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RETHINKING LEADERSHIP
A Neuroscience Perspective

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Lawrie Austin Award for Neuroscience
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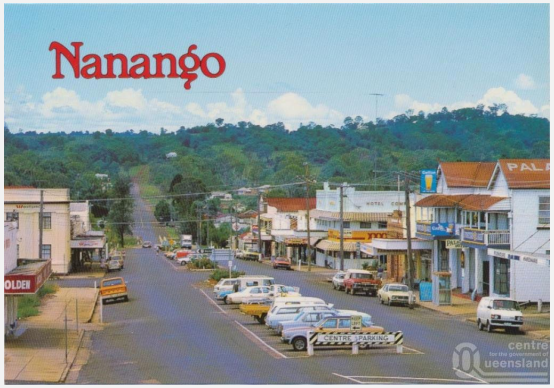
BRAIN HEALTH BECOMES EVERYONE'S BUSINESS

THANK YOU FOR YOUR SERVICE

WHAT I HOPE YOU GET OUT OF TODAY'S SESSION

- Understanding how **advances in neuroscience** and genomics underpin brain health and performance and the role this plays for the Australian Army
- Understand the role of the brain's neuroplasticity in training Army and Civilian mindsets
- Develop brainfit strategies to
  - reduce first term attrition
  - enhance performance while serving
  - assist with transition back to civilian life mindsets
- Understanding and reducing impacts on families across the generations



THE AUSTRALIAN NATIONAL UNIVERSITY

UCSF

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TRI TRANSLATIONAL RESEARCH INSTITUTE AUSTRALIA

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

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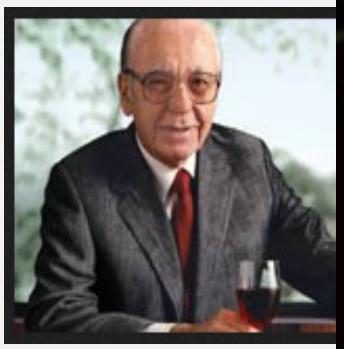
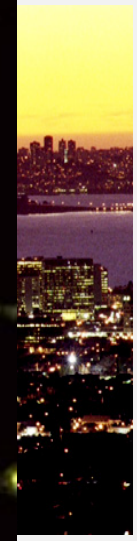


Cell Biology of Addiction

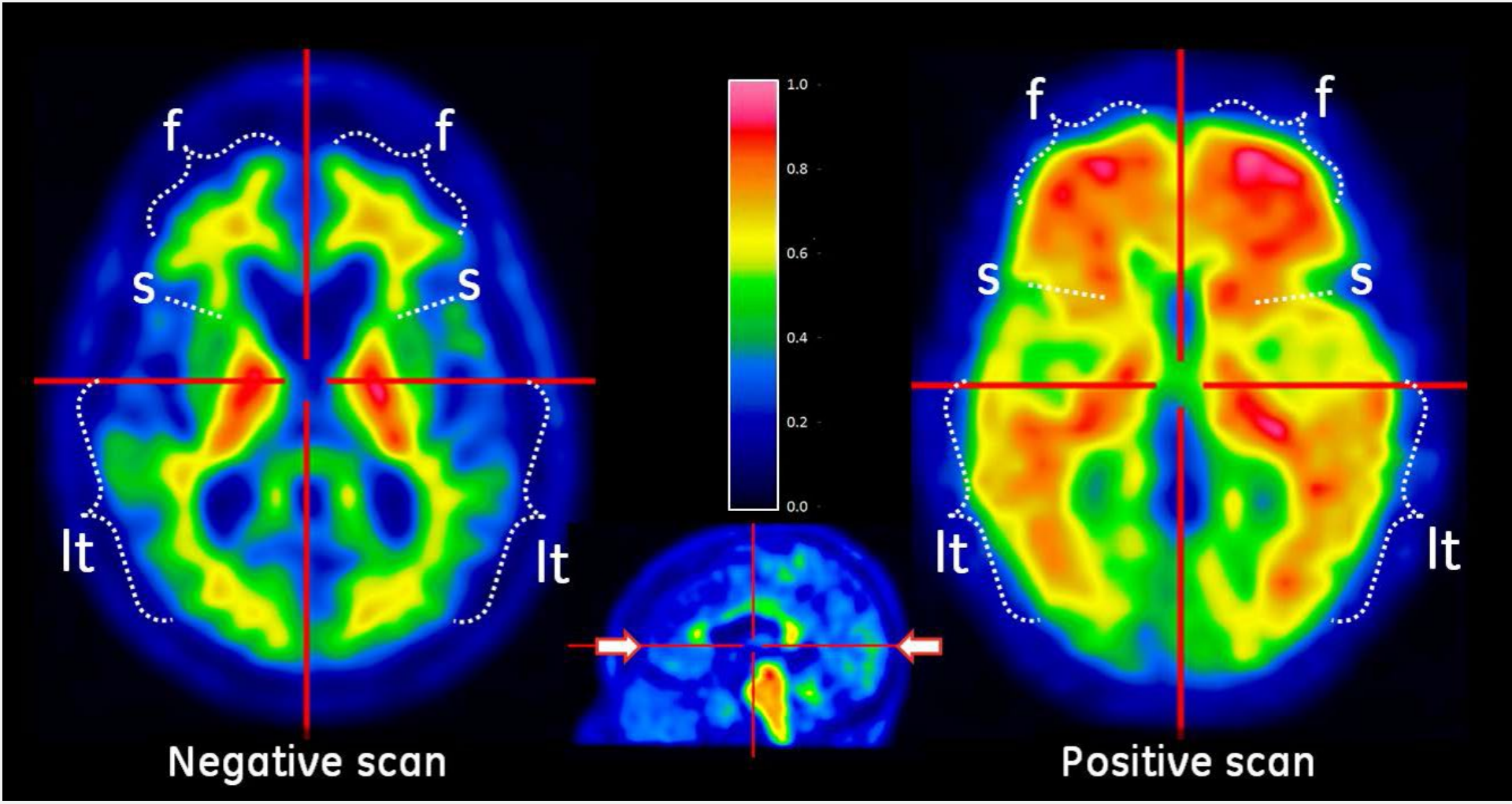
EDITED BY: Bertha K. Madras, Christine M. Colvis, Jonathan D. Pollock, Joni L. Rutter, David Shurtleff, and Mark von Zastrow



CO

BRAIN HEALTH AFFECTS OUR PERFORMANCE AND ABILITY TO LEAD

COVID19 IS AN AMPLIFIER



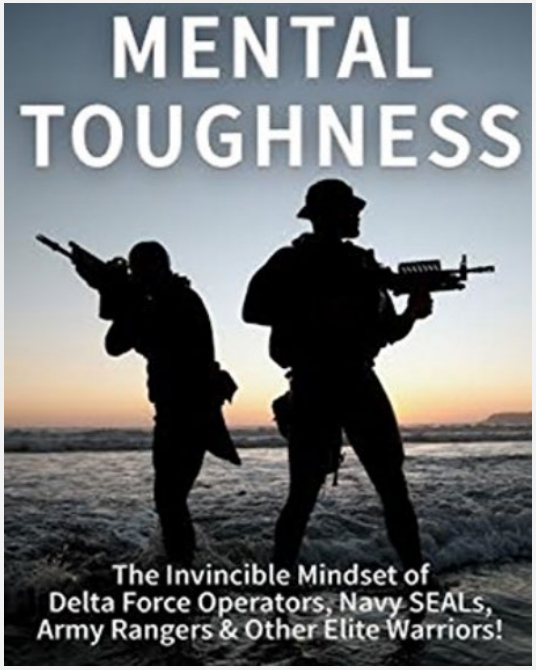
GRASPING THE POWER NEUROPLASTICITY FOR TRAINING AND RETRAINING MINDSETS

"THERE ARE NO PERFECT LEADERS, BUT THERE ARE PEOPLE WHO ARE PERFECTLY INTENDED"
GENERAL SIR PETER JOHN COSGROVE, AK CVO MC

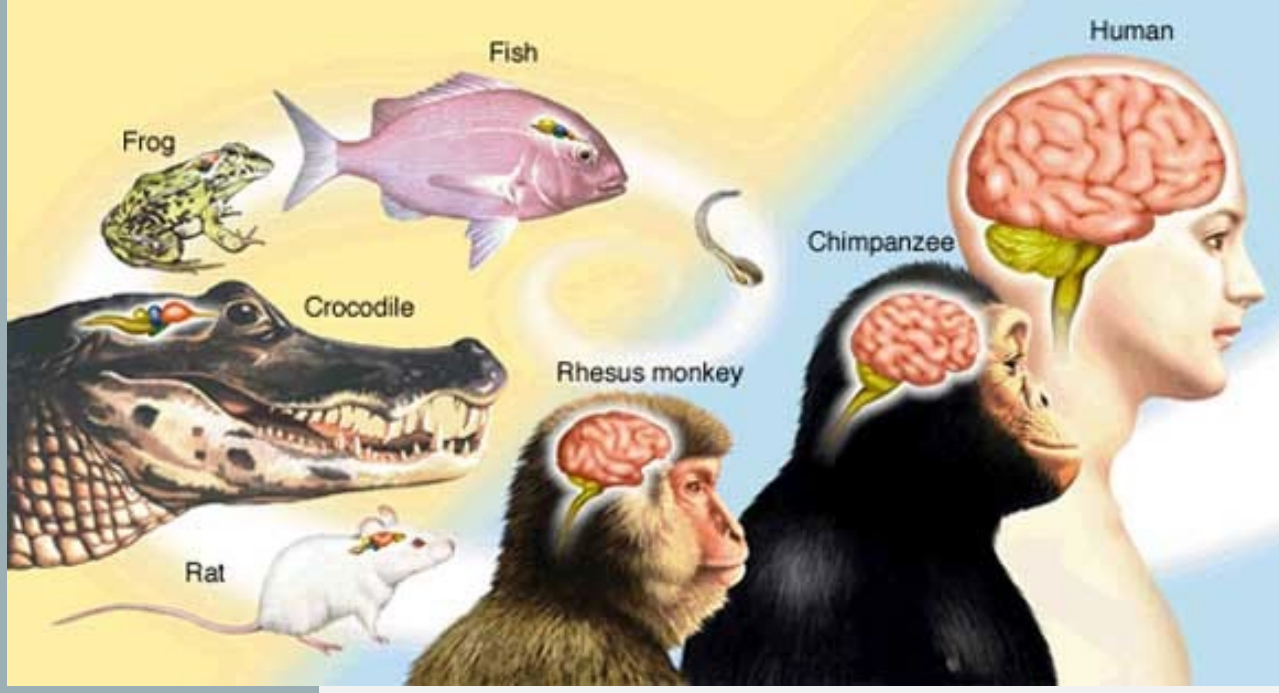
- Enable people to realise their full potential
- Self-awareness by asking ourselves question first
- Trust is vital and built from the inside out
- Responsibility, accountability and absolute devotion to your team (ADFA, 2019)

ARMY AND CIVILIAN MINDSETS MAINTAINING BRAIN HEALTH ACROSS THE LIFESPAN

- Army mindset is a non-negotiable for optimal job performance.
- Can we train the brain to switch from an Army to a civilian mindset?
- How do we maintain brain health across the lifespan despite the service or work conducted in our lifetime?

