


**Trauma and the Brain**  
*The effects of Complex  
 Childhood Trauma on  
 Behaviour and Learning*

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[www.cebm.ca](http://www.cebm.ca) February 22, 2021 1

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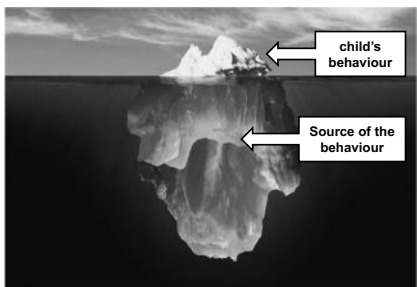
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**Gaining perspective**

A student's behavior isn't always what it seems, we need to dig deeper and look at what's happening beneath.



The diagram shows an iceberg floating in water. The small tip above the water is labeled 'child's behaviour' with an arrow pointing to it. The much larger part of the iceberg submerged below the water is labeled 'Source of the behaviour' with an arrow pointing to it.

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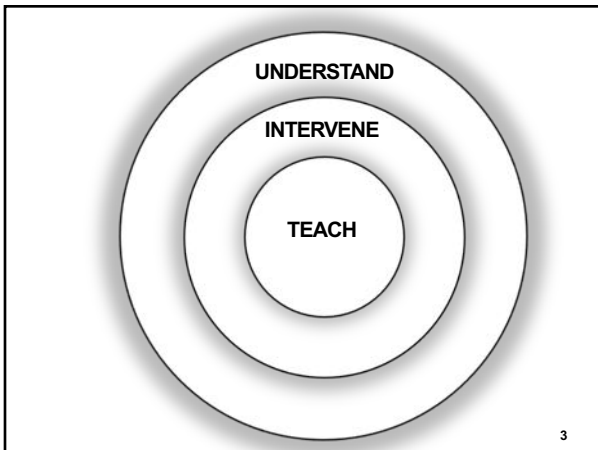
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Sources for Understanding Trauma
<ul style="list-style-type: none"><li>○ Regalena Melrose</li><li>○ Bruce Perry – Child Trauma Academy</li><li>○ Bessel Van der Kolk</li><li>○ Delphine Collin-Vézina</li><li>○ Nadine Burke Harris</li><li>○ Peter Levine</li><li>○ Sonia Lupien</li><li>○ Australian Childhood Foundation</li><li>○ ACES – Adverse Childhood Experiences Study</li></ul>

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Sources for understanding children and human development
Research on the development of the human brain – Jay Giedd, Laurence Steinberg, Iain McGilchrist Attachment-based developmental paradigm of Dr. Gordon Neufeld

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Why look at Trauma now?
<ul style="list-style-type: none"><li>▷ Schools are continuing to struggle with students whose behaviour is difficult to manage</li><li>▷ There seem to be more of these challenging students in our schools</li><li>▷ Resources at School Boards are limited</li><li>▷ Special classes still have a hard time managing children referred to them</li><li>▷ There are no other places to send children</li></ul>

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**How can understanding Trauma help us?**

- ▷ It requires us to “see” behaviour differently
- ▷ What we see affects what we do
- ▷ It will help us to intervene more effectively to the behaviour using Trauma-informed responses
- ▷ Trauma-informed responses are not only helpful to the children who are affected, but are also effective with all children in our schools.
- ▷ Better practices for managing behaviour lead to better learning outcomes.

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**Complex Childhood Trauma**

- ▷ **Prevalence:**
  - **Anywhere from 20 to 30% of children have experienced 4 or more Adverse Childhood Experiences** (Gonzalez et al. 2016) (Finkelhor D et al. 2007)
- ▷ **Effects on children**
  - **Exposure to 4 or greater ACE categories was associated with increased risk for learning and behavior problems, as well as obesity.** (Burke et al 2011)

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**WHAT IS COMPLEX CHILDHOOD TRAUMA?**

- involves the repeated **relational** harm
- that comes from:
  - physical, emotional or sexual **abuse**
  - significant emotional or physical **neglect**
  - family and other forms of interpersonal **violence**

❖ directed at infants and children by the very people on whom they depend for protection, nurture and care.

Australian Childhood Foundation

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**ACE STUDY (2010)**

The study's participants - 17,000 mostly white, middle & upper-middle class college-educated San Diegans with good jobs and great health care.

