

BRAIN NEUROPLASTICITY: A TWO-WAY STREET

Most of us grew up learning that babies' brains develop at an amazingly rapid rate. We were also probably taught that our adult brains reached a fixed state like our arms or legs. Of course now we are bombarded with books and magazine articles extolling our brain's wondrous ability to change. See [The Brain That Changes Itself](#) by Norman Doidge and [The Woman Who changed Her Brain](#) by Barbara Arrowsmith-Young.

While brain scientists have believed in adult brain neuroplasticity since the 1800's, only the recent arrival of functional magnetic resonance imaging (fMRI) has enabled scientists to visually "see" into the brain to confirm the incredible malleability of the brain. We now know with certainty that brain change occurs throughout life, regardless of our age. Our brain neuroplasticity enables recovery from stroke, injury, birth abnormalities, symptoms of Autism, Attention Deficit Hyperactivity Disorder (ADHD), Learning Disabilities, Depression, Addictions, Obsessive-Compulsive Disorder (OCD), etc.

Interestingly, brain change works in both directions. Some people excel in negative thinking and beliefs, which freezes or fixates neuronal processing. On the plus side, recent research suggests that seniors with positive beliefs about old age are less likely to develop dementia. This positive effect was true for all study participants, even those with ApoE4 gene, which raises the likelihood of dementia. Positive attitudes reduce stress that interferes with concentration and memory. Stress may also increase one's tendency toward bad health habits such as smoking, overeating, sedentary life-style, and over-consumption of alcoholic beverages. (See Focus on Healthy Aging newsletter, Vol. 21, Nr. 5, May 2018, Icahn School of Medicine at Mount Sinai.)

What are steps we can take that will lubricate our brain machinery so we stay open to life? We need to strengthen our "brain muscle" just as we need to strengthen all of our muscles.

Healthy Steps

Dr. Michael Merzenich is considered the world's leading researcher on brain neuroplasticity. His common sense advice to reverse brain decline as we age includes focused attention, determination, hard work and maintaining overall brain health. See his book, [Soft-Wired: How the New Science of Brain Plasticity Can Change Your Life.](#)

Focused attention occurs whenever we are 100% into a given activity. It could be reading fiction or non-fiction, meditating, painting, thinking, composing music or a poem. Being 100% in the present moment.

Our brains like determination. When we are 100% determined about something, our brains release the neurochemicals needed for our neurons to connect resulting in brain change. It is similar to putting oil into our car engines.

Hard work encompasses focused attention and determination with the added ingredient of persistence. The harder you try, the bigger the brain change. Think about stroke recovery, overcoming OCD or ADHD or simple fears. Repetition is required until a new neuronal path is created. It is tantamount to repeating a path in the woods until the new way is unalterably established.

A related issue is that initial changes are temporary and very reversible. This point is important to keep in mind to avoid discouragement and possible abandonment of the desired change. Even with well-established change, if we are severely stressed we will likely revert back to our earlier unhealthy stance. An example is a person who has striven for years to install a self-belief about being professionally strong and capable, but when censored in some way, returns to a temporary bout of diffidence. In this case, stress is like new snow that easily obscures a new path.

A therapeutic, clinical application of brain neuroplasticity is the emerging field of neurofeedback, which uses computer technology and auxiliary equipment to measure the metabolic activity of the cerebral cortex. While few clinicians are currently trained in neurofeedback, it holds the promise of great effectiveness in treating a wide range of mental illnesses. It has particular relevance for individuals who are disenchanted with psychotherapy and psychotropic medications. See [The Healing Power of Neurofeedback](#) by Stephen Larsen.

Brain Health

What is needed to achieve and maintain overall brain health? The list is probably boring and uninspired for those of us who are inundated with health and wellness urgings. Our real challenge is to actually act on what we already know.

Here are nine elements needed for brain health. I am certainly only touching the surface. First, we need to eat wisely. Second, exercise feeds our brains with essential oxygen and blood. Third, quit smoking. Fourth, severely limit alcohol intake. Would you put dirty oil in your car engine? Fifth, avoid head injury situations.

Sixth, get enough sleep. Recent research has discovered that our brains experience a car wash effect while in deep sleep, which drains away harmful enzymes and neurochemicals, which impede clear thinking. Awake refreshed!

Seventh, avoid stress. Stress muddies our brains. Emotional over-reactivity clouds our thinking and injures our body. Stress resides throughout our body, in our stomach, chest, throat, head, legs, arms, etc. Chronic stress kills. We know it when we have it.

Eighth, practice visualization. For brain change, visual rehearsal is just as effective as actual bodily rehearsal. Successful athletes practice visualizing positive results. They see themselves hitting the baseball or golf ball straight and true. They see perfection and excellence results.

Ninth, practice self-awareness. Without awareness of our thoughts and feelings plus what we are inclined to say and do, we are lost. Awareness enables us to have choice or freedom in managing ourselves. How do we attain self-

awareness? We sit alone and silent, following our breath, quieting our mind, observing without judging, experiencing without thinking, becoming pure awareness.

Two-Way Street

Keep in mind, our brain neuroplasticity works equally well in either direction. As we age we can easily lapse into curmudgeonly stagnation or we can stay vibrant as long as we live. Seems like a relatively easy decision.

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