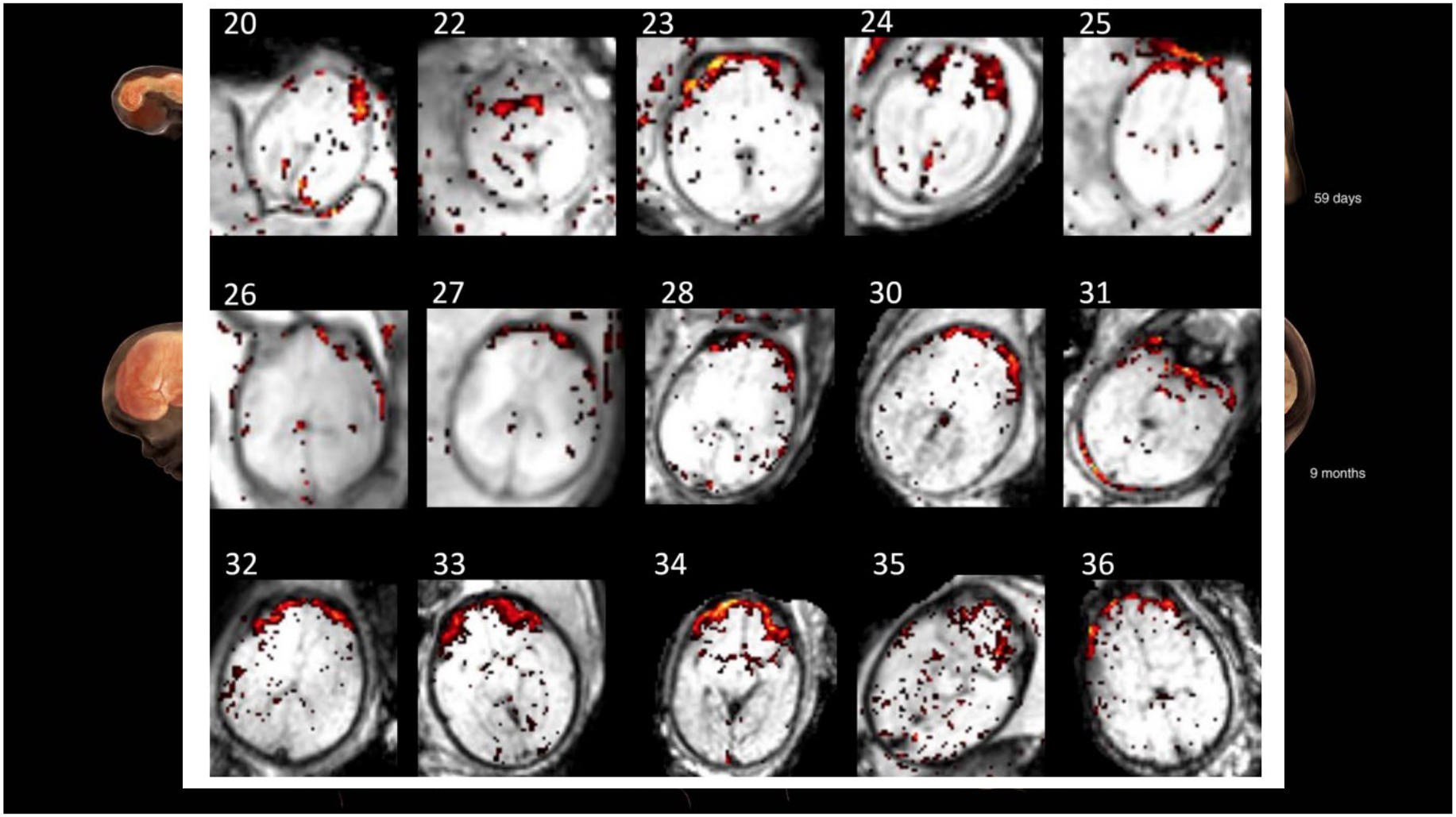


Do you know what is happening inside your brain when you are stressed out?



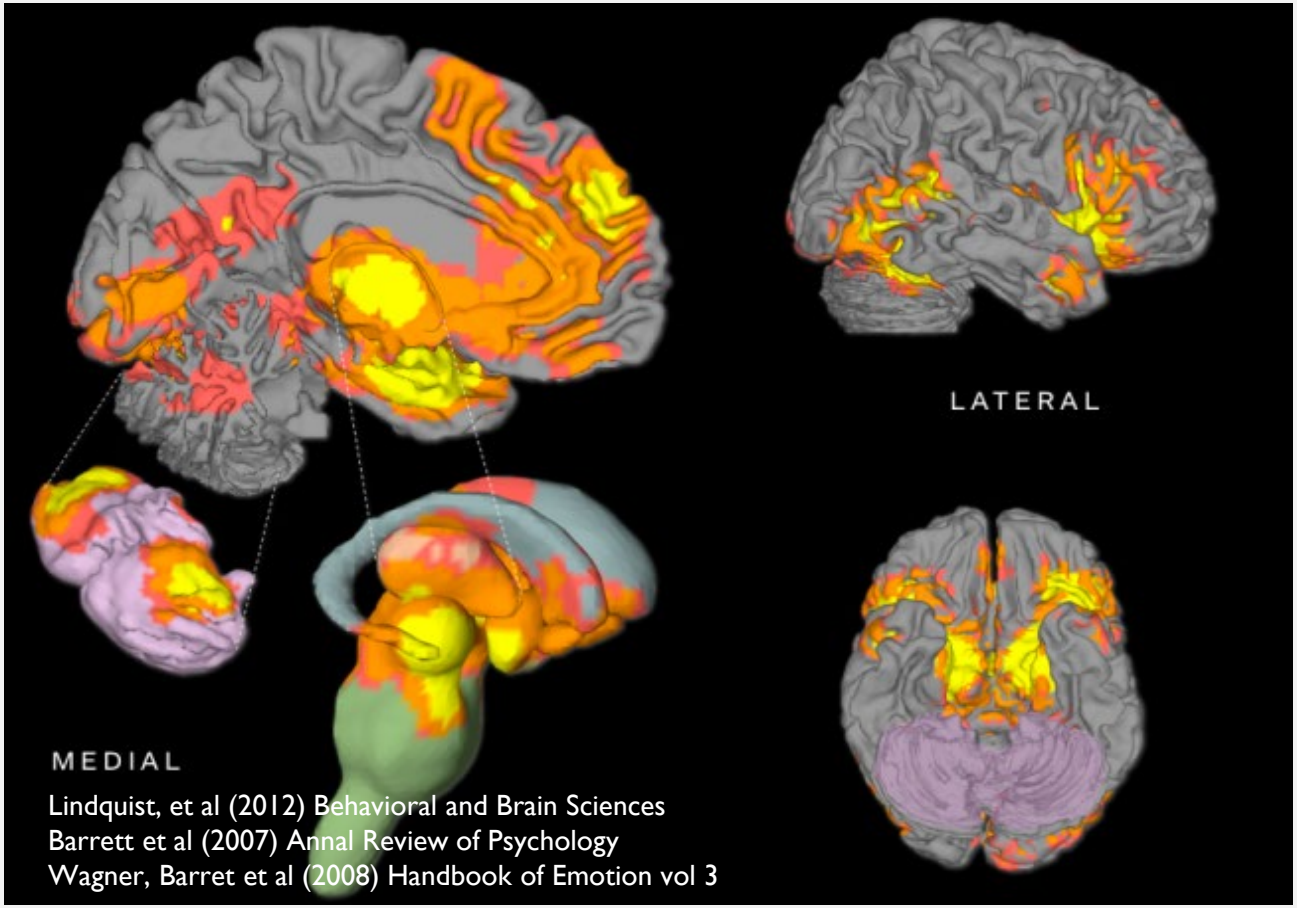
HOW THE BRAIN ARCHITECTURE IS BUILT

BRAIN NEUROPLASTICITY OCCURS ACROSS THE LIFESPAN



THE BRAIN CAN BE RETRAINED

WHAT IS THE BRAIN'S PRIMARY PURPOSE?



