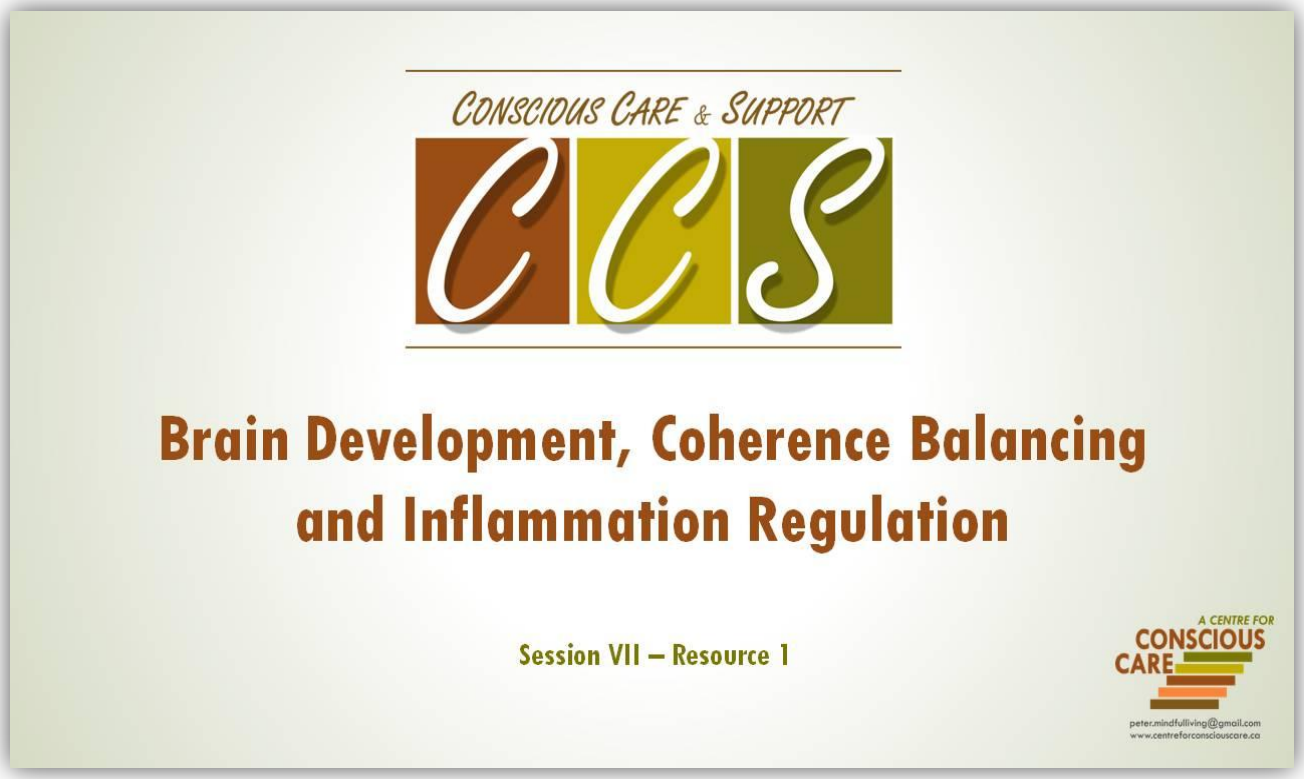
CONSCIOUS CARE & SUPPORT
CCS
Brain Development, Coherence Balancing and Inflammation Regulation
Session VII – Resource 1
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"The idea that the brain can change (heal) its own structure and function through thought and activity is, I believe, the most 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

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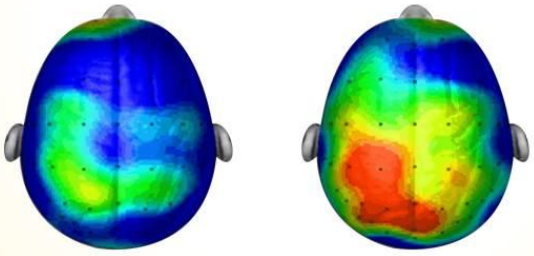
Brain Coherence

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)