**Adverse Childhood Experiences (10):**

<input type="checkbox"/> emotional abuse <input type="checkbox"/> physical abuse <input type="checkbox"/> sexual abuse <input type="checkbox"/> lack of family support <input type="checkbox"/> physical neglect	<input type="checkbox"/> loss of parent <input type="checkbox"/> witness domestic violence <input type="checkbox"/> familial substance abuse <input type="checkbox"/> familial mental illness <input type="checkbox"/> family member in prison
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With an **ACE score of 4 or more** the likelihood of:

- lung disease increases - **390%**
- hepatitis - **240%**
- DEPRESSION - **460%**
- SUICIDE - **1,220%**

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**ACE STUDY (2010)**

**ACE score of 6:**

- a **4,600%** increase in the risk of becoming an **IV drug user**.

**ACE score of 10:**

- **homeless,**
- **prison for life or**
- **death by suicide**

People with high ACE scores die, on average, **20 years earlier** than those with low ACE scores.

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**Adverse Childhood Experiences (10):**

<input type="checkbox"/> emotional abuse <ul style="list-style-type: none"> <li>○ parent and/or sibling</li> </ul> <input type="checkbox"/> physical abuse <ul style="list-style-type: none"> <li>○ parent and/or sibling</li> </ul> <input type="checkbox"/> sexual abuse <input type="checkbox"/> lack of family support <input type="checkbox"/> physical neglect	<input type="checkbox"/> loss of parent <ul style="list-style-type: none"> <li>○ separation/divorce</li> <li>○ absence</li> <li>○ multiple step-parents</li> <li>○ illness</li> <li>○ death</li> <li>○ adoption</li> </ul> <input type="checkbox"/> witness domestic violence <input type="checkbox"/> familial substance abuse <input type="checkbox"/> familial mental illness <input type="checkbox"/> family member in prison?
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**Other possible Adverse Experiences**

- Frequent hospitalization (parent or child)
- Death of a sibling
- Sibling with special needs
- Adoption
- Foster care
- Multiple changes in parental or guardian care
- Caregivers/parents who are at odds with each other

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**CHARACTERISTICS OF AN ACE**

**SEPARATION**

The loss or possible loss (facing separation) of

- those to whom you are attached and/or
- who are meant to take care of and protect you

Resulting in a state of **survival alarm**

- ▶ Chronic – happens over time
- ▶ The earlier it is experienced the more the child is affected
- ▶ The more ACEs, the more likely the child is to have long-term effects
- ▶ Can have a greater effect on a child with high sensitivity
- ▶ **Can be modulated by a responsive environment- (FACTOR OF PROTECTION)- CARING ATTACHMENTS**

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**Interactive Factors for ACEs**

<b><u>SENSITIVITY</u></b>	X	<b><u>STRESS</u></b>
<ul style="list-style-type: none"> <li>• Genetics</li> <li>• Pre-natal stressors</li> <li>• Peri-natal stressors</li> </ul>		<ul style="list-style-type: none"> <li>• Separation</li> <li>• Shame</li> <li>• Alarm</li> </ul>

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**The Effects of Complex Childhood Trauma**  
 Australian Childhood Foundation

- ▶ **Trauma significantly alters baseline physiological arousal levels in children.**
  - The amygdala becomes kindled, releasing stress hormones into the body and brain
- ▶ **Trauma reduces cortical capacity to regulate subcortical activation in children.**
  - The prefrontal cortex functioning is hijacked and is also less developed due to stress hormones. Emotions take over.
- ▶ **Trauma disrupts memory functioning in children.**
  - The hippocampus focuses on survival, not on memory transfer
- ▶ **Trauma restricts the attentional capacity of children.**
  - The Limbic System is preoccupied with survival

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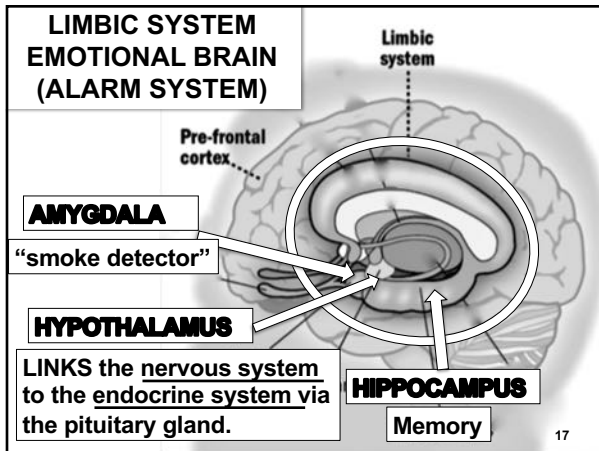
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**SYMPATHETIC NERVOUS SYSTEM**  
**the system of ACTIVATION**