Lindquist, et al (2012) Behavioral and Brain Sciences
Barrett et al (2007) Annal Review of Psychology
Wagner, Barret et al (2008) Handbook of Emotion vol 3

STRESS IS THE BRAIN'S PRIORITY

KEEP US FEELING SAFE

WORKING MEMORY TEST

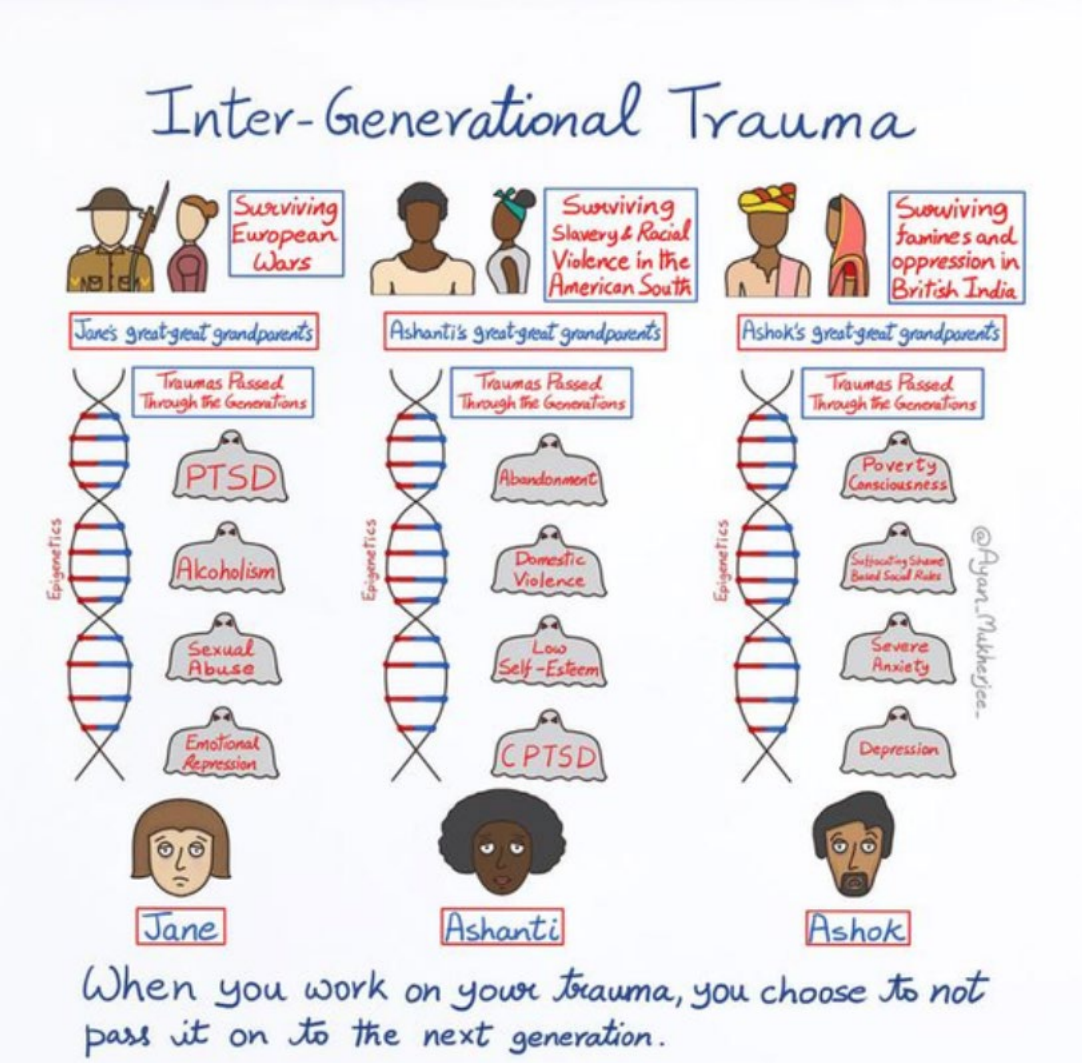
WHY DOES THE BRAIN DO THIS TO US?

UNDERSTAND OUR BRAIN TO UNDERSTAND OTHERS

Every brain is different because of genetics and epigenetics
Stress over the lifetime has more impact because the neuroplasticity switches are turned on.


We are not born
a blank slate

INTER-GENERATIONAL INHERITANCE



Gap et al., Nature Neuroscience, 2014, Vol 17, p667.

Mecca McCain, Wilderzine Newsletter, Feb 2020

DIFFERENT TYPES OF STRESS

POSITIVE

A normal and essential part of healthy development

EXAMPLES
getting a vaccine, first day of school

TOLERABLE

Response to a more severe stressor, limited in duration

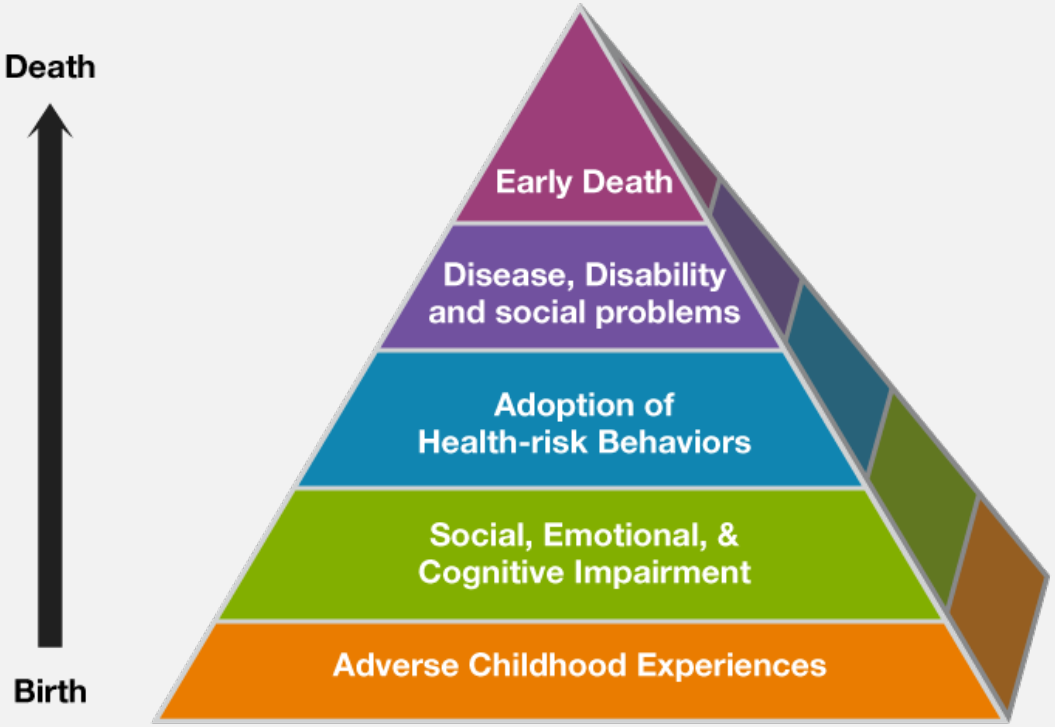
EXAMPLES
loss of a loved one, a broken bone

TOXIC

Experiencing strong, frequent, and/or prolonged adversity

EXAMPLES
physical or emotional abuse, exposure to violence

ADVERSE CHILDHOOD EXPERIENCES (ACES) SCIENCE IMPACT ON RECRUITMENT AND ATTRITION



Kaiser Permanente; Study of 17K Californians

ACE Study:

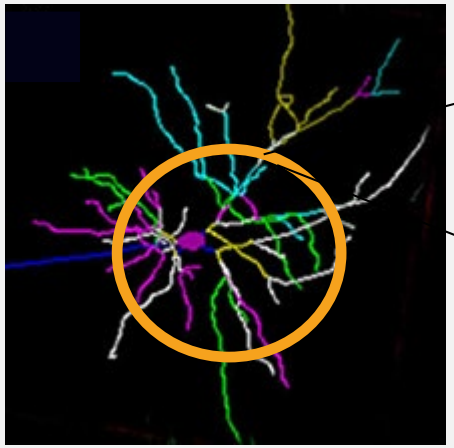
- **17K** Kaiser HMO Members
- **75%** Caucasian
- **75%** Attended/graduated college
- **56%** 50 years old+

Fellitti and Anda (100 papers+)

Early life experience impacts the prefrontal cortex affecting impulse control, cognition. Foundational skills cannot be applied across the life span

