

Certain mental functions slow down with age, but the brain compensates in ways that can keep seniors just as sharp as youngsters **BY MARION SONNENMOSE**



A 16-year-old girl and her 70-year-old grandfather may use very different mental strategies to perform the same tasks—and they could both learn something from the other.

dence shows that older people are just as mentally fit as younger people, because their brains compensate for some kinds of declines in creative ways that young minds do not exploit as well.

Fast Mistakes

Just as a person’s body ages at different rates, so does the mind. As adults advance in age, perception of sights, sounds and smells takes a bit longer, and laying down new information into memory becomes more difficult. The ability to retrieve memories quickly also slides. And it is sometimes harder to concentrate and maintain attention.

On the other hand, the aging brain can create significant advantages by tapping into its extensive store of knowledge and experience. The biggest trick that older brains employ is to use both hemispheres simultaneously to handle tasks for which younger brains rely on predominantly one side. Positron-emission tomography images taken by cognitive scientists at the University of Michigan at Ann Arbor, for example, have shown that even when doing basic recognition or memorization exercises, seniors exploit the left and right brain more extensively than men and women who are decades younger. Drawing on both sides of the brain gives them a tactical edge, even if the pure speed of each hemisphere’s processing is slower.

In another experiment, Michael Falkenstein of the University of Dortmund in Germany found that when

Experience versus Speed

JAKE, AGED 16, has a terrific relationship with his grandmother Rita, who is 70. They live close by, and they even take a Spanish-language class together twice a week at a local college. After class they sometimes stop at a café for a snack. On one occasion Rita tells Jake, “I think it’s great how fast you pick up new grammar. It takes me a lot longer.” Jake replies: “Yeah, but you don’t seem to make as many silly mistakes on the quizzes as I do. How do you do that?”

In that moment, Rita and Jake stumbled across an interesting set of differences between older and younger minds. Pop psychology says that as people age their brains “slow down.” The implication, of course, is that elderly men and women are not as mentally agile as middle-aged adults or even teenagers. But although certain brain functions such as perception and reaction time do indeed take longer, that slowing down does not necessarily undermine mental acuity. Indeed, evi-

(Seniors **exploit the left and right brain** more extensively than men and women who are decades younger.)

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elders were presented with new computer exercises they paused longer before reacting and took longer to complete the tasks, yet they made 50 percent fewer errors, probably because of their more deliberate pace.

One analogy for these results might be the question of who can type a paragraph “better”: a 16-year-old who glides along at 60 words per minute but then has to double-back to correct a number of mistakes or a 70-year-old who strikes keys at only 40 words per minute but spends less time fixing errors. In the end, if “better” is defined as completing a clean paragraph, both people may end up taking the same amount of time.

Computerized tests support the notion that accuracy can offset speed. In one so-called distraction exercise, subjects were told to look at a screen, wait for an arrow that pointed in a certain direction to appear, and then use a mouse to click on it as soon as it shone on the screen. Just before the correct symbol appeared, however, the computer displayed numerous other arrows aimed in various other directions.

resonance imaging machine and concentrate on two different lists of printed words posted side by side in front of them. By looking at the lists, they were to find pairs of words that were similar in either meaning or spelling.

The eldest participants did just as well on the tests as the youngest did. And yet the MRI scans indicated that the elders’ left frontal and temporal



mechanisms used by younger men and women.

The reason aging brains can forge new capabilities that compensate for certain declines is that neuronal networks are surprisingly flexible, or “plastic.” They can adapt. Animal experiments prove that an intact nerve cell can take over the function of a neighboring nerve cell that has become damaged or that has simply withered with time. The brain creates ways to keep itself sharp by making these kinds of adjustments on a widespread scale over time.

Although researchers still know little about how to help the brain adapt to overcome the declines associated with aging, they do know that exercise—physical and mental—can provide some benefit. A rising number of studies have noted that senior citizens who stay more physically active have less deterioration in the brain than those who are sedentary [see “Smart Exercise,” by Aimee Cunningham; *SCIENTIFIC AMERICAN MIND*, Vol. 16, No. 1; 2005].

Even more studies show that peo-

(Crossword puzzles, book clubs, **political debate** and physical exercise can all stave off mental decline.)

Although younger subjects cut through the confusion faster when the properly positioned arrow suddenly popped up, they more frequently clicked on incorrect arrows in their haste.

Mental Gymnastics

Older test takers are equally capable of other tasks that do not depend on speed, such as language comprehension and processing. In these cases, however, the elders utilize the brain’s available resources in a different way. Neurologists at the Cognitive Neurology and Alzheimer’s Disease Center at Northwestern University came to this conclusion after analyzing 50 test subjects ranging in age from 23 to 78. The subjects had to lie down in a magnetic

lobes and certain visual centers, which together are responsible for language recognition and interpretation, were much less active. The researchers did find that the older people had more activity in brain regions responsible for attentiveness, such as the posterior cingulate cortex. Darren Gitelman, who headed the study, concluded that older brains solved the problems just as effectively but by different means.

Similar adaptation seems to aid memory, too. In 2003 Mara Mather and her colleagues at the University of California at Santa Cruz found that older adults who performed well on memory tests used a process of comparing bits of memories that was different from the memory-recollection

ple who continue to challenge themselves intellectually have lesser rates of Alzheimer’s disease and other forms of dementia and mental decline. Neurologists who have conducted such work recommend that people continue to engage in everything from crossword puzzles and book clubs to college courses and political debate. They can take up a musical instrument. Or learn a new language like Rita did. Not only will these vocations keep aging minds sharp, they will give their owners a sense of satisfaction in their never-ending mental powers.

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