Understanding the Neurobiology of Complex Trauma

Building a framework for effective practice with children, young people and their network of relationships.

The Y Ballarat
November 26 2022

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The Australian Childhood Foundation acknowledges the Aboriginal and Torres Strait Islander peoples as the traditional custodians of this land and waters. We pay our respects to their elders past and present and to their children who are the leaders of tomorrow. We acknowledge their history and living culture and the many thousands of years in which they have raised their children to be safe and strong.

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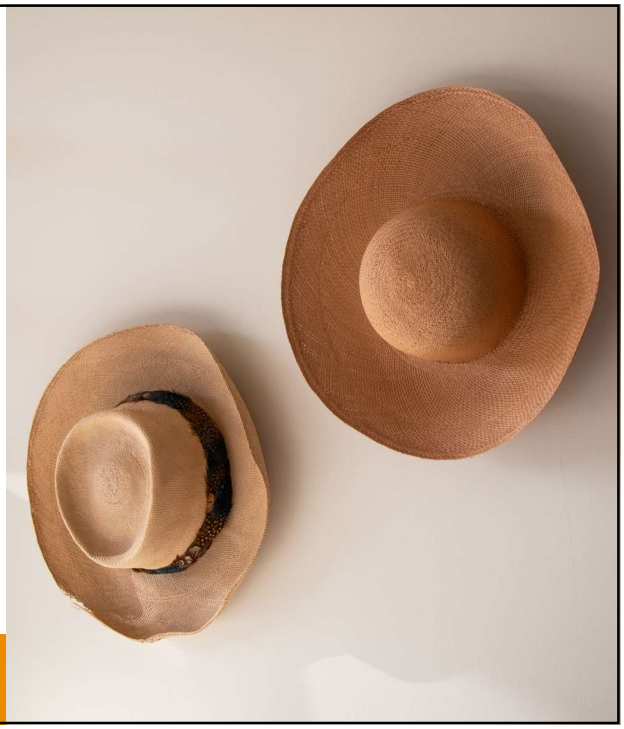
Safety

The content of this training can evoke strong emotions and may stir up personal experiences of trauma.

Please be mindful of your own wellbeing during this training and if you need support please ask the facilitator.



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Housekeeping

-Breaks & Nourishment

(Please do not forget to vote if you have not already)

-Confidentiality

-Adult Learning Environment

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Learning outcomes

- ✓ Learn in detail about brain/body development through childhood
- ✓ Understand the ways that trauma shapes children and young people's states, needs and experiences
- ✓ Develop creative and evidence based approaches and practice strategies to enable children and young people to communicate and transform their experiences of trauma,
- ✓ Build approaches that resource change across all environments in which children and young people live, learn and relate.

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Consider a teacher who taught you, and had a positive influence on you... What do you remember about them? How did they make you feel?

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ACF Model of Care

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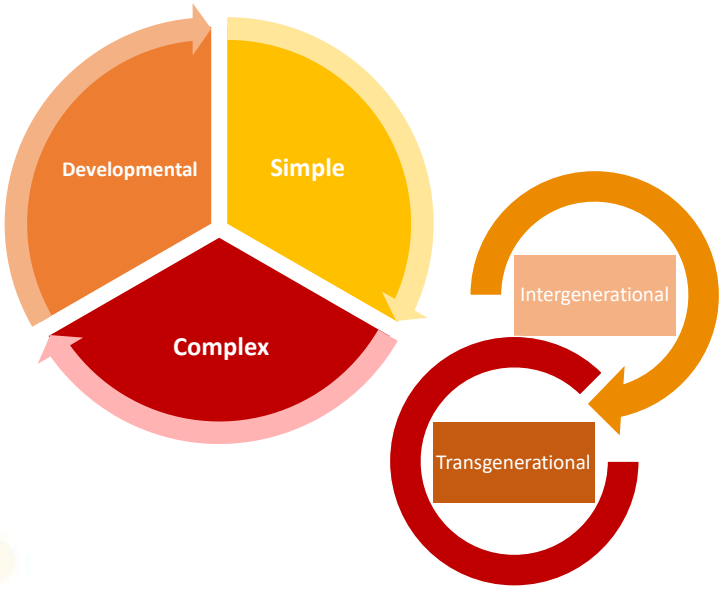
Defining trauma

Any single, ongoing or cumulative experience which:

- is a response to a **perceived threat**, usually to survival
- **overwhelms** our capacity to cope
- feels/is **outside our control**
- often evokes a **physiological** and **psychological** set of responses based on fear or avoidance