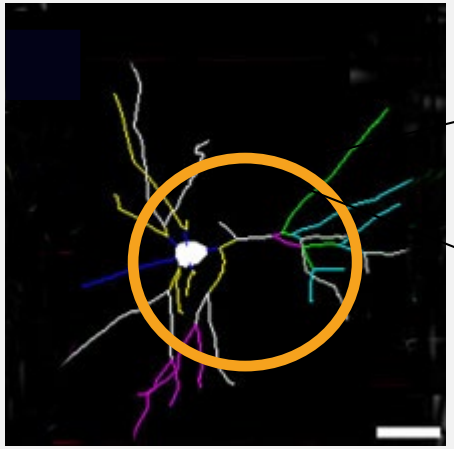
Toxic Stress Changes Brain Architecture

Normal



Typical neuron—
many connections

Toxic
stress

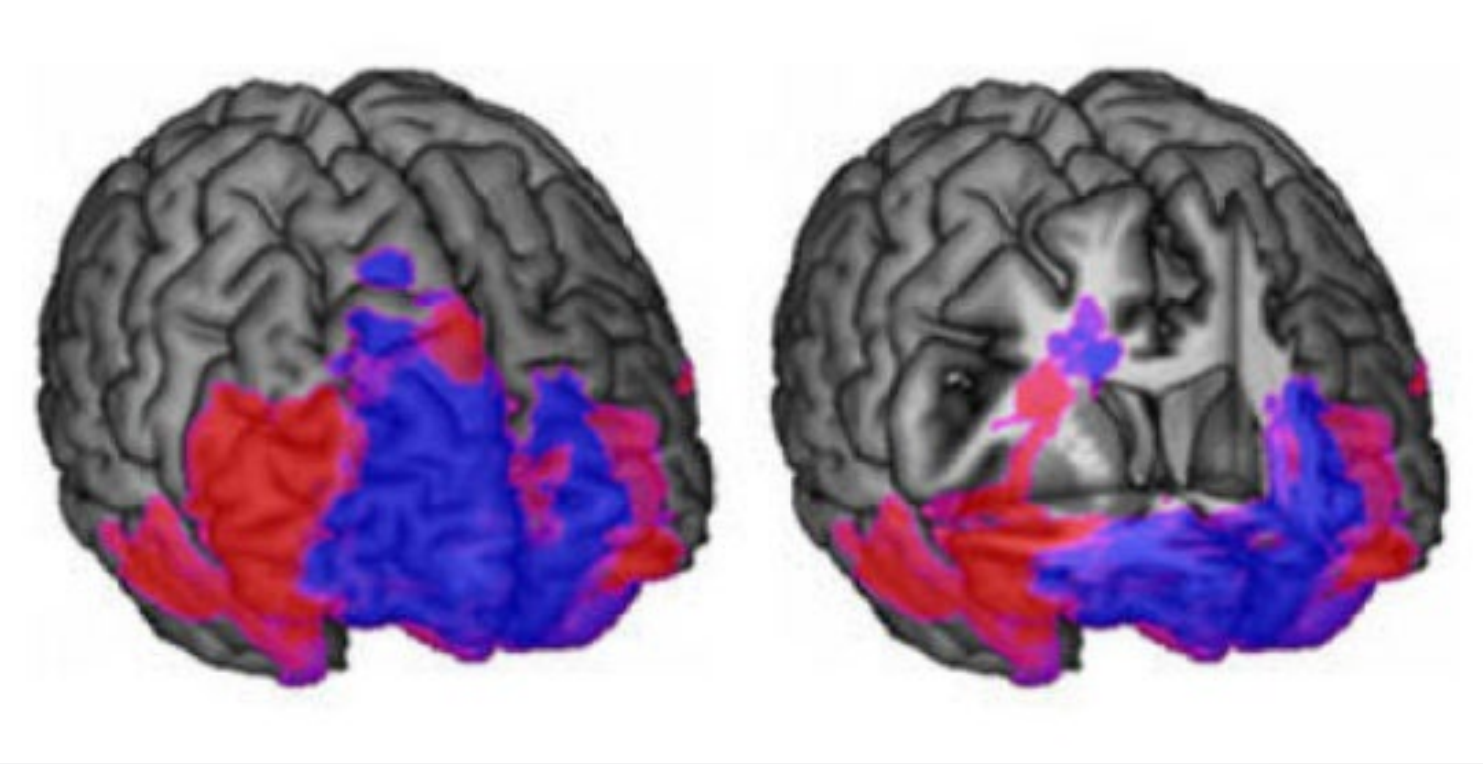


Damaged neuron—
fewer connections

Prefrontal Cortex and Hippocampus –
Memory and Decision Making

Sources: Radley et al. (2004)
Bock et al. (2005)

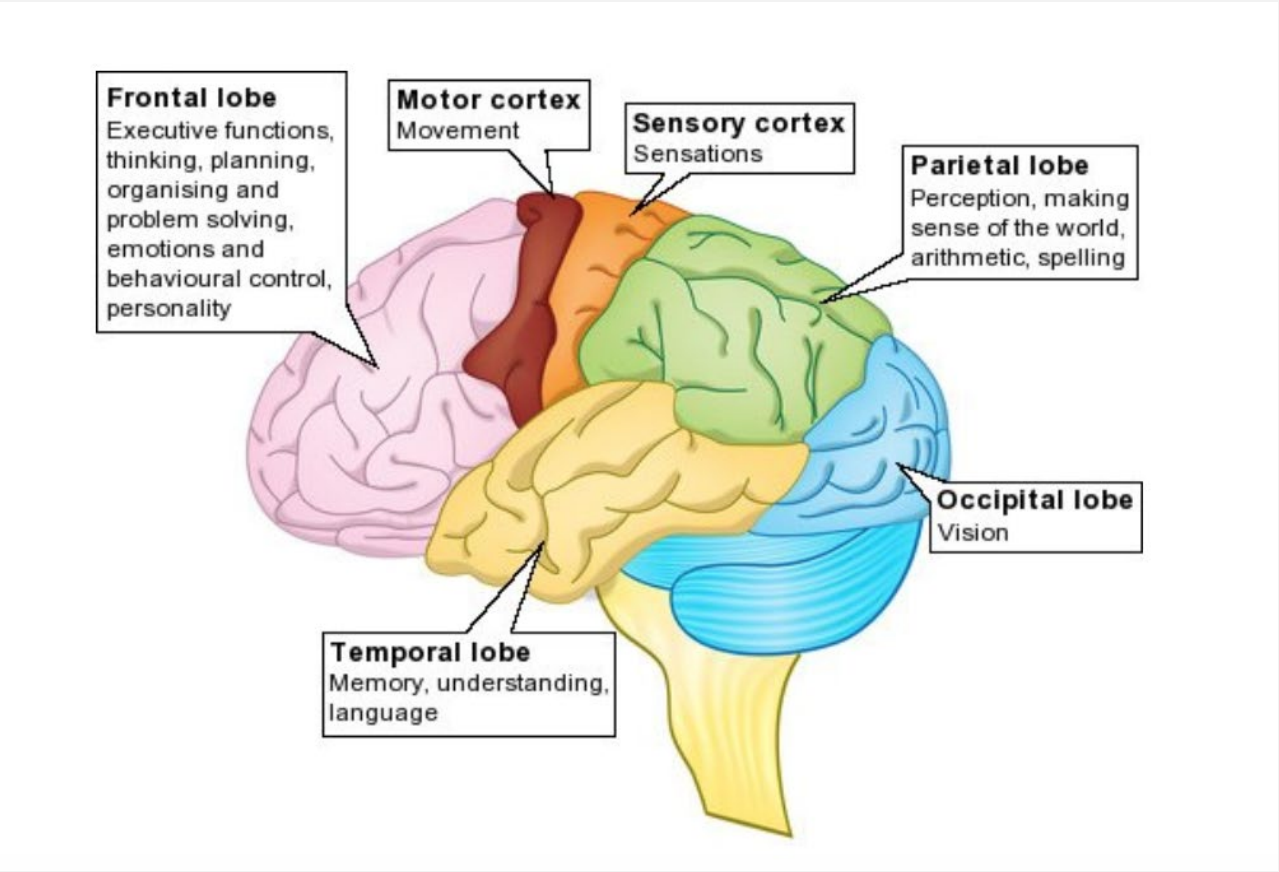
STRESS IMPACTS BRAIN AREAS ASSOCIATED WITH EXECUTIVE FUNCTION
DECISION-MAKING AND BEHAVIORAL CONTROL



MRI scans of a human brain show the regions significantly associated with decision-making in blue, and the regions significantly associated with behavioral control in red. On the left is an intact brain seen from the front — the colored regions are both in the frontal lobes. The image on the right is that same brain with a portion of the frontal lobes cut away to show how the lesion map looks in the interior.

