

The neuroscience of learning and the biology of stress

December 2022 - Sharon Gray OBE



Case Studies

William Henry Smith School - SEMH Residential

Specialist Education Services - Dual Registered Children Homes

Embark Federation - 16 Schools - Mainstream Primary, Secondary and Special

Meridian Trust - 30 Schools - 14 primary, 14 Secondary, 7 16 - 19 College, 2 Special



Our Key Principles

"We promote a positive sense of self, high aspirations and endless opportunities to achieve outstanding outcomes. We plant the foundations for health, happiness and growth by building strength, confidence and resilience, a love for learning and a tool box to help manage life's challenges. We teach right from wrong, a positive mind-set and the belief and value of a 'can do' approach. We aim for our children to become respectful citizens who have the ability to form healthy relationships and contribute to society, through social and moral purpose and economic responsibility. All our young people are offered bespoke transition to adulthood, College or University."

Sue Ackroyd PRINCIPAL



Meridian Trust



Ofsted Outstanding Provider

Our Children's Homes and Schools



Avocet House

Avocet House opened in April 2005 and accommodates eight boys. It has dual registration as a residential special...



Turnstone House

Turnstone House opened in October 2012 and accommodates eight boys and girls. It has dual registration as a residential...

Our Post 16 Provisions



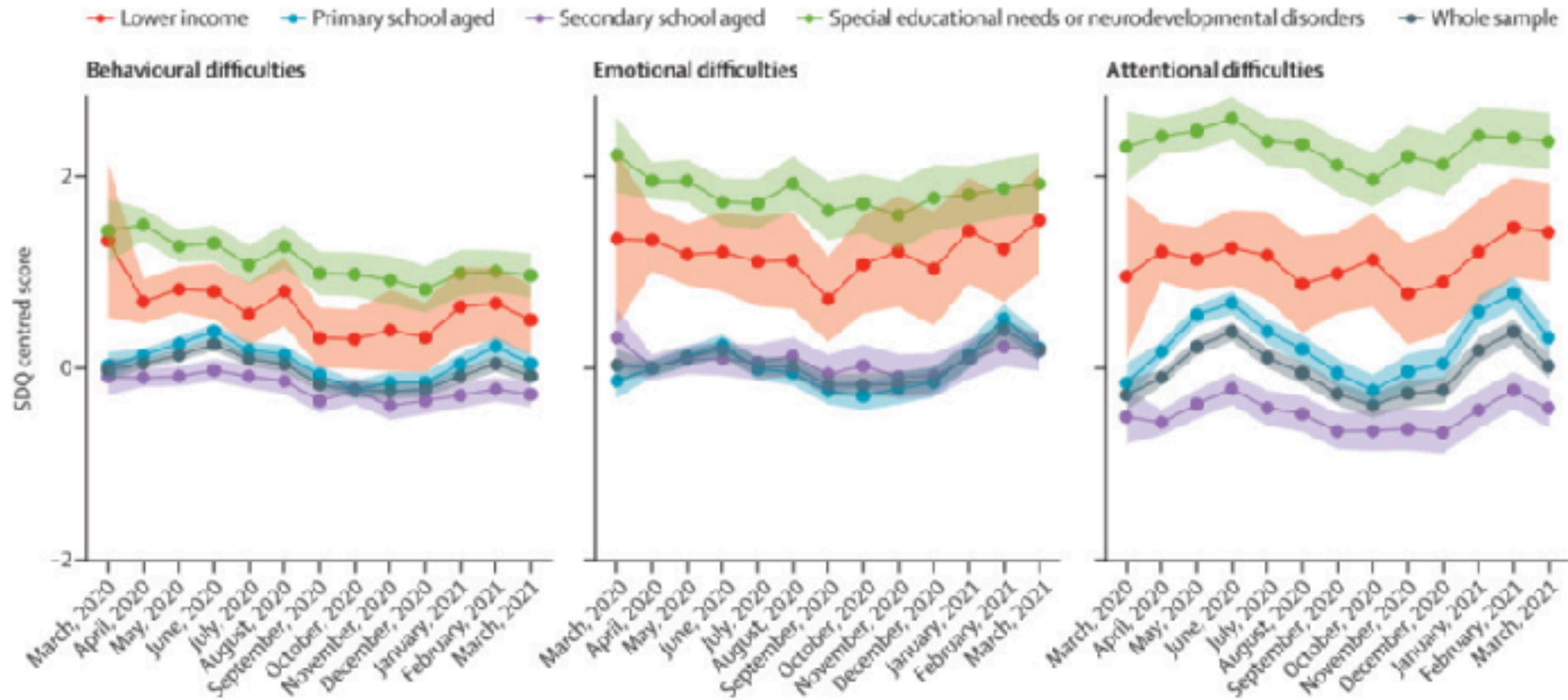
Supported & Residential Living

Designed to serve vulnerable care leavers who, post 16, require and will benefit from a highly personalised, community...

Ultimately, the learnings from the Co-SPACE study are mostly not new. Economic hardship, special educational needs and neurodevelopmental conditions, parental stress, and child and adolescent mental health are closely related.

