



Using neuroscience principles to support  
children post the COVID-19 pandemic

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# 'Easy' neuroscience



# Why does neuroscience matter?

We were all infants once - this happened in your brain while you were growing up

This happened (and is happening) in the brains of the children you work with

This is happens in our own brains in all social interactions

Theses are the 'Precious Years'  
The importance of Infant Mental Health, as a time of great potential but also great vulnerability



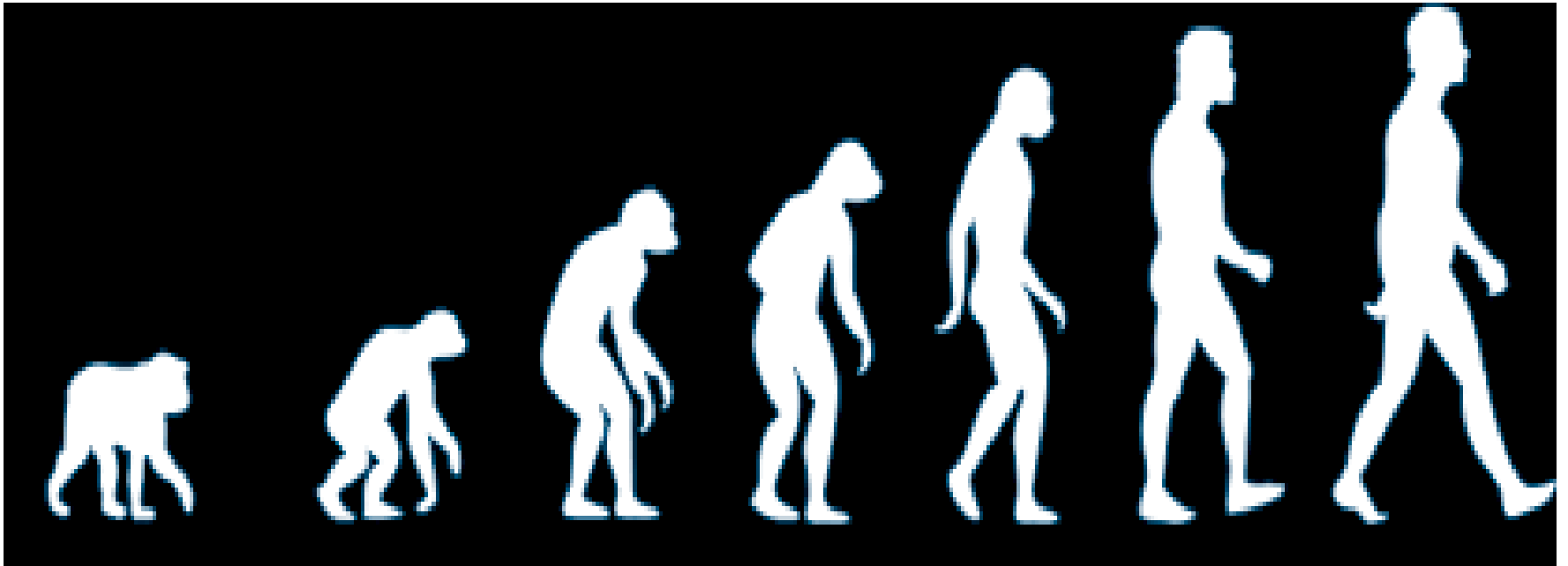


Infant's brains are still under construction, most brain development happens **after birth**

