



A COLLABORATIVE ONLINE EVENT

PUSHING THE BOUNDARIES OF ACHIEVEMENT

A SERIES ON THE LATEST EVOLUTION OF APPLIED NEUROSCIENCE

Thank you for joining us today, along
with our international partners.



**STRONGER
BRAINS**
For better lives



BRAINFIT®



Your Panelists

Alex Kitzes Ph.D.

Clinical Psychologist & Co-Founder of Stronger Brains Inc, USA

Cheryl Chia

Physiotherapist & Founder of Singapore-based BrainFit

Dave Stanley

Director of Learning Ecosystems at LearnFast Australia

Your Presenter - Michael Merzenich PhD

Michael is a serial entrepreneur, author and world-class neuroscientist. For nearly five decades, he has been a leading pioneer in brain plasticity research.

In 2016, Dr. Merzenich was awarded one of the world's top neuroscience prizes, the Kavli Prize, for his achievements in the field of brain plasticity.

Michael is a Professor (emeritus) at University of California at San Francisco, and is the founder of three companies...Scientific Learning, Posit Science and Stronger Brains.

Neuroscience:

The Importance of Understanding the Brain

Dr. Michael M. Merzenich

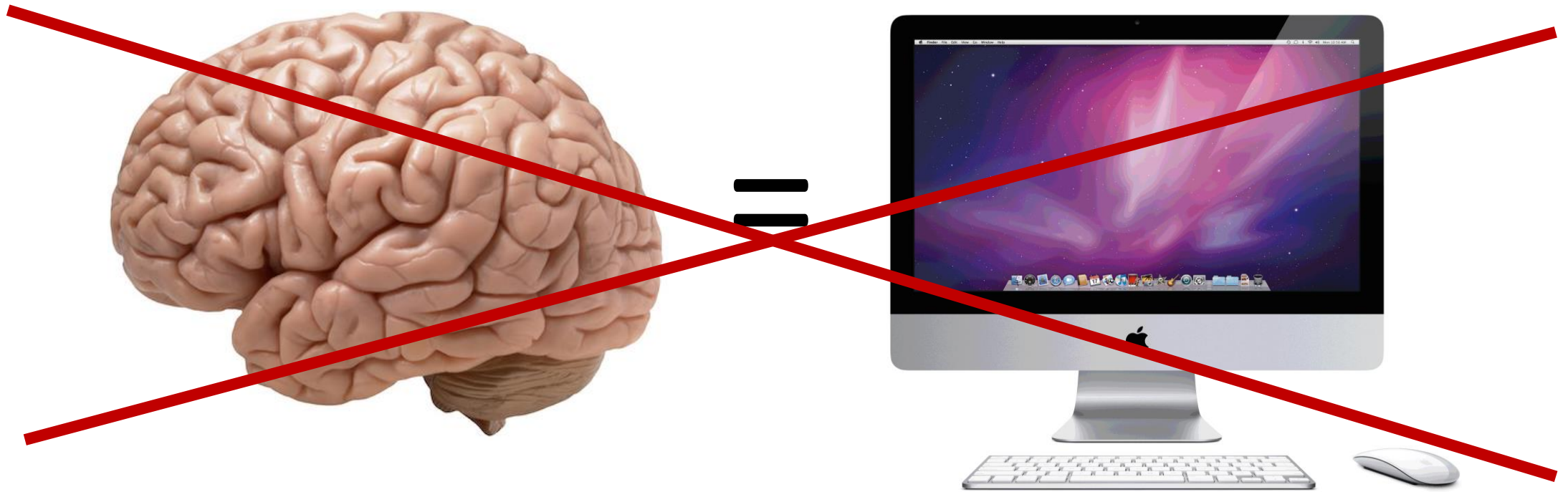
Francis Sooy Professor, University of California at San Francisco (emeritus

Founding CEO, Scientific Learning

Founder and CSO, Posit Science (BrainHQ)

Founder, Stronger Brains

In the second half of the 20th Century, the view that the 'plastic' rewiring of the brain was limited to the first years of life was ascendant in neurology, psychiatry, and education.



Nothing could be further from the truth.

