

# Assessing Then Improving Organic Brain Health And Functional Ability

## A Neuroscience Perspective

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**CSO, Stronger Brains**

**BRAIN PLASTICITY: The basis of the brain's creation of a model of your world, and of the control of your operations within it.**



Your brain made YOU  
(your **SELF**)...



...and whatever your age, you  
are still a work in progress.

WHAT is changing, exactly, as the brain remodels itself — throughout life — to make the most of its unique experiences?

1. Its revises its detailed **WIRING** (synaptic connections) and its elementary processing machinery in ways that enable the skills and abilities that define YOU.
2. It also changes **MANY OTHER** physical and chemical aspects of its processing machinery.
3. It advances the machinery that controls change itself.

Changes are **PHYSICAL.**

The product of all that change?

The creation and th continuous elaboration of a unique **PERSON.**

Measures of ATTENTION control and processing SPEED (with sustained accuracy) index the brain's performance capabilities and organic health.

1. They are easy to measure.
2. Processing speed (and accuracy) has been convincingly argued to be THE 'general' factor indexing individual ability/intelligence.
3. Performance at EVERY cognitive operation (memory; categorization; logical thinking; problem solving; creativity; et al.) is highly correlated with indices of neurological speed.
4. **ATTENTIVE** and **FAST** brains are **NECESSARILY** physically and chemically advanced (= **HEALTHY**).

IT'S EASY TO IMPROVE ATTENTIVENESS AND SPEED IN THE BRAIN.

# The Brain is like the body. **WHEN YOU WAKE UP AND SPEED UP THE BRAIN,**

## **EVERYTHING GETS STRONGER**

With appropriate training **EVERY** physical and functional index of brain health and brain power advances. In the environmentally challenged (unhealthy; low-performing) brain, **EVERY** index of brain health and brain power can be NORMALIZED.

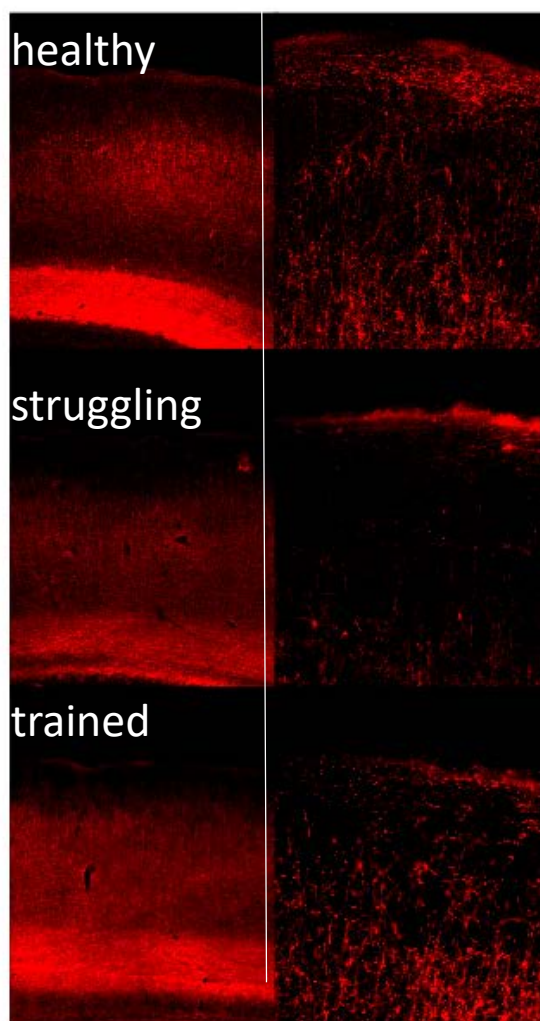
WHAT'S RESTORED? (a partial list)

WHAT'S IMPROVED? (a partial list)