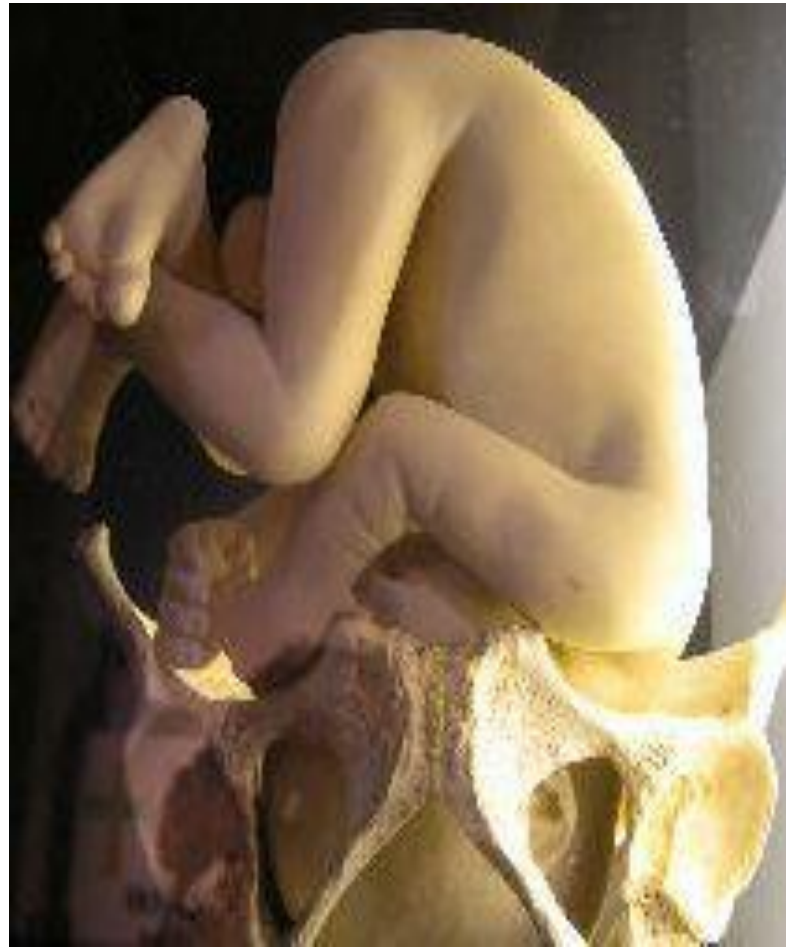


- At birth, the human brain is only 29% of its fully matured size
- Monkeys brains are 65%, Gorilla's 45% and Chimpanzee 40% of their adult size
- 90% of brain growth takes place in the first 5 years
- At around 7 years massive sculpting takes place, key neural pathways are strengthened and unused, unneeded pathways are pruned
- A child's basic brain architecture is fixed by their 7<sup>th</sup> birthday

# Homo Erectus the unfinished brain, at birth



# Our evolutionary compromise





# Alan Schore video

# The Science of Parenting

- Adults who don't manage stress well often did not have enough support in childhood to set up effective stress-regulating systems
- For a child to experience a safe world inside their heads, depends largely on special one-to-one moments with their parents
- Primary care givers can affect the chemistry inside an infants head to such an extent that, mostly, their inner thoughts will be self encouraging rather than self critical
- Childhood experiences can dramatically influence systems in an infant's brain in order for them to live a more fulfilling life
- Nurturing, sensitive care can assist children to move into adulthood without losing the awe and wonder about the world

# Our Brain Story

Our world is old .... Humans very young

300 million years ago reptiles evolved

200 million years ago the mammalian brain evolved

200 000 homo sapiens emerged

Our brain still bears witness to this history

Jaak Panksepp “our brains resemble old museums that contain many of the markings of our evolutionary past, but we keep much of that suppressed by our cortical lid”

# 3 Brains

Infants have 3 brains : (triune brain)

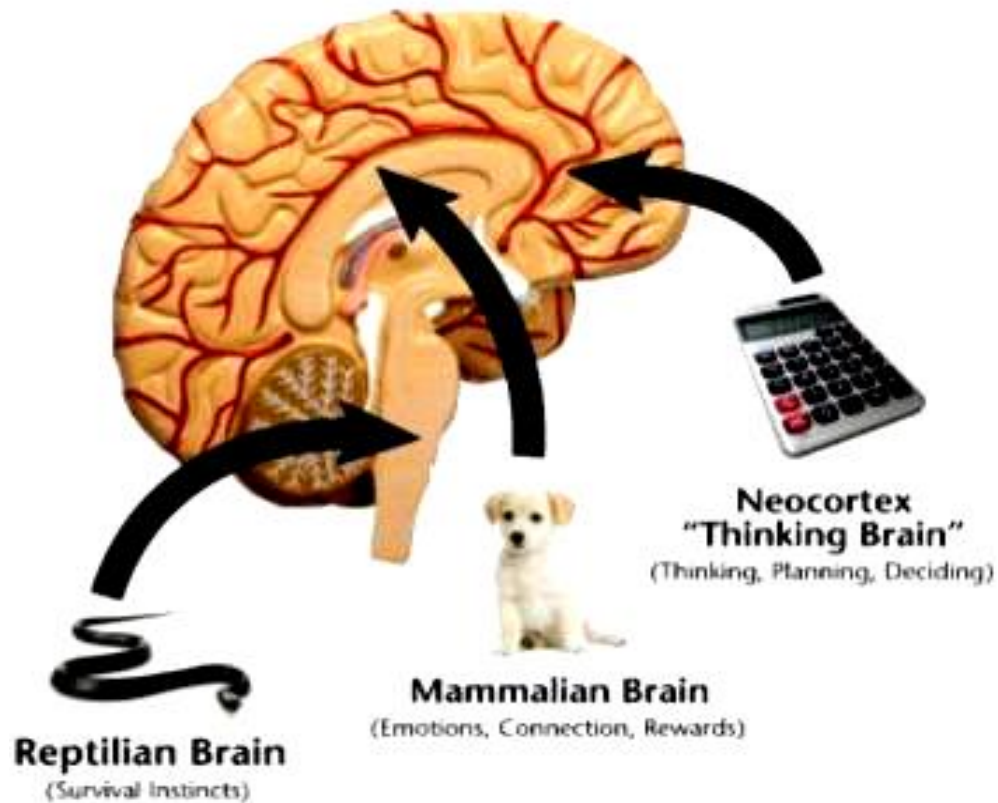
1. Core /body reptilian brain,
2. lower feeling/mammalian brain,
3. Higher/thinking human brain or rational brain.

# Video hand model of the brain

# Different functions of the 3 brains:

- **Body/Reptilian brain** – most ancient shared with other vertebrates, largely unchanged through evolution. The reptilian brain activates instinctive behaviour for survival and sustains essential bodily functions. Hunger, digestion, breathing, circulation, temperature, movement (posture and balance), territorial instincts and fight, flight and freeze.
- **Feeling/Mammalian brain**, emotional brain, the lower brain. The Limbic system. Shares the same chemical systems and structures as other mammals such as chimpanzees. It triggers strong emotions and helps to control primitive fight or flight impulses. Seeking, Rage, Fear, Lust, Care, Grief, and Play.
- **The thinking/rational brain**, the neocortex, frontal lobes, newest part of the brain. Its functions include: creativity and imagination, problem solving, reasoning and reflection, self awareness, kindness and empathy.