However, the disruption caused by the pandemic has put these risks for child and adolescent mental health in stark relief. The findings illustrate that some groups of children appear to be less likely to bounce back as restrictions have eased which brings further cause for concern.

<http://cospaceoxford.org/>



Colleagues across the entire system would benefit from being able to identify and....



- understand the basic neuroscience underlying anxiety, fear, anger and rage - possibly as a result of adverse childhood experiences - ACEs
- how to support children (and ourselves) to manage stress regulation
- recognise some of the behaviours that communicate anxiety, fear, anger and rage
- develop ways to help children to recognise sensations and linked emotions - to stop feel and then think about responses
- develop ways of helping children to regulate their emotions and feelings, to stop think and then choose a response
- increase self-awareness and understanding of one's own triggers for anxiety, fear and anger

neuroscience

/ˈnjʊərəʊsɪəns/

noun: neuroscience; plural noun: neurosciences

1. any or all of the sciences, such as neurochemistry and experimental psychology, which deal with the structure or function of the nervous system and brain.
2. Neuroscience, also known as Neural Science, is **the study of how the nervous system develops, its structure, and what it does.** Neuroscientists focus on the brain and its impact on behaviour and cognitive functions.

ACE Study



- Decade long - 17,000 people involved.
- Looked at effects of adverse childhood experiences over the lifespan.
- Largest study ever done on this subject



The ACE study revealed irrefutable evidence showing that childhood experiences are the most powerful determinants of who we become as adults.

And that traumatic childhood experiences – when unaddressed – have a significant graded relationship to the development of the most troublesome health, mental health and social problems of today

Attachment aware, trauma informed approaches, why so important across the entire system???

Our stress-regulation system involves:



- brain
- aspects of nervous system
- aspects of endocrine (hormone) system

Our stress-regulation system is vital to our survival and is activated by our primitive survival circuits: rage, fear and separation distress.

Exploring our own stress regulation system



a - What are your sensations - what is happening in your body that indicates that things are not ok?

b - What are your feelings/emotions - what is the emotional or felt reaction that accompanies these sensations?

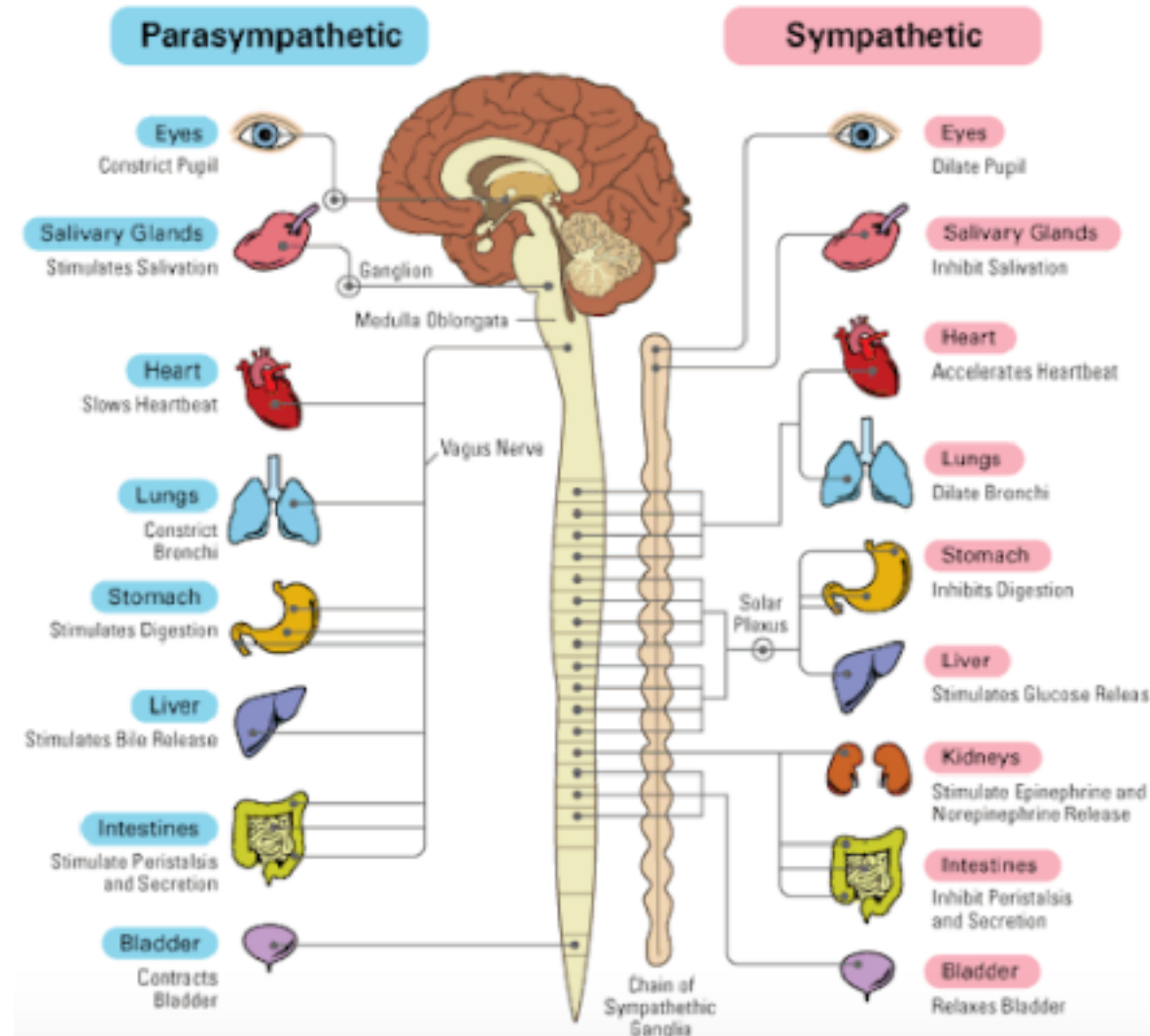
c - What are your immediate behaviours - what would others around you see in your behaviour (external manifestation of emotions/feelings)

