



Use It or Lose It

What are you doing to enhance your brain function?

Golden Opportunity” (page 14), our cover story for this issue, describes how bringing insights gleaned from neuroscience research into the classroom can improve the way kids learn. Fortunately, these techniques can be applied across the life span—from neonates, children, and adults with learning or memory disabilities, to healthy children and adults who want to improve their brain function. How can this be? In a word: neuroplasticity.

Neuroplasticity is the term we use to describe a very complex process of brain changes that occur during recovery from a brain injury—and when we learn and master new skills. The process depends on new connections being formed throughout the brain. After a brain injury, these new connections replace injured ones. When we learn something new, connections are forged and strengthened between brain areas that work together.

We have been able to study neuroplasticity in great detail in recent years because of advances in brain-imaging techniques. We can now see how the brain is functioning and view the complex networks that connect one area of the brain to another. These imaging techniques provide powerful information about how recovery occurs and what we can do to maximize a person’s return to normal function. And here’s the best part: neuroplasticity happens regardless of age.

Drs. Laura Ment and Todd Constable reviewed the use of a newer brain-imaging technique called functional MRI (fMRI) to study brain injury and recovery in prematurely born children. These infants are at high risk for brain injury, which can lead to attention and behavioral disorders, among other problems. After examining a number of research studies, Drs. Ment and Constable concluded that preterm infants who sustain brain injury can develop alternative neural pathways to compensate for the loss. This allows these children to develop language and memory function that is no different from that of normal-term infants by the time they reach adolescence. Further, fMRI studies have shown that certain enrichment interventions can improve function in these children.



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Dr. Carreiras and colleagues showed how this same process operates in adults without brain injury. They studied men from Columbia who had spent their youth as guerrilla fighters and were unable to read or write. Even people living in very impoverished environments develop language abilities, but reading and writing abilities must be learned. Using fMRI, these scientists studied 40 former guerrilla fighters who became integrated into mainstream society in their 20s. One group went through an intensive literacy program and the other did not. The brain images from the two groups were markedly different. Many of the brain regions responsible for reading were larger, better developed, and had more robust connections between them in the men who went through the literacy program than in those who did not. This study has given us valuable information about brain changes that occur as we learn to read, and also clearly demonstrates that the brain can change in response to learning a new skill.

This approach—enhancing neuroplasticity—is being used to help people during physical rehabilitation from stroke and traumatic brain injury. It is also being used to help people maintain cognitive function or recover from depression. But it’s an active process:

Those reading circuits didn’t develop until the guerrillas went through a rigorous literacy program.

We have all heard the phrase “use it or lose it.” Our brains retain the remarkable capacity for neuroplasticity throughout the life span. The techniques used to help children learn better in elementary school can also be used to help people in their 60s and 70s retain normal cognitive skills. I am working on improving my Spanish language skills. What have you done today to enhance your brain function?

Take good care,

Robin L. Brey, M.D.
Editor-in-Chief