Credit: California Institute of Technology

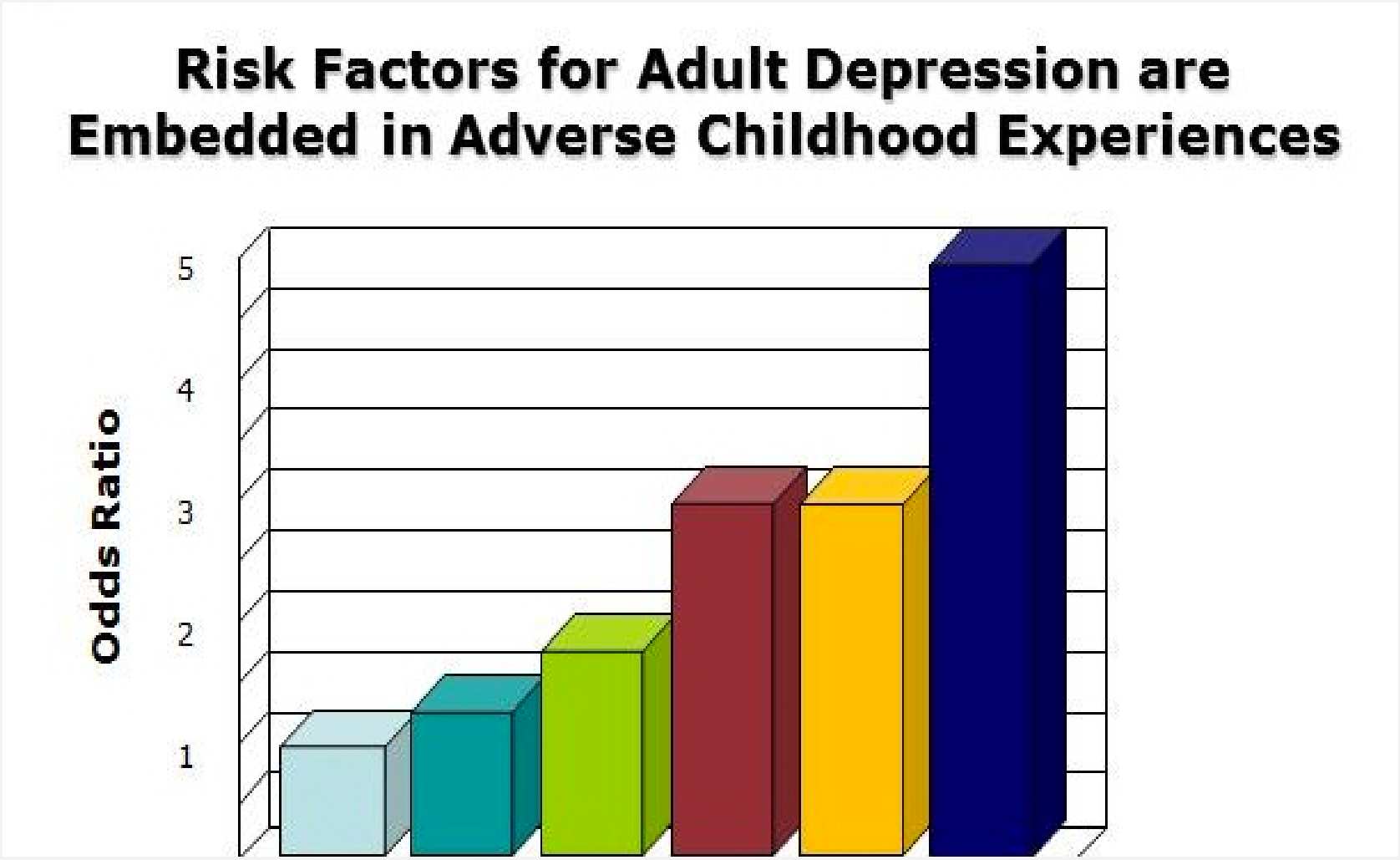
EXECUTIVE FUNCTIONS ARE CRUCIAL



IMPACT OF EXECUTIVE FUNCTION ACROSS THE LIFESPAN

Aspects of life	The ways in which EFs are relevant to that aspect of life	References
Mental Health	EFs are impaired in many mental disorders, including:	
	Addictions	Baler & Volkow, 2006
	Attention deficit hyperactivity (ADHD)	Diamond, 2005, Lui & Tannock, 2007
	Conduct disorder	Fairchild et at. 2009
	Depression	Taylor-Tavares.2007
	Obsessive compulsive disorder (OCD)	Penad'es et al. 2007
	Schizophrenia	Barch, 2005
Physical health	Poorer EFs are associated with obesity, overeating, substance abuse and poor treatment/adherence	Crescioni et al. 2011, Miller et al. 2011, Riggs et al. 2010
Quality of life	People with better EFs enjoy a better QoL life	Brown & Landgraf, 2010, Davis. 2010
School readiness	EFs are more important for school readiness than are IQ or entry-level reading or math	Blair & Razza, 2007, Morrison et al. 2010
School success	EFs predict both math and reading competence throughout the school years	Borella et al. 2010, Duncan et al. 2007, Gathercole. 2004
Job success	Poor EFs lead to poor productivity and difficulty finding and keeping a job	Bailey, 2007
Marital harmony	A partner with poor EFs can be more difficult to get along with, less dependable, and/or more likely to act on impulse	Eakin et al. 2004

DIMINISHED EXECUTIVE FUNCTION PREDISPOSES THE BRAIN TO DEPRESSION, ANXIETY, AND ADDICTION

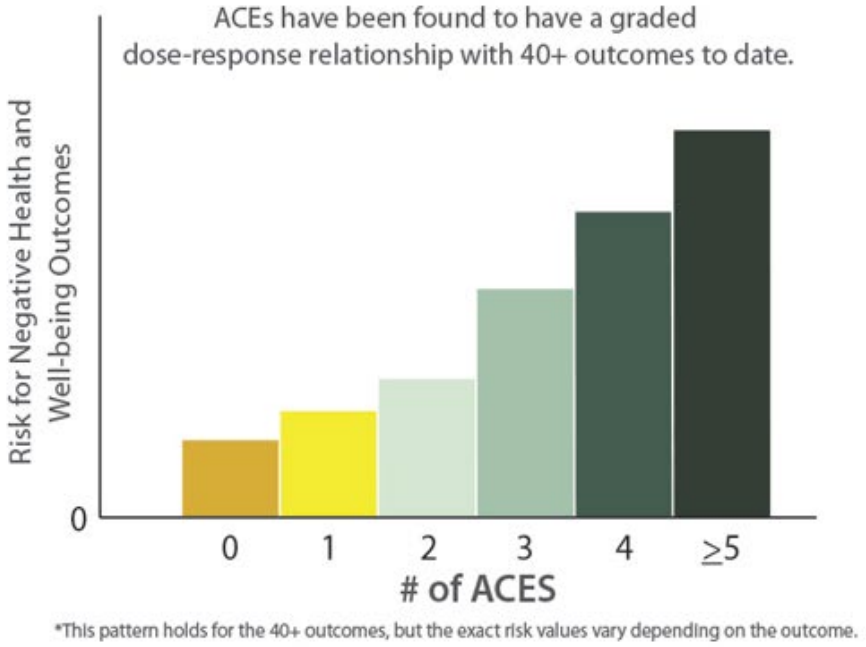


ACES can have lasting effects on….

Health (obesity, diabetes, depression, suicide attempts, STDs, heart disease, cancer, stroke, COPD, broken bones)

Behaviors (smoking, alcoholism, drug use)

Life Potential (graduation rates, academic achievement, lost time from work)



CENTRE FOR AUSTRALIAN ARMY LEADERSHIP TO ENABLE FUTURE READY LEADERS

"The future operating environment needs **diverse, high performing teams,** with augmented technology, that are able to succeed in difficult and degraded environments."

Leadership Quarterly, October 2020
Chief of Army, Lieutenant General Rick Burr, AO, DSC, MVO)

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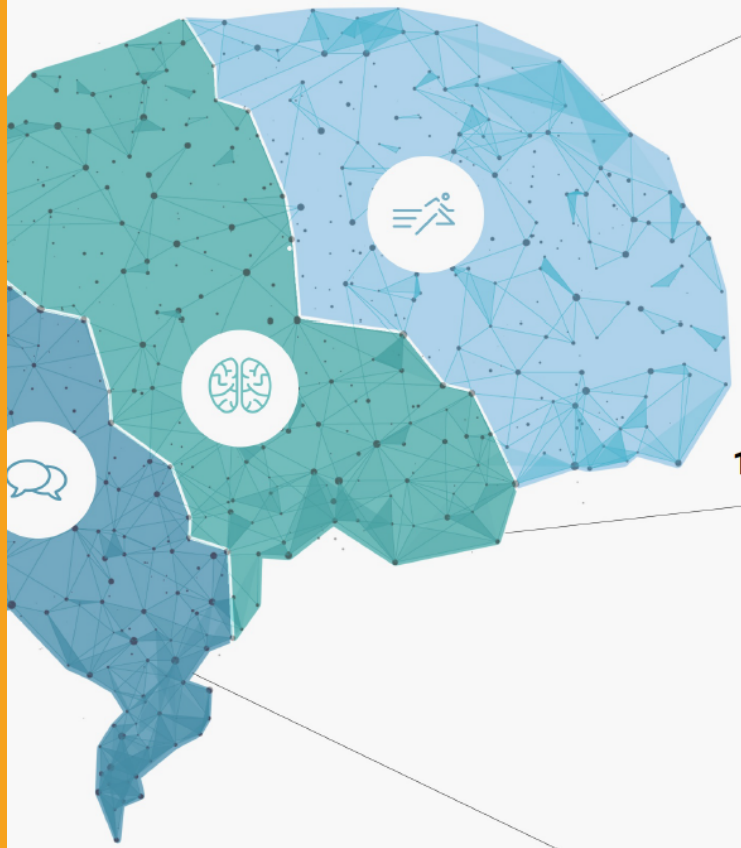
MIGFIT™
BRAIN FIT TRAINING

SELENA IS IN GOOD PHYSICAL AND COGNITIVE HEALTH.



PHYSICAL WELL-BEING

6/6

GOOD WELL-BEING

Recent studies have provided valuable information to help us understand the close relationship between physical and mental well-being. Sleep, diet, and exercise are all factors that determine physical well-being and condition proper cognitive function.

PSYCHOLOGICAL WELL-BEING

13/15

GOOD WELL-BEING

Psychological well-being would include cognitive, affective and emotional aspects in the different areas of human life.

SOCIAL WELL-BEING

4/5

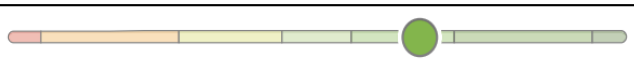
GOOD WELL-BEING

A rich and consistent social life can help cognitive and mental health. Being with other people causes us to learn to adapt to others, and implies empathy, downtime, fun, and sense of company and community.

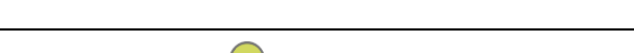
STEPPING ON THE BRAIN SCALES

Overall Brain Health Score 4.6

Thinking 5.9

CAPACITY	SCALE	SCORE	
Motor Coordination	expected range	3.5	
Processing Speed	expected range	5	
Sustained Attention	expected range	7	
Controlled Attention	expected range	6.5	
Flexibility	expected range	6.5	
Inhibition	expected range	5	
Working Memory	expected range	6	
Recall Memory	expected range	7	
Executive Function	expected range	7	

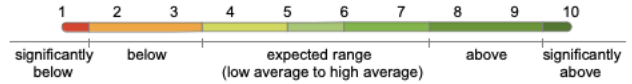
Emotion 6.5

CAPACITY	SCALE	SCORE	
Identifying Emotions	expected range	4.5	
Emotion Bias	above	8.5	

TRAINING THE BRAIN TO IMPROVE COGNITION

Brain Health Scores

STEN scores range from 1 to 10.
Higher scores always indicate better functioning.
See end of report for description of Brain Health Scores



