Brain Development and Impact of Trauma and Stress on Children

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Overview of Session

• Understanding human brain development and the importance of positive brain development in early years
• Impact of trauma and stress on children and the developing brain
• Brief overview of the impact this can have during adolescence
• Contextualising trauma and neglect
• Focusing on the role of the relationship in recovery
Caution!!!!

- New discoveries—research is still in its infancy
- Do **NOT** over-interpret or interpret too simplistically
- Some research has been conducted on animals — we assume the information transfers to people
- Behaviour is the result of complex interactions among individual, environment, genetics, situation, cultural expectations, and numerous other factors
Brain development

Hierarchy of the brain

1 Brain stem
Develops first. Controls basic essential functions (blood pressure, temperature, heart rate)

2 Midbrain
Controls appetite and sleep

3 Limbic structures
Alarm system especially amygdala - seat of impulse and emotions

4 Cortex
Develops last. Logic, planning and cognition take place here. We edit and adapt our impulsive reactions. The cortex is connected to the limbic system by the orbitofrontal cortex which straddles right and left hemispheres – receiving information from internal bodily states and the external environment

From The Solihull Approach
Brain Circuitry

- Neurons “communicate” by transmitting electrical impulses along their axons.
- Axons send messages across a synapse to the receiving dendrite of the target neuron.
OVERPRODUCTION AND PRUNING

• Brain development occurs in 2 basic stages—growth spurts/overproduction of neurons and pruning

• Critical phases: in utero
  0-3 years
  10-13 years

• Overproduction results in significant increase in the number of neurons and synapses

• Exuberant growth during these 3 phases gives the brain enormous potential
PRUNING

• These 3 critical phases are quickly followed by a process in which the brain *prunes and organises* its neural pathways

• **LEARNING** is a process of creating and strengthening frequently used synapses (brain discards unused synapses)

• Brain keeps only the most efficient and “strong” synapses

• Experience determines which synapses flourish and which are pruned away
PRUNING

• “USE IT OR LOSE IT”– Reading, sports, music, video games, x-box, hanging out—whatever a child/teen is doing—these are the neural synapses that will be retained

• How children/teens spend their time is CRUCIAL to brain development since their activities guide the structure of the brain
Brain development happens in a social context
• Positive predictable interactions with nurturing caregivers profoundly stimulate and organize young brains.

• The quality of early caregiving has a long lasting impact on how people develop, their ability to learn, and their capacity to both regulate their own emotions and form satisfying relationships.
The attachment bond shapes an infant’s brain

• The infant brain is profoundly influenced by the attachment bond.

• When the primary caretaker can manage personal stress, calm the infant, communicate through emotion, and see the infant as separate, the young child’s nervous system becomes “securely attached.”

• The strong foundation of a secure attachment bond enables the child to be self-confident, trusting, hopeful, and comfortable in the face of conflict. As an adult, he or she will be flexible, creative, hopeful, and optimistic.
Regulation

- one of key tasks of infancy is learning to co-regulate and self-regulate bodily and emotional states

- Infants learn to manage their impulses and affect in conjunction with main carers who holds them in mind, reflect on their intentions accurately – picking up on cues and do not overwhelm them......

(Shonkoff and Phillips 2000).
IMPACT OF NEGATIVE LIFE EXPERIENCE ON BRAIN DEVELOPMENT AND FUNCTIONING
Impact of ongoing stress
Impact of ongoing stress

• Chronic stress, and neglect sensitize certain neural pathways and over-develop certain regions of the brain (limbic region) involved in anxiety and fear. This often results in the under-development of other regions of the brain (frontal lobe)

• Chronic stress from fear, violence, abuse, hunger, pain, etc. focuses the brain’s resources on survival and other areas of the brain are not “available” for learning social and cognitive skills
The co-regulation of stress: Pathways

Distress or danger

Infant signals a need for care from the parent

Affect Regulation

Return to calms state

No Response

Flight or Fight Response

Hyperarousal

Fade / Freeze Response

Dissociation Hypoarousal

Inappropriate Response
Stress and Trauma: Impact

• The organising brain requires patterns of sensory and emotional experience to create the patterns of neural activity that will guide the neurobiological processes involved in development.