<ul style="list-style-type: none"> <li>• <u>Cortisol</u> – increase blood sugar – suppress immune system</li> <li>• <u>Adrenaline</u> – increases heart and respiratory rate</li> <li>• <u>Norepinephrine</u> – responsible for vigilant concentration</li> <li>• <u>Growth Hormone</u> – increases glucose</li> </ul>	<ul style="list-style-type: none"> <li>• Constricts blood vessels</li> <li>• Suspends "rest &amp; digest"</li> <li>• Sharp Increase in Breathing &amp; Heart Rate</li> <li>• Blood diverts to Muscles</li> </ul>
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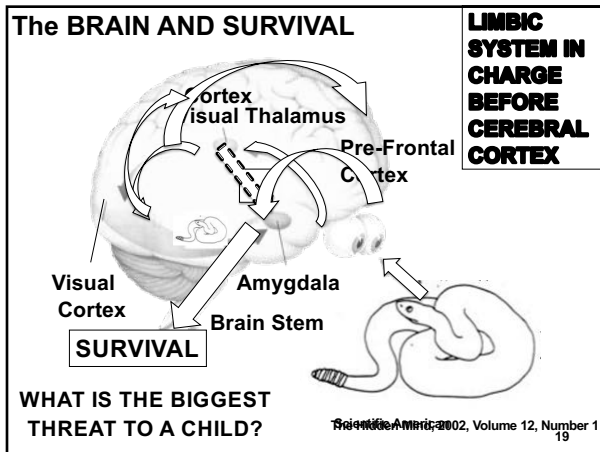
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- REACTING TO A THREAT**
1. **FREEZE** - size up  
- look for Attachment (PURSUIT)
  2. **FLIGHT** – flee first  
move to Caution (ALARM)
  3. **FIGHT** – if overtaken-defend  
Attack (FRUSTRATION)
  4. **NUMBING OUT** – system withdraws  
**DEFENSIVE DETACHMENT**
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**Effects of Adverse Childhood Experiences**

**Eamon McCrory et al. U College London, 2011**

Children exposed to family violence show the same pattern of activity in their brains as **SOLDIERS EXPOSED TO COMBAT**.

Exposure to family violence was associated with **increased brain activity** in the **AMYGDALA** when they were shown pictures of angry faces.

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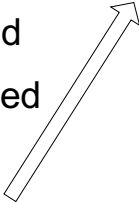
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**Effects of Adverse Childhood Experiences**

**The amygdala is "kindled".**  
 The amygdala continues to fire as though **DANGER** is always imminent

**RAPID ESCALATION:**

feeling terrorized  
 feeling threatened  
 mildly anxious



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**Effects of Adverse Childhood Experiences**

**TRAUMA CHANGES THE BRAIN**

- Karr-Morse and Wiley:  
*–for children of any age, long-term damage can occur from a **single searing trauma** or a **prolonged exposure to chronic stress or fear.***

The body is in a constant state of preparation for defense because **threat is seen everywhere.**

**This affects memory and learning** because the brain requires REST in order to consolidate what has been learned.

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**Effects of Adverse Childhood Experiences**

- HYPER-VIGILANCE –Scanning the environment
- FOCUS is on the **NON-VERBAL**
  - TONE OF VOICE
  - BODY LANGUAGE
  - FACIAL EXPRESSION
  - INABILITY TO UNDERSTAND WORDS
  - BECOMES A BEING OF "SENSATION"

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**Effects of Adverse Childhood Experiences**

Erin E. Edmiston et al., Yale Univ. 2011

Self-reported scores on the Childhood Trauma Questionnaire (CTQ) show that experiences of *physical abuse, physical &/or emotional neglect* can decrease the volume of the PREFRONTAL CORTEX

**MALES = IMPULSE CONTROL**  
**FEMALES = EMOTIONAL REGULATION**

A.P. Jackowski et al., 2008

Children with PTSD had reduced volume in the Corpus Callosum.

