

# Fathers as Agents of Positive Change: Dads and Neuroplasticity

New England Fathering Conference 2022  
*“Opportunities for a New Beginning”*

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# Enrolling Questions

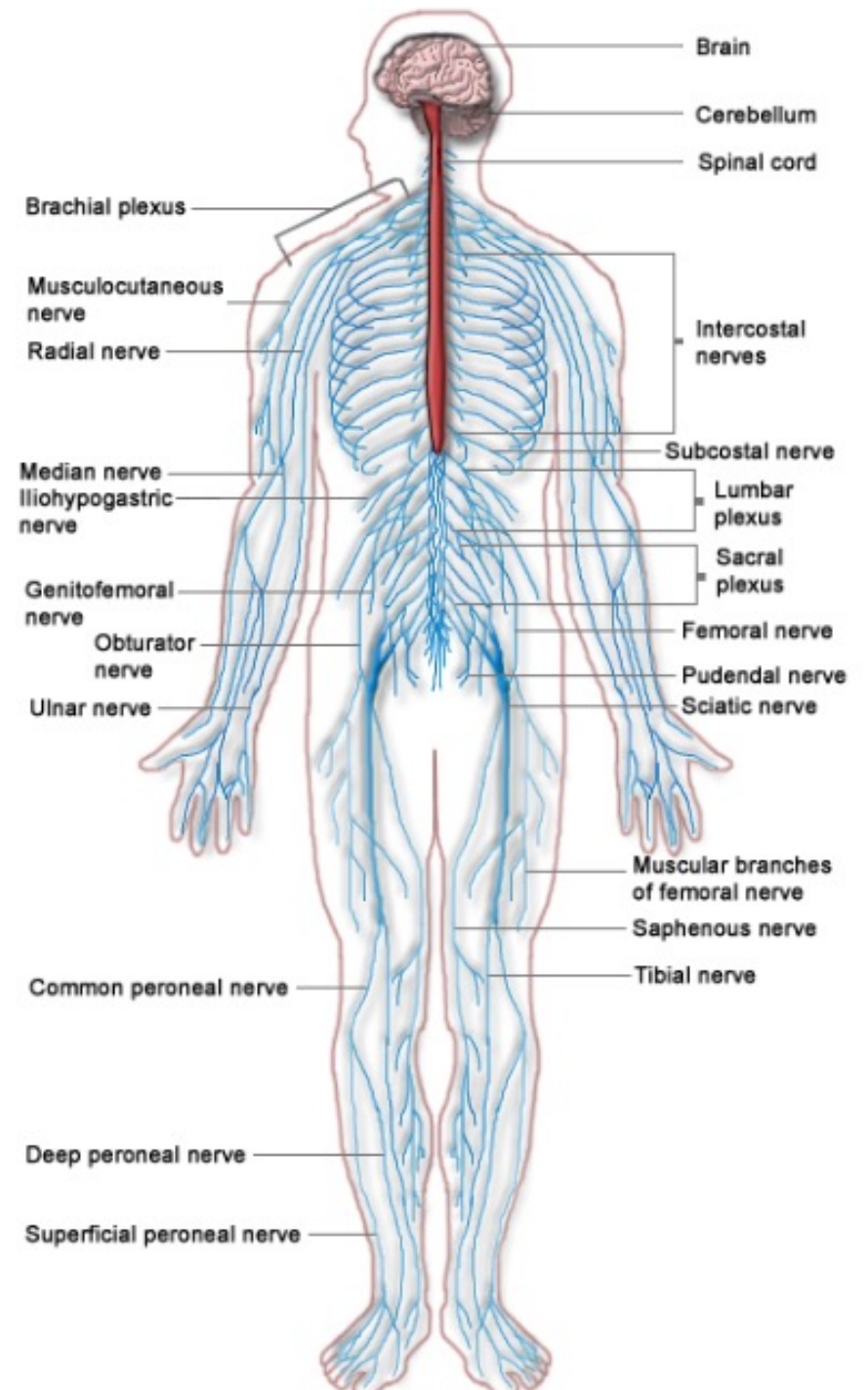
1. Are you curious about research that shows the brains of new fathers, and the brains of new mothers, structurally change in similar ways?
2. Are you interested in how trauma changes brain architecture (and human behavior)? And, if so, do you think about ways people can reduce the effects of trauma?
3. Are you fascinated by the cultural changes that've occurred around fathering in recent decades? And are you passionate about engaging men in the joys, and challenges, of parenting?