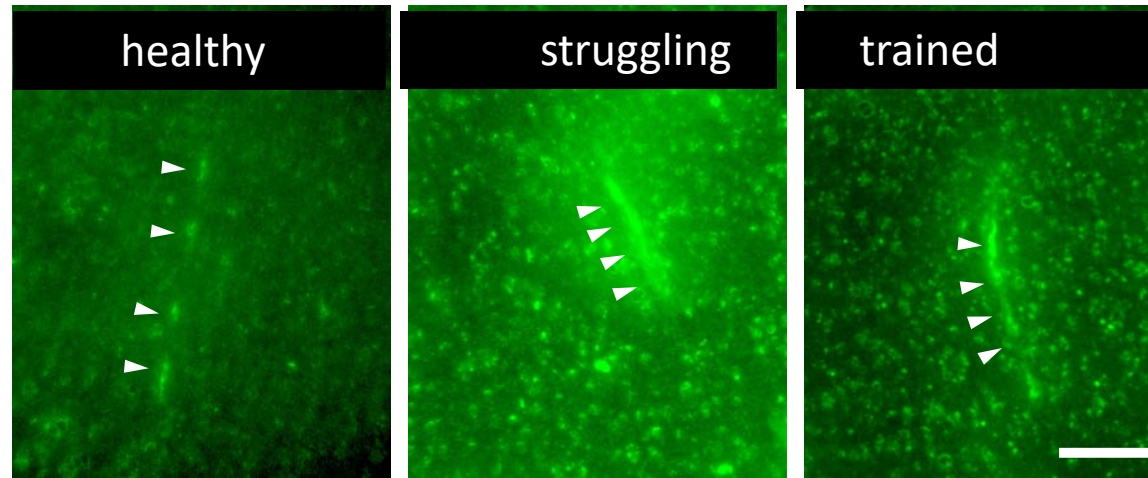
1. The brain's **PHYSICAL** machinery (dendrite & axon elaboration; myelination; et al)
2. Its **CHEMISTRY** (synaptic processes; modulators; growth factors; et al)
3. Its **DEFENSES** (immune response; 'blood-brain barrier'; et al)
4. Its **NUTRITIONAL SUPPORT** (on-demand blood flow; neuronal metabolism; et al)
5. Its **INFORMATION PROCESSING MACHINERY** (association; predictive flow; et al.
6. Its **RECORDING MACHINERY** (work and serial memory; memory retrieval; et al)
7. Its **EXECUTIVE CONTROL MACHINERY** (agency; voluntary initiation and control of movement and thought; emotion control; et al)

We have repeatedly shown that specific forms of brain exercise **1) grow brain-power**, and **2) restore neurological integrity**, in normal and struggling adult brains.

