relativistic thinking), to resolve contradictions (dualistic thinking), and to be able to see the forest instead of the trees (systematic thinking). These three types of thinking are all advanced in the sense that they do not come naturally during our youth, says Cohen, adding up to what some would call wisdom.

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