Now, consider how you might regain control and take appropriate actions

The autonomic nervous system



The **parasympathetic nervous system** – acts like a **brake**, slowing us down to rest, digest and connect, or in extreme situations to shut the body down in the freeze response.



The **sympathetic nervous system** – acts like an **accelerator**, preparing us for action, such as fight or flight

Social engagement system



Safety - Social engagement system

Regulated by parasympathetic nervous system (myelinated vagal system)

Optimum level of arousal

Steady heart rate and breathing

Relaxed, calm and responsive

Connect to others through eye contact, facial expression, vocalisation



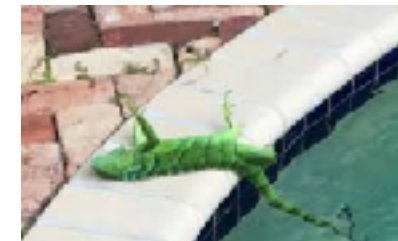
Danger - Fight/flight response

- Regulated by sympathetic nervous system
- Mobilisation
- Hyper-arousal
- Racing heart and fast breathing
- Alert, tense, angry or fearful
- Defensive towards others



Life Threat - Freeze response

- Regulated by parasympathetic nervous system (unmyelinated vagal system)
- Immobilisation
- Hypo-arousal
- Reduced heart rate and shallow breathing
- Numb, dissociated, collapsed
- Withdrawn and shut-down from others





Anxiety and stress

If stress in early life has disrupted the child's development, their stress response will be poorly regulated.

The child's brain is like a trigger-happy alarm system, wired to fire at any sensory stimulus that is reminiscent of an earlier threatening situation: a voice tone, a sudden movement, a smell that triggers unconscious memories. The survival response is triggered that propels the child into fight, flight or freeze.

When the child feels threatened, they have limited access to thinking because their lower brain regions (brain stem and limbic system) are dominant and they are surviving the best way they can.

Learning is therefore blocked until regulation happens and for this, the child is dependent on the presence of a self regulated/regulating adult.

How does the environment we create feel for some of our children - when in our care?



What does Betty do?

Our need for connection.....

“The energy that exists between people when they feel seen, heard and valued;
when they can give and receive without judgement;



and when they derive sustenance and strength from the
relationship.”

Brene Brown 2020

Creating physically and psychologically safe environments for all
stakeholders. Therefore facilitating the secure base from which everyone can
flourish and thrive.

Wholeheartedly



“We live in a world where most people still subscribe to the belief that shame is a good tool for keeping people in line. Not only is this wrong, but it’s dangerous. Shame is highly correlated with addiction, violence, aggression, depression, eating disorders, and bullying.

“Researchers don’t find shame correlated with positive outcomes at all—there are no data to support that shame is a helpful compass for good behaviour. In fact, shame is much more likely to be the cause of destructive and hurtful behaviours than it is to be the solution.”

— Brené Brown, [Daring Greatly: How the Courage to Be Vulnerable Transforms the Way We Live, Love, Parent, and Lead](#)

The key that unlocks the door to learning

Positive human interaction



- Creates the conditions of safety needed for activation of the social engagement system
- Promotes good physiological regulation
- Integrates brain systems by developing the connections between right and left hemispheres, and between the frontal cortex and lower brain structures
- Buffers the negative effects of stress on the nervous system
- Supports the immune system
- Significantly reduces the impact of ACE's!

“Being able to feel safe with other people is probably the single most important aspect of mental health; safe connections are fundamental to meaningful and satisfying lives.” *B.V.D. Kolk*



Guiding principles of welcoming pupils back to school, rupture to repair, relational re-connection to recovery

We will meet our children where they are and won't assume that we know how children are feeling and that they will be the 'same as before'

We will empathise and not judge. We will pro-actively listen and acknowledge concerns, however small we perceive they may be. Many will have heightened anxieties and hidden trauma. We will need to facilitate a *sense of safety* - physically and emotionally.

We will reassure that they will come through this and a new 'normality' will return and we will be right by their side. We will take time to highlight how others have journeyed through adversity.

We will allow our children to catch up with each other and 're-connect socially and emotionally' - they will have a lot to share.

We will ooze positivity by looking for the best in all and celebrating small steps forward, showing exaggerated delight without sarcasm, even in jest.

We will go out of our way to check in with all. Whilst prioritising those most vulnerable and who are known to be grieving, struggling, but be alert to potential hidden troubles and or trauma.