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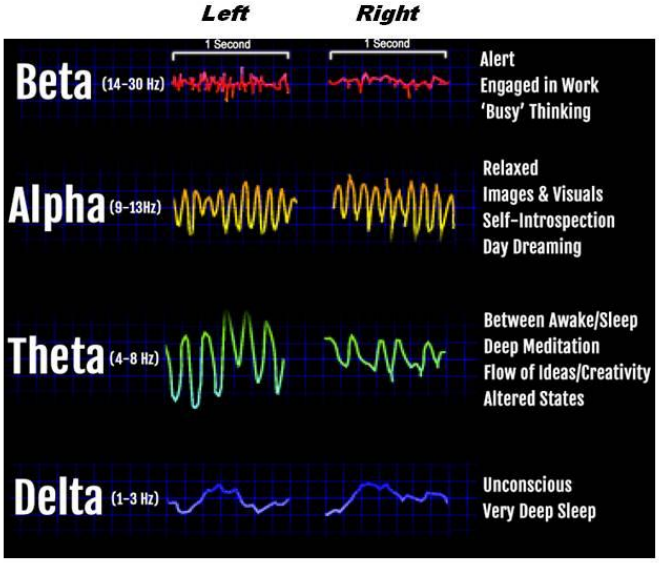
Brain Coherence Balancing & Inflammation Regulation

ASD Neurological Abnormalities



Resting State EEG Abnormalities Including Enhanced Power in the Left Hemisphere of The Brain is Shown in ASD

(Journal of Neurodevelopmental Disorders 2013, 5:24)

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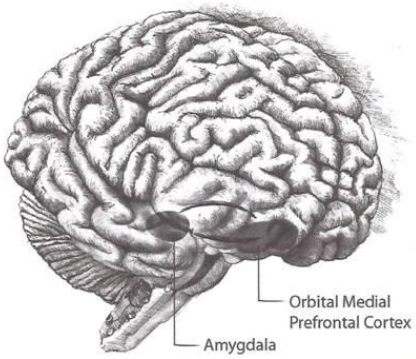
A Main CCS Focus

Mindful Neuro Development for Supporters and People with ASD/DD



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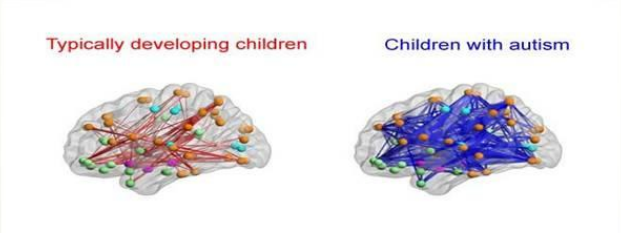
Potential for Well-being for People with Developmental Disabilities

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.



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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.

Reference:

N. Doidge – *The Brain's Way of Healing*
D. Siegel – *The Mindful Brain*
D. Eagleman – *The Brain*

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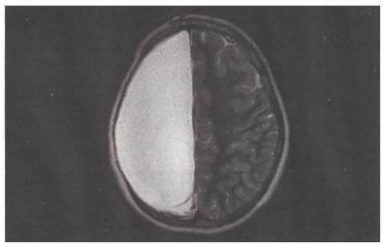
Could This Indicate Potential for Well-being?

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.

(Reference D. Eagleman *The Brain)*

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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 above Bibliography)

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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.

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- **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.

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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.

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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). Reference J. Ratey and R. Manny 2014;

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- **Neurogenesis** i.e. promotion of the growth of new neuron cells (reference Mayo Clinic Ahlskog JE, et al. 2011) (D. Siegel, *The Mindful Brain*);

- **Neuroplasticity** i.e. the reformation of neuron networks to take on new and extra 'tasks' (reference Doidge, N., *The Brain That Changes Itself* and *The Brain's Way of Healing*);

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- **Neurostimulation**
  Promoting Motor Function by Exercising the Brain (reference Brain Science 2013, Mar:3 (1) 101-122).

- **Transcranial Magnetic Stimulation** (reference Eagleman, David, *The Brain* pages 94-95).