• In the face of interpersonal trauma, all the systems of the social brain become shaped for offensive and defensive purposes.

• A child growing up surrounded by trauma and unpredictability will only be able to develop neural systems and functional capabilities that reflect this disorganisation.

Robin Balbernie (2011)
Toxic Stress

• Persistent threat is a form of toxic stress.
• The components of the fear response become sensitised, putting the child in a *persisting* fear state (*a state becomes a trait*) that causes exaggerated reactivity.
• He or she may become hyperactive, over-sensitive and hypervigilant, and move quickly from anxiety to terror.
• It also negates the capacity for rational thought.
The dissociative continuum

• This comprises the freeze, or surrender, response.

• The parasympathetic system is the ‘rest and digest’ branch of the autonomic nervous system, concerned with self-maintenance and conserving bodily resources.

• When over-activated it leads to a ‘freezing’ reaction that slows the heart and breathing, shutting down the body rather than mobilising it.

• Babies and toddlers can neither fight nor flee. In the stage of early alarm the infant can only use his limited repertoire of behaviour to attract the attention of the caregiver.
The dissociative continuum

- If this strategy is ineffective, so there is no soothing response, the child will abandon the early alarm response which will then be extinguished.
- Such a defeat response of ‘learned helplessness’ is common in neglected & abused children.
- In the face of persisting threat the only ‘escape’ may be to dissociate and physically and cognitively freeze. Such mental mechanisms of defence involve disengaging from the external world and only attending to stimuli from the internal world, thus becoming disconnected from reality. Again, *a state may become a trait.*
Stress

Heightened Arousal

Balance restored

States

Dysregulated stress response

Infant learns to tolerate internal challenges

Traits

Under or overactivity becomes a hardwired feature of stress response system
Contextualising Trauma and Neglect

What can lead to mental health problems in young people?
Contextualising Trauma and Neglect

The impact of trauma and neglect will be determined by a combination of factors:

• Risk
• Resilience
• Protective
• Adversity
Adolescence and Adolescent Brain Development
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From The Solihull Approach
Summary of Tasks of Adolescents

✓ Cope with physical changes
Summary of Tasks of Adolescents

- Establishing an identity
- Establish sexual identity/sexual orientation
- Establishing autonomy
- Prepare to live independently
- Separate and develop new relationships with family of origin
- Establish peer relationships
- Establish intimate relationships
- Develop moral code

Ruth Talbot, YoungMinds
New research on brain development during adolescence

• Adolescent brain is neuroplastic undergoing specific and significant remodelling
• Grey matter → white matter
• Process of fine tuning brain developments
• Use it or lose it
• Adolescence and young adulthood is a time of great potential for change and development
Normal adolescent behaviour consists of changes in:

- Sleeping and eating habits
- An increase in conflict with family members
- A desire to be with one’s friends
- Resistance to messages form authority
- Irritability
- Risk taking
- Proclamations of sheer boredom
Rebelliousness and risky behaviours need to be checked and steered but they cannot be suppressed.

Many of the erratic and seemingly defiant choices made during adolescence share a common origin: a brain under construction.
The impact of trauma

• Aggressive, submissive, and frustration behaviors may become structurally encoded.

• If relationships are negative, threatening, and/or fear inducing, the lower brain responses become dominant and the cognitive regulating structures do not develop to their full capacity; consequently, an individual may not develop the cognitive ability to control emotions or behaviour.
The impact of trauma

• Traumatised people may find it difficult to:
  • Self-regulate – stress, mood, impulse
  • Process information accurately – make sense of the world around them and of their inner world of feelings
  • Make and maintain relationships – understand and be interested in the world of others

• Impact on others

From Kate Cairns
Young people who are vulnerable are more likely to be traumatised

- Being unable to self-regulate they can be injured by stresses that would not injure someone more resilient
- They may be driven to seek out high risk situations
- They may be targeted by perpetrators of harm