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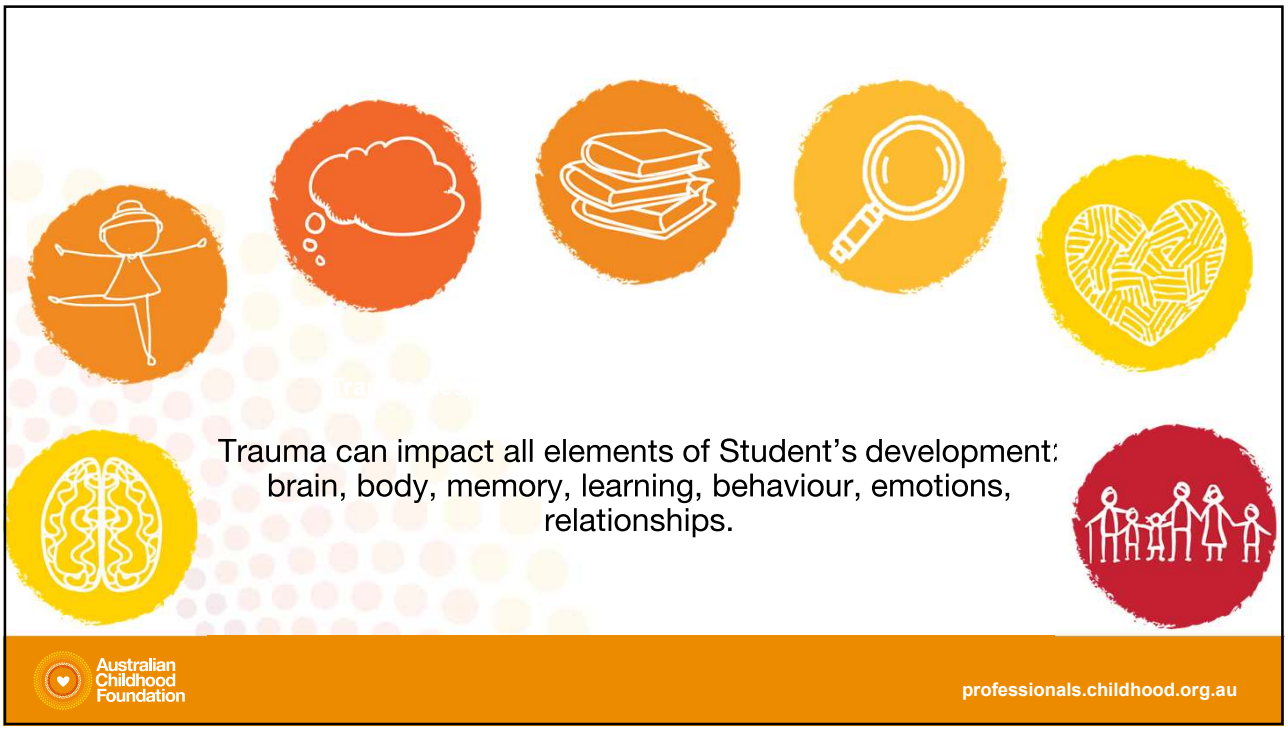
Trauma can impact all elements of Student's development: brain, body, memory, learning, behaviour, emotions, relationships.
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BRAIN DEVELOPMENT
and the impacts of trauma
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The Importance of Culture

How did you become who you are?

Safety: Belonging
Relationships: Connection
Meaning making: Identity

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Brain development

- The brain develops through a mix of genetics and environmental factors.
- Key to this development are relationships
- The brain develops sequentially from the bottom up

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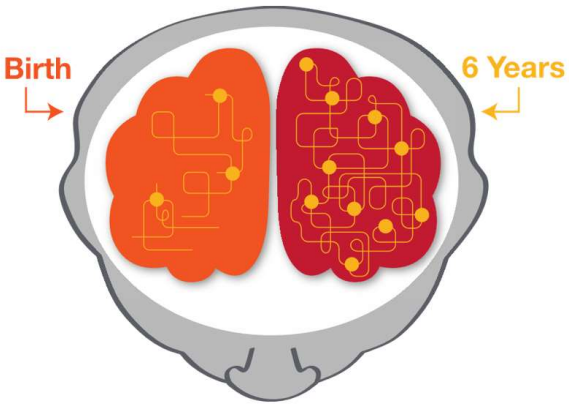
Neuronal connections

- The neural system has the ability for one neuron to communicate with up to 10,000 other neurons
- The newborn brain has approximately 100 billion neurons