**A** myelin basic protein

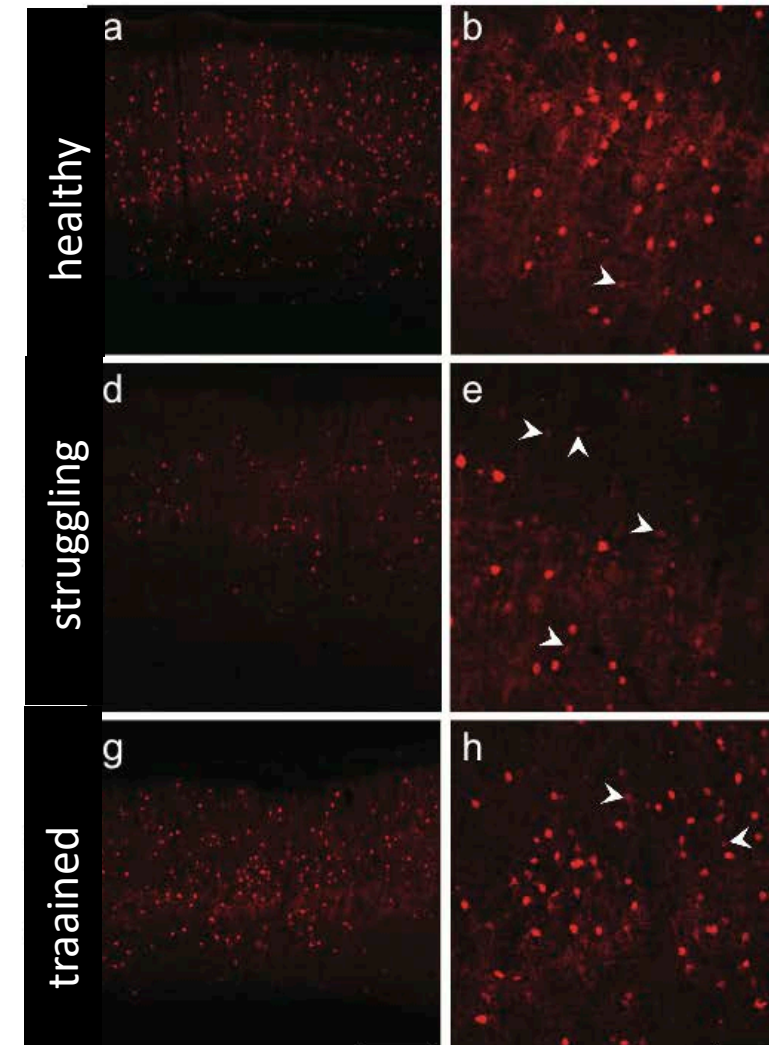


**B** neurovascular unit integrity ("blood-brain barrier")



**>40 specific indices  
of brain health  
were restored  
by training.**

**C** parvalbumin inhibitory neurons



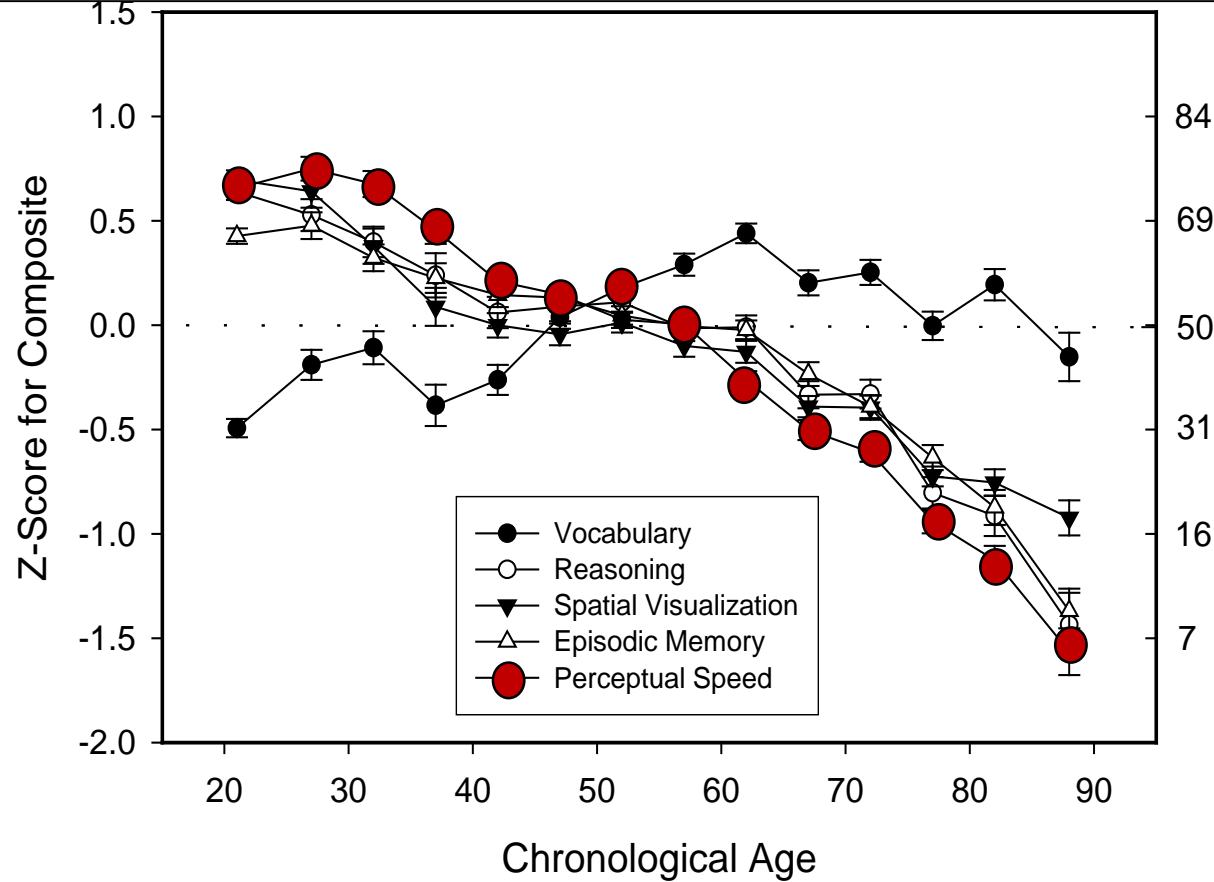
# *The Bottom Line*

The organic *HEALTH* and the functional capacities of the brain (like the body) can almost always be substantially improved by appropriately exercising it...

(...and as a bonus, improving brain health will have a major impact on general health, and on healthy longevity.)