We will focus on relational connection & regulation first, re-establishing relationships, routines, learning habits, slowly, sensitively, truly hearing and responding to our children's voices.

We will prioritise emotional health and well being offering support to those who may be struggling with/through isolation, grief, trauma, anxiety, family, finance - it is likely to be a long journey in front of us all. The best form of therapy is a positive relationship, these will facilitate healing.

We understand that there are no shortcuts to success, we will therefore invest the time needed to get this right for all - we know we only have one go to do this. This is why we have developed our whole Trust/ School response. Together stronger.

We will be emotionally present, smile and welcome children without our words, body language, gesture, pitch, tone, prosody of voice sending the subtle but powerful cues of safety - for many they will be glad to be back. We will be positive, reassuring and welcoming - to all.

We will be child focused, remembering that children are little people not data sets! We know that catching up on lost learning will not happen immediately. We are focussing on the road to success, ensuring the foundations are strong is our absolute priority. We are co-creating a secure base from which we can thrive & flourish.

We will re-connect, re-engage, re-enthuse our children back into a love of learning. Re-training brain/body, habits collectively.

We will go out of our way to look out for each other - we are very much aware that the adults, our staff, our families may also be struggling and they might not be aware of it. Kind candour, trust, honesty will thread like gold grout to ensure ultimate re-connection and emotional containment.

We are prepared to 'show up' to be vulnerable, knowing that these remain unprecedented times, we will try new things, some will work, some will not, maintaining the courage to take our part in this Trust of trusting collaboration, do our bit knowing; The Whole is Greater than the Sum of its Parts.

How our adults endeavour to be, the stance we will take in relationship to support each other, our children, families and wider community.

Everyone a leader, everyone a learner, everyone together, together stronger.



Leading from a place of self-awareness rather than self-defence with compassion, empathy and kindness with candour.

A shared understanding of a 'Child First' Approach

The importance of beginnings, endings and transitions

- Explore feelings about the return to school by asking for letters, drawings or videos
- make an online virtual tour to show the layout of the classrooms, corridors and communal areas
- Help children anticipate new routines through verbal/visual countdowns, rhythm or music
- Consider transitional objects which help the child feel connected and held in mind

Language is a vital means of communication

- Name 1 to tame it - talk through difficult situations like a story
- Use visuals, emojis, shortscripts, role plays, social stories, therapeutic stories to recognise and regulate emotions- "I am feeling...because." and "when I feel... I can..."
- Use warm and welcoming words and be aware of non verbal communication through body language and pitch, tone, prosody or voice - "I've so missed seeing your smile", "When I saw... on TV, I reminded me of you"
- Agree an acronym, concise and factual statements about the passing of relatives and friends, typical responses to grief and coping methods.

All behaviour is communication

Dan Hughes talks about the adult staro-being PAGE

Playfulness - to reduce stress - personalised greetings, fun rehearsal of new routines.

Acceptance - of the child's thoughts and feelings - "I'm wondering if you loved spending time with your parents every day and how sad it seems here?"

Curiosity - to help elicit the child's views - "I've noticed that you have been quiet since coming back"

Empathy - "I'm sensing that this is really tough for you, the classroom looks different since we were last here" The child feels connected and held in mind

The classroom offers a secure base

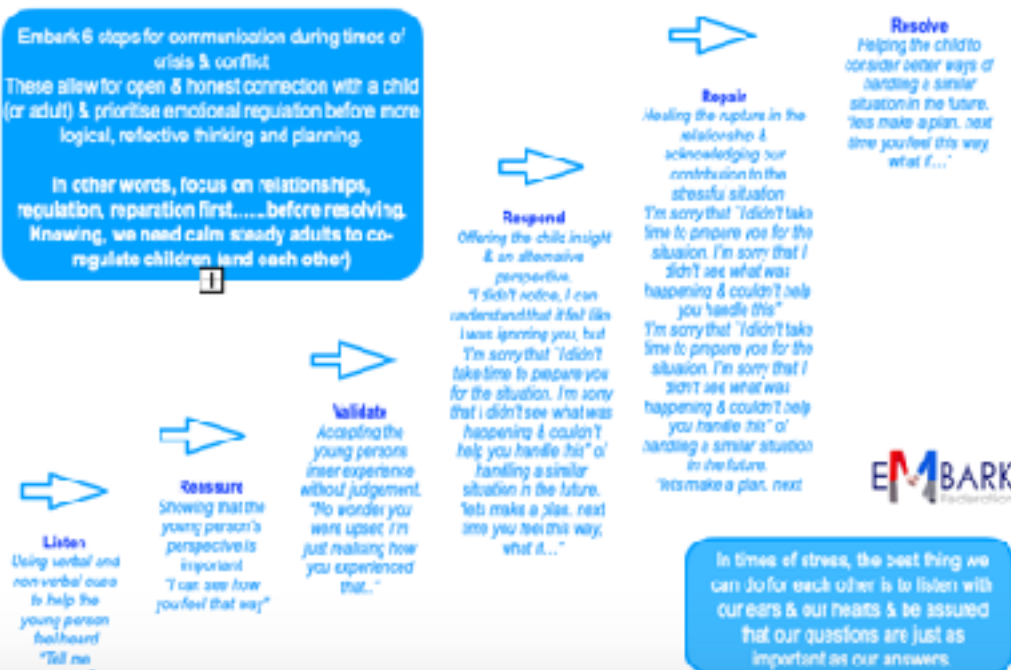
- Consider social & or therapeutic stories which acknowledge the difficulties of the lockdown, welcomes children back to school and shows how things will be "different" and why.
- Emphasise structure and predictability - visual timetables, seating plans, clear labelling of new areas for storing resources, possessions
- Identify designated areas for relaxation & calming sensory input.
- Create a sense of belonging, display photos of the children & key staff