Overall Brain Health Score 6.9

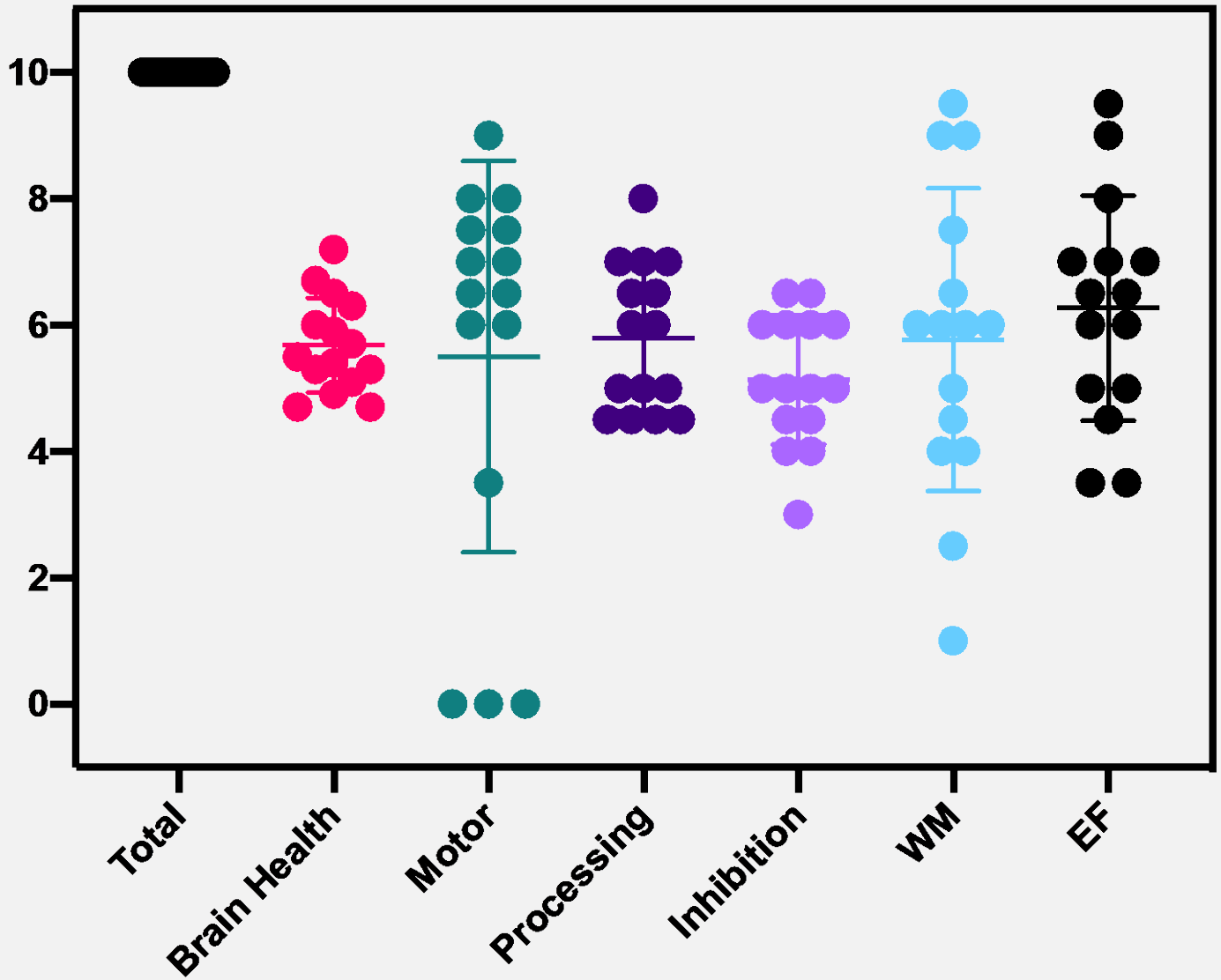
Thinking 7.2

CAPACITY	SCALE	SCORE
Motor Coordination	above	8
Processing Speed	expected range	7
Sustained Attention	expected range	7
Controlled Attention	above	7.5
Flexibility	above	7.5
Inhibition	expected range	7
Working Memory	expected range	4
Recall Memory	expected range	7
Executive Function	significantly above	10

Emotion 7.5

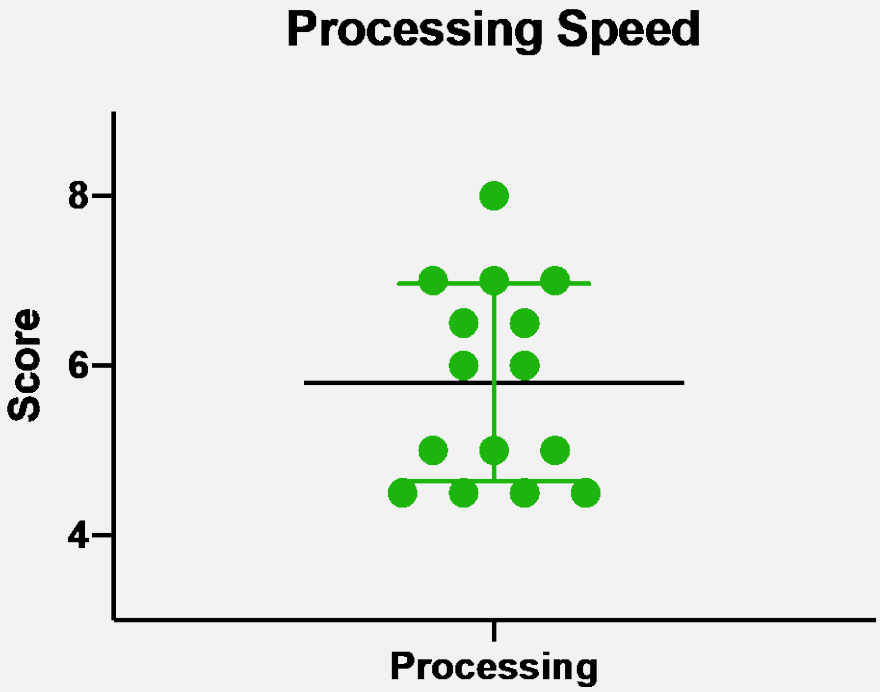
CAPACITY	SCALE	SCORE
Identifying Emotions	expected range	6
Emotion Bias	above	9

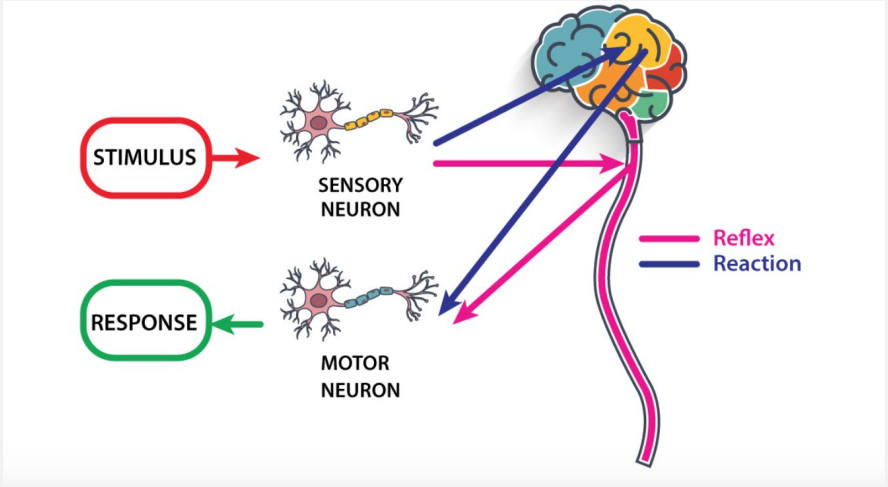
EXECUTIVE BRAIN : FOCUS GROUP



PROCESSING SPEED

Capacity to rapidly process information measured by reaction time





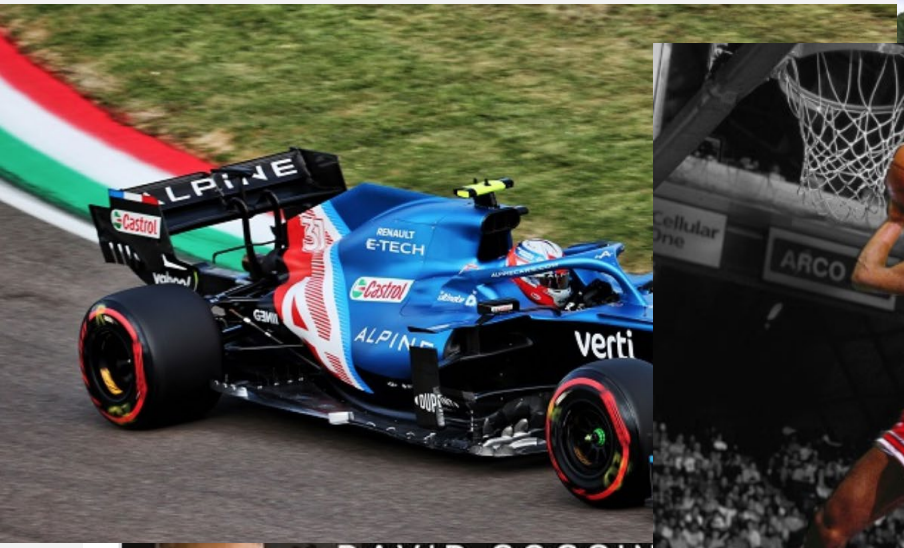
Processing Speed	Capacity to rapidly process information	*Choice Reaction Time* – Respond to 1 of 2 circles that light up, using the left and right arrow keys on the keyboard. There are 20 trials.

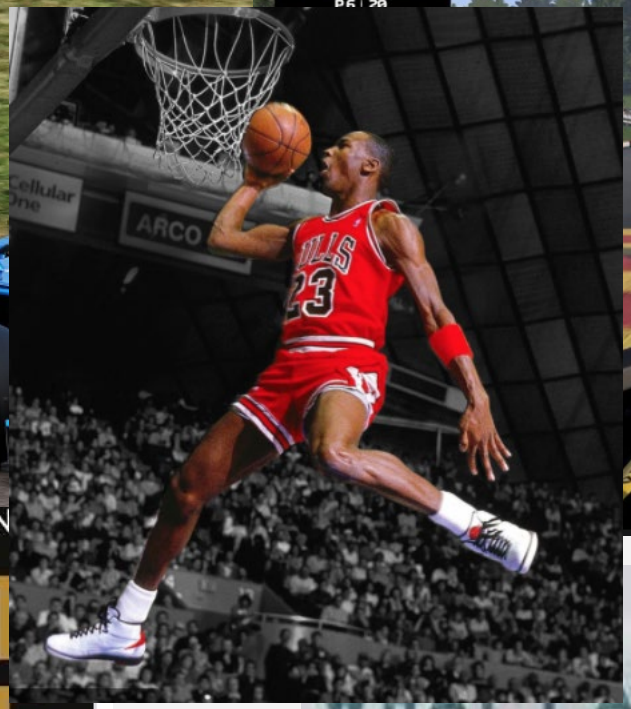
STRATEGIES TO IMPROVE BRAIN SPEED

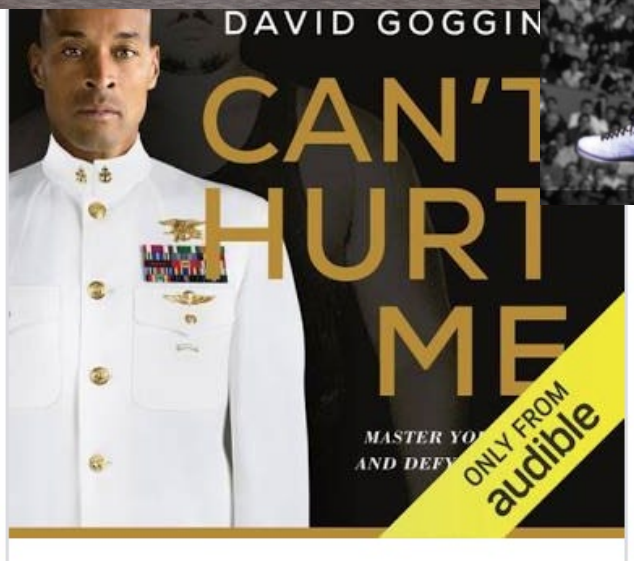
1. Computer-based brain speed focused exercises.