# An example (among many): Improving **brain speed**, for individuals with different levels of ability/impairment.



**AGE—or differences in initial ability—does not matter. Almost EVERYONE improves.**



**All of these declining abilities can be improved by training.**

**Performance gains in speed must arise from a coordinated series of brain-strengthening physical changes .**

**We achieve this strengthening of brain health and brain power** using brain-exercise programs delivered via the Internet on computers, pads and smartphones. Training programs are:



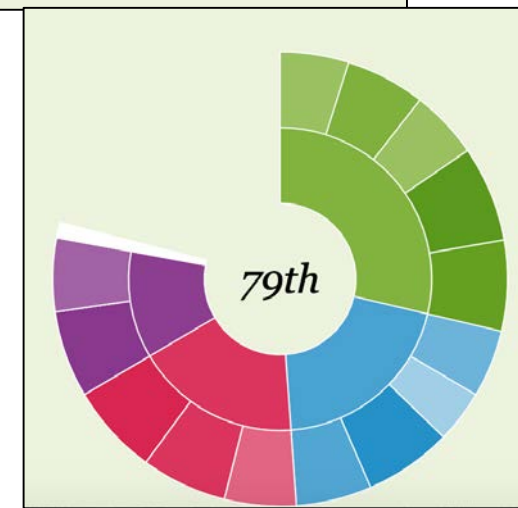
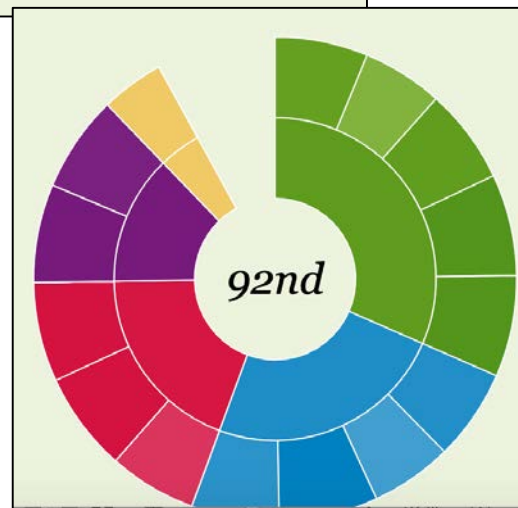
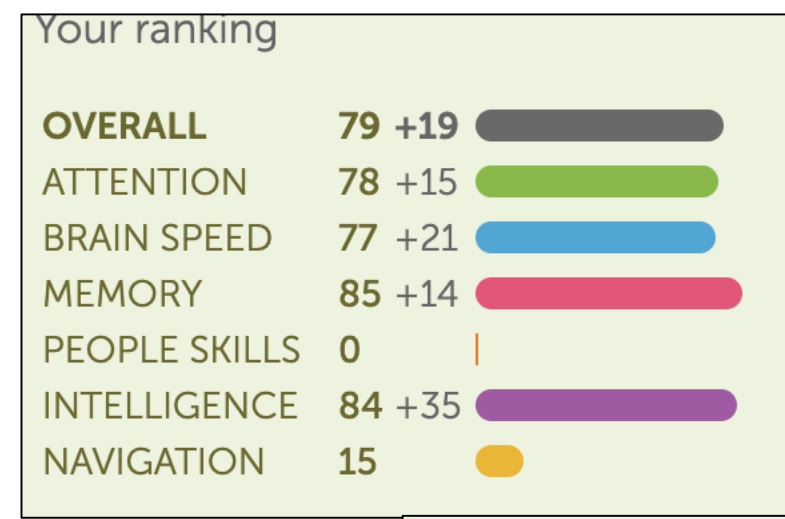
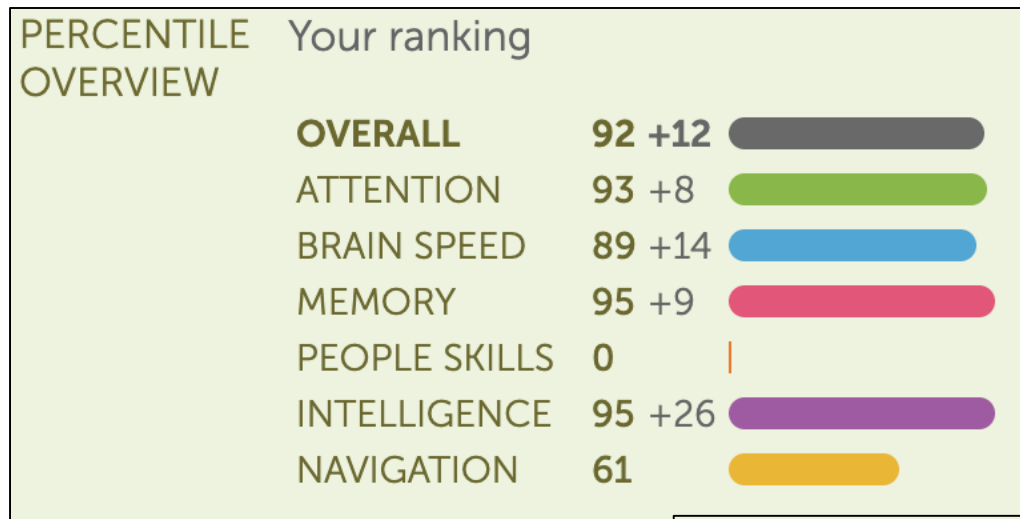
**BrainHQ**