## The Three Brains



# Parenting influences which part of the brain is activated most





Parenting affects how brain regions work together to process information, it therefore affects the wiring of children's brains



# Integration of higher brain with lower brains

- The three brains need to be coordinated and integrated. Emotionally responsive parenting has a dramatically positive impact on the development of our human rational brain.

# Integration

- The process of combining information from many sources.
- The nervous system combines information from the different senses (vision, hearing touch, etc), and each part of the brain combines information from many other parts of the brain.
- This process is essential for the body and its parts to function smoothly and effectively.
- It is also essential for the ability of the brain to extract and organize information about the world.

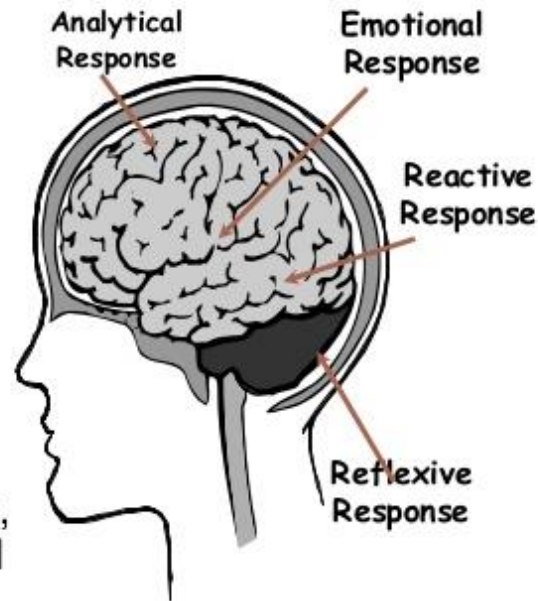
# UPSTAIRS/DOWNSTAIRS BRAIN

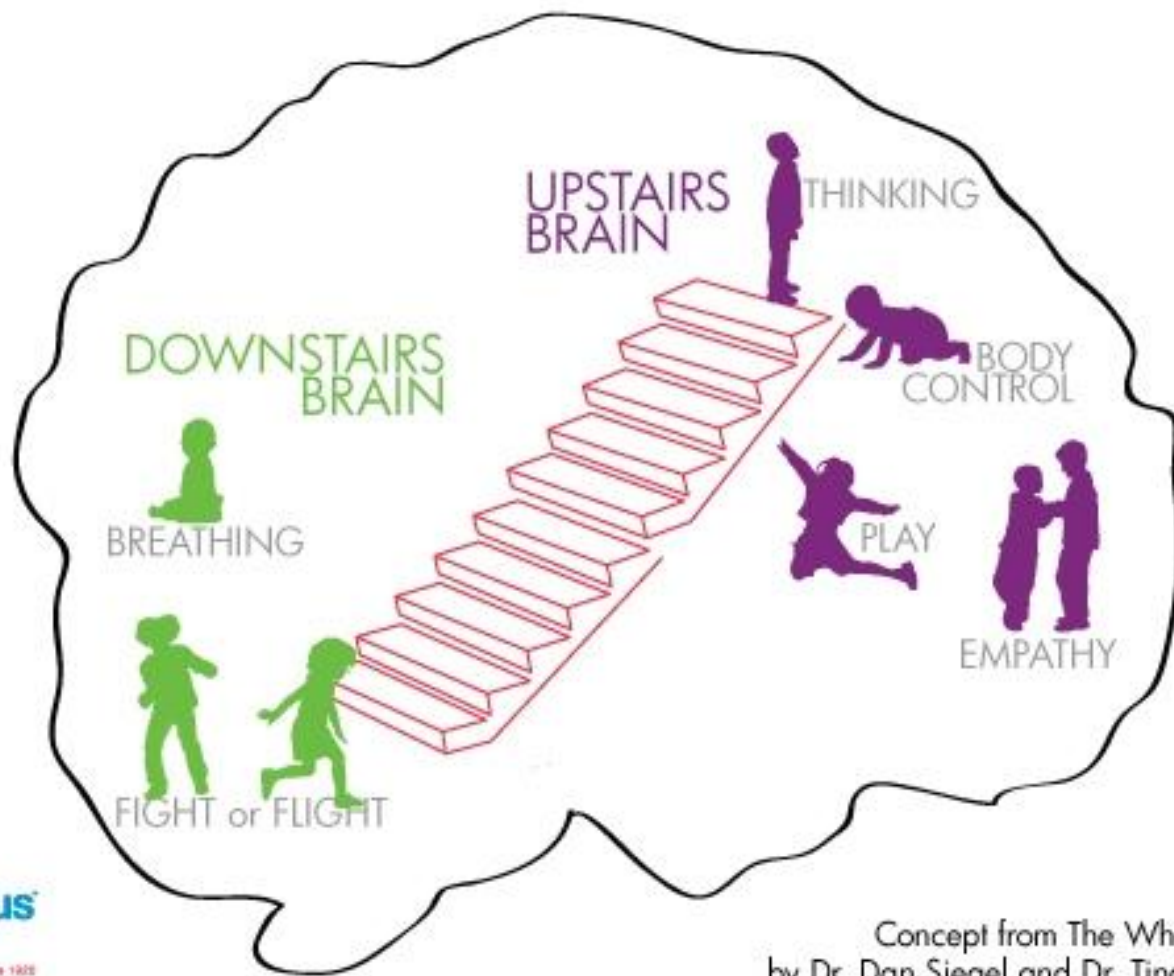
## ✧ Downstairs brain:

- Brain stem and limbic region
- Basic bodily functions, emotional reactivity, attachment, fight/flight/freeze

## ✧ Upstairs brain:

- Cerebral cortex
- Decision making, planning, self-understanding, control over emotions and body, empathy, morality, executive functioning





# Video Marshmallow Test

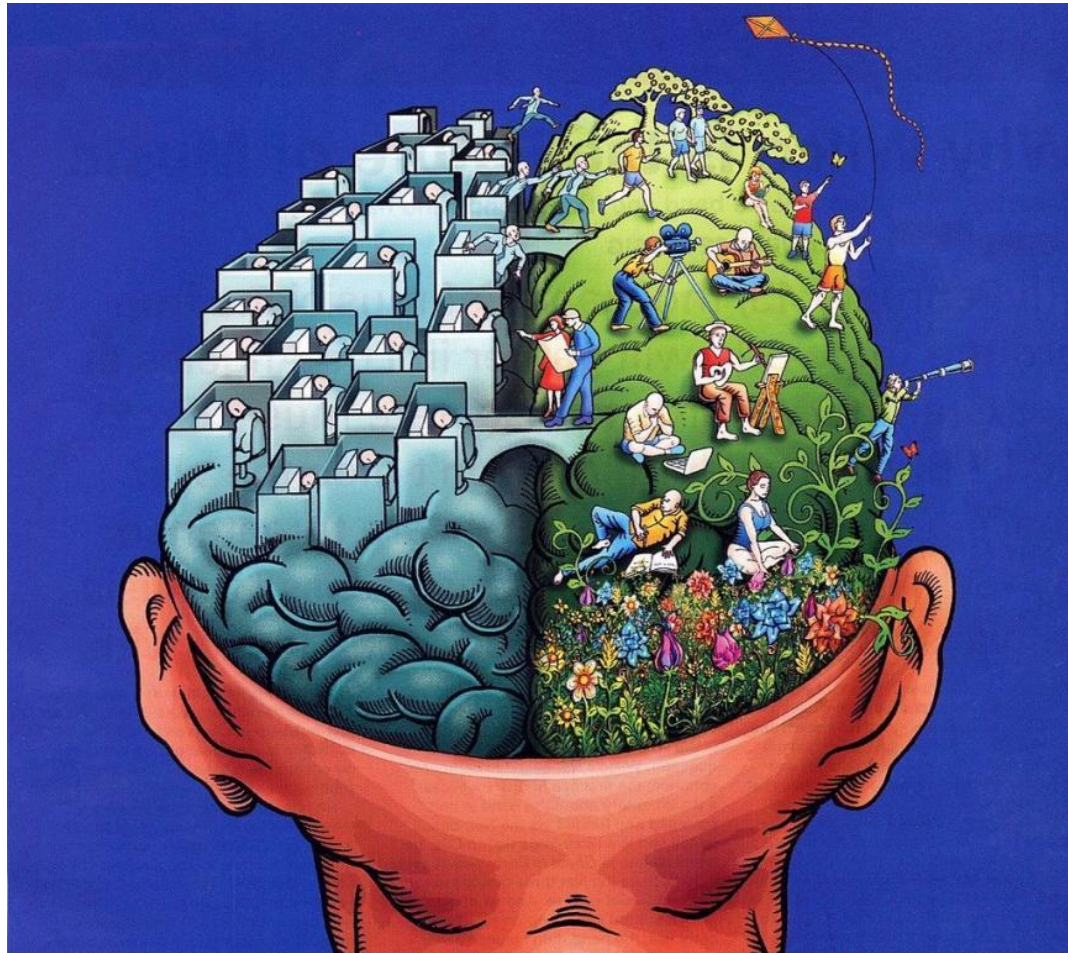
## **Early childhood experiences are the greatest predictor of adult functioning.**

Adults with a history of secure attachments in childhood have a greater sense of self agency, they are better emotionally regulated and have higher self esteem than individuals with a history of insecure attachments. (MLSRA)





Our brain's also have 2 hemispheres, left and right, each has evolved for a different purpose





Look at the chart and say the **COLOR** not the word

<b>YELLOW</b>	<b>BLUE</b>	<b>ORANGE</b>
<b>BLACK</b>	<b>RED</b>	<b>GREEN</b>
<b>PURPLE</b>	<b>YELLOW</b>	<b>RED</b>
<b>ORANGE</b>	<b>GREEN</b>	<b>BLACK</b>
<b>BLUE</b>	<b>RED</b>	<b>PURPLE</b>
<b>GREEN</b>	<b>BLUE</b>	<b>ORANGE</b>