Through those plastic (neurological remodeling) processes, the brain accomplishes four wondrous things within a child's skull, across their first two decades on earth.

It creates that incredible, special version of their world.

It creates their operational personhood.

It creates their SELF.

It creates that Self's command-center powers of agency—the **captaincy of their little ship.**

A “gift from the Gods”....

**That wonderful
emergent SELF is
absolutely
'one-of-a-kind'.**

A few things you should know about your brain plasticity:

- ❖ The brain is a work in progress, continually revising it's wiring.
- ❖ Brains get 'smarter' (more 'powerful') as a result of the progressive refinement of the machinery of the brain driven by specific patterns of brain use.
- ❖ When you learn any new skill or ability, beyond brain re-wiring, there are many other positive physical changes that empower that ability.
- ❖ We understand the rules that govern those changes. Following those rules, constrained by their limits, *we can modify a brain, at will.*
- ❖ Change is controlled by the brain's own evaluation of 'importance', and 'success'.
- ❖ Remodeling processes are inherently bi-directional.
- ❖ 'Mental illnesses' and 'aberrant behaviors' are expected end-stages of usually-long progressions of 'negative' plastic revision.

A key aspect of the processes that express neuroplasticity: They are reversible, by nature.



Etienne de Villers-Sidani



Jyoti Mishra



Xiaoming Zhou

Our studies compared very old vs young ('prime of life') brains; or the brains of animals or humans who had good vs very distressing (abusive; fear-loaded) early lives.



VS



VS



de Villers-Sidani et al., PNAS 2010; Mishra, de Villers-Sidani et al., J Neurosci 2014; Zhou et al., PNAS, 2017

Older individuals—or individuals with lousy childhoods—were then engaged in simple forms of brain-health-relevant training.....

The grand result:

With simple forms of training **ALL** 'negative' changes (in A-1) attributable to aging or a stress/fear-plagued early life that we had recorded were **REVERSED**. What's recovered/strengthened (a partial list)?

The brain's...

...**PHYSICAL** machinery.

...**CHEMISTRY**.

...**PLASTICITY-CONTROL (CHANGE) PROCESSES**.

...**DEFENSES** (immune response).

...**NUTRITIONAL SUPPORT**.

...**INFORMATION PROCESSING MACHINERY**.

...**RECORDING (remembering) MACHINERY**.

...**EXECUTIVE CONTROL MACHINERY**.

...**SPEED**.

...**ACCURACY**.

...**ASSOCIATIVE POWERS**.

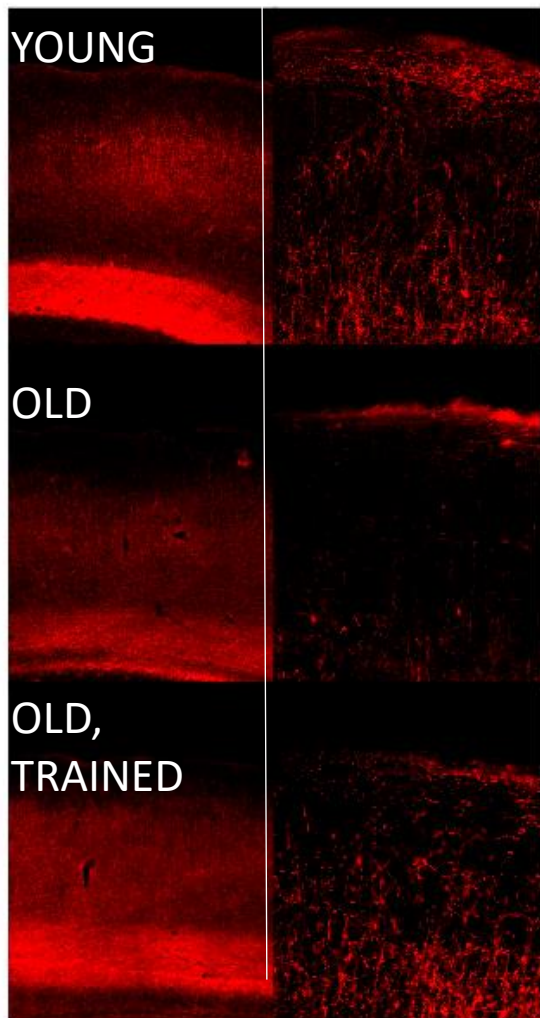
...**ALERTNESS, BRIGHTNESS**.