The importance of nurture for wellbeing & self-esteem

- Notice strengths & creativity during the lockdown, ask parents for photos, videos of rainbow paintings, activities done at home
- Offer limited choice in new tasks and routines as a way of providing control, promoting autonomy yet not overwhelming.
- celebrate & remind them of success - keep a look, box, display with evidence of effort and achievements

Learning is understood developmentally

- Rather than 'catching up' we may need to revisit previous learning
- Opportunities for play & activities which evoke togetherness, laughter & satisfaction should be initially prioritised over academic expectations
- provide meaningful, practical and multi-sensory experiences for new learning/ actively with tasks that are broken into small steps and modelled
- Consider attachment needs, tasks which can be completed with little support vs time-limited bursts of independent working & regular reassurance from staff






In times of stress, the best thing we can do for each other is to listen with our ears & our hearts & be assured that our questions are just as important as our answers.

PACE - Dan Hughes
Threads throughout
Secure Stairs approach

Question	Answer
1. How do features of the brain relate to the fight or flight response?	For infants and adults, about our hidden self, the more physiological processes associated with the fight or flight response.
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5. How do features of the brain relate to the fight or flight response?	For infants and adults, about our hidden self, the more physiological processes associated with the fight or flight response.

Think of some features of the following animals. Label their characteristics in the box next to them:

Crocodile		
Monkey		
Human		

Triune Brain Theory

Reptile Brain	Mammal Brain	Human Brain
Instincts & reflexes	Emotions & memories	Language, abstract thought, imagination, consciousness
Fight or flight	Decisions	Reasons, rationalizes
Autopilot		



The Triune Brain in Evolution, Paul MacLean, 1968

Watch <https://www.youtube.com/watch?v=1H59Q2C6y0> on the Triune Brain

When a baby is born, the three parts of the brain are present, but they have hardly any connections in. We have to help them make new synaptic connections.

Write numbers on to show the order in which these brains are (usually) forming connections. Add ways that adults around a young child can help them after talking with your teacher.
Reptile Brain
Mammal Brain
Human Brain

Watch https://www.youtube.com/watch?v=50T_2NnCS8 about 'Flipping Your Lid'

Polyvagal theory



Read each of these scenarios and state whether they are in the red, yellow or green zone:

Scenario	Which zone?
A new student arrives at school and doesn't want to go out to play football.	R Y G
A group of mates get together for a meal at McDonald's to learn their lines for a play.	R Y G
A car headed directly towards the man, but his feet felt rooted to the spot, as though he couldn't move.	R Y G
The class laughs at their teacher's jokes about the psychology experiment.	R Y G
The woman 'plays dead' when the terrorists come back.	R Y G



Unit Outcome:

1.16.12 CHILD DEVELOPMENT: FIGHT OR FLIGHT RESPONSE
Knowledge of
1. The physiological and evolutionary bases for the fight or flight response and where this is located in the brain and body
2. The concept of survival mode, i.e. fight, flight, freeze, submit
3. 3 mindful activities that calm the limbic system
4. The fact that going into survival mode is not a choice
5. At least 3 activities for calming a child in Survival Mode

Objective 1: to know the physiological and evolutionary bases for the fight or flight response and where this is located in the brain and body:



Have you ever woken in the middle of the night with your heart pounding?

Your body might go into survival mode:

- Fight
- Flight
- Freeze
- Flip

This is a biological response to a perceived threat.

Because of our mammalian brains.

These 4 animals have evolved to show different responses.

Write fight, flight, freeze or flip next to the picture.

