

Good for the Body, Great for the Mind:  
Exercise and the Brain

Kitsap Tennis and Athletic Center  
Health & Wellness Seminar  
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*In order for man to succeed in life, God provided him with two means, education and physical activity. Not separately, one for the soul and the other for the body, but for the two together.*

*With these two means, man can attain perfection.*

*-Plato*

# Introduction

Exercise makes us feel better. Why?

-Exercise makes the brain function at its best, plain and simple.

-We (us humans) are born movers. Evolutionarily speaking, to survive over the long haul, our ancestors had to use their smarts (their brain-power) to find and store food, and to know when to freeze, flee or fight in the face of danger. *To survive, our ancestors needed to be able to carry with them quite the “cognitive capacity”: anticipate, plan, remember, understand, apply, analyze, evaluate and create, all within the context of the physical environment presented.* What is more, they needed to be “smart” about setting goals that would reinforce all that they had accumulated in terms of this cognitive capacity for future survival.

-Essentially, an ongoing symbiotic, positive feedback relationship, between body and brain was required for human beings to continue to exist.

Fast forward to today. What’s the problem?

**Motivation:** Rather than thinking about exercise as something you “should” do, how do you refashion it as something you “want” to do, in fact something that literally becomes a “habit of mind”.

-Self-Determination Theory (What motivates you? What moves you? What is YOUR motor?)

**-SDT = Drive that CAR**

**-Competence**

**-Autonomy**

**-Relatedness**

-In the context of schooling: Sports physiologist Craig Broeder says “One of the things that too many people forget is that you have to find something that allows a student to feel comfortable at excelling, so that it feels like *them* when they’re doing it.”

# Learning

-Exercise actually GROWS Brain Cells. How?

-Darwin taught us that learning is the survival mechanism we use to adapt to constantly changing environments. Inside the microenvironment of the brain, that means forging new connections between cells to relay information.

-The brain is flexible, or plastic, more “Play-Doh” than porcelain. It is an adaptable organ that can be molded by input.

-The concept of plasticity is fundamental to understanding how the brain works and how exercise optimizes brain function by fostering that quality. Everything we do, think and feel is governed by how our brain cells, or neurons, connect to one another. Those connections are called neurotransmitters.

-Neurotransmitters? **It’s ALL about communication.**

The 3 Biggies: Serotonin, Norepinephrine and Dopamine.

-**Serotonin:** Policeman of the brain, keeping activity under control.  
-regulates mood, impulsivity, anger and aggressiveness.

-**Norepinephrine:** Personal trainer of the brain, keeping activity motivated.  
-amplifies signals that influence attention, perception, and arousal.

-**Dopamine:** Teacher of the brain, keeping activity geared towards learning.  
-rewards learning and satisfies attention while attending to pleasurable experience.

**KEY:** Most drugs employed to improve mental health target one or more of these neurotransmitters. But simply raising or lowering the level of one or two doesn’t elicit a crisp one-to-one result because the system is so complex. Manipulating just one neurotransmitter creates a ripple effect that takes different paths in different brains, with very obvious varying results.

-Ultimately, exercise balances these three neurotransmitters, as well as produces proteins called glutamates that nourish the neurons like fertilizer. Your brain is a garden, exercise helps to provide the context for cultivation and growth.

# Stress & Anxiety

-Exercise can reduce stress and anxiety, how?

-By doing something physical, rather than sitting and worrying (thinking without doing), we reroute our thought process around the passive-response center and dilute the fear/stress/anxiety/panic, while at the same time optimizing the brain to learn a new scenario. Instead of freezing like a rat in a cage, by doing just the opposite, we engage in cognitive restructuring, using our bodies to cure our brains.

## **The 6 Biggies:**

-Provides Distraction: Quite literally, putting your mind (and attention) on something else.

-Reduces Muscle Tension: Exercise serves as a circuit breaker just like beta-blockers, interrupting the negative feedback loop from the body to the brain that heightens anxiety.

-Builds Brain Resources: Increases in serotonin and norepinephrine, both in the moment, and in the long-term have already been mentioned. It's worth mentioning again however that these both improve the performance of the prefrontal cortex that is key in regulating fear, inhibiting anxiety, and bolstering rational, logical thought.