### **Left - Right Conflict**

Your right brain tries to say the color but  
your left brain insists on reading the word

# Left and Right Brain Functions

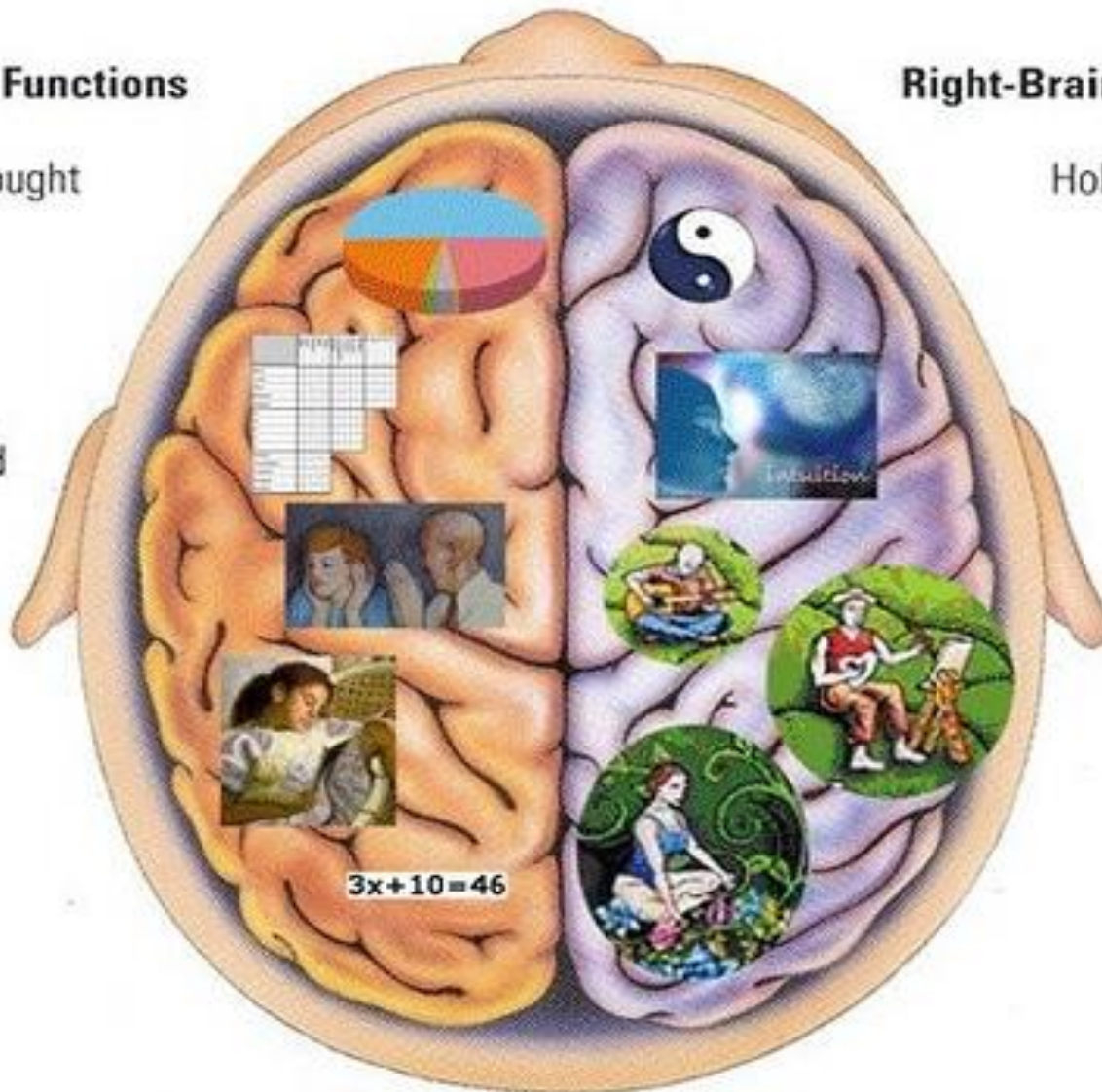
## Left-Brain Functions

Analytic thought

Logic

Language

Science and math



## Right-Brain Functions

Holistic thought

Intuition

Creativity

Art and music

$$3x + 10 = 46$$

# Integration

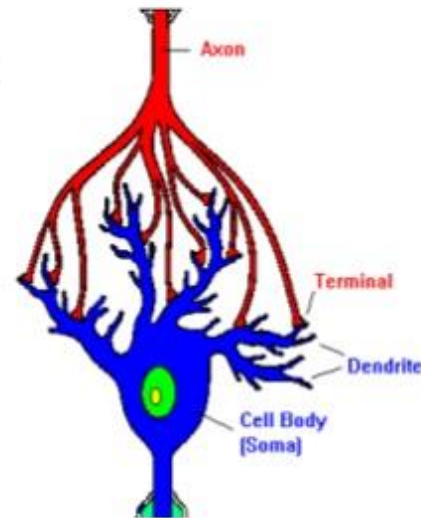
- Integrating upstairs and downstairs brain
- Integrating left and right hemispheres

# Brain wiring from birth



# Synaptic Pruning

- Following birth, the brain of a newborn is flooded with information from the baby's sense organs.
- This sensory information must somehow make it back to the brain where it can be processed.
- To do so, nerve cells must make connections with one another, transmitting the impulses to the brain.