From Kate Cairns
Jumping into action: Role of Self regulation

The difficulties many young people who have experienced high levels of trauma and abuse (and for those in a state of crisis) is their ability to tolerate the experience of painful and intense feelings, which are expelled as soon as they threaten to surface by means of action such as violence, criminal behaviour, abuse, self-harm or excessive helpfulness or intellectualising etc.
Jumping into action: Role of Self regulation

Jumping over the unwanted emotional experience straight into action

Unconscious or barely conscious feeling

Experience of feeling

Thought about it

Action (e.g. violence or projection)

Jumping into action Hughes & Pengelly (1997)
"I don't know what it is either... Let's call it 'CHEF'S SURPRISE.'"
Working with the Relationship:

The Role of Containment, Attunement and Co-regulation in Working with Young People Who Have Experienced Trauma
Based on ideas from:

The Solihull Approach

What can we learn from early development

• How does the baby learn to manage in the world, to self-regulate?

• What can we learn from early development to help us when this doesn’t happen?
Babies need to feel their emotions and needs are understood

**Mirroring**

The infant experiences that the emotion he or she is feeling is closely reflected *but not replicated* in the carer’s mind.  

*(Fonagy et al., 2004)*

**Containment**

The way in which one person can take on board the powerful feelings of another and, by communicating with touch, gesture and speech, make them more manageable.

*(Bion, 1962)*
From Physical to Emotional Containment

Progressive move by mother from physical to mental and emotional containment from pregnancy into early years, affecting bonding and attachment.
Containment

• Containment is where a person receives and understands the emotional communication of another without being overwhelmed by it and communicates this back to the other person.
Containment

• In this way containment is a two-way process – that which ‘contains’ and that which is ‘contained’.

• As a result the other person no longer feels overwhelmed themselves, this restores their capacity to think about the situation as well as their ability to process their emotions. In this way containment is a two-way process – that which ‘contains’ and that which is ‘contained’.
Containment

A person good at Containing others is:

1. Receptive

2. Able to hold on to another persons difficult feelings without being overwhelmed by them themselves

3. Makes calm and thoughtful attempts to understand the problem

4. Can convey a feeling that what the other person is feeling is tolerable and meaningful... and manageable.
Containment and the brain

Young person
Containment and the brain

- Received/understood
Containment and the brain

• Head full

Diagram:
- Parent
- Baby, child or young person
Containment and the brain

• Head full
Containment and the brain

• Parallel process
Babies need to feel that these needs will be responded to:

**Attunement**

- an empathic responsiveness between two individuals which subtly conveys a shared emotion
- attuned adults will be able to acknowledge the infant’s current emotional state and symbolise it in verbal and non-verbal interaction
- Attuned interactions help infant develop emotional regulation

**Reciprocity**

Describes the sophisticated interaction between a baby and an adult where both the baby and the adult are involved in the initiation, regulation and termination of the interaction.

(Stern 1985)

(Brazelton, 1975)
RECIPROCITY

Describes the sophisticated interaction between a baby and an adult where both the baby and the adult are involved in the initiation, regulation and termination of the interaction. Reciprocity also applies to the interaction between adults and can also be used to describe the interaction within all relationships.

This is a two-way flow of communication. From the first moments outside the womb (and perhaps even before birth) the mother and baby learn how to interact with each other. Even for a simple activity like feeding, something like a dance occurs in a normal mother-child relationship.
Reciprocity

• The need for each person in a relationship being able to affect, and be affected by, the other.

• If this does not happen the child will not develop a sense of agency (having an impact or power within their environment).

• Equally, if a child is allowed to feel too much in control, without regulation by parents the child will not internalise a sense that they can manage and regulate their own feelings and responses.
The “dance” of reciprocity

- Initiation
- Orientation
- State of attention
- Acceleration
- Peak of excitement
- Deceleration
- Withdrawal or turning away
Look Away

- Brazelton identified four strategies that babies used to withdraw from too much stimulation from the other person or inappropriate stimulation for example, being too intrusive to the baby:
  - Turning or shrinking from it
  - Rejecting it by pushing it away
  - Decreasing its power to disturb by withdrawing attention
  - Signalling behaviour, by crying, fussing, laughing, yawning

- Look away similar to ‘Take up Time’ – thinking time for pupil to process information, except look away describes baby’s attempts to self regulate as well as process information
Chase and Dodge