# Neuroscience is about YOU

**Neuroscience** is the branch of biology which investigates the brain and nervous system.

The nervous system is made of billions of neurons connected together and to other systems in the body.

**“Know Thyself.”**



# What is Neuroplasticity?

The capacity of neural networks in the brain to change their connections and behavior in *response to new information*, such as sensory stimulation, damage or dysfunction.



**“You are your synapses.”**

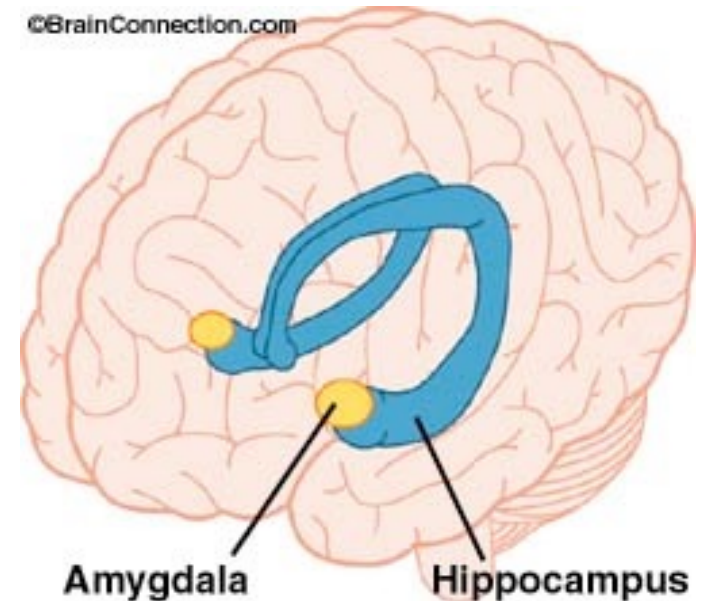


# Mindfulness and Neuroplasticity

Studies show after 8 weeks of mindfulness practice, MRIs of adult brains consistently ***decreased density in the amygdala, which plays a role in anxiety and stress.***

There were also ***increased density in the hippocampus, which is important for learning, memory and self-awareness.***

These consistent changes in adult brains were due to neuroplasticity.



# A Dense Neural Network by Age 2



**Newborn**



**1 Month**



**9 Months**



**2 Years**



**Adult**



# TWO OPEN WINDOWS: PART II

NEW RESEARCH ON INFANT AND CAREGIVER NEUROBIOLOGIC CHANGE

by Tiffany Phu, Andrew Erhart, Pilyoung Kim, and  
Sarah Watamura; University of Denver, Stress, Early  
Experiences, and Development (SEED) Research Center

 **ASCEND**  
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# Two Open Windows Research

Substantial evidence indicates that nonbiologic caregivers and ***fathers are effective parents***, so it is unsurprising and yet an important finding to identify that the ***changes that occur in biologic mothers' brain circuits relevant to parenting also occur in other parents.***



Photo credit: thebasics.org

# Two Open Windows Research

Fathers who spend more time alone with their child (*with direct responsibility*) demonstrate ***stronger connections between brain areas involved in detecting cues and social cognition***; also, their pattern of brain response was similar to those of primary-caregiving mothers.



Photo credit: unsplash.com - vishnu-nishad



# Two Open Windows Research

Mothers experiencing economic hardship and excessive stress have less activation in brain areas that are important for directing parenting behavior . . .

This suggests that *hearing an infant cry may be harder for those mothers who experienced extreme adversity* and thus it may be harder to respond sensitively to an infant's needs.