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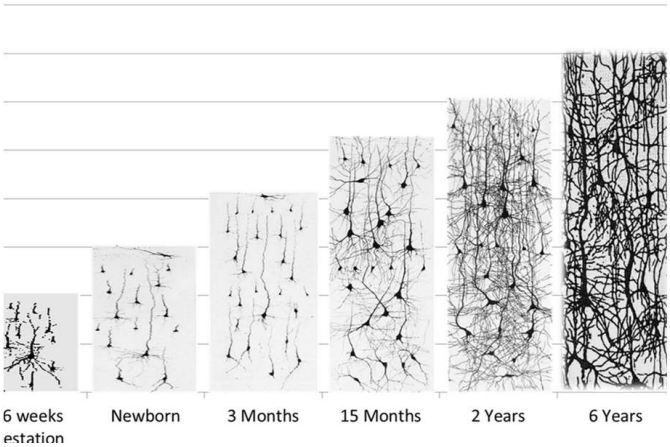
Neuronal development



- Rapid growth occurs from birth to 6 years
- **Critical period** of development
- Healthy neuronal development occurs through **relationships, regulation, repetition**

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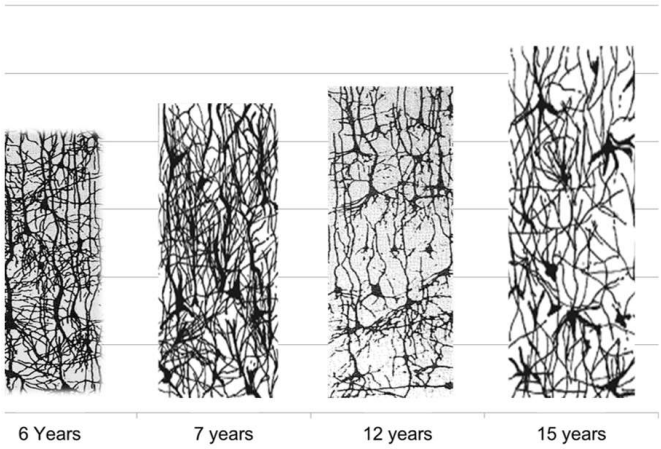
Neuronal development



- Early years – period of **rapid growth**
- Followed by onset of puberty in which **synaptic pruning** and **formation of new neurons** occurs.

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Sequential brain development – building blocks

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Brainstem - basic life functions

- Basic life functions
- First part of our brain to develop
- This is the most developed brain part at birth
- Responsible for our heart beat, breathing, sucking, temperature control, blood pressure

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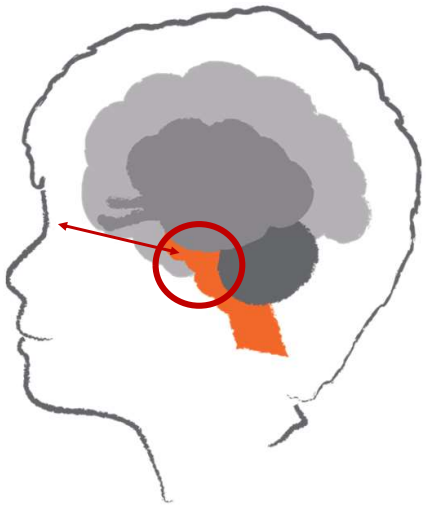
Superior Colliculus

- Processes visual threats – looming objects identified by cells in the retina of the eye
- Retinal neuronal input received by Superior Colliculus which engages the body in **Avoidance and defensive behaviours**



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Cerebellum- movement and balance

- Helps us to know where our body is in space
- Helps us with our posture and balance
- Helps us not to fall over and to control our movements
- Has its own connective pathways between the
  2 halves- cerebellar vermis

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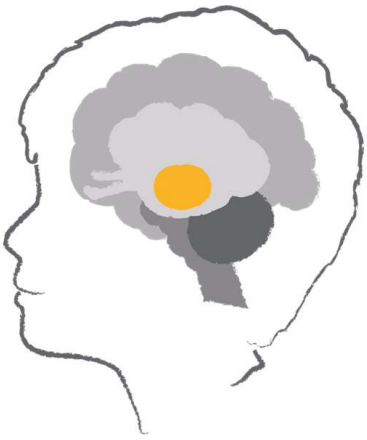
Diencephalon - sorting & sending centre

- This area of the brain develops mainly after birth
- It sorts out messages coming into the brain and sends them
- It uses hormones to send signals to body
- Hormonal signals tell your body what it needs, eg. food, water, love