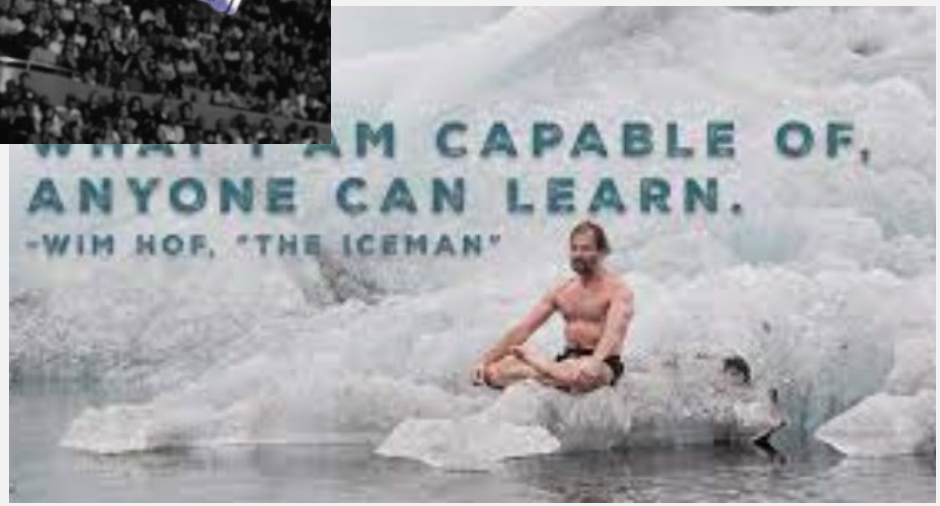
Non-computer based strategies to Improving reaction time exercises.

BRAIN TRAINING IMPROVES PERFORMANCE









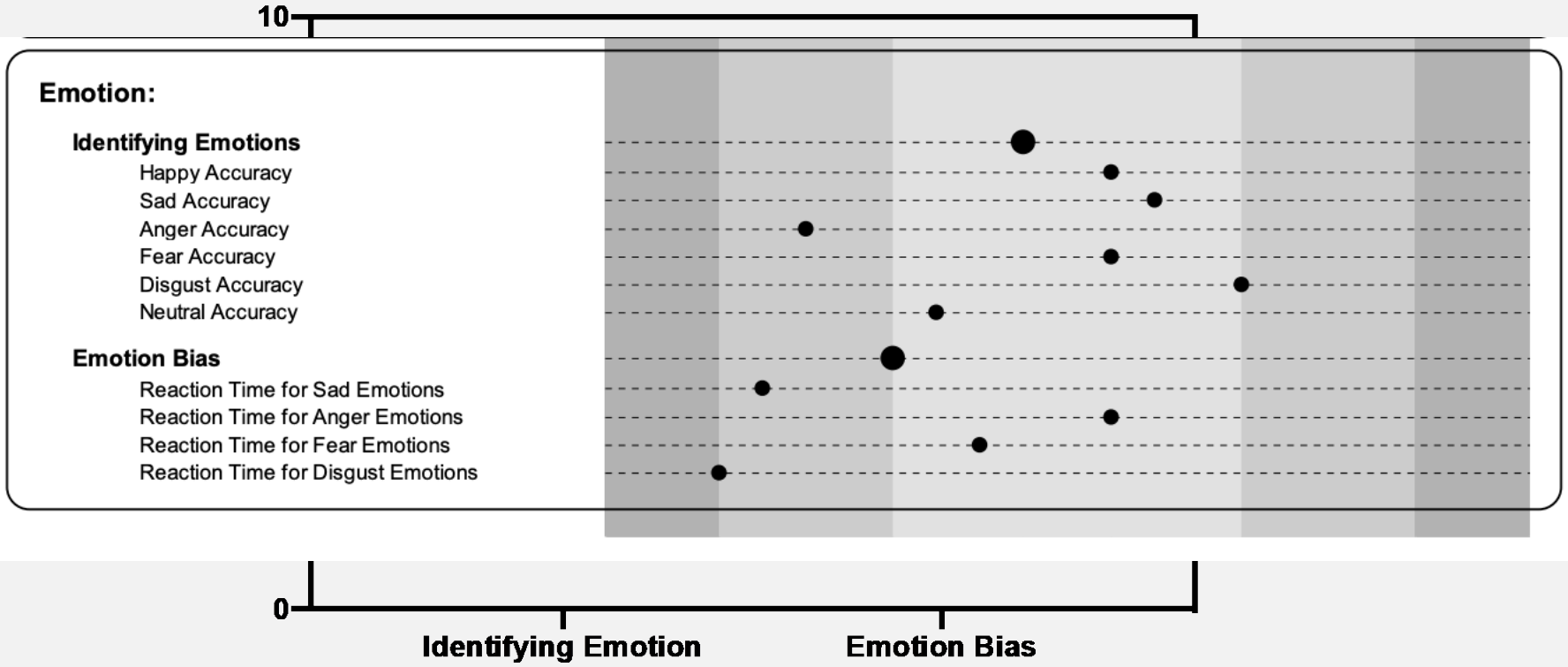
IDENTIFYING EMOTIONS & EMOTIONAL BIAS

Find the matching face among those below. The correct face is highlighted. Click on that face.

Emotion[2,3]

CAPACITY	DESCRIPTION	TASK DESCRIPTION
Identifying Emotions	Capacity to identify emotions in others and yourself (such as fear and happiness)	*Explicit Emotion Identification* – Participants identify the emotional expression of faces presented on the screen, selecting 1 of 6 word labels presented below the face (Happy, Fear, Sad, Anger, Disgust, Neutral).
Emotion Bias	The degree to which your nonconscious negative biases impact your thinking	*Delayed Emotion Recognition* – Sets of two faces are presented on the screen, one face is repeated from the previous task, and one face is new. Participants select which of the two faces they remember from the previous task. Reaction time for each emotion compared to Neutral reflects the impact of emotions on decision making.

IDENTIFYING EMOTIONS & EMOTIONAL BIAS



TRAINING TO IMPROVE SOCIAL COGNITION

This person is also sad.

TARGETS

- Social cognition
- Visual processing speed

SCIENCE

Imagine you're at a wedding or another event, and you make a joke—and the woman next to you makes a face. What does it mean? Did she think your joke was funny, insensitive, or just confusing? In situations like this, the ability to read facial expressions is important—even when they flit by quickly. How you read an expression usually determines how you react—and often, reading it correctly can make the difference

EXERCISE

FACE TO FACE

Dr. Mor Nahum

Associate Professor, Hebrew University
PhD, Computational Neuroscience, Hebrew University

Face to Face was designed by Dr. Nahum based on research on brain areas dedicated to the perception of processing of facial information. The exercise is constructed so that it challenges our face perception system in the brain to process faces more

1. CHANGE THE CONVERSATION TO BRAIN HEALTH AND FITNESS

2. UNDERSTAND OUR BRAIN TO UNDERSTAND OTHERS

Every brain is different because of genetics and epigenetics
Stress over the lifetime has more impact because the neuroplasticity switches are turned on.

3. MIGFIT TRAINING
TRAIN THE BRAIN LIKE A MUSCLE

After 1st learning trial

After 2nd learning trial

After 3rd learning trial

After 4th learning trial

Hemispheres

Left **Right**

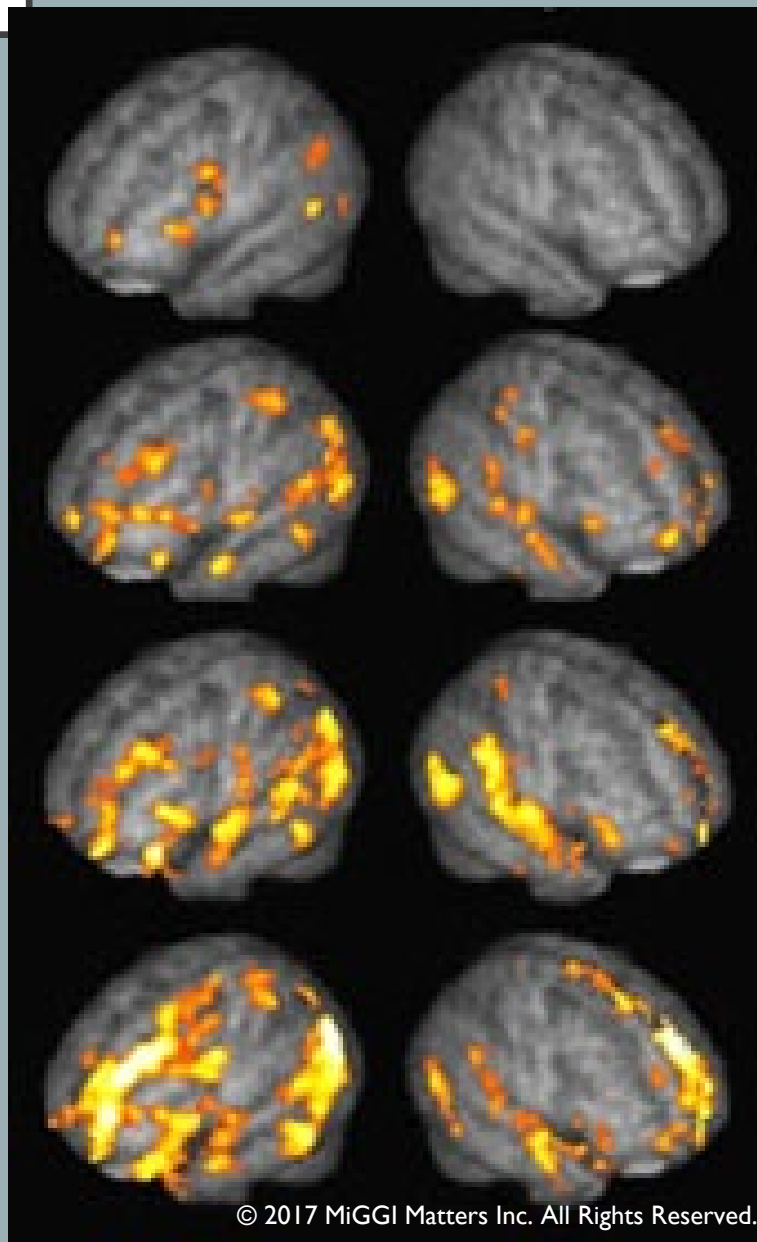


Fig. 1

4. TRAIN THE BRAIN FOR RESILIENCE AND MINDSET TRANSITIONS

Journal of Science and Medicine in Sport 2018 211116-1124DOI: (10.1016/j.jsams.2018.05.005)