...**DISTRACTOR SUPPRESSION**.

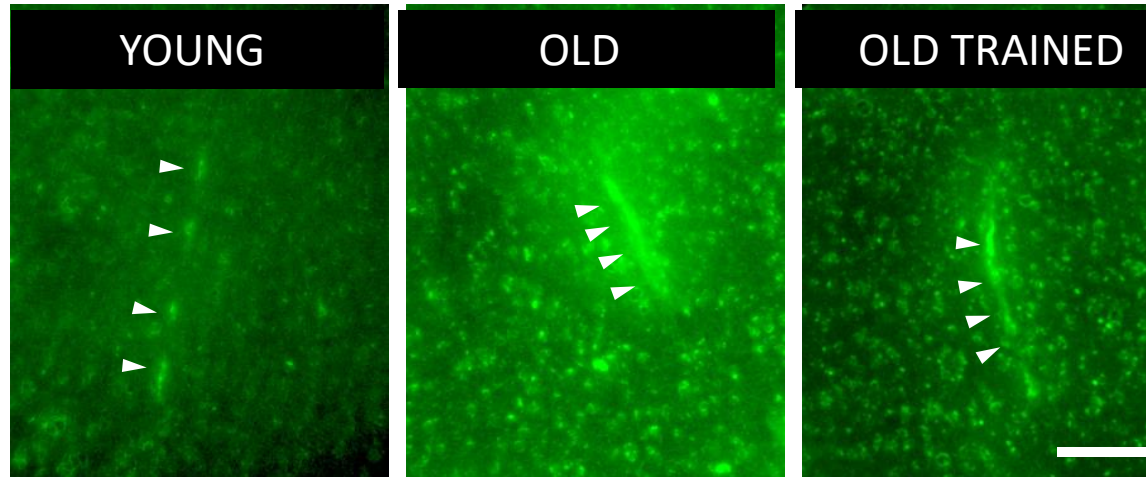
de Villers-Sidani et al, 2010, PNAS 107:13900; Zhou et al, 2011, J Neurosci 31:5625; de Villers-Sidani & Merzenich, Prog Brain Res 191:119; Mishra, et al, 2014 Neuron; Lin, Zhou et al, 2016, PNAS; Zhang et al, 2021 PNAS