Photo credit: unsplash.com - Ayo Ogunseinde

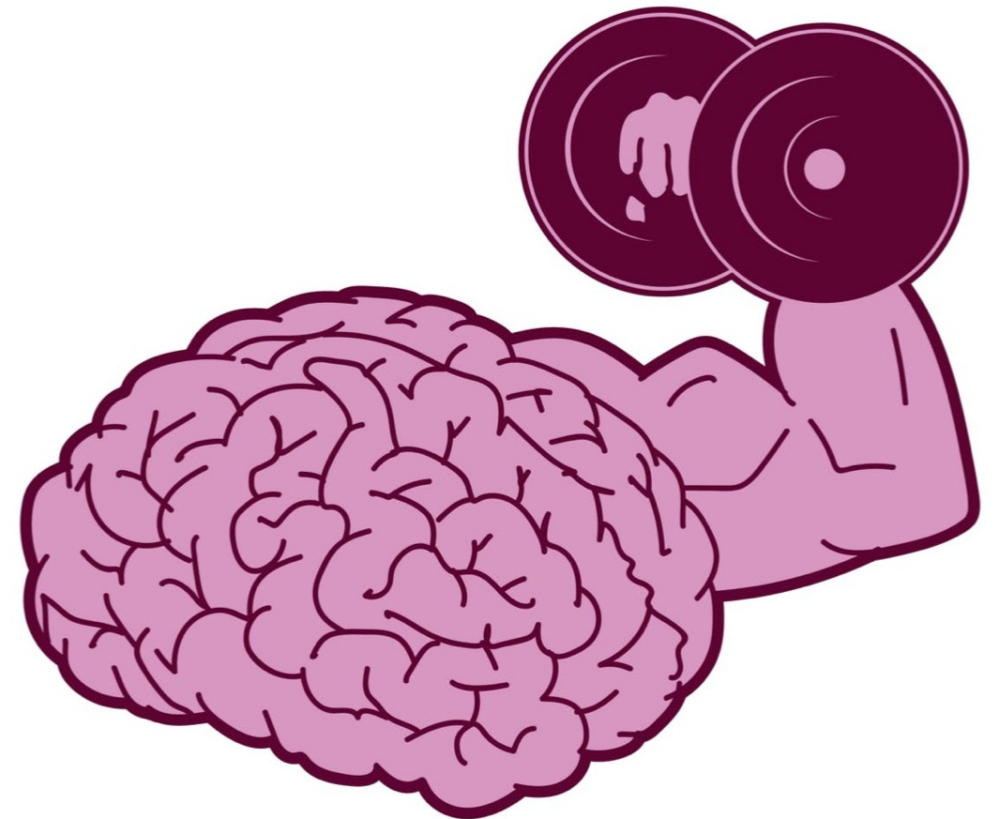
# Neural plasticity in fathers of human infants

Pilyoung Kim<sup>1,2</sup>, Paola Rigo<sup>1,3</sup>, Linda C. Mayes<sup>2</sup>, Ruth Feldman<sup>2,4</sup>,  
James F. Leckman<sup>2</sup>, and James E. Swain<sup>2,5</sup>

## Bottom Line

Fathers exhibited increased gray matter in several neural regions involved in parenting . . .

The findings provide evidence for neural plasticity in fathers' brains.





**TRIGGER WARNING**

# What is Trauma?

An event, or series of events, experienced by an individual as **physically or emotionally harmful or life threatening**.

These events have *lasting adverse effects* on the individual's functioning, on their *mental, physical, social, emotional, and spiritual* well-being.