# Video – neurons wiring up

# NEURONS THAT FIRE TOGETHER WIRE TOGETHER

Dan Siegel

- Synaptic pruning eliminates weaker synaptic contacts while stronger connections are kept and strengthened.
- Experience determines which connections will be strengthened and which will be pruned; connections that have been activated most frequently are preserved.
- It is plasticity that enables the process of developing and pruning connections, allowing the brain to adapt itself to its environment.

# Video: How Brains are Built



# In Summary

- First 2 years are the precious years
- Enormous neuro-genesis and potential
- Infants have three brains: body, feeling and thinking.
- And 2 brain hemispheres: left and right
- Children's brain are still under construction
- 90% of brain growth takes place in first 5 years of life
- 3 brains and 2 hemispheres need integrating up and down and laterally, (by the way so do yours)
- A parent or primary care giver's job is to regulate babies' emotions and bodily states

# Regulating emotions during a pandemic

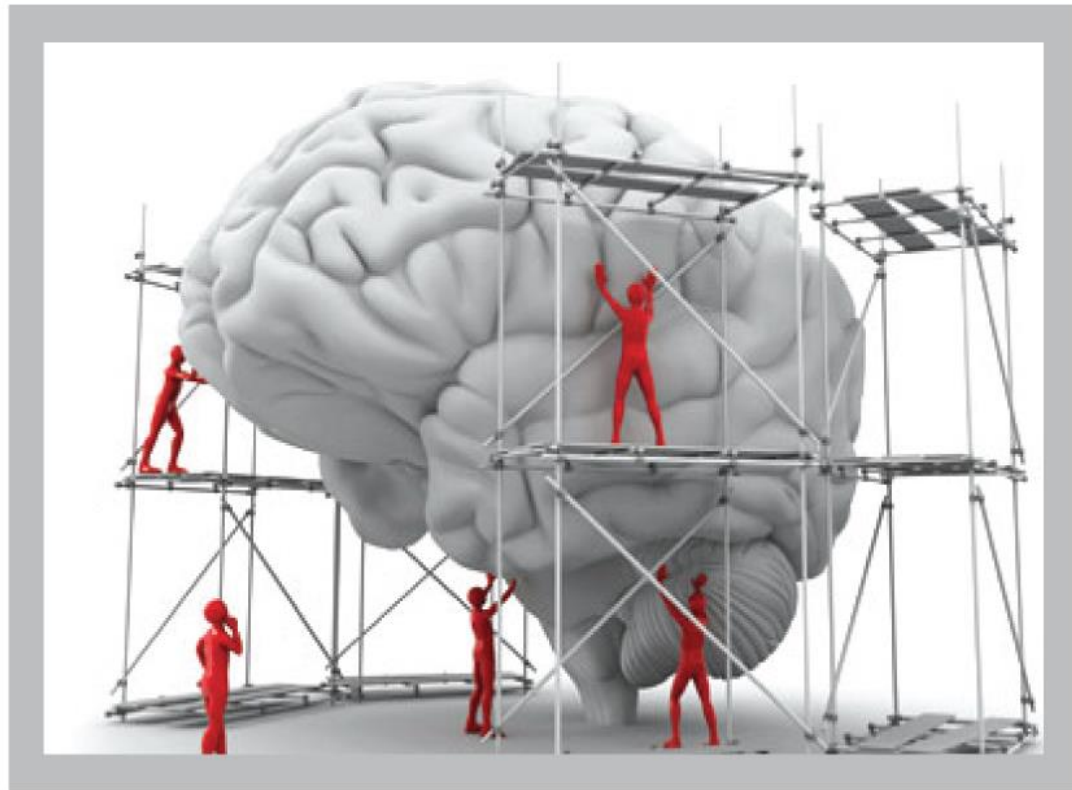
What could the developmental implications for infants and children be when their world experiences a global pandemic?

How were children affected by their care givers heightened emotional states: anxiety, grief, loss and uncertainty?

What were the social implications of lock down and mask wearing during these precious, early years?