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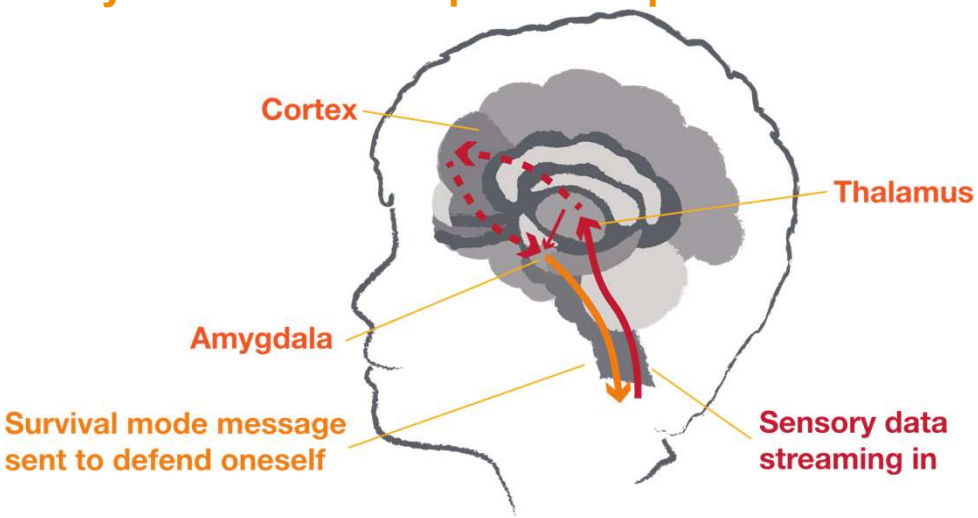
Sensory information response sequence



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8 senses

1. **Visual**
2. **Auditory**
3. **Olfactory** (smell)
4. **Gustatory** (taste)
5. **Tactile System** (touch)
6. **Vestibular** (sense of head movement in space)
7. **Proprioceptive** (sensations from muscles and joints of body)
8. **Introception** (awareness of basic primary functions – hunger, toileting, breathing)

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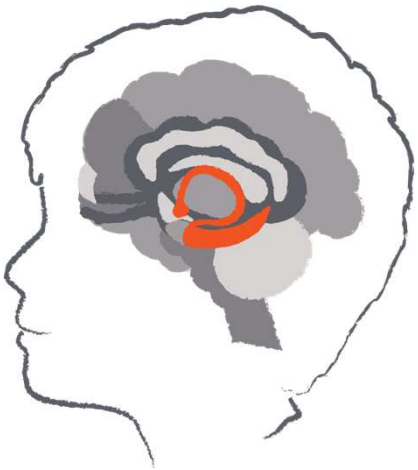
Limbic lobe- emotional gateway

- The part of the brain that helps us attach an emotion to an experience or memory
- This part of the brain is particularly involved with the emotions of fear and anger
- Also heavily involved in attachment processes
- This area develops mainly after birth

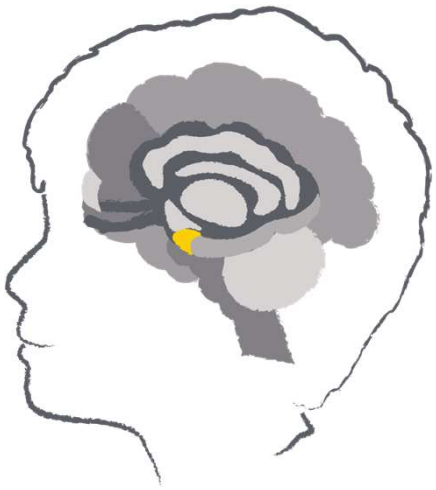
Hippocampus – Brain's historian

- Explicit memory system
- Develops approximately 2-3 years of age
- Provides context to memory and embeds long term memory



Amygdala – smoke alarm

- Detects threat
- Develops from birth
- Learns by association
- Involved in implicit memory processes



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Cerebral cortex- complex thinking

- The largest part of the brain
- Associated with higher brain function such as thought and action
- Examples of functions:
  - Reasoning
  - Logic
  - Judgement
  - Voluntary movement

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The prefrontal cortex- executive function

- Responsible for executive functions, such as judgement, reasoning, and self awareness
- Final part of the brain to reach maturity in one's mid 20s
- Under reconstruction in adolescents from the age of approximately 12 years

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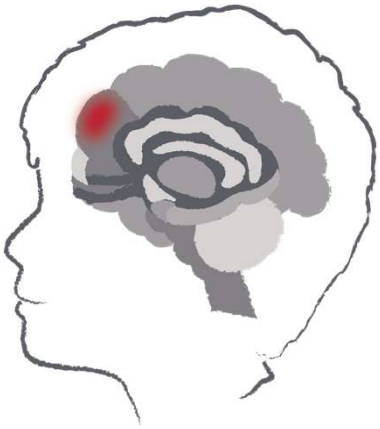
Medial prefrontal cortex

