How Exercise Makes us Smarter and Think Better

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human brainIf I told you there was a new brain-enhancing drug and it’s free and available to everyone, would you take it? Actually, this drug has been around forever, we just didn’t know our brains were susceptible to it. We even taught that the brain didn’t change, at least not for the better. We were wrong. Now we know that healthy brains are actively growing new cells and making new connections, especially under the influence of EXERCISE.

While the direct study of the inner workings of our brain is quite young, new technologies have opened doors to explore its structures, functions, interactions and the effects of internal and external environment. Perhaps the biggest surprise has been that the brain is quite plastic, “more Play-Doh than porcelain,” says John Ratey, MD in his best selling book, SPARK, the Revolutionary Science of Exercise and the Brain.

Our brains are constantly adapting to their changing environment. They’re forging new connections and being molded by input, much like our muscles are sculpted by lifting weights. As muscles develop “muscle memory,” brains develop “preferred” pathways. Our brain signaling becomes less random and more patterned with use, favoring more superhighways and fewer off-road excursions. In 1949, neuropsychologist Donald Hebb observed this phenomenon and coined the phrase, “Neurons that fire together wire together.”

Exercise and physical activity significantly influence this wiring and re-wiring. It’s more than accidental that we have a sound mind in a sound body. Clearly, mind and body were designed to work together to give us a healthy life. Here’s how.

Exercise fine-tunes and balances neurotransmitters

Neurons communicate with each other across connections called synapses via chemicals called neurotransmitters (NTs) which communicate the message. One hundred billion neurons chat in the language of 100 different chemicals, but the finely tuned regulation happens via transmitters like serotonin, norepinephrine, and dopamine. Often, these drugs are used for pharmacological intervention, but supplementation results in a generalized impact everywhere that transmitter is active. This can have variable and unpredictable effects. Exercise has a generalized effect on brain chemistry. It fine tunes and balances the neurochemistry of ALL the neurotransmitters together – a sort of everyone-play-nicely kind of playground monitor.

Exercise improves the environment conducive to learning

Exercise stimulates the production of a chemical called Brain Derived Neurotrophic Factor (BDNF) which builds and maintains the cellular circuitry, the ‘infrastructure’ of the brain. It improves neuron function, encourages growth, strengthens cells and protect against natural cell death. Repeated activation of neurons with practice and repetition causes their synapses to swell with BDNF and make stronger connections, which enhance memory and learning. BDNF has been called Miracle Gro for the brain.

Exercise improves the rate of learning

By increasing the number of new nerve cells and enriching the environment for these cells to grow, exercise not only improves learning but it increases the rate at which learning occurs. Neurons exposed to an enriched environment sprout new branches, make new connections, conduct the message faster and transmit it more efficiently and more reliably. The exercising brain and its booster crop of BDNF, processes new experiences and helps us makes sense of them. Exercise gives us the power to change our brain in a way that helps us learn!

Exercise strengthens the cellular machinery of learning

Use it or lose it holds as true for the brain as it does for the body. Synaptic connections regularly rearrange themselves under the stimulation of learning. Pathways that get more traffic are strengthened; pathways with less traffic, weaken. In an environment enriched with novel experiences, more social contact and regular exercise, the brain grows more connections, develops more ‘super highways’ with improved traffic flow.

Exercise + Brain Challenge + Social Environment = Better Brains

Sporting activities of all sorts are perfect for this. It really doesn’t matter if you win or lose, as far as your brain is concerned, it is truly all about whether you play the game. Ratey, who has spent decades studying the effects of exercise on learning, observes that exercise:

Optimizes mindset, improves alertness, attention and motivation

Prepares and encourages nerve cells to connect with one another

Spurs the development of new nerve cells which develop and specialize with use.

Here’s the best news of all: even moderate cardiovascular exercise engages the brain in learning. Aerobic activity increases and balances neurotransmitters, creates new blood vessels, bringing new growth factors, and increasing the number of cells. But mile after mile in mindless movement with repetitive motion, isn’t enough to accomplish the brain boost. Ten thousand repetitions doesn’t get you there, either.

All it takes is a mental challenge in a physically demanding setting, like a game the requires some decision making and a bit of teamwork. Complex activity is what strengthens brain connections and expands networks. No wonder we feel smarter after we exercise!

Our brain can’t afford for us NOT to exercise.