Photo credit: unsplash.com - Tony Rojas

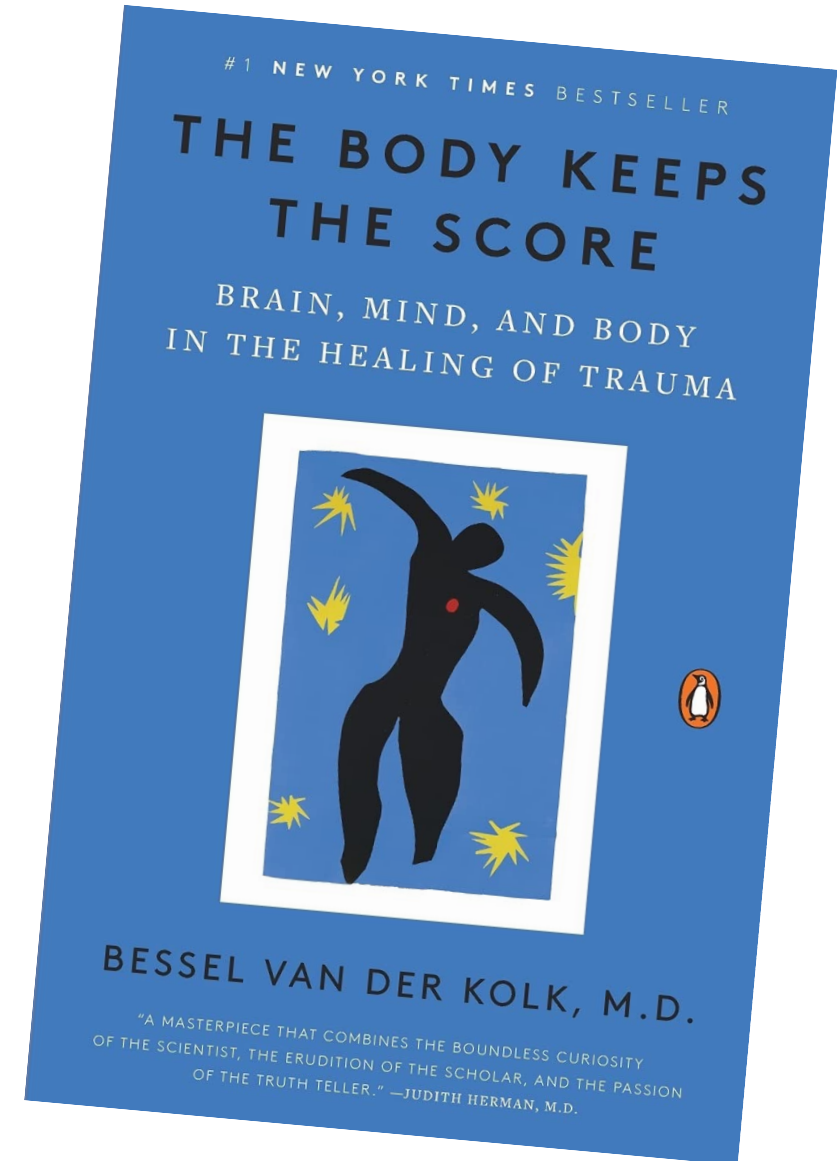
# What are Common Causes of Trauma?

- War
- Divorce
- Poverty
- Serious illness
- Natural disasters
- Death of a loved one
- Physical pain or injury
- Substance use disorder
- Physical or emotional abuse
- Terrorism
- Addiction
- Incarceration
- Domestic violence
- Community violence
- Witnessing a death
- Sexual abuse/assault
- Parental abandonment
- Moving to a new location



We have learned that trauma is not just an event that took place sometime in the past; it is also the imprint left by that experience on the mind, brain, and body . . . trauma is held in people's body.

