
CONSCIOUS CARE & SUPPORT



Brain Development, Coherence Balancing and Inflammation Regulation

Session VI – Resource 1

“The idea that the brain can change (heal) its own structure and function through thought and activity is, I believe, the most important discovery of the brain since we sketched out its basic anatomy and the workings of its basic components, the neuron.”

Norman Doidge

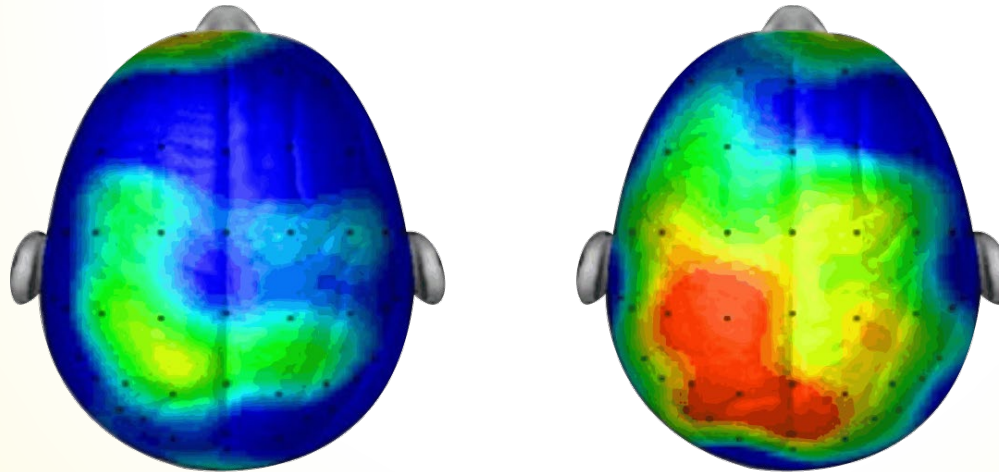
The Brain That Changes Itself

Brain Coherence

i.e. Many Parts of the Brian 'Talking' to Each Other

"Like you, I need to be able to understand and process information". This requires optimal Brain Functioning e.g.