- Associated with perceptions of self and similar others
- Known as centre for mindfulness
- Involved in maternal bonding – the parent child dyad and inter-subjectivity



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Hemispheric integration

Left Hemisphere

- Evaluates language content
- Optimistic hemisphere
- Understands beginning, middle and end
- Learns from the past and expects the future
- Looks for patterns

Right Hemisphere

- In the present moment
- Eye contact
- Facial expression
- Tone of voice
- Posture
- Gesture
- Intensity
- Is mute
- Grasps the whole

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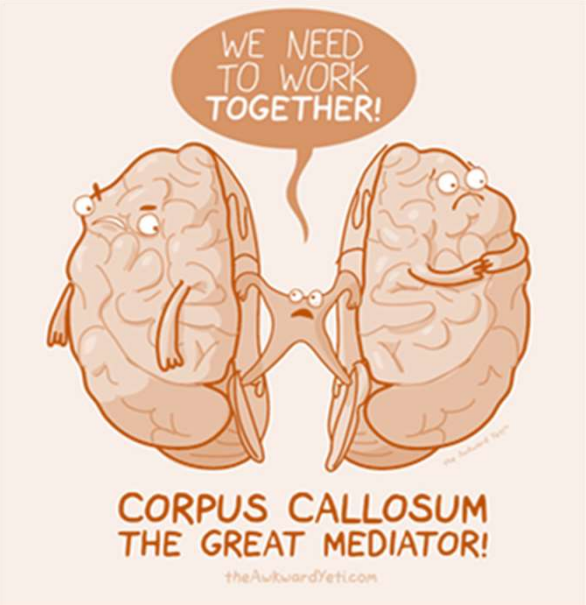
Corpus Callosum



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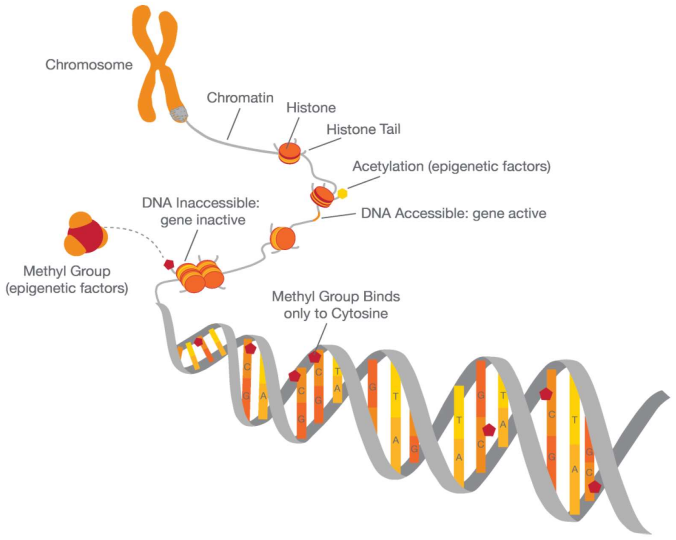
Epigenetics

"The study of inheritable changes in gene function without the change in the DNA sequence"

Journal of Science



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Epigenetics

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Strategies for building healthy brain development

Brain area	Function	Activity ideas
Brainstem & Diencephalon	Basic survival & sensory processing	Pacification or stimulation. Activities in the child's preferred sensory modality
Cerebellum	Coordination of movement	Using music, rhyme and movement activities
Limbic	Emotional processing	Building relational connection through plays, animals, games
Cortex	Thinking processes	Linking experiences and sensations to words and descriptions
Prefrontal cortex	Analytical and abstract thinking	Challenges and safe risk taking activities

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I need to feel SAFE…

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Polyvagal theory and Protective Responses

by Stephen Porges

Behavioural Functions	Body Functions
Social Engagement Soothing and calming Indicates safety	• Lowers or raises vocalisation pitch • Regulates middle ear muscles to perceive human voice • Changes facial expressivity • Head turning • Tears and eyelids • Slows or speeds heart rate
Mobilisation Fight or Flight Active Freeze Moderate or extreme danger	**Hyper arousal** • Increases heart rate • Sweat increases • Inhibits gastrointestinal function • Narrowing blood vessels - to slowblood flow to extremities • Release of adrenaline
Immobilisation Collapse or submission Death feigning Increased pain threshold Conserves metabolic resources Life threatening situations	**Hypo - arousal** • Slows heart rate • Constricts bronchi • Stimulates gastrointestinal function