1. **Adaptive**, for individualizing training
2. **Optimized**, for rapid gains
3. **Targeted**, to recover/strengthen key abilities
4. **Extensive**, to achieve 'rejuvenation' at all brain system levels, in all affected domains
5. **Continuously validating outcomes** (in every exercise cycle)
6. **PROVEN to work**, via >250 'gold standard' trials
7. **Clinically monitored (optionally)** via the Internet
8. **Scalable**

It's easy to calibrate a trainee engaged in training and to deliver ongoing compliance and progress information to a training monitor or supervisor.

Percentile rank for a person of my age

If I was 20 years old...



It is important to understand that it is just as easy to drive the brain in a **NEGATIVE** (unhealthy; less functionally capable) direction.

1. ANYTHING that increases the ‘noisiness’ of brain processes drives every index of brain-change progressions in reverse.
2. **There are several hundred known sources of >>> brain chatter/noise.**  
[For example: CONCUSSION and other TBIs; persistent STRESS; MOOD DISORDERS; ACE history; PHYSICAL/SEXUAL/MENTAL ABUSE; SLEEP DISORDERS; PTSD; ENVIRONMENTAL NOISE; ALCOHOL ABUSE; TINNITUS; SSRI DRUGS; et alia.] **They DEGRADE brain function and health.**
3. There is also a rich variety of ways to engage neurological operations in ways that DISTORT them.

The brain has a kind of gene-regulation “Master Switch”.

**ADVANCE**



**RETREAT**

You want that “switch” thrown **UP** for your key personnel.

# How can you apply this science to improve your personnel?

1. **Deploy neurological (not just psychological) testing strategies to assist in recruiting personnel with a high chance of succeeding.**
2. **IDENTIFY—then ADDRESS issues of organic brain health that manifest or foretell current or sub-optimal work performance**
3. **Review how your training practices might be further optimized to minimize **negative** and to maximize **positive** neurological and operational impacts.**
4. **Routinely monitor (through computerized assessment) the neurological and mental health, and the brain performance status, of all personnel.**
5. **Re-evaluate the neurological status of personnel who have been historically exposed to direct (concussion; TBI; blast injury) or indirect (high stress; persistent anxiety) brain health-degrading experiences. Then **ADDRESS** those emergent neurological weaknesses.**
6. **Re-evaluate the neurological status of all older (>35 yo) personnel. They'll likely substantially benefit from a 'brain health training update'.**

# Examples:



**High accident rate jobs**



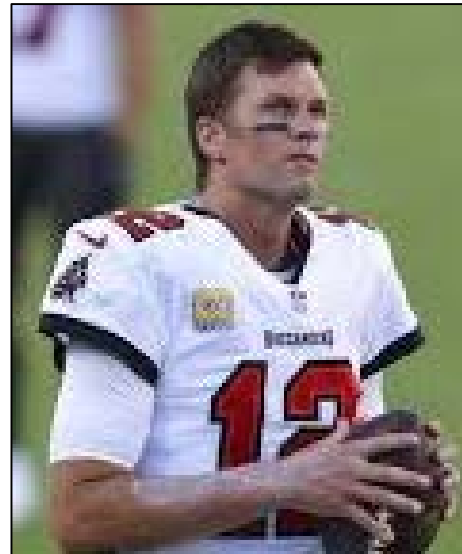
**Drivers; equipment operators**



**Engineers, program designers**



**Military recruits  
Special ops forces**



**Tom Brady**



**Law enforcement personnel**

Finally, you should routinely apply computerized assessments that indicate neurological weaknesses or distortions that indicate extant problems, or a significant risk of a future progression to **depression, anxiety disorder, suicide, oppositional behaviors, substance abuse, personality disorders, et alia.**

They plague every modern group of people—even high-performance people in the military.