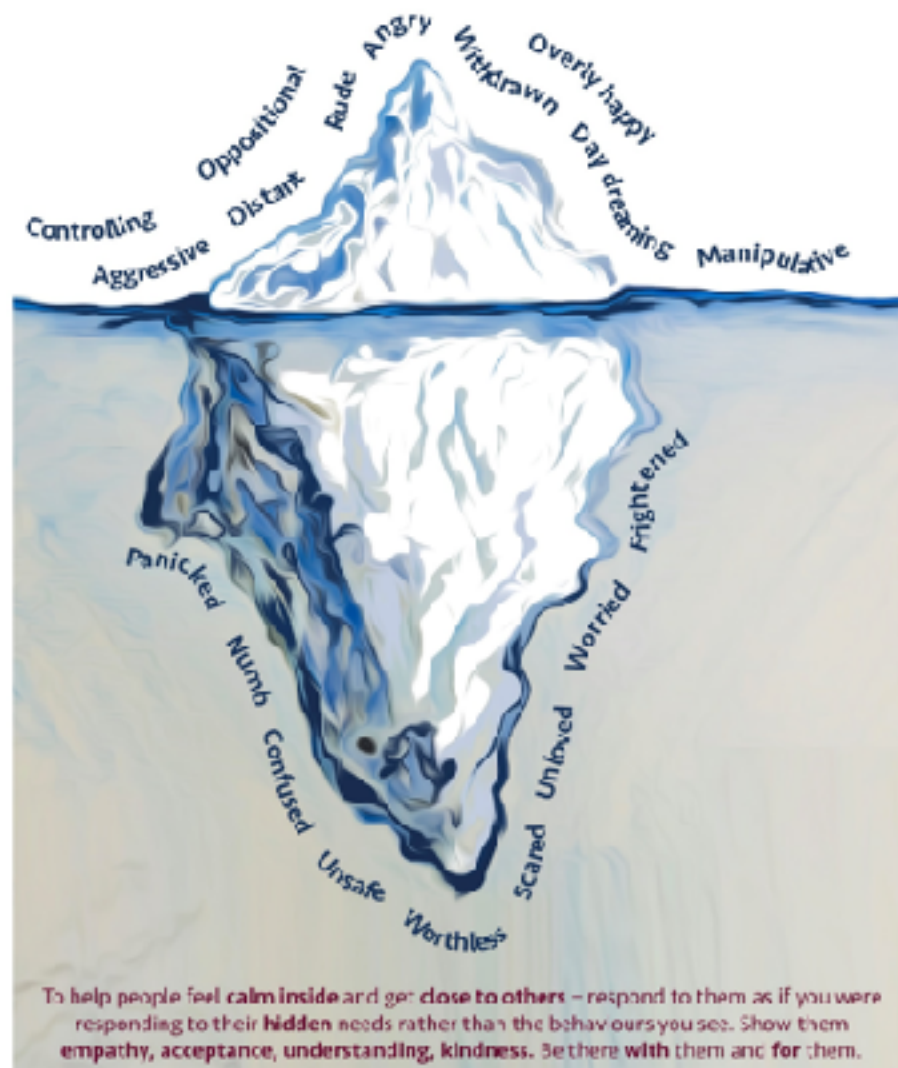


https://www.youtube.com/watch?v=2Hw8PS_Q

Watch Why Do We Lose control of Our Emotions on Youtube <https://www.youtube.com/watch?v=3bKucH8CkFc&t=225s>

Bringing Hidden Needs To The Surface

People of all ages, from babies to old age, find ways to manage their emotions so that they feel as **protected** and as **safe** as possible. It is human instinct to do this. We guard ourselves against feeling **too vulnerable** by showing the world behaviours which keeps others at a **safe distance**. Our 'real' needs are **buried deep below** the surface where they are hard to see.



Visible (Above Water): Controlling, Aggressive, Oppositional, Distant, Rude, Angry, Withdrawn, Overly happy, Day dreaming, Manipulative.

Hidden (Below Water): Panicked, Numb, Confused, Unsafe, Scared, Unloved, Worried, Frightened, Worthless.

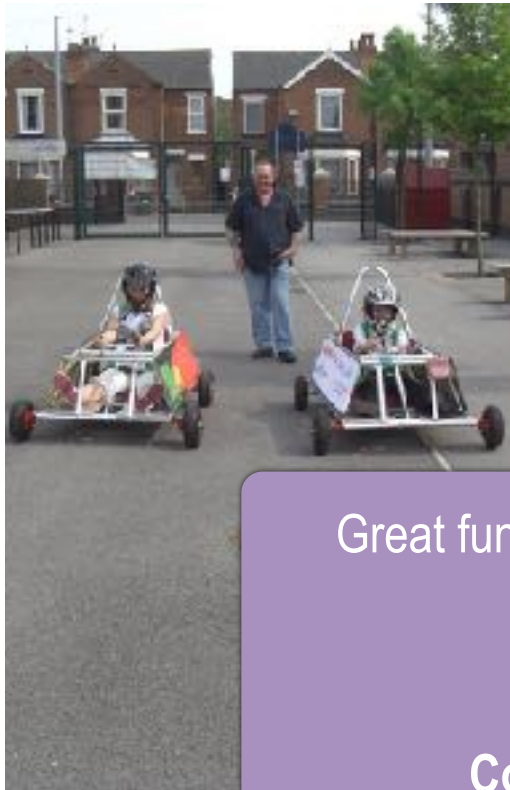
To help people feel **calm inside** and **get close to others** – respond to them as if you were responding to their **hidden needs** rather than the behaviours you see. Show them **empathy, acceptance, understanding, kindness**. Be there with them and **for** them.



Self Awareness, Self Regulation

Learning to drive our own 'Body car' before then building and driving these cars that run on a car battery at 15 mph!

On this **GCSE Psychology** course, students learn a range of complex **psychological** theories and research. Studying for this course gives students the foundation to work in counselling and mental health roles. The qualification can also be used to move on to further study at A Level.