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

A myelin basic protein

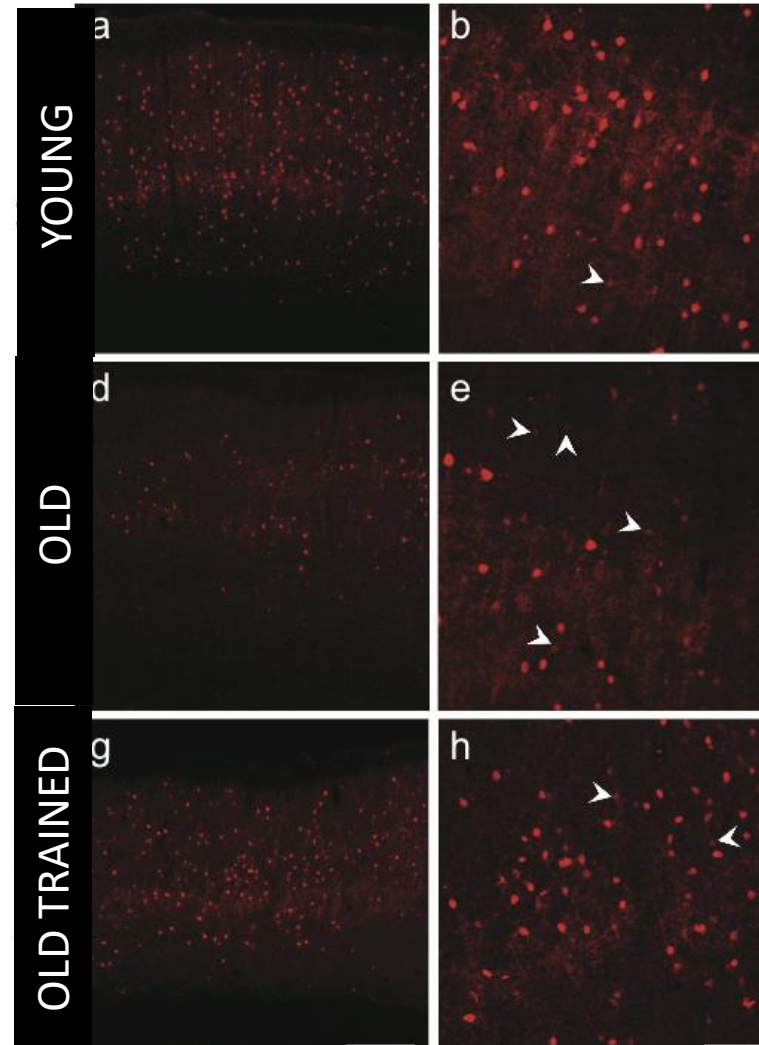


B neurovascular unit integrity ("blood-brain barrier")



In fact, ≥ 35 specific indices of brain health were restored/advanced to an organically healthier status by training.

C parvalbumin inhibitory neurons



Three examples of how this science can be applied to manage and assure brain health, and to advance an individual's neurological powers.

Example 1. Detecting and addressing issues related to a child's organic brain health, and the status of the neurological assets that support academic and personal success

Because we now understand the relationships between physical and functional brain status and the brain's 'performance' capabilities, we can now identify many factors that foretell childhood or older-age struggles—**AND ADDRESS THEM.**



It's all about **DETECTING AND RESPONDING TO** genetic and brain-history-based neurological weakness and distortion that can impact academic and personal success.

Periodic therapist-monitored "Brain-Checks" integrated with as-indicated brain plasticity-based training can provide a child with a substantially better chance of successively navigating the minefield of a modern childhood.

A second example...

EVERY kid can grow a stronger and more reliable executive "Self"—
THEN further elaborate its powers of agency (executive control).

We now understand the neurological processes that give rise to the emergent "Self"—**AND WE THEREBY UNDERSTAND HOW TO GROW ITS POWERS OF AGENCY AND CONTROL.**

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We can index its status by computerized assessment—then slowly grow its powers, in almost any individual.

That 'executive', capable of operating with high flexibility with high accuracy at speed, is the foundational basis of a child or adult's "adaptive intelligence".

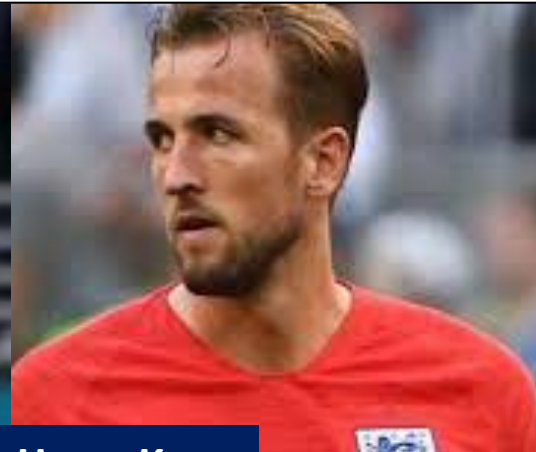
A third example.....

Brain speed is of the essence. Faster brains with retained accuracy are healthier, more alert, 'smarter'...
EVERY brain can be *FASTER*.

Improvements in brain speed and accuracy are easy to document. Almost EVERY individual on Planet Earth CAN improve the accuracy of their neurological processes at speed.



Tom Brady



Harry Kane

ANYONE can improve their neurological mastery, of almost anything that is important to them.

Fast brains are healthier.

Fast brains are 'smarter'.

For a child in training, the Stronger Brains approach integrates...

- ❖ Extensive pre- and post-training benchmark assessments, with
- ❖ continuous ongoing compliance- and progress-monitoring, to assist program providers in successful program use, with
- ❖ daily brain science-education videos, with
- ❖ exercises designed to strengthen a child's emotion-control, social-cognition and control, and attention control abilities, with
- ❖ adaptive brain training designed to advance the child's fundamental neurological powers, to support and accelerate that academic and personal progress, with
- ❖ training to elaborate the child's now-stronger executive control, with
- ❖ training to grow resilience against an otherwise-probable progression to older-age mental illness, addiction, or oppositional behaviors, with
- ❖ training forms known to impact sleep duration & quality, and physical health.