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"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

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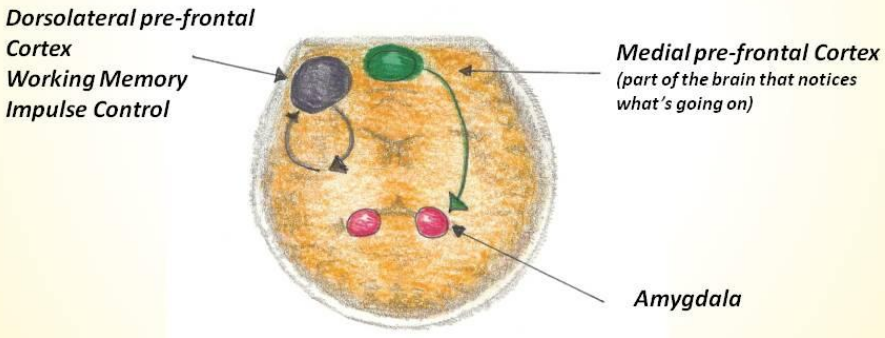
B-FIT Mindfulness to be Emotionally Self Regulated

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.



(*Research reference: J. LeDoux, "Emotion Circuits in the Brain", Journal of Neuroscience 33, no. 9 (2013) 3815-23)

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According to Dr. Daniel Siegel in *The Mindful Brain* (2007, pp. 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.

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Brain Development

The areas for brain development are mainly the insula, superior temporal and medial pre frontal 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) (reference Seigel, D., *The Mindful Brain* pages 165-190).

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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.

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Prefrontal Cortex Development – Autism

(reference News Medical Life Sciences Jan 2015, ***Improving the prefrontal cortex activity could help autistic people regulate emotions***, UNC School of Medicine, published in the Journal of Autism Developmental Disorders, Gabriel Dichter, PhD, associate professor of psychiatry and psychology).

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Supporters' Optimal Solutions to Help People Supported with Aerobic Exercise

- Aim for twenty minutes twice a day of aerobic exercise;
- Establish a walking speed similar to someone in a hurry;
- Include balancing movement such as exercise on a mini-trampoline to activate and grow the cerebellum, therefore amplifying the operations of the prefrontal cortex;
- As approved by a physician, use interval training twice a week. The pattern could be 20 seconds intense exercise followed by 10 seconds of rest repeated for 4 minutes.

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Exercise and Proven Development

Doctors Ratey and Manning in 2014 proposed that exercise improves all brain learning in the following ways:

- Increase attention, less fidgety, less impulsive;
- Causes over 100 billion brain cells to be better nourished by neurotransmitters, growth factors and hormones that wire in memories more easily;
- Grows new and **better** brain cells (Homeostasis).

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- Cardio exercise, especially bouncing on a mini trampoline/rebounder, increases electrical activity in the brain to the required level for optimal processing.

- This activity creates more constant rhythms, **which results in thoughts becoming more organized and focus** becoming clearer, both of which increase the sense of calm.

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- Stimulation of the cerebellum through bouncing and balancing exercises significantly improves the brain's electrical distribution system.
- Less confusion, more coherence and cognition, and therefore fewer maladaptive behaviours.
- Stabilizing balls and cushions are extremely helpful to improve brain energy balance as a result of increased cerebellum activation.

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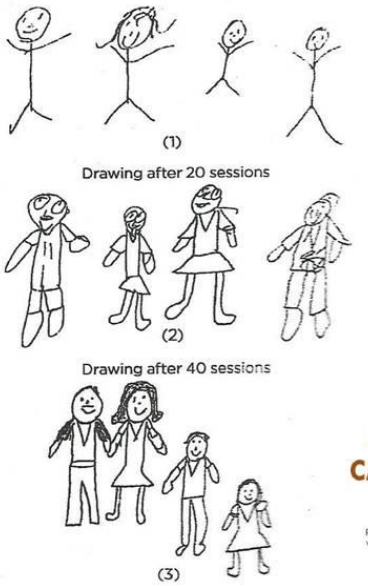
Autism and Neurofeedback

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.

(Research Reference: B. van der Kolk, "The Brain Keeps the Score")



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Training in ASD/DD Self Regulation 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

(Reference *The Autistic Child's Guide*, MacKenzie, H., 184-204 pages 321-323)

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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 BBABC Best Practices/Tools.

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