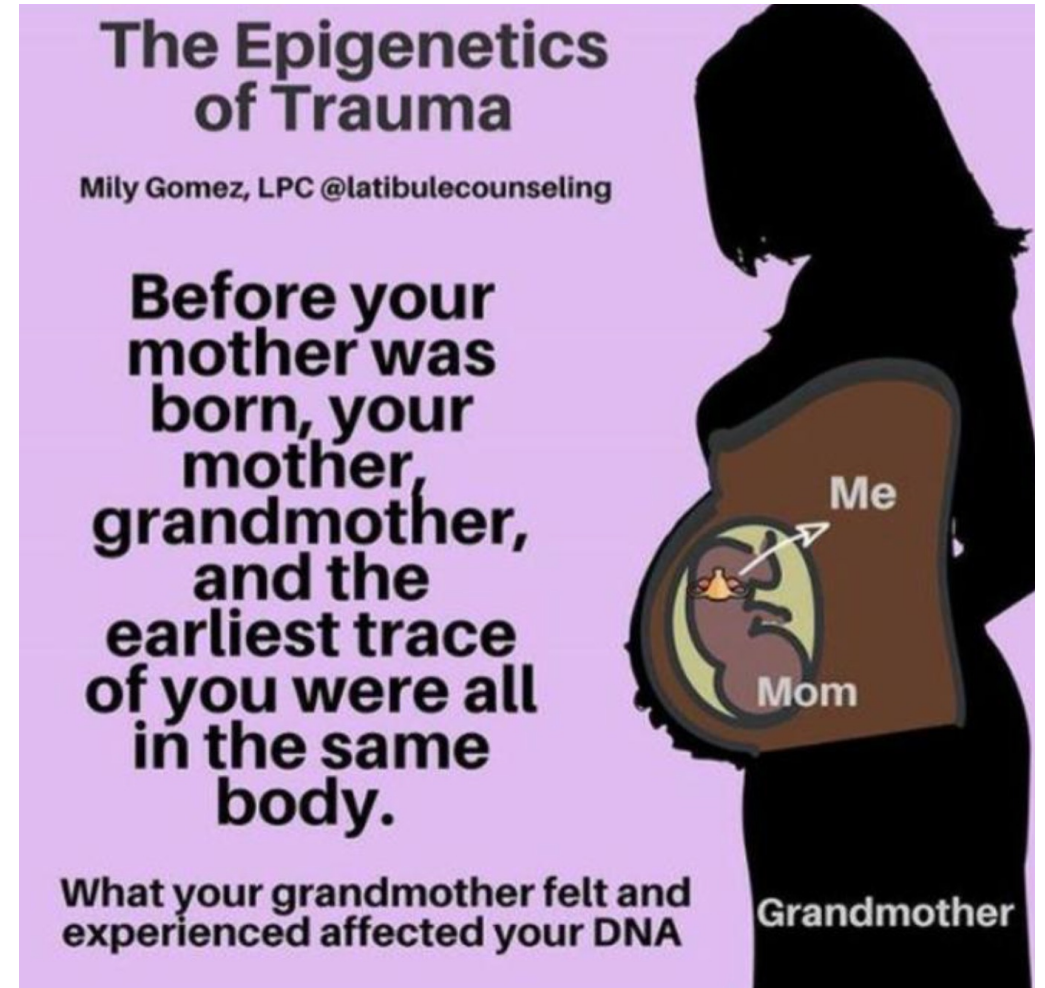
*"The Body Keeps The Score: Brain, Mind and Body in the Healing of Trauma,"*  
by Bessel Van Der Kolk, M.D.



# Intergenerational trauma

Trauma can be passed from the person who survived to further generations of offspring via Post Traumatic Stress Disorder (PTSD) mechanisms.

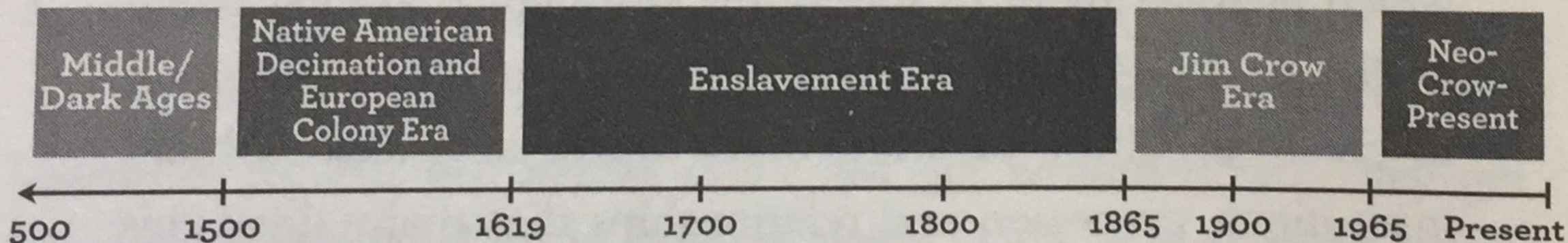
**Epigenetics** is the study of changes in the health of, not only, the people who originally experienced the trauma, but also their descendants by modifying gene expression.