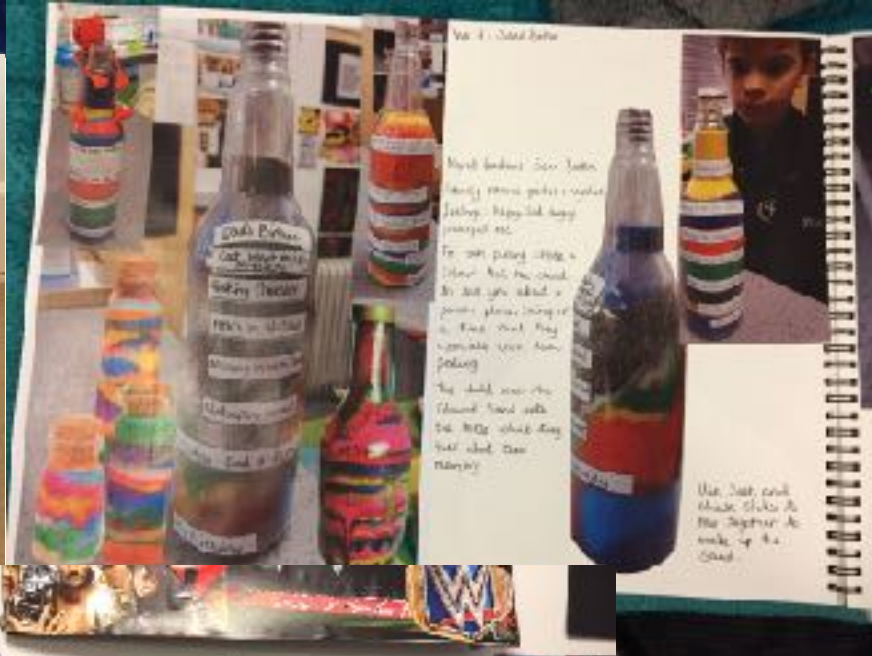
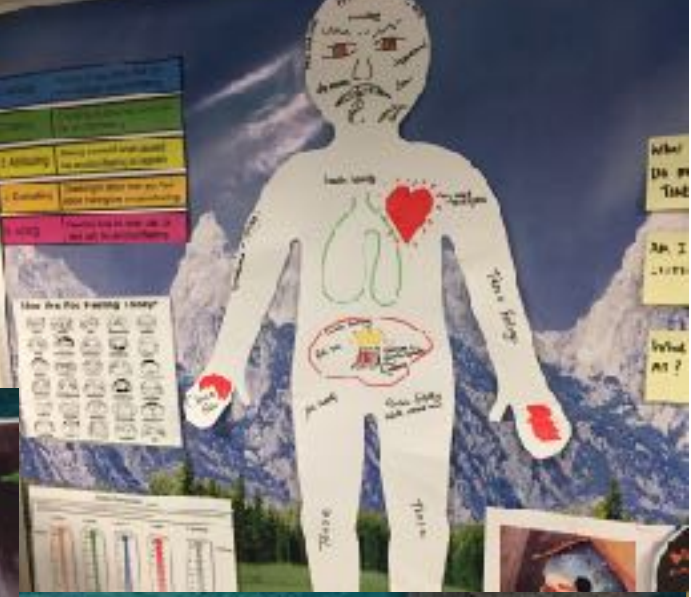
Great fun for the adults and children, with the adults finding driving their own body cars quite a challenge at times - but a real necessity!!!

Teaching into the ANS - for staff!!

**Co-regulation is key, to then support awareness and self regulation.
Behaving and leading from self awareness as opposed to unconscious self defence,
self protection**

Scuba Diving in Egypt - Deepest Classroom

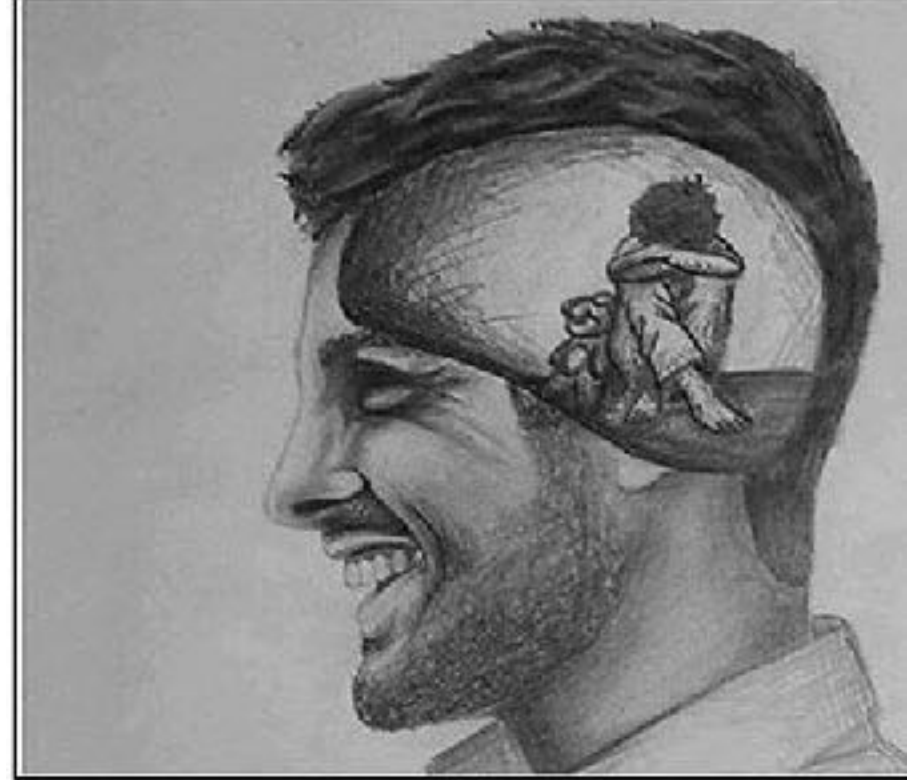




Regulation,
Relationships, Resilience
from the earliest of ages to
KS3 and 4

The Weather.....