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**PREFRONTAL-CORTEX**

Conflicting:  
 • THOUGHTS  
 • FEELINGS

EXECUTIVE FUNCTIONS:  
 • Suppressing Impulses (tempering)  
 • response flexibility  
 • delay of gratification  
 • time management  
 • ability to work

PROVIDES A TEMPERING ELEMENT

Medial prefrontal cortex

Ventromedial prefrontal cortex

ALLOWS US TO APPLY WHAT WE KNOW

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**CORPUS CALLOSUM**

Corpus callosum

• Communication between LEFT Brain & RIGHT Brain  
 • Transfers MOTOR, SENSORY, and COGNITIVE information between the brain hemispheres.  
 • INTEGRATION OF INFORMATION

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LEFT HEMISPHERE	NEO-CORTEX	RIGHT HEMISPHERE
<ul style="list-style-type: none"> <li>• detail-oriented</li> <li>• decontextualizes</li> <li>• finds facts</li> <li>• wants THE RULE</li> <li>• looks for THE ANSWER</li> </ul>		<ul style="list-style-type: none"> <li>• whole-oriented</li> <li>• contextualizes</li> <li>• makes vivid and concrete,</li> <li>• takes in the whole picture</li> </ul>
<p><b>RIGHT HEMISPHERE REQUIRES EXPERIENCES NOT INFORMATION TO DEVELOP</b></p>		
<p><i>The Master and His Emissary: The Divided Brain</i> <b>Iain McGilchrist</b> <sup>28</sup></p>		

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**Effects of Adverse Childhood Experiences**

↑

« HOT COGNITION »

EMOTION

KINDLED AMYGDALA

↓

« COLD COGNITION »

REASON

COMPROMISED PREFRONTAL CORTEX / CORPUS CALLOSUM functioning

**THE DOUBLE INVISIBLE HANDICAP**<sup>29</sup>

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**The Effects of Complex Childhood Trauma**  
Australian Childhood Foundation

▶ **Trauma based behaviour is functional at the time in which it develops as a response to threat.**

- Flight or fight response makes sense to the brain that is trying to survive but causes big problems in a school setting.
  - Flight – avoiding work that makes the child feel vulnerable
  - Fight – attacking those who are trying to make the child do something that feels unsafe
- Hypervigilance is necessary to ensure survival
  - BUT scattered attention makes it difficult for the child to remember instructions or to stay on task

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**The Effects of Complex Childhood Trauma**  
 Australian Childhood Foundation

▶ **Trauma limits children's response flexibility and adaptability to change.**

- When in the survival mode cortisol, norepinephrine cause the brain to put the focus on survival behaviours which stem from the limbic system
- Even though the child "knows better", in the moment, the child cannot "do better" as they cannot access the higher parts of the brain
- Since cortisol is detrimental to brain development, children have access to fewer parts of the cortex than children of the same age. Less prefrontal cortex access and less communication between the hemispheres (corpus callosum)

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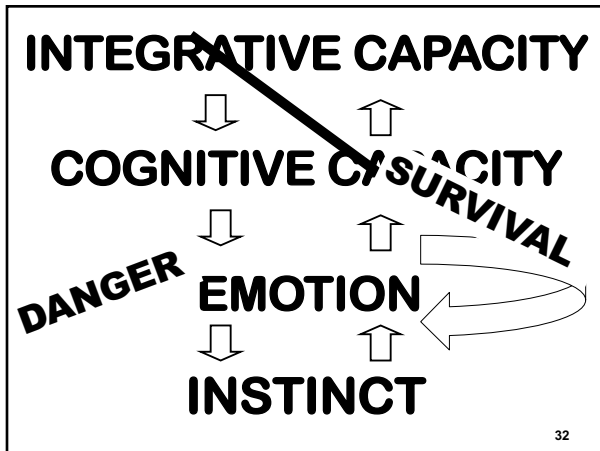
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**The Effects of Complex Childhood Trauma**  
 Australian Childhood Foundation

▶ **Trauma disconnects children from relational resources that can mitigate its effects.**

- Challenging behaviours alienate adults trying to intervene, especially
  - if the child "knows" better but can't "do" better
  - if the child "turns" on them
  - if increasing the intervention does not work or seems to make things worse

▶ **Trauma undermines identity formation in children.**

▶ **Trauma diminishes social skills and isolates children from peers.**

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**WHAT DOESN' T WORK**

**REASONING, TALKING especially about CONSEQUENCES**

- Talking keeps them in high arousal – flight or fight mode – intensifies the agony.
- When the child is in “survival” mode they cannot hear our words, just our tone.
- They can't process language (the words we are using) just keep hearing the TONE
- They can't remember the future (what will happen if they don't stop) – **only feel the intensity of the present moment.**

**Waiting to hear: “And I've had it with you.”**

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**What ELSE happens when we are FACING SEPARATION?**