**With appropriate forms of brain training,** the neurological health and resilience of your team members can be strengthened in ways that can reduce the neurological distortions and impairments associated with these ‘illnesses’, and attenuate and often reverse the progression of symptoms anticipated to lead to their onsets

How can you apply this science to improve (normalize) the health and welfare—and to increase (normalize) the lifespans—of retired personnel?

- 1. Provide them with computerized “How To Be A Civilian Again” training courses.** We’d help you develop them.
- 2. Provide them with a (computerized) “Brain Checkout”—subsequently repeated annually.** We’d assist you in implementing strategies for shipping these assessment outcomes to medical specialists/therapists in your venue.
- 2. Provide them with an individualized brain health (computerized) training programs—on an “as-needed” basis.** We’d assist you in implementing strategies to monitor and assure compliance, and provide you (and local medical specialists) with a continuous and complete documentation of brain health training outcomes that would inform other useful health-support options.



# How can you apply this science to improve performance—of active duty personnel who need to operate with peak performance?

- 1. Measure performance – and then change it.** At every stage of a person's career in the military, their cognitive performance can be measure – from new recruit to experienced commander. And at each stage, performance is not fixed – it can be changed and improved. And where there is room for enhancement, cognitive training can be used to take good brains and make them great brains.
- 2. Predict success – and train for it.** Use cognitive performance data to evaluate who goes on over time to successful military careers (and who doesn't). Then provide cognitive training to ensure that people on the wrong track get on the right track – and that people on the right track stay on it to succeed.

**Thank you to our collaborators!**

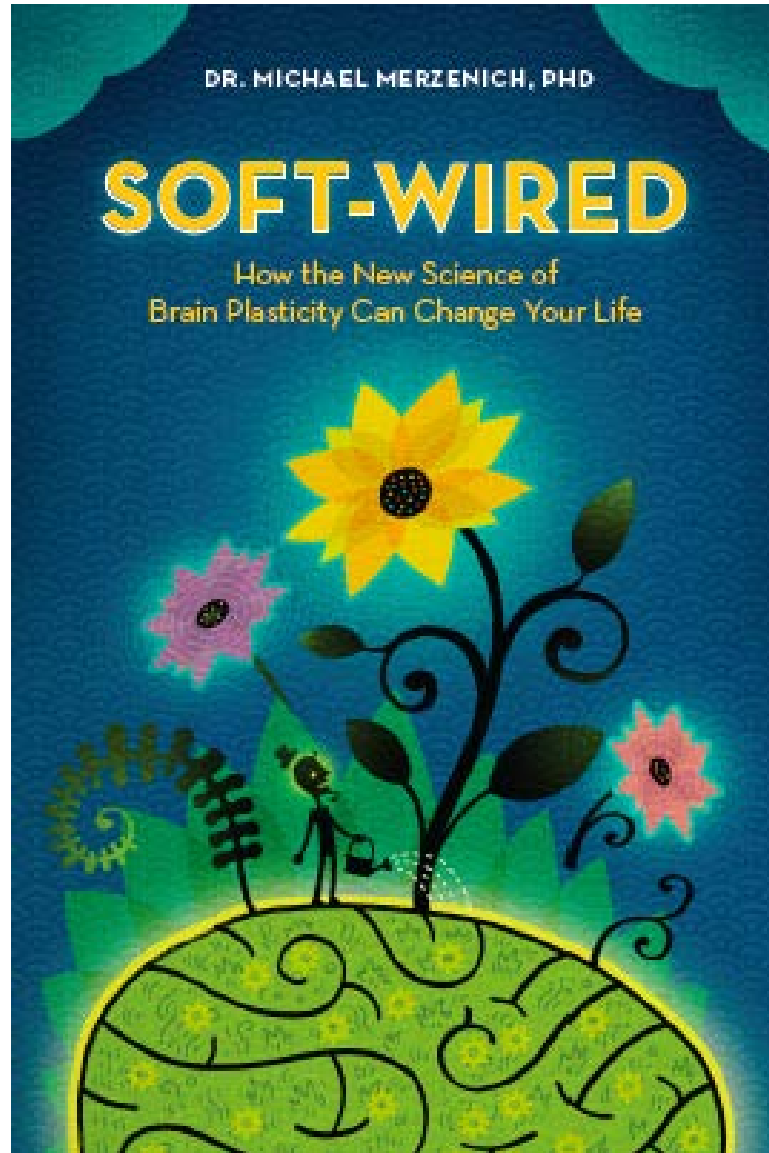


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And for even more unmasked-for advice, read my book!



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