HOW NEUROSCIENCE HELPS LEADERS LEAD MORE EFFECTIVELY

- Understanding the brain first step to improving team productivity and performance
- Stress impacts cognition is the number one problem
- Train the brain to turn msec stress reactions into a one second rational response
- Cognitive training exercises improve brain function and executive functions

ONE MINUTE REFLECTION IN PAIRS

- Your opinion about the potential for brain health and fitness to be applied in the Army to amplify the development of:

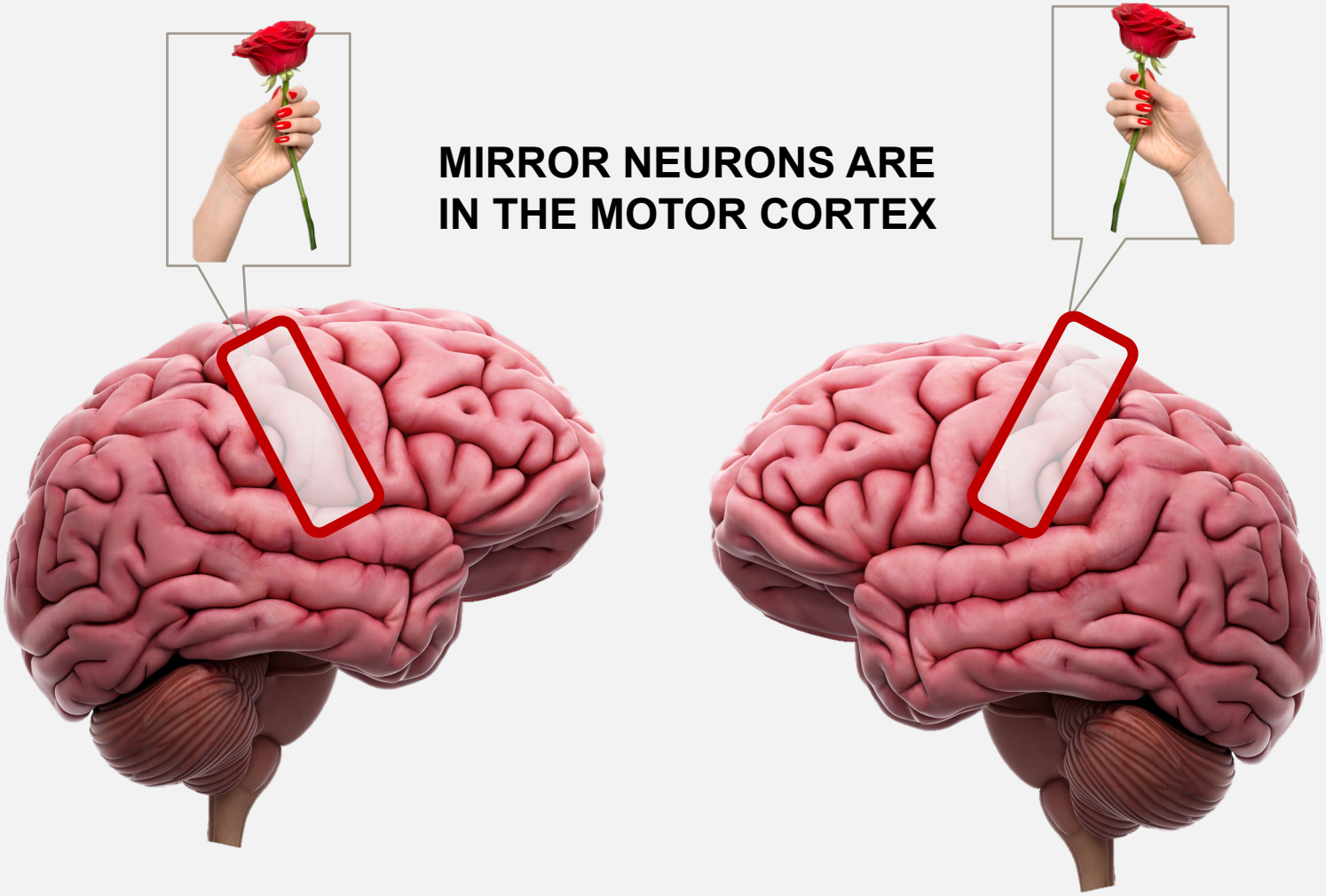
“diverse, high performing teams”

ONE MINUTE REFLECTION IN PAIRS

THINK ABOUT THE BRAIN HEALTH OF NEW RECRUITS
ROLE IN ENTRY AND TRANSITION INTO THE DEFENCE FORCE AND FIRST TERM ATTRITION

- 69% of all recruits did not complete the first term.
- The most significant measures predicting first-term attrition were aptitude score, PI rating, and preenlistment level of education. (Phillip J. Hoglin and Nicole Barton Armed Forces & Society , January 2015, Vol. 41, No. 1, 2015, pp. 43-68)

AN ORGANISATION IS A REFLECTION OF IT'S LEADERS



Rizzolatti and colleagues, Trends in Neuroscience, 2004

EXERCISE: LEADERSHIP STARTS WITH AWARENESS, CUROSITY AND LEARNING
WRITE A NEUROPLASTICITY ACTION PLAN

Exercise:
What would you like to try to do in another way?

Write your own 7-day neuroplasticity plan

Pick two things to try.

Practice every day.

Train the brain to respond not react to stress

KEY TAKE-AWAYS

1. Change the conversation to brain health and fitness
2. Understand our brain to understand others using neuroscience
3. Brain health can be assessed and then the brain can be viewed and trained like a muscle across the life span
4. Not born a blank slate.

   "Stress over generations impacts brain architecture and is the reason there are different capacities for performance and resilience across the lifespan"
5. Switching between army and civilian mindset requires training
6. Teams and organisations reflect their leaders at work, home and life

LEARN MORE AT THRIVING MINDS PODCAST

Apple Podcasts Preview

30 episodes

Changing the conversation to brain health and fitness rather than mental health treatment is empowering. The podcast brings the brain to life to help people empower themselves and their brain using neuroscience. Let's get to know how the

connection...

THRIVING MINDS

Dr Selena Bartlett, Neuroscientist and Founder of MIGFIT

Arts

★★★★★ 5.0 • 6 Ratings

AUG 10, 2020

Episode #50. Using Laughter to Survive Cancer at 19 years old.

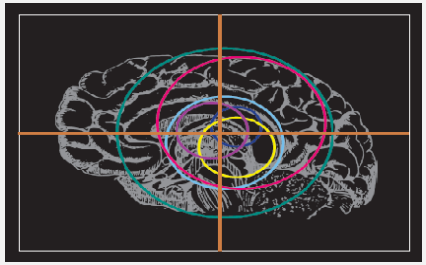
Lea survived a cancer diagnosis at 19 years of age. She discovered the power of laughter and the brain in helping her survive. She is now writing a book about this topic. We met to discuss how laughter helps and its impact on the brain.

43 min

MAY 15, 2020

Episode #49: Pivotal moment to drive a preventative mental health strategy. Thinking about how to make a "slip slop slap"like campaign to assist Australians with mental health.

We have an opportunity to change the way we view mental health. It would be great to have a focus on prevention rather than treatment. Covid-19 has affected everyone in some way. The importance of



SMASHING MINDSET

REBOOT RECHARGE REINVENT

Using practical neuroscience to tap into brain plasticity for a growth mindset.

Professor Selena E. Bartlett, Neuroscientist

PROFESSOR BARTLETT'S HIGHLIGHTS

Research & Awards

- Lawrie Austin Award for Contributions to Neuroscience 2019
- Director Medications Development, UCSF- 2004-2012
- Received $8,000,000 in NHMRC and NIH grant funding for addiction neuroscience research and development – 2008-2016
- Nominated for Australian Academy for Health and Medical Sciences – 2017
- Outstanding Achievement Award in Biotechnology, WIT (Aus) – 2013
- International press coverage for showing the brain pathways changed by sugar addiction 2016-2018.
- Awarded $700,000 research grants for tacking obesity by reducing sugar consumption-2020.

Selected Press & Talks

- TEDx QUT: Measuring Brain Health and Vitality (video) http://bit.ly/1MKQfS7
- Huffington Post: Sugar Addiction Can Be Treated Like a Drug of Abuse http://huff.to/1pmSkbz
- Channel 7 News: Sugar as addictive as Alcohol (video) http://yhoo.it/1NmDaye
- ABC News Interview: Changing Brains, Changing Lives (podcast) http://ab.co/1SyeMMt
- Science Daily: Treating Sugar Addiction like Drug Addiction http://bit.ly/2119rNU