Timeline from  
“My Grandmothers’ Hands:  
Racialized Trauma  
and the Pathways to  
Mending Our Hearts and  
Bodies”  
by Resmaa Menakem,  
LICSW



## Somatic History Eras



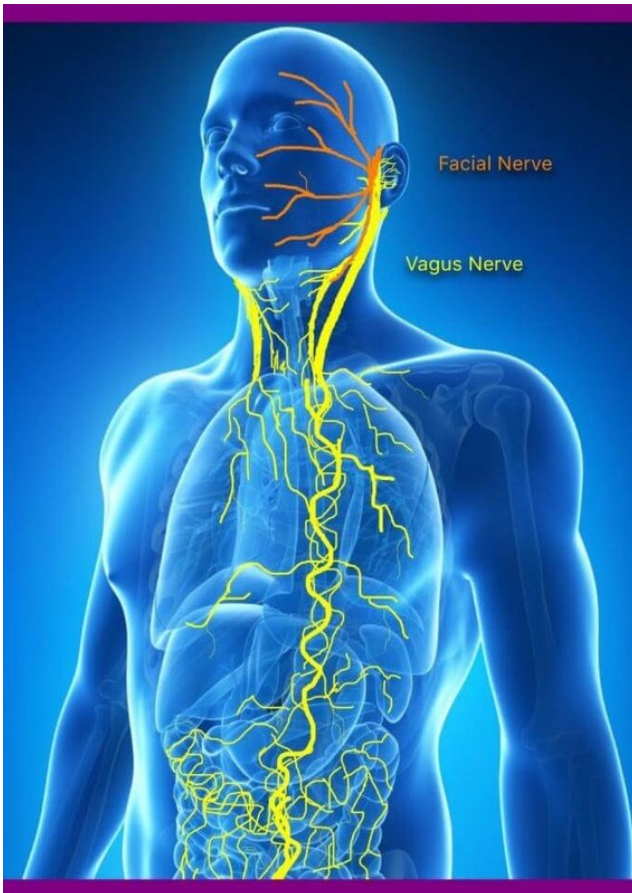


# How Does Unresolved Trauma Affect Fathering?

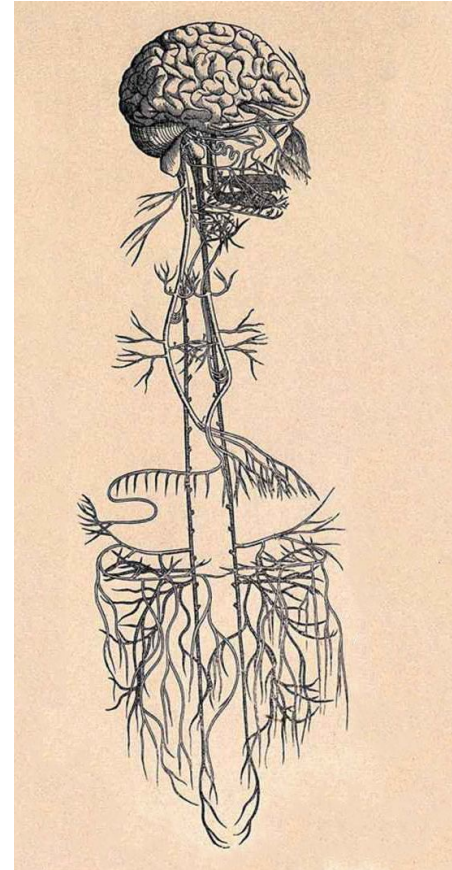
- Absence
- Addiction
- Family violence
- Difficulty bonding
- Sexually acting out
- Mental health problems
- Higher levels of aggravation
- Children's behavioral health problems



# The Vagus Nerve



- The **Vagus Nerve** is the unifying organ of your nervous system, reaching into your throat, lungs, heart, stomach, liver, spleen, pancreas, kidney and gut.
- One of the main jobs of your **Vagus Nerve** is to receive ***fight, flight, or freeze*** messages from your **lizard brain** and spread them to the rest of your body.
- Another purpose of the **Vagus Nerve** is to receive and spread the opposite message of ***it's okay, you're safe right now, you can relax.***