In a daily 45-minute-long session, the 10-18 year old trainee:

1. completes a brief daily self-report;
2. watches a usually-entertaining and/or compelling brain science education video;
3. completes a short, calming epoch of computer-guided meditation;
4. completes other exercises designed to strengthen 'habits' that stabilize emotion control; then
5. enters the 'Brain Gym', where they complete a programmed series of brain-remodeling exercises.

A 3-session-long computerized assessment battery is delivered on the first three and last three (of 60) training days in the first training cycle.

Embedded measures of neurological performance are automatically recorded 10->30 times, in every daily training session.

The BrainHQ exercises deployed in the 'Brain Lab' on computers, pads or smartphones are:



BrainHQ on StrongerBrains.com



1. **Adaptive**, for individualizing training.
2. **Optimized**, for rapid gains.
3. **Targeted**, to grow the powers of physical/functional brains.
4. **Extensive**, to achieve 'rejuvenation' at all brain system levels, in all domains.
5. **Continuously validating outcomes** in every exercise cycle (10 to >30 times training session).
6. **PROVEN to work**, via >250 'gold standard' RCT outcomes reports. (More than 350 additional trials are now underway across the world— involving tens of thousands of trainees.)

Tools for the Stronger Brains Program Provider:

1. On-line SB Provider training, certification.
2. Access to a SB Program Provider Portal for enrolling new trainees, and to monitor their compliance and progress.
3. Detailed pre-training and post-training status reports on the trainee's:
 - a. Organic brain health.
 - b. Neurological assets and weaknesses enabling and/or limiting academic and personal success.
 - c. Test-indicated extant issues and risk factors re current and future mental health, addictions, oppositional behaviors, et alia
 - d. Impacts attributable to each SB training cycle.
4. Technical and other implementation support assistance.
5. Support and test forms for annual downstream "Brain Checks".

Stronger Brains is Working Hard on:

1. 'Phase 2' (and later-phase) SB Program models,
2. A SB parent/guardian portal that establishes an ongoing link with their SB Program Provider (and designed to further strengthen parent-child communication; deployed at the Provider's discretion).
3. Automated strategies designed to help assure trainee compliances.
4. A second almost fully automated program version, specifically targeting high-needs children.
5. A new series of training programs specifically designed for 4-10 year old kids.
6. Randomly-assigned controlled outcomes trials, conducted in a variety of practical (primarily school-based) settings.
7. **Initiating a special study with the goal of tracking the older-age FATES of every SB-trained child.** [We'll ask you to voluntarily help us achieve this important goal.]

Other active targets of this translational neuroscience:

AUTISM (and a host of other pervasive development disorders)

DYSLEXIA, DYSCALCULIA, APRAXIA, et alia

SOCIOPATHY (and other social/emotion regulation disorders)

CONCUSSION treatment, and prevention

TRAUMATIC BRAIN INJURIES

ADDICTION prevention, treatment

OPPOSITIONAL (juvenile criminal) **BEHAVIORS**

MENTAL ILLNESS RESILIENCE, to prevent its onset in high-risk individuals

MENTAL ILLNESS TREATMENTS designed to re-normalize disease-distorted neurology

HIGH-PERFORMANCE ATHLETIC TRAINING

YOUTH JOB APPRENTICESHIP TRAINING

Gee, it won't happen overnight...

...but this IS a revolution, in our own times, which shall ultimately be recognized as a signal era in which...