“I have come to the frightening conclusion that **I am** the decisive element. It is **my personal** approach that creates the climate. It is **my daily mood** that makes the weather. **I possess tremendous power** to make life miserable or joyous. I can be a tool of torture or an instrument of inspiration, I can humiliate or humour, hurt or heal.



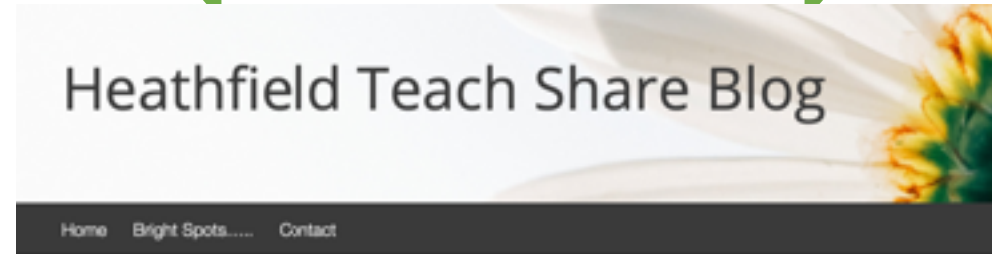
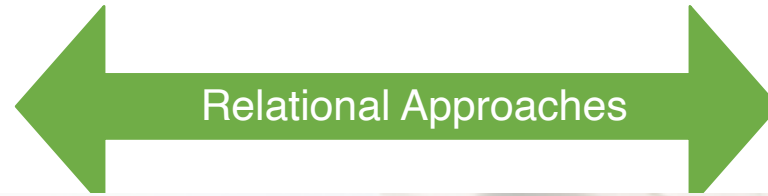
In all situations, it is **my response** that decides whether a crisis is escalated or de-escalated, and a person is humanised or de-humanised.”

[Haim G. Ginott, Teacher and Child:](#) [A Book for Parents and Teachers](#)

‘It’s a thousand little moments that lead to great attainment for disadvantaged pupils rather than those big, shiny interventions.’

Marc Rowland

Clearly Marc is suggesting that the majority of these ‘golden moments’, as he puts it, are happening in the classroom, across the educational community, but the impact of these interactions all over the school must not be underestimated.



Reflections: The impact of school closures on disadvantaged students and the attainment gap

HCC Ped Team / June 11, 2020

Relationships

Relationships



Many of you will be familiar with Enhanced Case Management (ECM), a psychology-led service.

ECM includes multi-agency case formulation and intervention planning, enabling youth justice practitioners to tailor and sequence interventions more effectively according to the developmental and mental health needs of individual children.

An [evaluation of the enhanced case management \(ECM\) approach](#) found that children identify that they want a good relationship with their worker, but that their worker must be someone who:

- they can trust
- has empathy
- is reliable
- does not let them down
- helps them to explore their interests and what they might do in life.

Children also want to feel cared for and valued as individuals and able to feel they can manage what they are being asked to do. In terms of practice, this is helped if they are not overwhelmed by multiple professionals and numerous appointments.

The YJB continues to develop its trauma informed work. This includes a new ECM pathfinder in the South West with plans to share any learning towards embedding that approach as business as usual.

With the youth justice workforce in mind, the YJB also launched an Effective Practice Award in trauma informed practice in July 2020, which was developed by Unitas, a specialist provider of youth justice courses. Other resources and training materials are also available on the [Youth Justice Resource Hub](#).

Looking with
fresh eyes??







Having the courage to sit with vulnerability and discomfort



We desperately need adults who are committed to courageous, wholehearted approaches and who are self-aware enough to act with steadiness from their hearts and minds, rather than self protection, defensiveness, hurt and fear.

We also have to invest time attending to our own fears, feelings, and history or we'll find ourselves managing our own unproductive behaviours. As daring leaders, we have to stay curious about our own blind spots and how to pull those issues into view, and we need to commit to helping the people we serve find their blind spots in a way that's safe and supportive.

Unsteady adults, will not create the secure base required for unsteady, anxious, frightened children and their families.

And a final message.

Be kind.

We need to look after ourselves, and each other authentically, support one another, reach out with empathy, compassion and kindness with candour.

Endeavour to truly 'show up' be you, courageous in the vulnerability that we know that one person has all of the answers in this situation, but by working in a connected way, we can be part of the solution.

We may well make mistakes, indeed we most definitely will not get it right all the time, but we will venture through this together and will, together, find our way through.



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Much love and all the very best,
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