**THE BRAIN IS MOVED TO FIX THE PROBLEM**

**=**

**E-MOTION**

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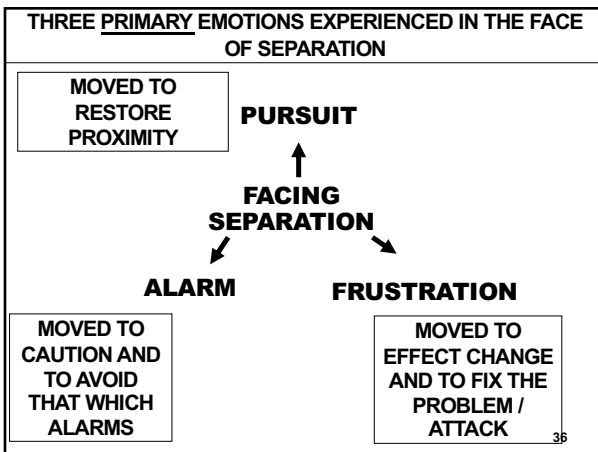
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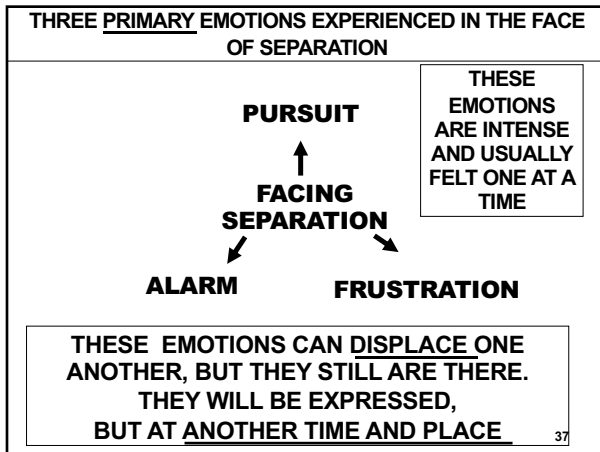
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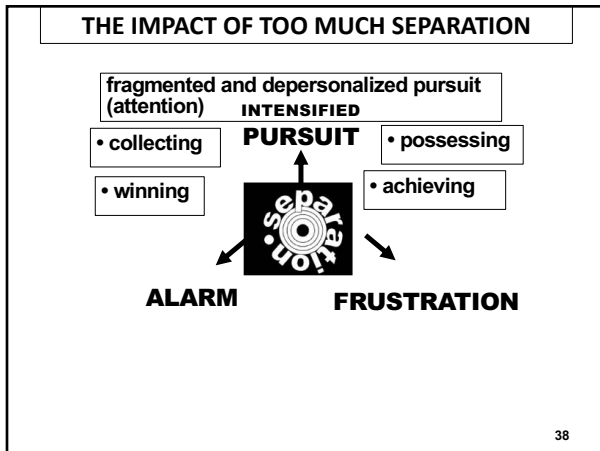
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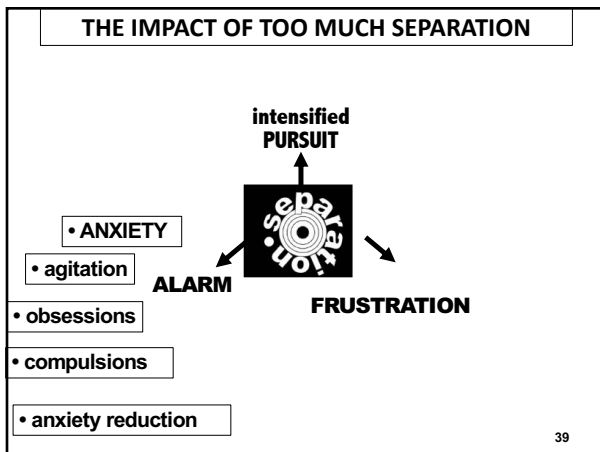