# Everyone needs to control their autonomic nervous system better.

Andrew Huberman, PhD

Huberman Lab Director

Professor of Neurobiology

Stanford University School of Medicine

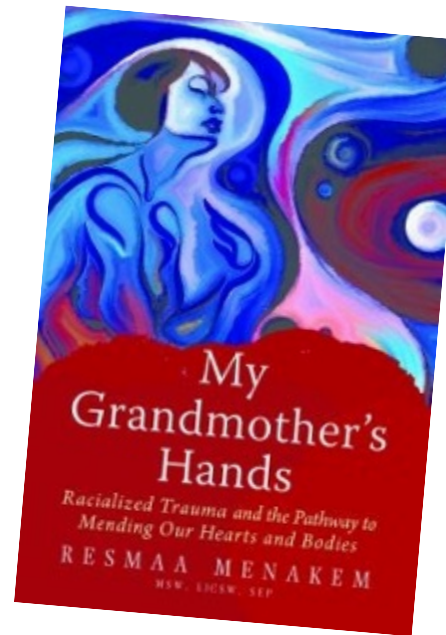


[#richroll](#) [#neuroscience](#) [#brainhealth](#)

Change Your Brain: Neuroscientist Dr. Andrew Huberman |

# Vagus Nerve aka “Soul Nerve” Techniques

- Belly Breathing
- *Body Scans*
- Chanting
- Humming
- Slow Rocking
- Rubbing Your Belly
- Singing aloud to Yourself



*Take responsibility  
for yourself, because  
no one's going to  
take responsibility  
for you.*

*- Tyra Banks*

# Neuroplasticity and you

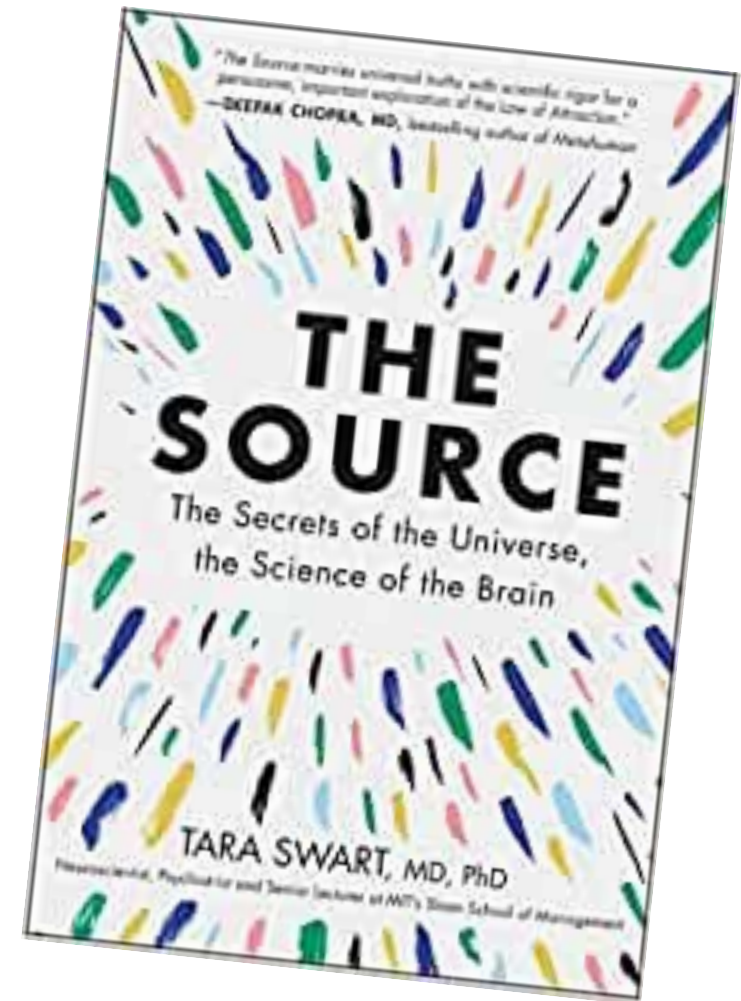
Neuroplasticity, at its most positive, is the key to self-empowerment.

