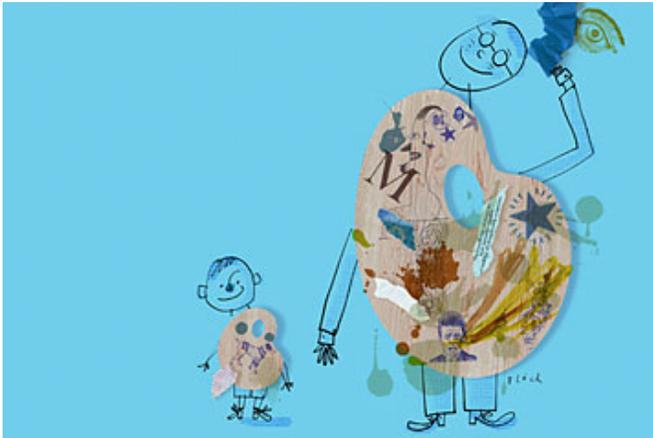


How To Live Long

*It may be no coincidence that so many creative types have long lives.
New findings show how doing what you love can add years.*

By Jeffrey Kluger Monday, Sept. 23, 2013

Illustration by Serge Bloch for TIME



One of the greatest buildings in New York City was created by a very old man. You won't find it on the skyline--it's far too small for that. You have to get up close, at street level. It's on Fifth Avenue, which for block after block obeys the old New York building rule of big and tall and flat--until all at once, at 88th Street, it doesn't. There stands the stout, round drinking cup that is the Guggenheim Museum, with its natural light and spiraling floor and snow white exterior, parting the neat scrim of the streetscape and filling it with a bit of stylish defiance. The human genius behind that structural genius was Frank Lloyd Wright, who started designing the building in 1943, when he was 76, kept at it until ground was broken in 1956 and lived until 1959--just shy of both his 92nd birthday and the museum's official opening.

"If you walk into any of Wright's buildings, you see he didn't think like us," says neuropsychologist Donald Davidoff of Harvard Medical School. "His rooms can have seven different heights to them depending on where you're standing. He thought in three dimensions, which is something we can appreciate when we see it but can't do ourselves."

Wright may have been unique in the style and quality and iconoclasm of his work, but he was not unique in how old he was when he did it--and that's true in a lot of fields. You can keep your boy geniuses in Silicon Valley, your young guns tearing up the fashion world, your celebrated wunderkinder in music and art and finance and government. Spare a moment--spare more than a moment--for the superannuated creators: Goya, who produced some of his most haunting paintings when he was in his late 70s; Goethe, who finished writing his masterpiece, *Faust*, when he was 81; Galileo, who published his last paper when he was 74, just a few years before his death--at a time when average human life expectancy was 35.

And it's not just the long-ago names: props to Maggie Smith, still starring in movies and TV series at age 78; to Warren Buffett, the 83-year-old financial genius who's not called the Oracle of Omaha because he

loses money; to Picasso, who died at 91 and had paint under his nails till the very end; to Herman Wouk, 98, who published his 18th and most recent novel just last year; to comedian George Burns, who died in 1996 at age 100 and celebrated his 95th birthday by signing a two-year contract to perform in Las Vegas. After he inked the deal he told the hotel manager who'd negotiated it, "If you're still around at the end of the two years, we'll talk again."

It's in our nature to love stories like this--and there can be a soft condescension to them. Aged celebrities get trundled out at award shows and public ceremonies and are described as "sharp as a tack" or "spunky as ever" when too often they're not sharp and they're terribly frail and what we're really applauding is that they're alive at all.

Still, there's something very real about the way creativity endures in the face of age--and maybe even pushes back age. By now it's a gerontological given that the active, busy brain is also the brain that stays lucid longer, that resists dementia and other cognitive problems better. And it's a biological given that sedentary, bored or depressed people are far likelier than happy and occupied ones to come down with physical ailments. Increasingly, brain research is showing that in the case of creative people, this mortal cause-and-effect pays powerful dividends--that it's not just the luck of living a long life that allows some people to leave behind such robust bodies of work but that the act of doing creative work is what helps add those extra years. And that's something that can be available to everybody.

"Doctors have to think creatively, lawyers have to think creatively, hedge-fund guys who come up with ways of making us not know what we're buying have to think creatively," says Dr. George Bartzokis, a neurobiologist and professor of psychiatry at UCLA. "Their work may not get hung in museums, but being able to do what you love makes you more satisfied, less depressed, and you'll probably do better with your body as a result." The key is finding work that calls on you to remain nimble, adaptive, even visionary, to invent ideas and solve problems on the fly rather than just responding to the same questions with the same answers again and again. As people facing deadlines often lament, work tends to expand to fill the time you have to do it. Now, science suggests, time just might expand to contain the work with which you choose to fill it.