• Generally viewed as negative
• Occurs when the mother does not pick up the signal that the baby is overwhelmed and needs to withdraw and becomes intrusive in her interaction to try to engage the baby
• The baby increases his efforts to get away
• The mother becomes more intrusive resulting in the situation deteriorating.
• Chase and dodge interferes with child’s ability to learn
Rupture and Repair

Beatrice Beebe

- Researched the rhythms of interactions between parents and children and showed the pattern of ‘disruption and repair’
- Rupture and repair refers to the process of getting out of step in the dance of reciprocity, but then being able to adjust to each other to get back in step with each other i.e. repair the rupture

Allan Schore

- Re-experiencing positive affect following a negative experience may teach the child that negativity can be endured and conquered
- Resilience emerges as a result of the quality of the interactions between the mother and infant and later other adults in which the adult and child move from a positive to negative and back to a positive affect

Resilience in the face of stress is an ultimate indicator of adaptive mental health.
Rupture and Repair

Getting out of step in the dance (RUPTURE) but adjusting to get back into step (REPAIR) = Normal
We experience that things getting difficult in a relationship but can still get back on track

Repeated rupture WITH repair

Develop hope, optimism, belief things get better, self esteem, self worth, trust in others

Repeated rupture WITHOUT repair

Don’t develop self worth, self esteem or trust in others

Good quality relationships

? Quality of relationships
Reciprocity

- The idea of reciprocity can be helpful in monitoring the relationship between you and the carer.
- It can help you think about your relationship with the child/carer/teachers that you are engaging/working with.
- It is helpful to get a sense of how in tune you are with each other.
- If you are not in tune why may that be the case?
Good enough parenting

• Winnicott
Co-regulation of Stress

Caring Response → Distress

Meaningful, Tolerable, Manageable

Affect Regulation
Soothing the Brain

Containment

Cortex

Reciprocity

Limbic structures

Brain stem
Implications for Behaviour Management

"stop behaving like a six-year-old!"

"But I am six years old!"
Reward
Punishment
thinking

Based on the assumption that the young person has the relational context and can make use of it
Reward Punishment thinking

Teacher punishes young person for disrupting the class

Young person’s mind makes link between disrupting the class and punishment

Young person motivated not to disrupt the class

Teacher punishes young person for disrupting the class

Hardwired survival strategies
Emotional regulation
Trauma memory

**Child’s Mind**

Shame
The need to relate
Effects of experience on brain and biology

- Need to protect myself from harm
- Feelings of isolation and fear
- Reaction to shame
- Impulsive responses
- Defence against shame
- Uncontrollable catastrophic emotions
- Unable to use feedback from punishment
- Reoccupation with damage to the relationship

All much more influential and detached from action of disrupting the class

No learning

Relational/Empathic behaviour management model

Attempts to understand own reaction

**Carer/Teacher’s Mind**
Attempts to understand how the young person’s behaviour makes sense

Hardwired survival strategies
Emotional regulation
Trauma memory

**Young Person’s Mind**
Shame
The need to relate
Effects of experience on brain and biology

Elliott, A. (2013)
In summary

• In providing containment and reciprocity one enables people to restore their capacity to think through containment, allows them to feel their emotional needs are understood and met through reciprocity.

• In doing this carer is able to focus on the issue in a reflective manner, able to learn and regulate their own emotional responses and can come up with solutions.
It’s all about relationships!

- The young people we care for and work with often have such skewed early experiences of relationships that the carers, teachers, practitioners and system needs to work with them in a way that tries to remedy some of that early damage.

- These concepts from early child development provide a framework for using relationships at various different levels to facilitate change for the care givers’ and child’s benefit.
References / Resources

Child Welfare Information Gateway
- https://www.childwelfare.gov/

Bruce Perry’s work
- www.childtrauma.org or www.childtraumaacademy.com (with free on-line courses)

Center on the Developing Child - Founded and directed by Jack Shonkoff, M.D.,
- www.developingchild.harvard.edu

Kate Cairns Associates
- http://www.katecairns.com/
References:
Kate Cairns: Kate Cairns Associates  http://www.katecairns.com/