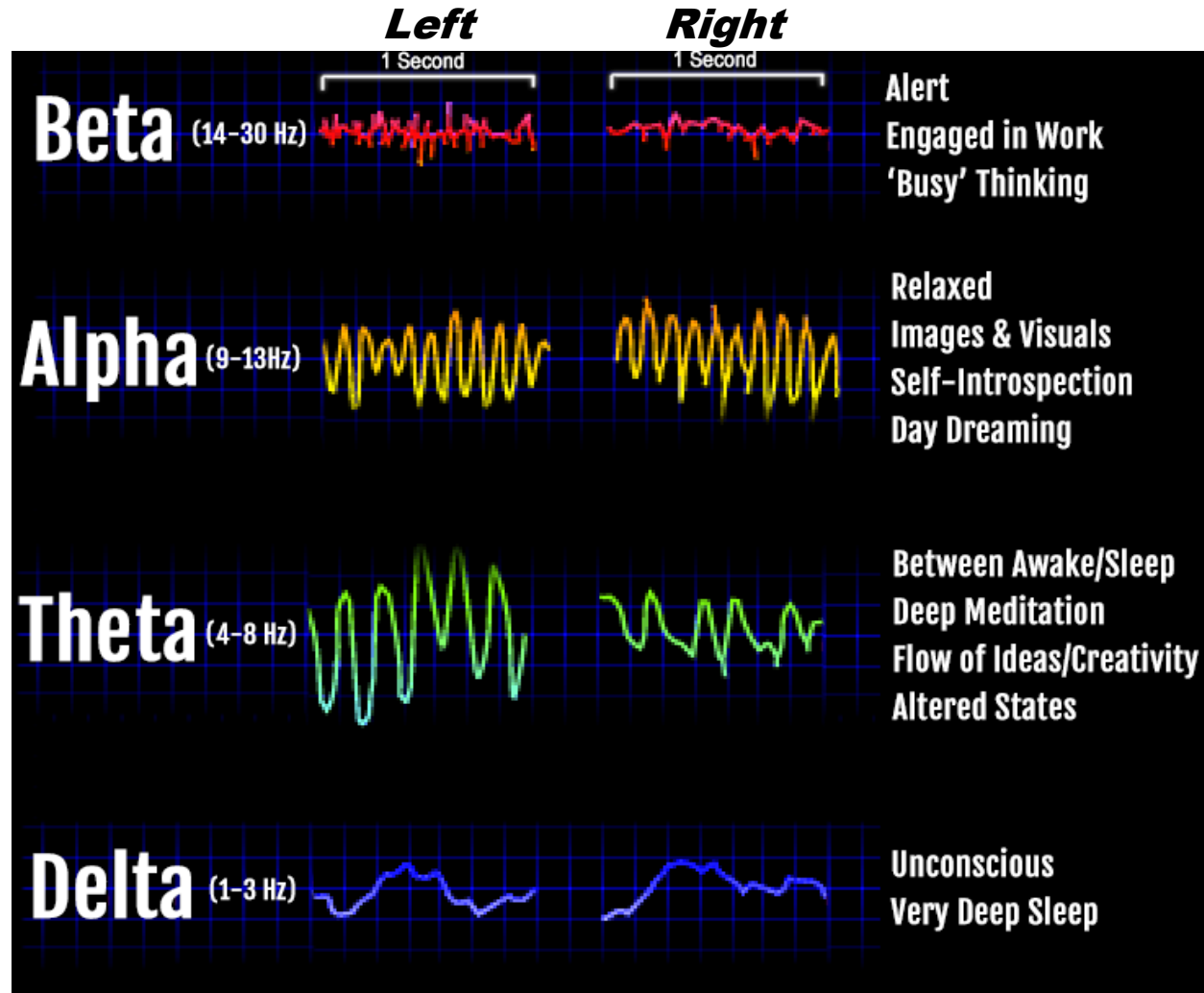
- neurogenesis (new neurons)
- neuroplasticity (more complete neuro networks)
- neurostimulation (brain firing)
- neurochemicals production (endorphins, dopamine, serotonin, oxytocin)



(Brain MRIs before & after
20 minutes of exercise)

Brain Coherence Balancing & Inflammation Regulation

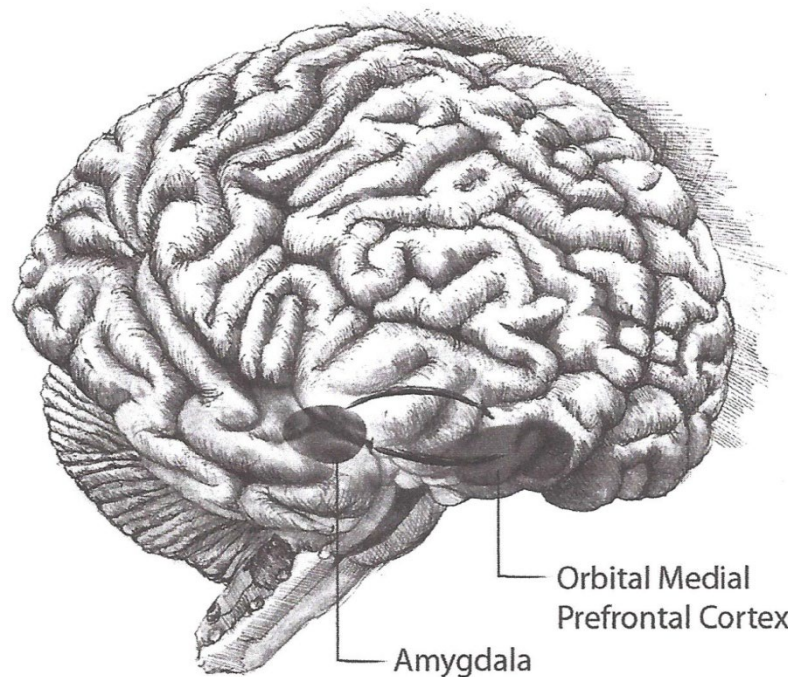
ASD Neurological Abnormalities



Wang, J., et al. (2013). *Resting state EEG abnormalities in autism spectrum disorders*. *Journal of neurodevelopmental disorders*, 5, 1-14.