1. *..we first came to understand how to routinely evaluate, repair (if necessary), and MANAGE our children's (and our own older-age) brain health.*
2. *..we finally began to implement strategies that grow resilience in children at risk for a host of preventable older-age catastrophes.*
3. *..we first understood that an individual child's neurological status is THE primary determinant of their academic and personal successes—AND THAT EVERY CHILD COULD (SHOULD) HAVE A NEUROLOGICALLY STRONGER BRAIN.*
4. *..we more reliably and more continuously helped EVERY child adopt habits that support a lifetime of continuous personal growth, on the path to their better, happier, more productive, healthier, safer, and longer lives on planet Earth.*

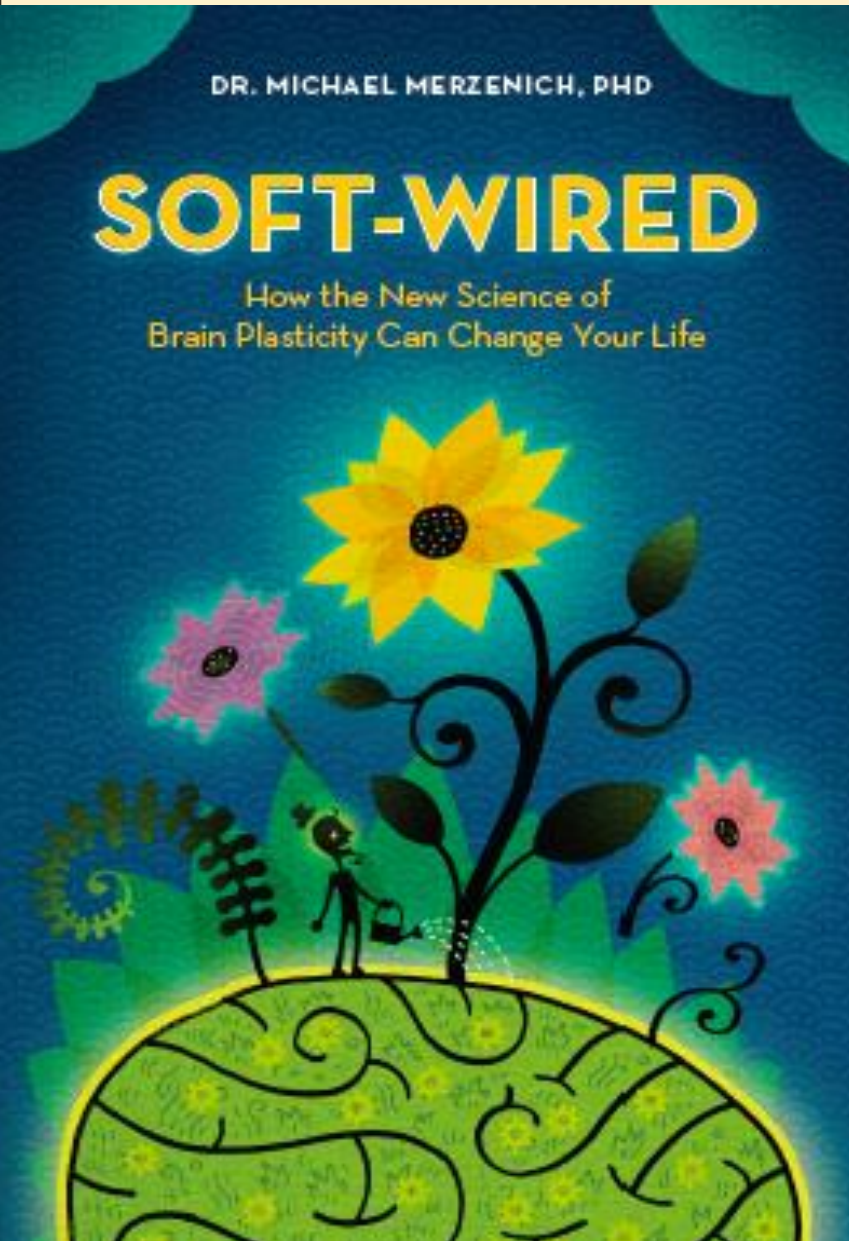


On the path to changing life...

...for all of us...

...very much for the better.

For more information and references...



**For Stronger Brains Program
certification training—and
to initiate program usage—see
contact@strongerbrains.com**

To ask a personal question.....

merzenichm@gmail.com

**For a copy of the bullet points in this
presentation...**

<https://strongerbrains.com>

Panel Discussion & Questions

Elite Performance Solutions provides our software and services through our partners:



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