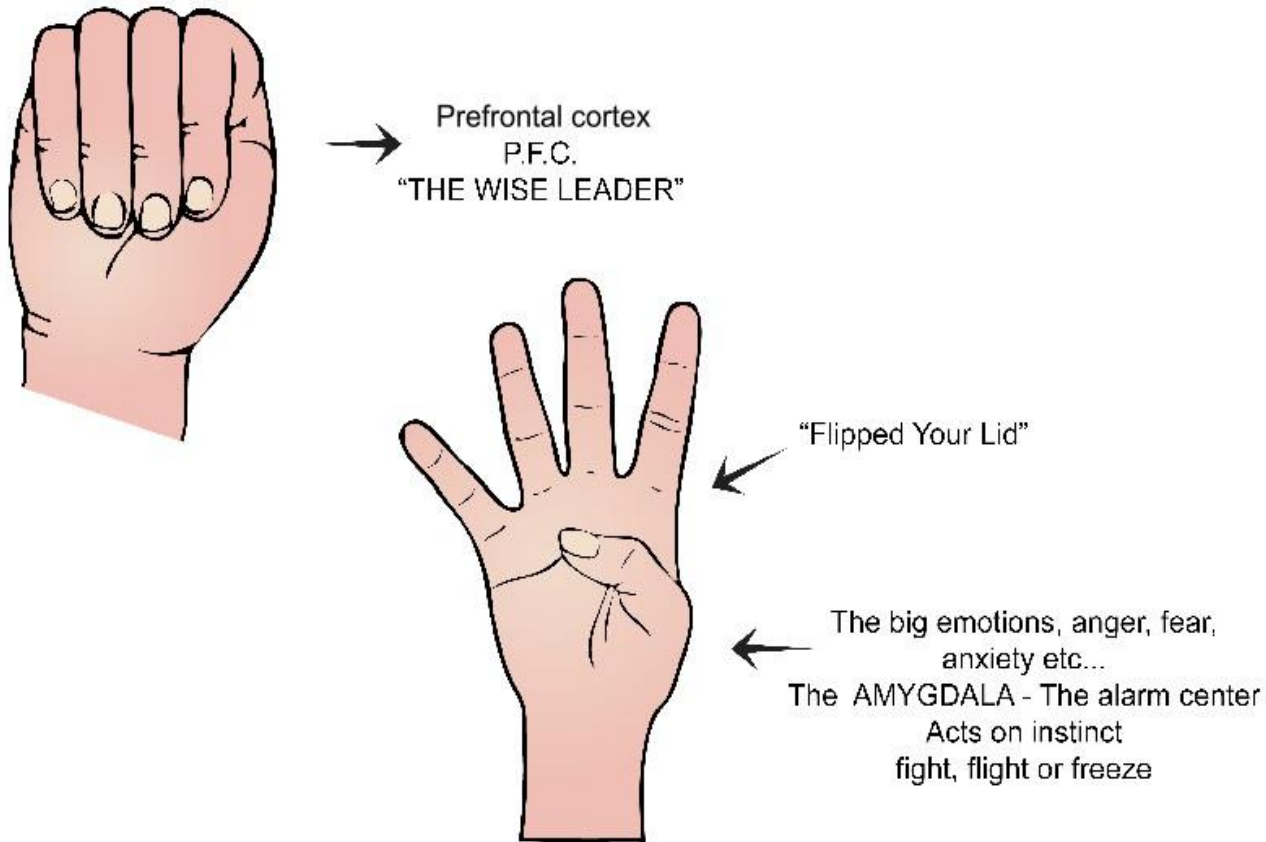
How can parents, caregivers and educators support children post the Covid-19 pandemic?





**BRAIN UNDER CONSTRUCTION**

# “Flipping One’s Lid”



Credit: Daniel Siegel, M.D. is the creator of this metaphor  
and expression "Flipped Lid". Copyright © 2014 [www.sharonelby.com](http://www.sharonelby.com)

# AMYGDALA

‘Student of the world and  
a teacher of the cortex’

Nim Tottenham

# **The amygdala is fully developed at 8 months gestation....**

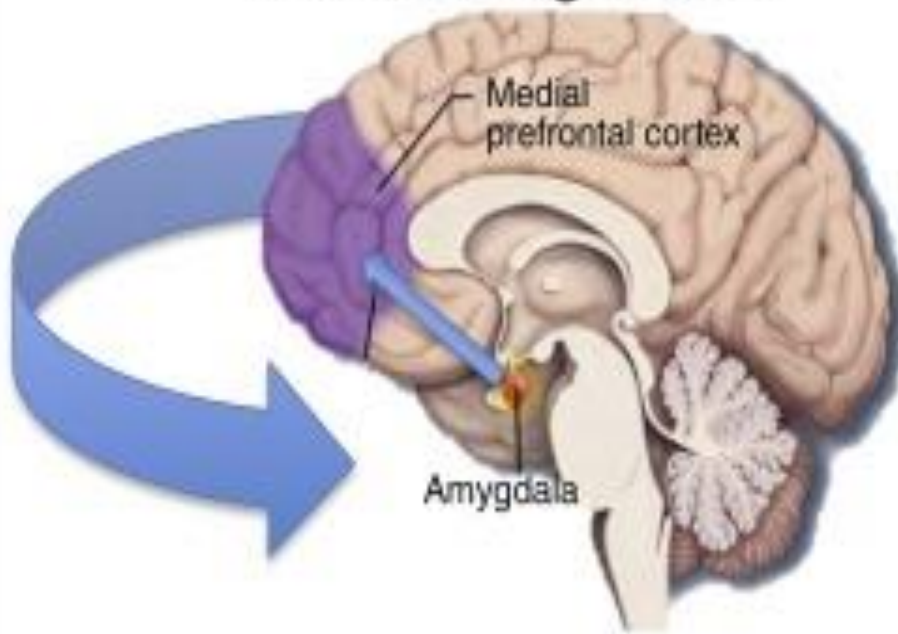
**'By the time we are born , we are fully capable of being completely terrified'**

Colzolino L. Neurobiology of Human Relationships (YouTube)