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The social engagement system

https://www.youtube.com/watch?v=lxS3bv32-UY

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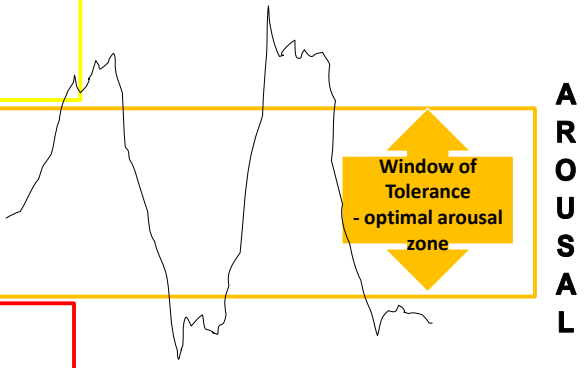
Changes in Arousal States

Affect:	Shame, anger
Thought:	"I'm a screw up, this is unfair"
Behaviour:	Hitting, running away
Sense of self:	"I am bad, I am broken"
Consciousness:	Hyper-focused, narrow, rigid

frozen, emotionally reactive, racing thoughts, hyper-arousal, impulsive, aggressive

Affect:	**Joy, pleasure**
Thought:	**"This is fun, "I'm good at this"**
Behaviour:	**Increased, sustained effort**
Sense of self:	**"I'm competent, I can do this"**
Consciousness:	**Focused and flexible**



Affect:	Shame
Thought:	"I don't care, I can't do it"
Behaviour:	Collapsing, spacing out
Sense of self:	"I am bad, I am broken"
Consciousness:	Diffuse, spacey

Numb, lethargic, collapsed, cognitively slowed, withdrawn, distant

(Adapted from Ogden & Fisher, 2015)

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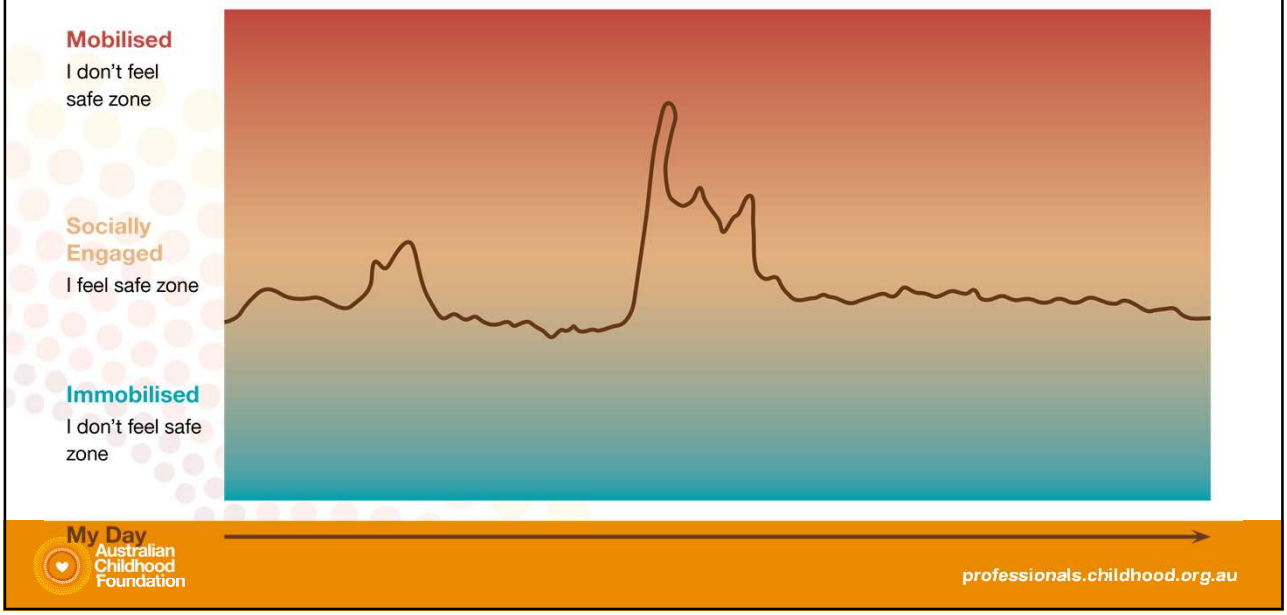
My Day feeling safe and unsafe



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What trauma or stress response can look like

Cognitions & Behaviours:

- Asking lots of questions
- Bravado (speech or actions)
- Attention, concentration and memory difficulties
- Black & White thinking, negative thoughts
- Generalised worries
- Rigid thinking & behaviours
- Compulsions/ repetitive behaviours
- Ruminating – what if's, should, cyclic thoughts

Mobilised Responses:

- Hypervigilant
- Edgy/jumpy
- Irritable – easily annoyed
- Poor recovery from distraction
- 'silly', loud, over-excitement
- Unsettled, sleep difficulties
- Outbursts, aggression
- Defensive, taking things personally
- Increased expectations of self and others
- Inflexible, 'controlling'
- Sensitive to sensory input