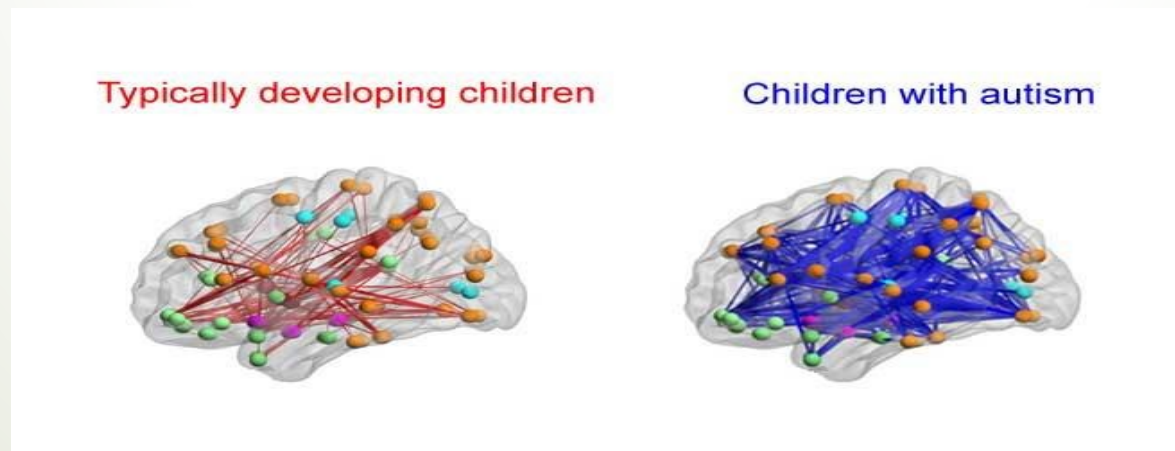
A Main CCS Focus

Mindful Neurodevelopment for Supporters and People They Support



Potential for Well-being for People with Developmental Disabilities

Neuroscience is generally in agreement that for most people with developmental disabilities, reduced brain information transfer that contributes to deficits in executive function, understanding what others are thinking and some lack of empathy, in great part are a consequence of local over-connectivity and long-range under-connectivity.



However:

Neuroscience also near unanimously concurs that **neurogenesis, neuroelectric stimulation, neurochemicals production, and neuroplasticity** are, with appropriate training and conditioning, not only possible but highly **predictable** to measurably enhance cognition, empathy and emotional self regulation.

References:

Doidge, N. (2016). *The brain's way of healing: Remarkable discoveries and recoveries from the frontiers of neuroplasticity*. Penguin Life.

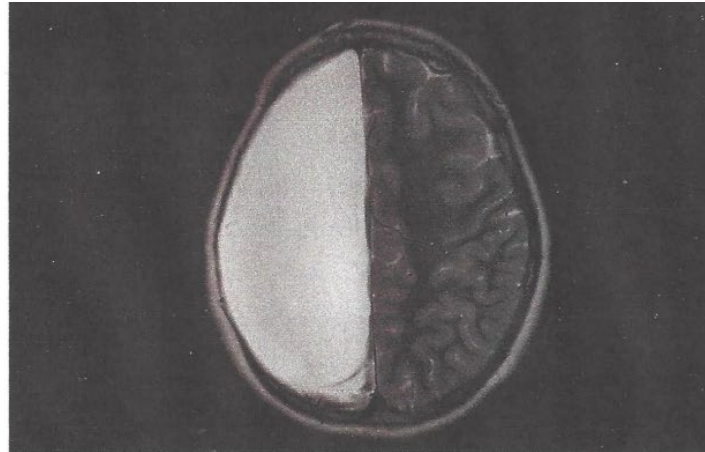
Eagleman, D. (2017). *The Brain: The story of you*. Vintage.