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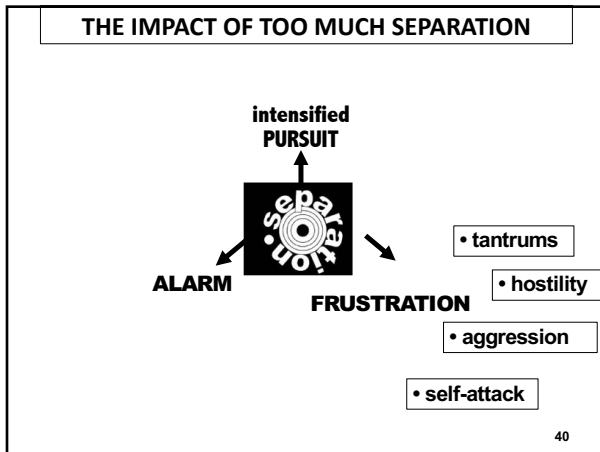
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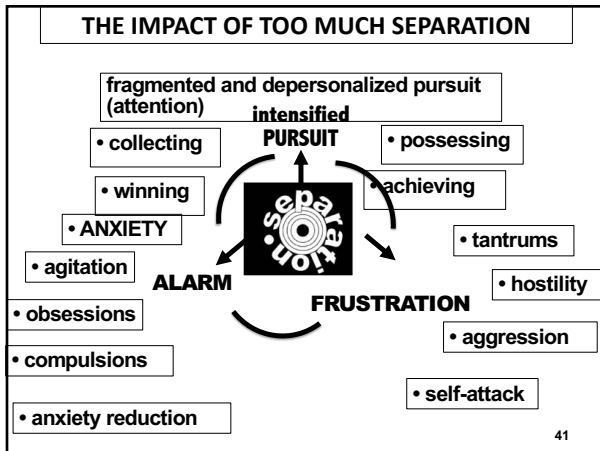
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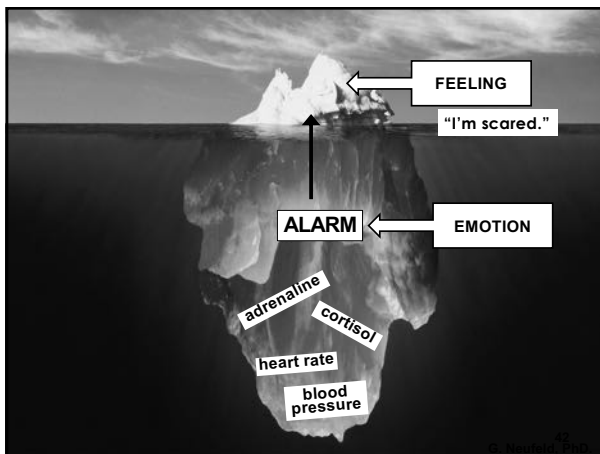
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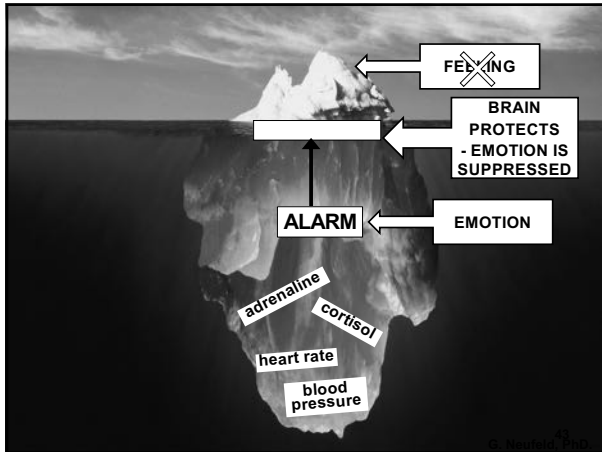
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**Why does our brain protect us?**