-Teaches a Different Outcome: Associating the physical symptoms of stress and anxiety with something positive, something that you personally initiated and can control, the fear memory fades in contrast to the fresh one taking shape. Think of it as "Biological Bait and Switch".

-Improves Resilience: You learn that you can be effective in controlling anxiety without letting it turn into panic. This is an essential component of Self-Determination and Self-Mastery, and developing it is a powerful prophylactic against anxiety sensitivity and against depression, which can develop from anxiety.

-Sets you Free: In consciously making the decision to do something for yourself, you begin to realize that you can do something for yourself. It's a very useful tautology. Stress and anxiety in any form or degree can feel like a trap. Taking action, going out, exploring, moving through the environment, exercising will continue to be a liberating experience.

# Aging

-Exercise, it won't keep you from dying, but at least you'll age wisely.

-Getting older is unavoidable, falling completely apart is not. As we age, the cells throughout the body gradually lose their ability to adapt to stress. In the brain, when neurons get worn down from cellular stress, synapses erode, which eventually severs the connections. If synaptic decay outpaces new construction, that's when problems associated with mental functioning (Alzheimer's, Parkinson's the most widely experienced) rear their head (pun intended).

-Exercise is one of the few ways to counter the process of aging because it slows down the natural decline of the "stress threshold". Because the aging brain is more vulnerable to damage, anything you do to strengthen it has a more pronounced effect than it would on a younger adult.

-And ultimately, exercise sparks connections and growth among your brain's cell networks by increasing blood flow/volume (more proteins to the neurons), regulates fuel (glutamate), and encourages neuronal activity and neurogenesis (**MORE and BETTER COMMUNICATION between brain cells**).

-Age happens. There's nothing you can do about the why (or the woe is me). But you can definitely do something about the how, where, when and with whom.

# The Regimen

-So Exercise is important for both body and mind. Now What?

**-The whole person is made up of the 3 big “H”s: Head, Hands and Heart.** As long as you have these four H’s working in concert, your life will move in a direction carrying a positive feedback cycle. Exercise can be woven into these four domains of life.

## **Head: Mental Exercise = Keep Learning.**

Keep challenging your mind. Exercise prepares your neurons to connect, while mental stimulation allows your brain to capitalize on that readiness. Branch out and learn the rules of a new sport or activity. Not just the physical challenge, but the mental challenge will produce double benefits for the brain.

## **Hands: Keep Working on New Physical Skills.**

If you enjoy one particular sport, or exercise, try different patterns, move in different ways, practice left-handed if you’re a right-handed racket ball player. Learning the asanas of yoga, the positions of ballet, the skills of gymnastics, the elements of figure skating, the contortions of Pilates, the forms of karate – all these practices engage nerve cells throughout the brain. Any motor skill more complicated than walking has to be learned, and thus it challenges the brain. Also, with repetition, you’re creating thicker myelin around the nerve fibers, which improves the quality and the speed of the signals and, in turn, the circuit’s efficiency.

## **Heart: Sticking With It, & Strength in Numbers.**

Continuing a regimen requires that your “heart” is “in it”, that you actually have to “care” about the physical activity you’re doing (or about to do). One way to stick with a plan is to center it around SMART goals. These are goals used widely in the world of education and are an easy way to remain both optimistic and realistic about the regimen.

SMART = Specific/ Measurable/ Attainable/ Realistic/ Timely.

Another factor is the social aspect. Engaging in a regimen with a group is a sure-fire way to hold oneself accountable, and to enjoy the benefits of social interaction. Exercising cues up the building blocks of learning, and social interaction cements them in place.

## Conclusion:

Exercise makes the brain function at its best, plain and simple.

-We're born movers.

Exercise actually GROWS Brain Cells.

-Our brains behave like a muscle, both through mental and physical activity

Exercise can reduce stress and anxiety.

-We naturally need levels of stress and anxiety, but those can be balanced effectively and healthfully through exercise

Exercise, it won't keep you from dying, but at least you'll age wisely.

-The more you find creative ways to move in older age, the more your brain will respond.

Exercise will continue improving the swirling positive feedback cycle that is healthy brain activity when your head, hands and heart work in physical concert.

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Reference:

Information adapted from:

Ratey, John, J., Hagerman, Eric. (2013). *SPARK: The Revolutionary New Science of Exercise and the Brain*. Little, Brown and Company; New York, Boston and London.