Siegel, D. J. (2007). *The Mindful Brain: Reflection and attunement in the cultivation of well being*. WW Norton & Company.

Could This Indicate Potential for Well-being?

In 2007, Neurosurgeons removed half of Cameron Mott's Brain

In this scan of Cameron's brain, the blank space is where half of her brain has been removed.



The Results:

Aside from some weakening on one side of her body, she is indistinguishable from her classmates. She is a good student and participates in sports.

Eagleman, D. (2017). *The Brain: the story of you*. Vintage.



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Neuroscience and Gastrointestinal (GI) Research Conclusions

Hundreds of Studies Indicate:

1. No evidence to suggest that the Brain and GI of people with developmental disabilities cannot heal, grow and develop.
2. Evidence that the Brain and GI can heal, grow and develop with appropriate (CCS type) training and conditions.

(Reference previous Bibliography)

Maladaptive Behaviours Related to Brain Balancing

In trying to satisfy their need for brain central coherence, individuals experiencing **problems associated with brain balancing may behave in reactionary and cognitively unintended ways.**

They may:

- **become angry.** Anger stimulates the brain to focus and in so doing organizes the individual's thoughts, and therefore offers the individual **relative calm.** For everyone, anger is a much less painful emotion than fear.

- **obsess and become compulsive.** These behaviours **organize the individual's thoughts, create focus** and therefore calm the individual;
- **blame and even hit others.** This is one way that the individual can **self-medicate with anger.** These behaviours are magnified by a supporter's mindless fear and unknowing powerful communication of that fear.

Brain Facts to Enhance Brain Coherence and Functioning and Reduce Challenging Behaviours

The proven potential for brain development and enhanced functioning is sadly, possibly the least appreciated and understood fact regarding needs in supporting individuals with ASD/DD to be all that they can be.

Through proven training and maintenance of a healthy brain (e.g. inflammation prevention) **enhanced brain functioning is possible** as a result of development in the following area:

- **Neurochemicals Production** e.g. endorphins, oxytocin, neurotransmitters like dopamine (pleasure) and serotonin and GABA (calming).

Ratey, J. J., & Manning, R. (2014). Go wild: Free your body and mind from the afflictions of civilization. Hachette UK.

- **Neurogenesis** i.e. promotion of the growth of new neuron cells

Ahlskog, J. E., et al. (2011). *Physical exercise as a preventive or disease-modifying treatment of dementia and brain aging. Mayo Clinic proceedings, 86(9), 876–884.*

Siegel, D. J. (2007). *The Mindful Brain: Reflection and attunement in the cultivation of wellbeing.* WW Norton & Company.

- **Neuroplasticity** i.e. the reformation of neuron networks to take on new and extra ‘tasks’

Doidge, N. (2007). *The Brain That Changes Itself: Stories of personal triumph from the frontiers of brain science.* Penguin Life.

Doidge, N. (2016). *The brain's way of healing: Remarkable discoveries and recoveries from the frontiers of neuroplasticity.* Penguin Life.

- **Neurostimulation**

Promoting Motor Function by Exercising the Brain

Perrey, S. (2013). Promoting motor function by exercising the brain. *Brain sciences*, 3(1), 101-122.

- **Transcranial Magnetic Stimulation**

Centre for Addiction and Mental Health (N.D.) *Repetitive Transcranial Magnetic Stimulation (rTMS)*. [URL](#).

Centre for Addiction and Mental Health. (2015, April 1). RTMS for autism spectrum disorder. YouTube. [URL](#).