This Is Your Brain on Age

If it comes as a surprise that human beings have the power to be so creative for so long, it's only because we've tended to underestimate the regenerative power of our brains. Like all other parts of the body, the brain wears out with age, but the thinking had always been that unlike those other parts, it had no ability to repair itself, meaning it couldn't stay ahead of at least some of the damage. That suggests a steady loss of intellectual altitude from middle age to our early senior years, culminating in a terminal plunge at the end.

It turns out, however, that that's not true. One process that starts early, in babyhood, is myelination--the growth of fatty insulation on neurons, which keeps brain circuits running smoothly. In recent years, researchers were surprised to discover that myelination isn't completed until young adulthood, when the full suite of executive functions in the prefrontal cortex comes online. Still more recent studies, conducted with magnetic resonance imaging (MRI) and postmortem exams, have pushed the myelination limit even further. In some parts of the brain, including the temporal--which is involved with processing

visual memories, language, meaning and emotions--insulating fat layers are still being laid down when we're in our 50s and even 60s.

"We're like a jumbo jet that's always getting repairs and new parts," says Bartzokis. The key to qualifying for that servicing, however, is remaining mentally active. Just as you can't build muscle mass without working your body, you can't grow new myelin--or at least enough of it--without working your brain. "When you use your brain a lot as opposed to sitting around looking at the wall, you're repairing things centrally," Bartzokis says.

Not all intellectual functions are preserved in older people. Age can be murder on what's known as fluid intelligence--which involves working memory, computing speed, the ability to hold multiple ideas in the mind at once. That hits certain skills harder than others. Mathematicians, physicists and chess players tend to do their greatest work when they're in their 20s and 30s since all of those disciplines require just the kind of agile, fast-clicking brain that's characteristic of those ages. It's the same reason too that kids acquire languages, master computers and video games and work puzzles like Rubik's Cubes so much better than older people.

Still, to the extent that the brain's processing power does decline, it compensates in other ways--ones that actually enhance creativity. In a younger brain, work is fairly well lateralized--with certain functions, like language, taking place in the left hemisphere and other functions, like spatial reasoning, playing out in the right. Studies with functional magnetic resonance imaging (fMRI), however, show that in the older brain, one hemisphere is not shy about calling on the other for help if it's having trouble with a task. "There may be a decline in function, but it's partly compensated for by a reorganization in function," says cognitive neuroscientist Roberto Cabeza of Duke University. "The brain shows these changes into the 80s."

That can pay particular dividends for the artist, Cabeza says. Take the metaphor--one of the writer's prettier devices and one of the brain's niftier tricks. Language conveys meaning, but if you want to give it particular resonance, it helps to attach a picture to the words. So the left brain has to reach into the right for help--the poet borrowing one of the painter's brushes. That's not easy to do--which is why not everyone can be a poet--but when the walls between the hemispheres get lower, the job gets easier.

Other kinds of insights and inspiration benefit from getting the hemispheres talking to each other. Neuroscientist Lisa Aziz-Zadeh of USC, who studies the brain and creativity, has conducted experiments in which subjects are slid into an fMRI machine while they solve scrambled-word puzzles. As anyone who has tried to unjumble a string of letters like LREFWO knows, sometimes the answer just jumps out at you (flower!) and other times you have to reason your way through it--try the L as the first letter, then the F, then the O, until you figure it out. And it's also clear which way feels better: it's the sudden insight, by a lot. "These moments feel really good. They feel amazing," says Aziz-Zadeh.

Such aha experiences, also called insight solutions or pop-out solutions, are big parts of creativity--the sudden idea for an opera, the sudden solution to a knotty part of a novel. When Aziz-Zadeh's subjects solved a word in that quick and satisfying way, they would push one button in the fMRI. When they used the more deliberate search method, they would push another. "With the search method," she says, "we saw activity only in the left hemisphere, but with the aha moments it was in both." What's more, in those latter cases there was additional activity in the insula and the brain stem, which also process emotion--helping explain the delicious thrill a sudden insight gives us. The more cross talk you get between the

hemispheres--something older people are very good at--the more of those happy pop-outs you get, leading to a self-reinforcing loop in which creating a little gives you a taste for creating a lot.