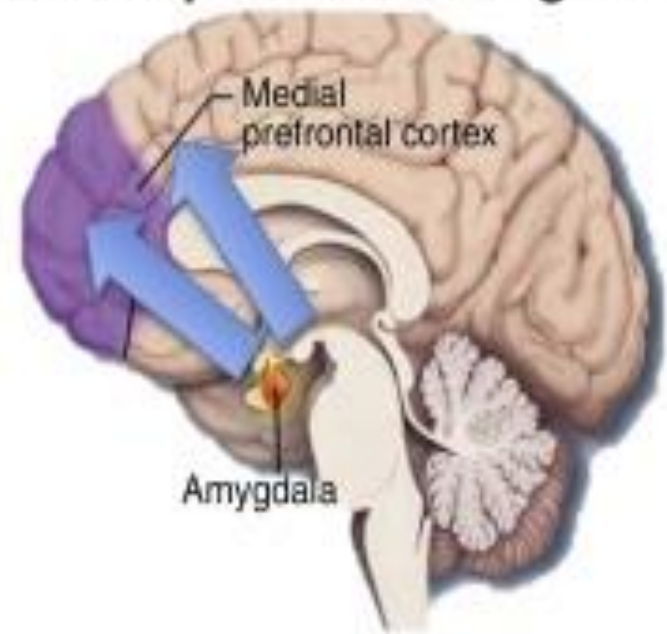


# Neural integration

**Adult Vantage Point**



**Developmental Vantage Point**



Current Opinion in Psychology

# Video Dan Siegel: roots of empathy non verbal communication



# Right Brain to Right Brain Communication

- Eye contact
- Facial expression
- Tone of voice
- Posture
- Gesture
- Timing
- Intensity



Mirror Neurons

# Video: Mirror Neurons

‘Babies don’t become social, they are social at birth’ Meltzoff, 1977



# Video: Meltzoff, mirror neurons, imitation and non-verbal communication

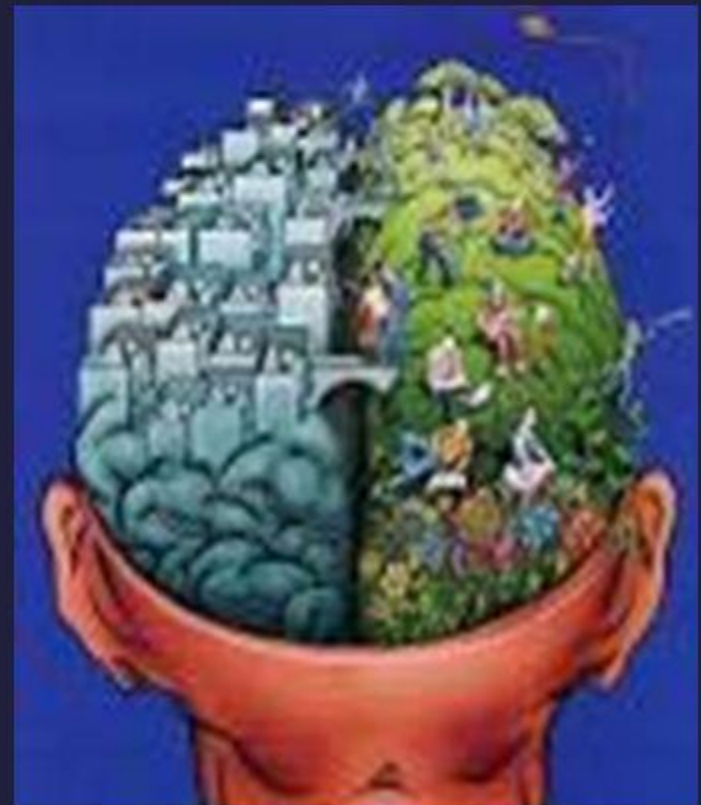
# Connect and Redirect\*

Dan Segal

- **Connect with the right**
  - Touch
  - Tone of voice
  - Facial expressions
  - Empathy

**THEN...**

- **Redirect with the left**
  - Solutions
  - Words
  - Planning
  - Logical Explanations
  - Boundaries



# How do we keep it positive?\*

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- Engage don't Enrage
- Connect and Redirect
- Name it To Tame it

\*From the work of Dan Siegel



# Whole Brain Child Neural Integration

- Step into the tantrum
- Right brain to right brain
- **YES** to all emotions and desires, **NO** the behaviour
- A moment to 'step up' parenting





# Rupture and Repair





## **Shower the 4 S's**

Safe

Seen

Soothed

Secure

Being with your child rather than doing with your child



# Video: Gabor Mate and attunement

# Parent Reminders

- **Good enough** parenting, occasional inattentiveness
- Brain wiring takes place through **rupture and repair**, this is a time of enormous potential, ruptures followed by repairs are learning experiences, teaching resilience
- Parents **are learners** too, they are not experts
- When a parent **trusts one's gut or instinct** it usually means that the parent's right hemisphere is on line with their babies right hemisphere
- **Importance of self care**, infants/children need strong healthy carers. Finding ways to replenish oneself emotionally is essential. Having some 'me' time or 'self care' is necessary.

# Why does neuroscience matter?

The pandemic was a time of rupture

The environment may not have provided infants' developing brains what they expected and needed.

Some delays and lags maybe present

Meet the child at their level, each child has their own capacity to adapt

Theses are the 'Precious Years' a time of great potential (and great vulnerability)

There is neuroplasticity for a lifetime

Successful repairs develop resilience

Not all stress is necessarily bad it has an adaptive value



## **Video: Mindfulness as a Super Power**