Eagleman, D. (2017). *The Brain: The story of you*. Vintage. pp.94-95

*“In his book **The Mindful Brain**, Siegel has both a meticulous understanding of the roles of different parts of the brain and an intimate relationship with mindfulness”.*

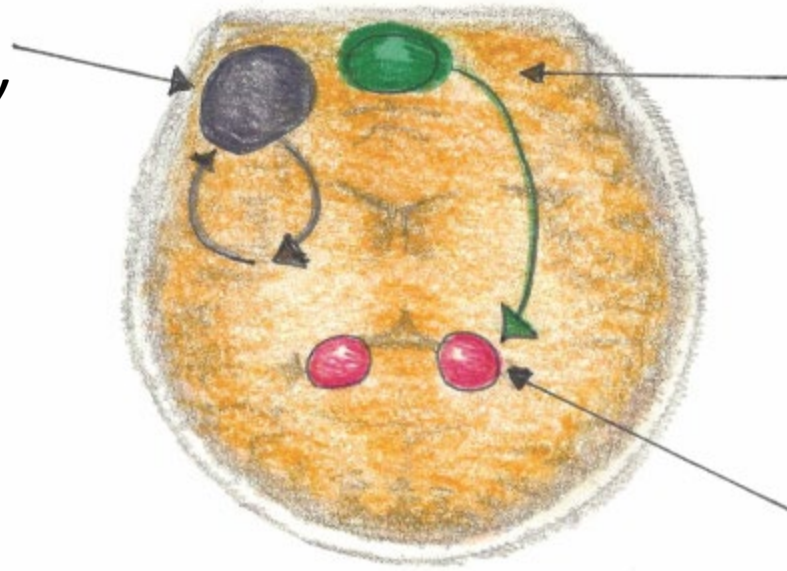
Scientific American Mind

B-FIT Mindfulness to be Emotionally Self-Regulated

Mindful Emotional Self-Regulation

The main way we can consciously access the emotional brain is through self-awareness*, i.e. becoming mindful. Mindfulness increases connections in the medial pre-frontal cortex. This reduces anxiety for the Supporter and the Person Supported.

***Dorsolateral pre-frontal
Cortex***
Working Memory
Impulse Control



Medial pre-frontal Cortex
***(part of the brain that notices
what's going on)***

Amygdala

*LeDoux, J. E. (2000). Emotion circuits in the brain. Annual review of neuroscience, 23(1), 155-184.

According to Dr. Daniel Siegel in *The Mindful Brain* (pgs. 42-43) the following brain, body and being functions correlate with the activity of areas within the medial prefrontal cortex:

- **Body regulation:** the emotional brakes and accelerator functions;
- **Attuned communication** involves the coordination of the input from another person with the activity of one's own (as with mirror neurons);
- **Emotional balance:** to have enough activation so that life has meaning and vitality but not so much that life becomes chaotic;
- **Response flexibility:** the capacity to pause before action;
- **Empathy:** knowing what might be going on inside someone else;
- **Insight or self-knowing:** awareness to be able to link the past, present and future;
- **Fear modulation** that may be carried out by the release of the inhibitory neurotransmitter GABA;
- **Intuition:** a neural mechanism by which we process deep ways of knowing via our body, i.e. somatic intelligence;
- **Morality:** taking into consideration the larger picture, to image what is best for the whole not just one's self, even when alone.

Siegel, D. J. (2007). *The Mindful Brain: Reflection and attunement in the cultivation of well being*. WW Norton & Company.

Brain Development

The areas for brain development are mainly the insula, superior temporal and medial prefrontal cortex (MPFC). This system forms the interconnected “resonance circuitry”. **Each time we become mindful, we fire-up these regions and what fires, wires** (i.e. grows new neuron cells i.e. neurogenesis).

Siegel, D. J. (2007). *The Mindful Brain: Reflection and attunement in the cultivation of wellbeing*. WW Norton & Company. pp. 165-190.