It protects us from being overwhelmed by that which makes us feel

**TOO VULNERABLE**

or

**TOO WOUNDED.**

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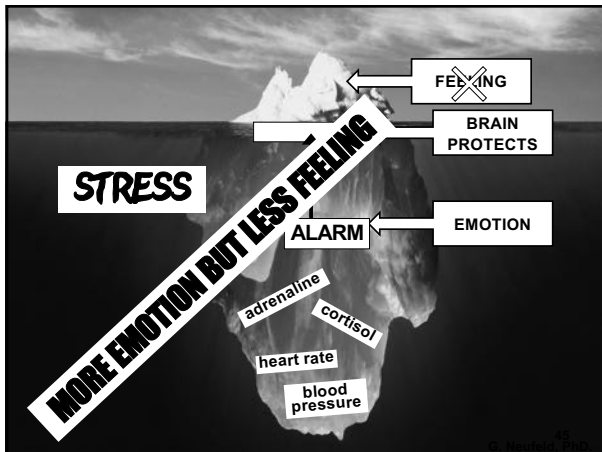
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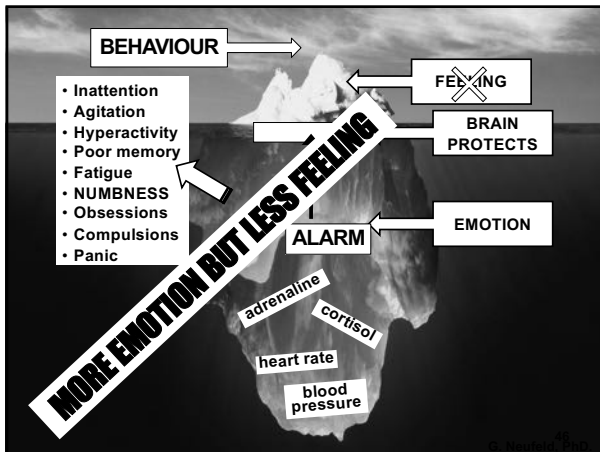
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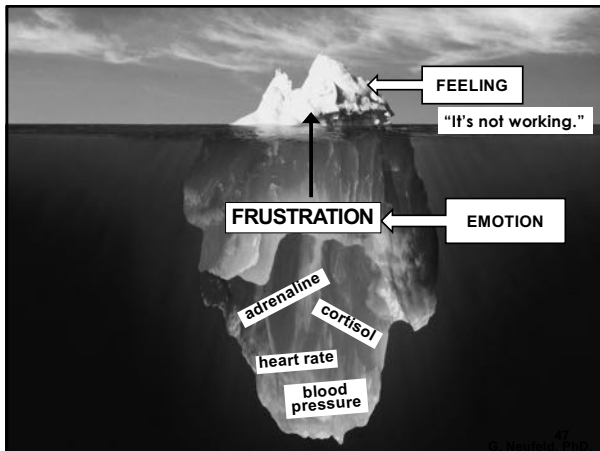
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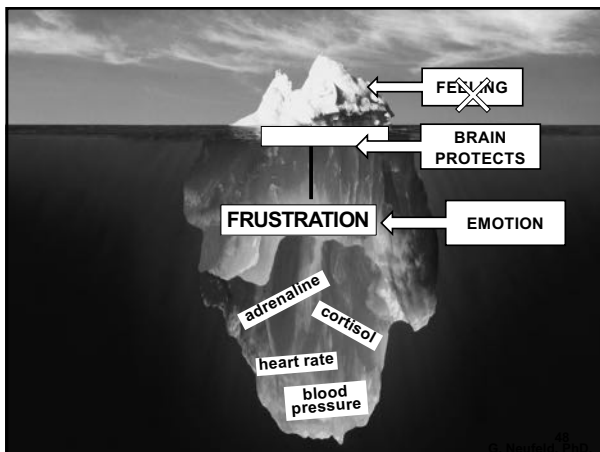
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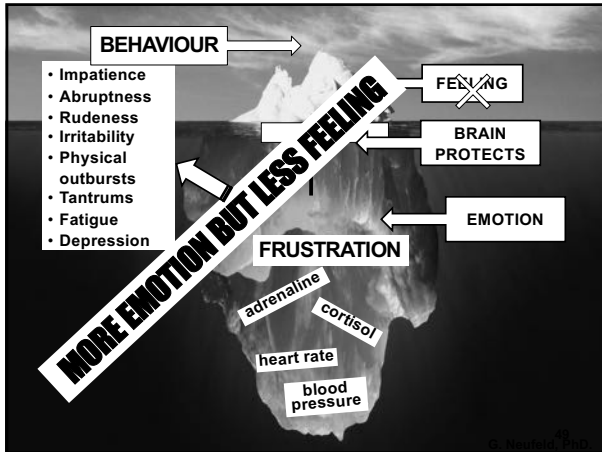
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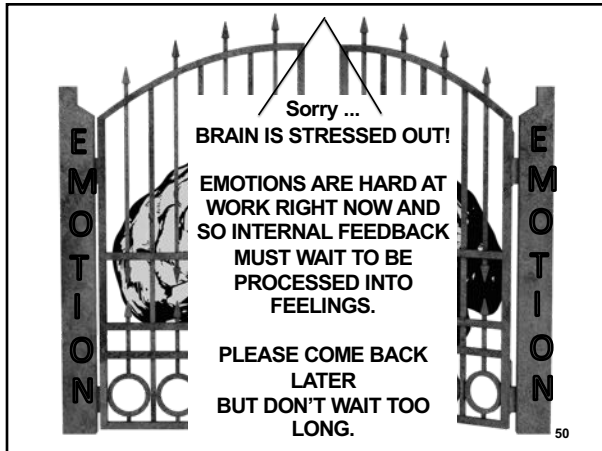
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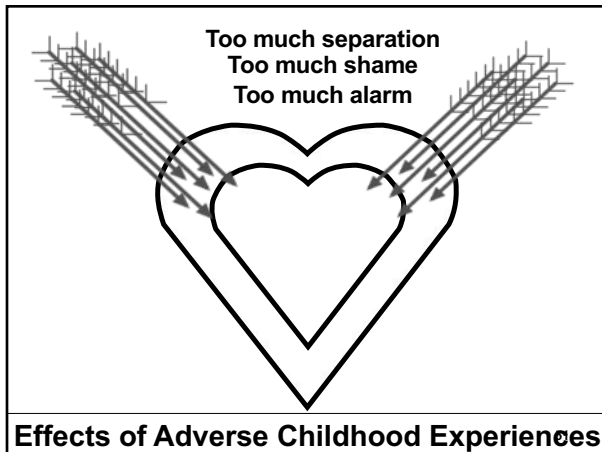
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**THE REASON FOR DEFENSIVE ARMOUR**