Immobilised Responses:

- Flat, numb affect
- Disengaged, disinterested
- Withdrawn
- "boredom"
- Lethargic, unmotivated
- Disconnected from peers
- Developmental regression – e.g. with abilities to self-soothe, self-care/hygiene, toileting
- Changes to appetite

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Working with Protective Responses

Increase Resources – Regulatory Capabilities

Calm the brain with:

- Long outbreaths
- Mindful activities
- Orienting outwards
- Connection & Co-regulation
- "Name it to tame it"

De-activate Mobilised Responses with:

- Rhythm (drumming, music, swinging, rocking, bouncing)
- Stretching/Yoga
- Carrying heavy items
- Heat pack, weighted blanket
- Reduce stimulation
- Hugging a teddy/cushion

Counter Immobilised Responses with:

- Grounding through the senses
- Proprioceptive input
- Splash face with cold water
- Something cold or sweet to drink
- Chewing candies/sucking a mint/lollipop

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How do you promote safety for the families you work with?

Think about:

- Client's perception of safety
- Physical & emotional safety – triggers
- Risk of re-traumatisation – triggers
- Attunement
- Body language
- Cultural safety
- The language you use
- Environmental safety – service space – warm/cold, dark/light, noise, colours etc
- The worker-client relationship- trust, respect, transparency
- Addressing both child AND parental trauma

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Strategies to promote neuroception of safety

Physiological safety

Relational safety

Environmental safety

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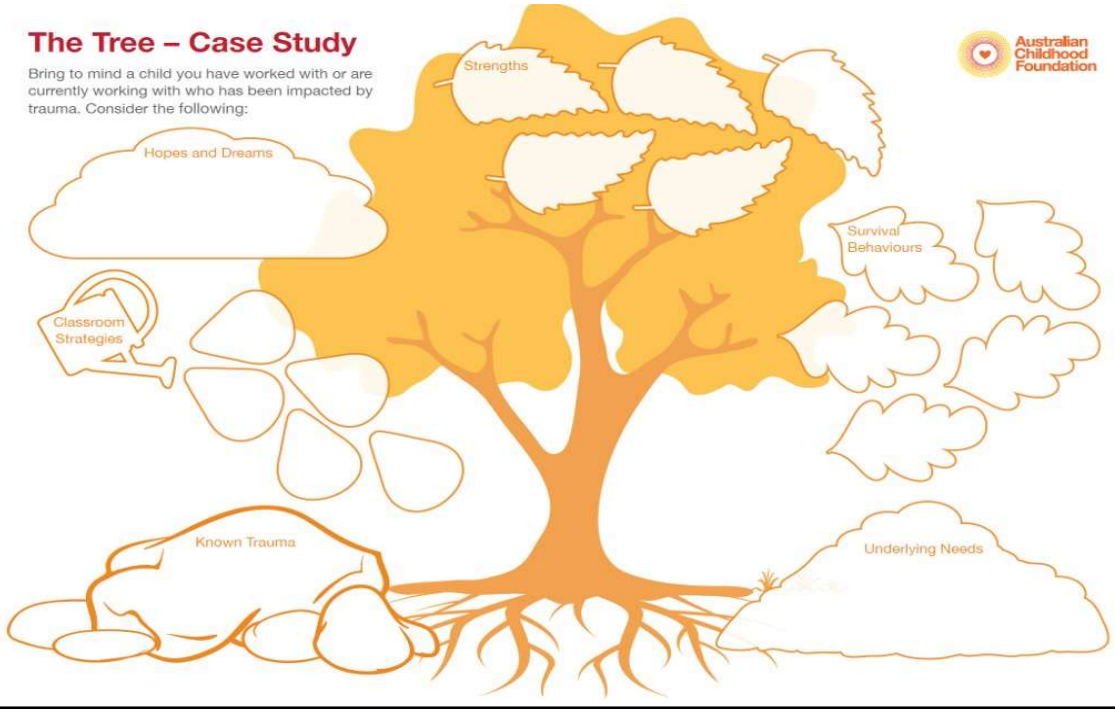
The Tree – Case Study

Bring to mind a child you have worked with or are currently working with who has been impacted by trauma. Consider the following:



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I need safe and attuned RELATIONSHIPS

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Relationships as Anchors

Accompaniment is an experience for a child that offers emotional reciprocity, validation, care and comfort. In this experience they feel heard, met, felt and understood

" Children internalize the people who understand and comfort them, so that they often have the felt sense of accompaniment when they are alone"

