

NEUROGENESIS

Back in July, I wrote a post entitled [10 Brain Tips To Teach and Learn](#). Those tips apply to students of any age, including adults, for ideally adults are still learners. Why is [adult learning](#) relevant in a brain-focused blog, you may wonder:

The short of it...

As we age, our brain:

- still forms new brain cells
- can change its structure & function
- finds positive stress can be beneficial; negative stress can be detrimental
- can thrive on novel challenges
- needs to be exercised, just like our bodies

The long of it...

Adults may have a tendency to get set in their ways – *I've been doing it this way for a long time and it works, so why change?* Turns out, though, that change can be a way to keep aging brains healthy. At the April Learning & the Brain conference, the theme of which was neuroplasticity, I attended several sessions on [adult learning](#). Here's what the experts are saying.

CHANGE and EXERCISE

According to Kathleen Taylor & Annalee Lamoreaux, understanding that we have the ability to change our mental models, also known as epistemological change (a change in the way of knowing), will let us open the door to transformative learning (being willing to change and having an understanding of how to change). You can download the slides from their presentation [here](#).

Learning something new outside our areas of expertise:

- keeps us fresh, which can add a spark to our teaching
- reminds us what it is like to be a student, which can help us empathize with our students
- exercises our mental muscles

Couple mental exercise with physical exercise, and you can improve general cognition and boost your creativity. Learn more about this from John Ratey's book [Spark: The Revolutionary New Science of Exercise and the Brain](#), which makes a compelling case that exercise is beneficial for cognitive health.

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Our brains may be aging, but they are also continuing to develop. Neurogenesis is the process of forming new brain cells, and unlike what was previously thought, this process continues throughout life, as noted in this Society for Neuroscience brain brief on [Adult Neurogenesis](#).

PLASTICITY

Neuroplasticity refers to the brain's ability to rewire itself. It empowers us to:

- fix damaged areas of our brains (as evidenced by the work of Edward Taub, Michael Merzenich, and Paul Bach-y-Rita, all mentioned in Doidge's book, referenced below)
- continue to learn well into old age
- alter our behavior and performance over time

Norman Doidge writes extensively about plasticity in *[The Brain That Changes Itself: Stories of Personal Triumph from the Frontiers of Brain Science](#)*, and notes that "brain plasticity occurs in response to the environment, the task at hand, and our thoughts and imaginings." Indeed, "in some cases, the faster you can imagine something, the faster you can do it."

STRESS and EXERCISE

In his session on stress and neuroplasticity in learning, Bruce McEwen concurred with Doidge, noting that "structural plasticity in the adult brain is modulated by experience". He went on to discuss the impact of stressful experiences on neuronal activity, delineating three types of stress:

1. positive, which consists of positive challenges
 2. tolerable, which consists of adverse life events coupled with good social and emotional support
 3. toxic, which consists of a sustained stress agent and a lack of social and emotional support
- Exercise, in addition to aiding cognition, can be beneficial in helping the brain and the body manage stress.

CHALLENGE and NOVELTY

Elkhonon Goldberg, neuroscientist and co-founder of SharpBrains, discussing Brain Plasticity and Cognitive Fitness, pointed out that "as we age, our expert knowledge remains strong, and our capacity for solving problems within our areas of expertise can often exceed that of those who are younger." He further employed us to "turn neuroplasticity to your advantage" by:

- welcoming novel challenges



- beware of being on mental autopilot
- remain cognitively active

Goldberg elaborates on these points in his latest book, [*The Wisdom Paradox: How Your Mind Can Grow Stronger As Your Brain Grows Older*](#).

Taken in sum, all of these ideas have me imagining professional development programs where teachers are encouraged to explore avenues outside of their expert areas. (More on that in a future post!) The combination of being a mentally and physically active lifelong learner isn't just good modeling for younger brains; it's also beneficial for us!

(Next post will consist of additional resources on these topics.)

Laurie Bartels writes the [Neurons Firing](#) blog to create for herself the "the graduate course I'd love to take if it existed as a program". She is the K-8 Computer Coordinator and Technology Training Coordinator at Rye Country Day School in Rye, New York. She is also the organizer of Digital Wave annual summer professional development, and a frequent attendee of Learning & The Brain conferences.

You will find more related information on how to improve concentration and memory by checking out these resources:

- [Neuroscience Interview Series](#): interviews with over 15 brain scientists and experts.
- Collection of [brain teasers and games](#): attention, memory, problem-solving, visual, and more.
- [Brain Training Games and "Games"](#): a 10-Question Checklist on how to evaluate programs that make brain-related claims.