- It's not safe.
- It's not safe to express what I am feeling.
- It's not safe to depend or be vulnerable.
- The world is overwhelming and there is no one who can keep me safe.

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**THE COST OF DEFENSIVE ARMOUR**



- a loss of **PLAYFULNESS, RESTFULNESS** and **VULNERABLE FEELINGS**
- a stunting of development - **IMMATURITY**
- less flexibility in distressing scenarios (the hardening results in rigidity)
- a **LOSS OF EMPATHY AND CARING**, resulting in more wounding interaction
- a predisposition to a host of problems that have defendedness at their core
- the loss of ability to heal, recover or bounce back
- the risk of losing caring **ATTACHMENTS**

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When a flower  
 doesn't bloom you fix  
 the environment  
 in which  
 it grows,  
 not the  
 flower.



- Alexander den Heijer

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**Intervening with Complex Childhood Trauma**

**CREATE A SAFE WORLD**

1. Keep child-adult relationships strong
  - Don't let the behaviour cause divisions
  - Find ways to reassure the child even when it has been a difficult day
2. Minimize the experience of SEPARATION
  - Analyse often used interventions for **hidden sources of separation**
3. Compensate for the effects of Trauma (over-reactivity and immaturity) to help the child behave successfully
  - Provide options for when overwhelmed
  - ANTICIPATE and PREVENT

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**Intervening with Complex Childhood Trauma**

**CREATE A SAFE WORLD**

4. Provide structure and predictability
5. Build a team of interveners
  - Use adult resources in the school creatively
6. Offer a variety of intervention options
  - Provide safe spaces in the classroom
  - Create a Nurturing Support Centre
  - Provide a safe place to express emotions
7. Aim to soften the defensive armour through emotional expression and play
  - Help the child to find their tears
  - Provide many opportunities for Play

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**Upcoming Event**

**CENTRE OF EXCELLENCE FOR BEHAVIOUR MANAGEMENT**  
www.cebm.ca

**PROFESSIONAL DEVELOPMENT - ONLINE**

Elementary and Secondary  
DATE: Tuesday, March 16, 2021  
TIME: 4:00 pm to 5:00 pm

**Part II: Trauma-Informed Interventions\***

**March 16th, 2021  
4:00-5:00 PM - ONLINE**

**PART 2: Trauma-informed interventions**

**CLICK HERE to register**

**www.cebm.ca**

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[www.cebm.ca](http://www.cebm.ca)



A website with Trauma-Informed and Developmentally Friendly interventions for schools. 58

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TRAUMA RESOURCES

Books:

- Bessel Van der Kolk: *The Body Keeps the Score*
- Bruce D. Perry & M. Szalvavitz: *The Boy who was Raised as a Dog*
- Nadine Burke-Harris: *The Deepest Well*
- Regalena Melrose: *Why Students Underachieve*

Websites:

- Australian Childhood Foundation: <https://www.childhood.org.au/>
- The effects of Adverse Childhood Experiences (ACE Study) [www.cdc.gov/violenceprevention/childabuseandneglect/acestudy/index.html](http://www.cdc.gov/violenceprevention/childabuseandneglect/acestudy/index.html)
- Child Trauma Academy (Bruce Perry): <http://childtrauma.org/>
- Burke Foundation (Nadine Burke Harris): <https://burkefoundation.org/what-drives-us/adverse-childhood-experiences-aces/>

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