Bonnie Badenoch

- Share meaning making experiences
- Understanding that the challenging behaviors result from their specific vulnerabilities and needs
- Focusing on and amplifying the child's strengths and talents
- Using consistent and positive reinforcement

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Relationships as Anchors

The concept of ***"showing up"*** which means :

- offering a quality of presence
- bringing your whole being, attention and awareness to the Child/Young Person
- providing an experience that enables them to expect positive interactions from others and themselves
- creating neural pathways in a student that will lead to selfhood, grit, strength and resilience

Dan Siegel and Tina Payne – The Power of showing Up: How Parental Presence Shapes Who Our Kids Become and How their Brains Get Wired

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Predictable You

"I've come to a frightening conclusion that I am the decisive element in the classroom. It's my personal approach that creates the climate. It's my daily mood that makes the weather. As a teacher, I possess a tremendous power to make a child's life miserable or joyous. I can be a tool of torture or an instrument of inspiration. I can humiliate or heal. In all situations, it is my response that decides whether a crisis will be escalated or de-escalated and a child humanized or dehumanized."

Hiam Ginott

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What might predictability look like in practice?

- For students
- For families
- For all staff
- Systemically

relationships	physical activities
routines	instructions
learning tasks	behavioural expectations

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I need to MAKE MEANING of my world

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Trauma response patterns

To cope with trauma children use initial adaptive responses to survive

This is reasonable as a once off occurrence, but, if they continue they can become maladaptive patterns of behaviour

These responses will be different for an individual child at different developmental stages

Often a combination of appropriate developmental behaviours and maladaptive patterns of behaviour emerge

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Behaviour tells a story

- Traumatised children's behaviour can be difficult and complex for parents, teachers and carers to understand, manage and shape
- However, it is functional and almost always makes sense given their specific experiences of trauma
- Develop openness and curiosity about behaviour
- If we can understand what drives a behaviour, we can work out how to respond to it
- If we can meet the need that is driving a behaviour, the behaviour can start to reduce
- **Some clues**: is the behaviour a fight/flight/freeze/withdraw response? Is it related to hunger/tiredness? Is it a bid for connection or space?

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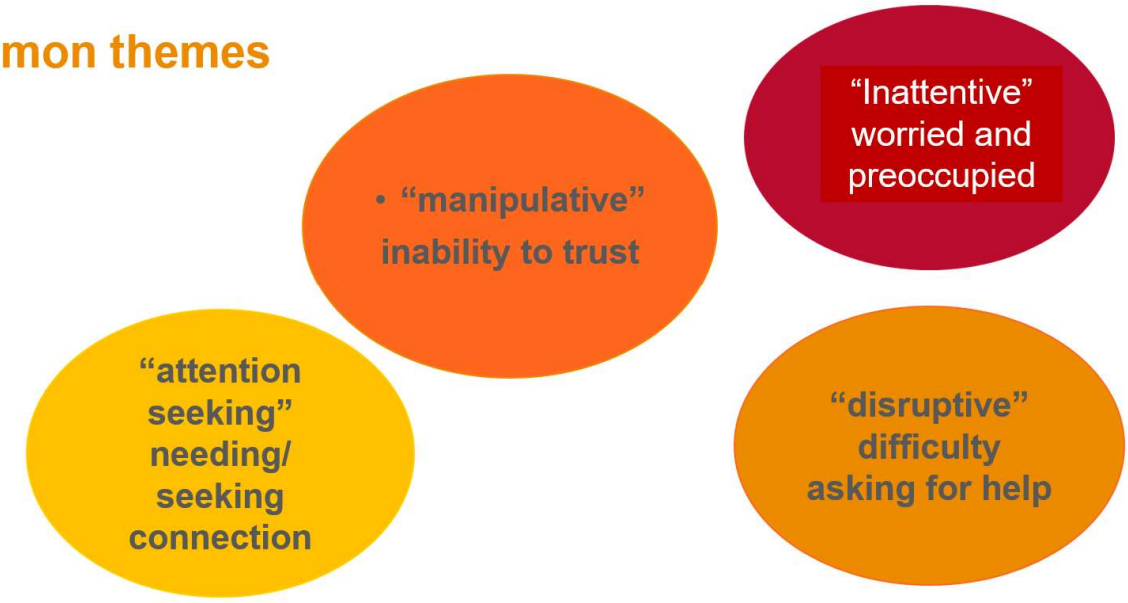
Common themes



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Meaning making

In making meaning we want the child to understand who they are despite their experiences of trauma

And for them to know they are ok, they are loved, they are accepted no matter what trauma symptoms are being expressed.

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Thank you for participating in todays session.

Jen Knoll
jknoll@childhood.org.au

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