Why Invest in Mindfulness?

For this reason, CCS invests heavily in **mindfulness training to enhance the development of emotional self-regulation in supporters**, who in turn will **then be competent and committed to teach mindful awareness** to people with developmental disabilities to enhance their emotional self-regulation.

Prefrontal Cortex Development – Autism

Research has shown that the medial pre-frontal cortex of people supported with neurodiversity can be functional, but not as readily activated as those who are not neurodiverse. The goal is to offer strategies to enhance the functioning of this region of the brain.

Richey, J. A., et al. (2015). Neural mechanisms of emotion regulation in autism spectrum disorder. *Journal of autism and developmental disorders*, 45, 3409-3423.

CCS Brain Coherence, Balancing & Inflammation Regulating Interventions

- 1. Enhance essential brain calming elements**
(e.g. GABA and Serotonin)
- 2. Prevent excess of excitatory elements**
(e.g. Cortisol, Glutamate, PPA)
- 3. Balance anxiety producing vitamins and minerals**
(e.g. Magnesium, Vitamin B6, Vitamin B12)
- 4. Cerebellum activation**
(e.g. 20 minutes of bouncing and balancing)
- 5. Maintain adequate glutathione levels to prevent brain inflammation**
(e.g. NAC)

6. Keep the Mitochondria Cell System Healthy:

- Mitochondria are known as the powerhouse of each cell
- They give cells their energy to do their work such as maintaining healthy brain functioning

Controllable Mitochondria Killers:

- Sugar and Simple Carbohydrates
- Oxidative Stress causing Brain Inflammation – low glutathione
- Medications such as Antibiotics and Antipsychotics
- Vitamins and Minerals Imbalance – low B vitamins, folic acid, magnesium, vitamin D

7. Cardio Exercise:

- Cardio exercise, especially bouncing and balancing, increases brain wave activity (e.g. cerebellum) to give better brain coherence for optimal functioning.
- Improved coherence results in thoughts becoming more organized and focused.
- This results in less fear and therefore more calm.





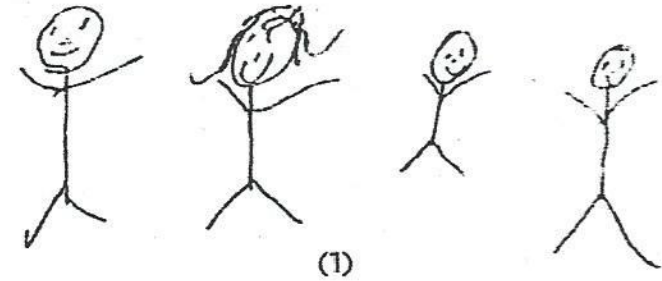
stabilization balls
and elliptical stabilization cushions

Autism and Neurofeedback

From Stick People to Clearly Defined Human Beings

After four months of neurofeedback, a ten-year-old boy's family drawings show the equivalent of six years of mental development.

van der Kolk, B. (2015). *The body keeps the score: brain, mind, and body in the healing of trauma*. Penguin Books.



Drawing after 20 sessions



Drawing after 40 sessions



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Training in Self-Regulation with those with ASD/DD can be Successful and Sustainable in the Following Areas:

- Attentional control, inhibition of verbal responses, cognitive flexibility and planning – through neurofeedback
- Some areas of executive functioning and behavioural control
- Resistance to distraction and concentration
- Affective, cognitive, physical self-regulation and pro-social behaviour

MacKenzie, H. (2013). *The autistic child's guide: presenting spark* (self-regulation program of awareness & resilience in kids)*. Wired Fox. pp. 321-323.

Summary

- **Brain development**, coherence and inflammation prevention are **essential** to promote the well-being of children, youth and adults with ASD/DD.
- **Brain development and coherence** are proven to **absolutely be possible through mindfulness, physical exercise, nutrition** and other support initiatives as outlined in Need #1 – 15 BB-ABC Best Practices/Tools.