It ensures that with effort, we can overcome deeply entrenched negative behaviors and modes of thinking, including addictive and destructive habits and relationship patterns.

*The Source: The Secrets of the Universe, the Science of the Brain*

Dr. Tara Swart, MD, PhD

Psychiatrist and Neuroscientist



# Activities that induce brain change

1. Novelty
2. Aerobic exercise
3. Emotional stimulation

Deep relaxation  
plus intense focus  
creates new  
synapses.

Tara Swart, MD, PhD

Dr. Andrew Huberman, PhD



Photo credit: unsplash.com - Caleb Jones



# Some of the 40 Neurotransmitters

**ADRENALINE**



Fight or flight  
neurotransmitter

**NORADRENALINE**



Concentration  
neurotransmitter

**DOPAMINE**



Pleasure  
neurotransmitter

**SEROTONIN**



Mood  
neurotransmitter

**GABA**



Calming  
neurotransmitter

**ACETYLCHOLINE**



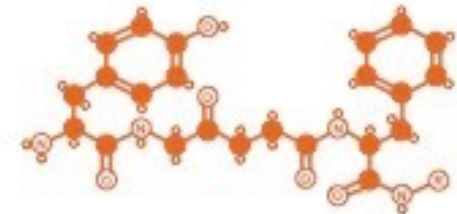
Learning  
neurotransmitter

**GLUTAMATE**



Memory  
neurotransmitter

**ENDORPHINS**



Euphoria  
neurotransmitter



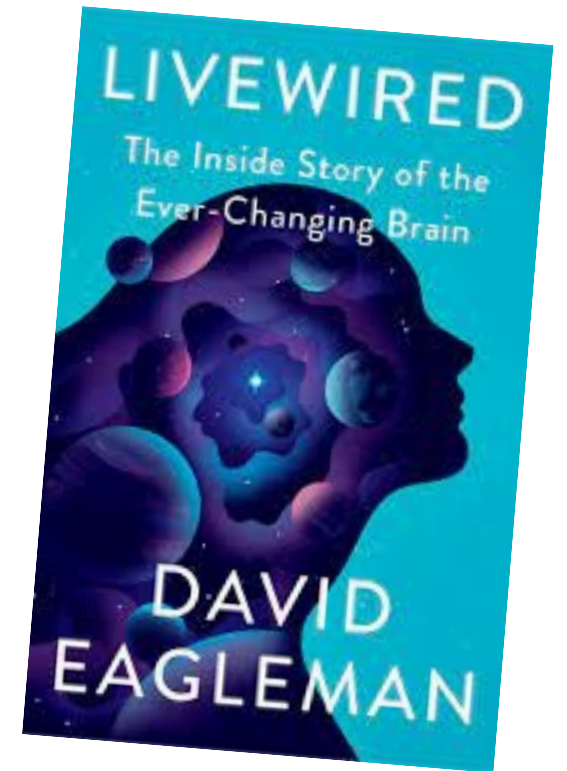
# Enjoy the limits of neuroplasticity

Neural networks lock themselves deeply into place not because of fading functions, but because they have had success in figuring things out . . .

If plasticity didn't decline, you would not lock down the conventions of the world . . .

Preserving total neural flexibility would retain the helplessness of an infant.

- *David Eagleman, PhD*



# Dads and Neuroplasticity Take-aways

- The brains of fathers are flexible, *so is the dominant culture.*
- NEFC is both an effect, and a cause, of a major cultural change.
- Intense focus alternated with deep relaxation creates new neural connections that literally make you a different person!



*Invitation*

# **Dads and Neuroplasticity Circle of Practice**

**Zoom Circle - June 22, 2022**

9:00 to 11:00

**Fall Parenting Conference**

November 2022

**NE Fathering Conference**

March 2023



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