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This Year, Change Your Mind

By OLIVER SACKS

NEW Year’s resolutions often have to do with eating more healthfully, going to the gym more, giving up sweets, losing weight — all admirable goals aimed at improving one’s physical health. Most people, though, do not realize that they can strengthen their brains in a similar way.

While some areas of the brain are hard-wired from birth or early childhood, other areas — especially in the cerebral cortex, which is central to higher cognitive powers like language and thought, as well as sensory and motor functions — can be, to a remarkable extent, rewired as we grow older. In fact, the brain has an astonishing ability to rebound from damage — even from something as devastating as the loss of sight or hearing. As a physician who treats patients with neurological conditions, I see this happen all the time.

For example, one patient of mine who had been deafened by scarlet fever at the age of 9, was so adept at lip-reading that it was easy to forget she was deaf. Once, without thinking, I turned away from her as I was speaking. “I can no longer hear you,” she said sharply.

“You mean you can no longer see me,” I said.

“You may call it seeing,” she answered, “but I experience it as hearing.”

Lip-reading, seeing mouth movements, was immediately transformed for this patient into “hearing” the sounds of speech in her mind. Her brain was converting one mode of sensation into another.

In a similar way, blind people often find ways of “seeing.” Some areas of the brain, if not stimulated, will atrophy and die. (“Use it or lose it,” neurologists often say.) But the visual areas of the brain, even in someone born blind, do not entirely disappear; instead, they are redeployed for other senses. We have all heard of blind people with unusually acute hearing, but other senses may be heightened, too.

For example, Geerat Vermeij, a biologist at the University of California-Davis who has been blind since the age of 3, has identified many new species of mollusks based on tiny variations in the contours of their shells. He uses a sort of spatial or tactile giftedness that is beyond what any sighted person is likely to have.

The writer Ved Mehta, also blind since early childhood, navigates in large part by using “facial vision” — the ability to sense objects by the way they reflect sounds, or subtly shift the air currents that reach his face. Ben Underwood, a remarkable boy who lost his sight at 3 and died at 16 in 2009, developed an effective, dolphin-like strategy of emitting regular clicks with his mouth and reading the resulting echoes from nearby objects. He was so skilled at this that he could ride a bike and play sports and even video games.

People like Ben Underwood and Ved Mehta, who had some early visual experience but then lost their sight, seem to instantly convert the information they receive from touch or sound into a visual image — “seeing” the dots, for instance, as they read Braille with a finger. Researchers using functional brain imagery have confirmed that in such situations the blind person activates not only the parts of the cortex devoted to touch, but parts of the visual cortex as well.

One does not have to be blind or deaf to tap into the brain’s mysterious and extraordinary power to learn, adapt and grow. I have seen hundreds of patients with various deficits — strokes, Parkinson’s and even dementia — learn to do things in new ways, whether consciously or unconsciously, to work around those deficits.

That the brain is capable of such radical adaptation raises deep questions. To what extent are we shaped by, and to what degree do we shape, our own brains? And can the brain’s ability to change be harnessed to give us greater cognitive powers? The experiences of many people suggest that it can.

One patient I knew became totally paralyzed overnight from a spinal cord infection. At first she fell into deep despair, because she couldn’t enjoy even little pleasures, like the daily crossword she had loved.

After a few weeks, though, she asked for the newspaper, so that at least she could look at the puzzle, get its configuration, run her eyes along the clues. When she did this, something extraordinary happened. As she looked at the clues, the answers seemed to write themselves in their spaces. Her visual memory strengthened over the next few weeks, until she found that she was able to hold the entire crossword and its clues in her mind after a single,

intense inspection — and then solve it mentally. She had had no idea, she later told me, that such powers were available to her.

This growth can even happen within a matter of days. Researchers at Harvard found, for example, that blindfolding sighted adults for as few as five days could produce a shift in the way their brains functioned: their subjects became markedly better at complex tactile tasks like learning Braille.

Neuroplasticity — the brain’s capacity to create new pathways — is a crucial part of recovery for anyone who loses a sense or a cognitive or motor ability. But it can also be part of everyday life for all of us. While it is often true that learning is easier in childhood, neuroscientists now know that the brain does not stop growing, even in our later years. Every time we practice an old skill or learn a new one, existing neural connections are strengthened and, over time, neurons create more connections to other neurons. Even new nerve cells can be generated.

I have had many reports from ordinary people who take up a new sport or a musical instrument in their 50s or 60s, and not only become quite proficient, but derive great joy from doing so. Eliza Bussey, a journalist in her mid-50s who now studies harp at the Peabody conservatory in Baltimore, could not read a note of music a few years ago. In a letter to me, she wrote about what it was like learning to play Handel’s “Passacaille”: “I have felt, for example, my brain and fingers trying to connect, to form new synapses. ... I know that my brain has dramatically changed.” Ms. Bussey is no doubt right: her brain has changed.

Music is an especially powerful shaping force, for listening to and especially playing it engages many different areas of the brain, all of which must work in tandem: from reading musical notation and coordinating fine muscle movements in the hands, to evaluating and expressing rhythm and pitch, to associating music with memories and emotion.

Whether it is by learning a new language, traveling to a new place, developing a passion for beekeeping or simply thinking about an old problem in a new way, all of us can find ways to stimulate our brains to grow, in the coming year and those to follow. Just as physical activity is essential to maintaining a healthy body, challenging one’s brain, keeping it active, engaged, flexible and playful, is not only fun. It is essential to cognitive fitness.

Oliver Sacks is the author of “The Mind’s Eye.”