A similar loosening of the brain's reins helps explain the way all of us--young and old--can sometimes go to bed at night trying to solve a problem and wake up in the morning with an answer or a burst of inspiration. When we go to sleep, the prefrontal cortex--which consolidates and integrates knowledge and acts as a sort of beat cop, keeping the other, unruly regions of the brain in line--powers down. At the same time, the occipital lobe, which processes information visually and symbolically, goes into high drive. Over the course of the night, the occipital is free to come up with novel, unlikely solutions to whatever problem is on our mind and slip them to us either in a dream or just as we wake up, before the more literal prefrontal region goes back to work. For the aging, less rigidly structured brain, the same kind of thinking takes place all the time. "Your inhibitions get taken away a little bit," says Bartzokis. "That process of losing things may actually make you more creative."

Breathing Room in the Brain

For the older person, simple life circumstances may help liberate the mind too. Even if you're explosively creative, when you're in young adulthood and middle age there are a lot of things making demands on your time and your mind--raising kids, paying off a mortgage, holding down a job. That kind of activity does not come free, and at some point you may simply tap out the energy reserves that could otherwise go to making you creative. But, says psychologist Robert Levenson of the University of California, Berkeley, who studies emotion and aging, "when you're older, you're off that treadmill, so you can free up some horsepower in the service of creativity."

That certainly describes the experience of Irene Morey, 97, who lives in Boston and worked as a nurse until her retirement at 65. Her husband was a professional artist, and when she left nursing, she decided to enroll in college and study painting. After she graduated, she joined him in the studio he built in their home, where they spent their days working together until his death. She continues to paint, now living independently, though a daughter who lives nearby looks in on her regularly.

"As a nurse I wasn't very creative," she says, "but my brain is freer now. When I went to art school I learned all of the disciplines, and one professor then said, 'Now go home and forget everything I taught you.'" She took him at his word and has been a painter ever since. The only real concession she makes to age is that she limits her work to watercolors and charcoal since the fumes from oil paints bother her. And she doesn't show her finished pieces at exhibitions quite as much as she used to. "It's getting harder to lug all that stuff down there," she says.

Morey may not think much about mortality--she certainly doesn't sound as if she does--but one thing that also motivates a lot of older artists is the dark but bracing sense that even if you have more free time than ever to create, the mortal clock is running down fast. In one oft-cited study of what's come to be called the swan-song phenomenon, psychologist Dean Keith Simonton of the University of California at Davis collected a massive sample group of 1,919 compositions written by 172 classical composers and compared how highly the works were rated by musicologists with how close the creation of those works came to the composers' deaths. On the whole, he found, compositions that were written later in the artists' lives--when, as Simonton wrote, "death was raising a fist to knock on the door"--tended to be

brief, with cleaner, simpler melody lines, and yet scored higher in aesthetic significance, according to the experts.

"In the past, the thinking was that the swan song was all about terror management," says Levenson, "trying to stay busy and deny death. But it's also about leaving a legacy, generating something lasting to mark your time here."

Buying Time

It's easier to explain how aging and creativity are linked in the brain than it is to prove that any of that can actually translate into extra years. There are no fMRIs that can deconstruct longevity the way they can deconstruct brain function. But tales of how the will--or lack of will--to live can lengthen or shorten life are everywhere: in the healthy elderly husband who dies just weeks after he loses his wife of 50 years, in the sickly person who hangs on long enough to attend the wedding of a child or be present for the birth of a grandchild and then peacefully dies.

Some of the links between physical and mental health are obvious. When Morey picks herself up in the morning and sets up her easel--and certainly when she lugs her work to a gallery--she's moving, getting her lungs, muscles and cardiovascular system working. Exercise--even very moderate exercise--is a proven way to reduce the risk of a whole range of ills. What's more, her work makes her happy. "I just love it," she says. "I just feel free to do whatever I want."

Multiple studies over the decades have shown that happiness contributes to longer life. As recently as last year, the British Medical Journal reported a survey of 68,000 subjects in England and found that people with even relatively mild depression have a 29% increased risk of dying from cardiovascular disease and a 29% increased risk of dying from other noncancerous disorders. "People who are depressed suffer from hypertension, diabetes, obesity," says Bartzokis. "How well your brain does affects how well your body does."

Just last month, a research review published in BMC Public Health found that doing volunteer work--in such places as hospitals and soup kitchens that allow direct contact with the people you're helping--may lower mortality rates by as much as 22% compared with those of nonvolunteers. Making such social connections, according to results from that review and others, increases life satisfaction and reduces depression and loneliness and in turn lowers the risk of hypertension, stroke, dementia and more.

All of that is a lot of existential and scientific baggage to pile on the satisfying work of the centenarian who merely likes to paint, the aged novelist who feels he still has one good book in him, the nonagenarian architect who wants to be around to see one more masterpiece rise on Fifth Avenue. And the same idea of simple pleasure from a job you like is also true if your work is teaching school or practicing law or keeping shop. But it's still nice to know that when you spend your working years happily and well, you just might get a handful of extra ones slipped in before the lights go off.