Neurosequential Model of Therapeutics

safe children | strong families | supportive communities

Casey Family Programs

Casey is a national non-profit foundation that works with public child welfare systems across the country to provide prevention and permanency support for youth at risk of aging out or entering the foster care system.

What is NMT?

The Neurosequential Model of Therapeutics is a "trauma-informed," developmentally-sensitive, approach to the clinical problem solving process.

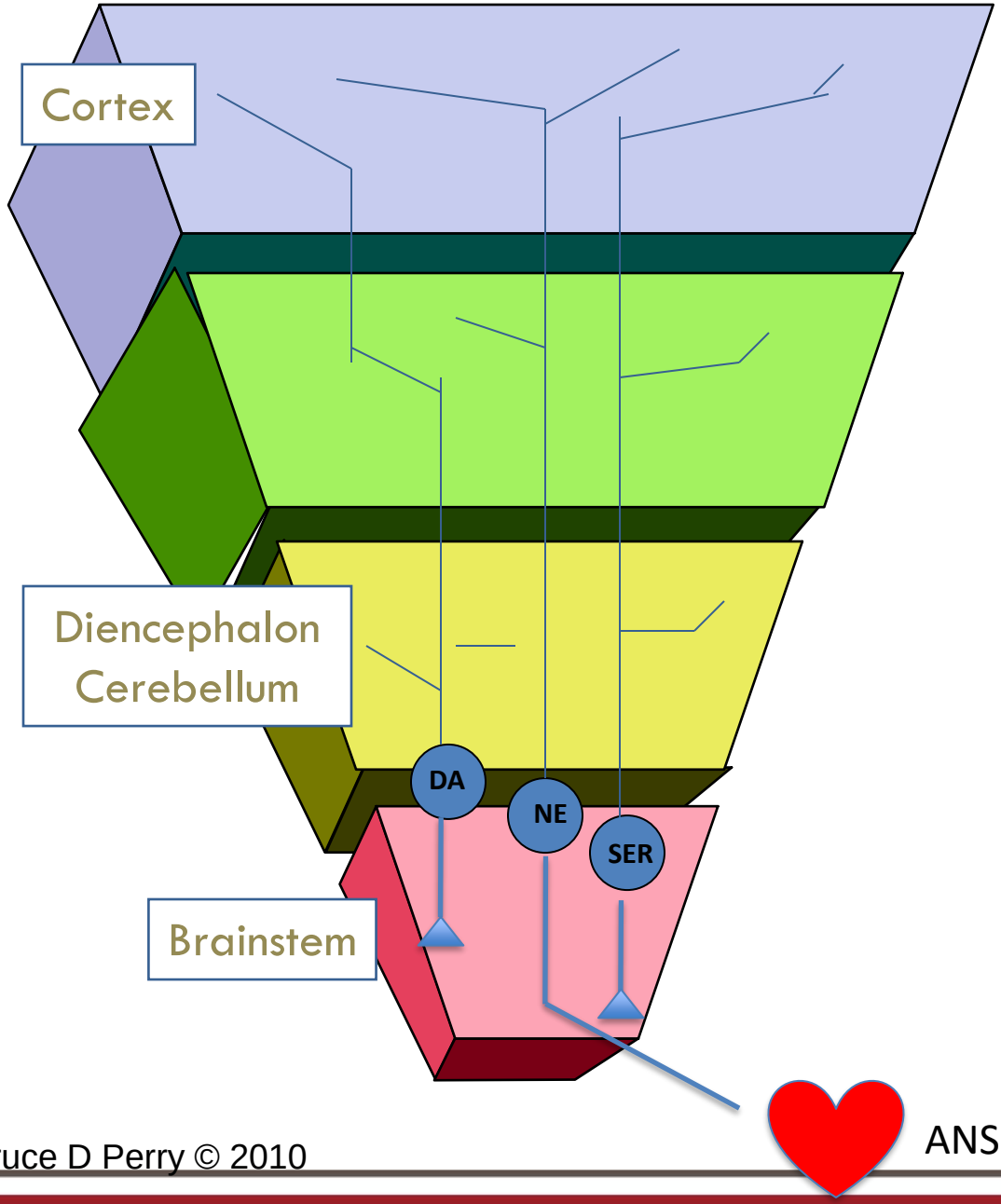
It is not a therapy – and does not specifically imply, endorse or require – any single therapeutic technique or method.

THE NEUROSEQUENTIAL MODEL

The brain mediates our thoughts, feelings, actions and connections to others and the world.

Understanding core principles of neuroscience, including neuroplasticity and neurodevelopment, can help us better understand ourselves and others.

NEUROSEQUENTIAL NETWORK™



Abstract thought

Concrete Thought

Affiliation/reward

"Attachment"

Sexual Behavior

Emotional Reactivity

Motor Regulation

"Arousal"

Appetite/Satiety

Sleep

Blood Pressure

Heart Rate

Body Temperature

Key Elements of Neuroplasticity

- Development (Time)
- Anatomy/Structure
- Specificity (Specific neural network)
- Pattern (frequency, intensity, timing)

All related to the dynamic activity of complex systems.

NEUROSEQUENTIAL NETWORK

USE-DEPENDENT DEVELOPMENT

The more a neural network is "activated" the more that network changes as a reflection of the pattern of stimulation

This is the basis for development, memory and learning

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Where do we get the information used in the brain map (metric)?

- Developmental History
  - Genetic
  - Epigenetic
  - Adverse Experiences
    - Developmental Timing
      - Nature, Severity, Pattern
  - Relational Health
    - Developmental Timing
      - Bonding and attachment
      - Family supports
      - Community supports

- Current Functioning
  - Individual CNS
    - Brainstem
    - Diencephalon/CBL
    - Limbic
    - Cortex/F TCTX
  - Relational
    - Family
    - Peers
    - School
    - Community

How do we use the brain map (metric)?

1. Is not a stand-alone evaluation or assessment.
2. Should not be used out of context of broader assessment and formulation.
3. Is a supplement not a replacement to clinical problem solving and planning.
4. Can inform information gathering, analysis, action and review but not appropriate for stand-alone evidence in court.
5. Final decisions and recommendations must be based on clinical expertise and judgement.

The Relational Landscape is Changing

Children have fewer emotional, social and cognitive interactions with fewer people.

The impact of “modern” life on the developing child has yet to be fully understood.

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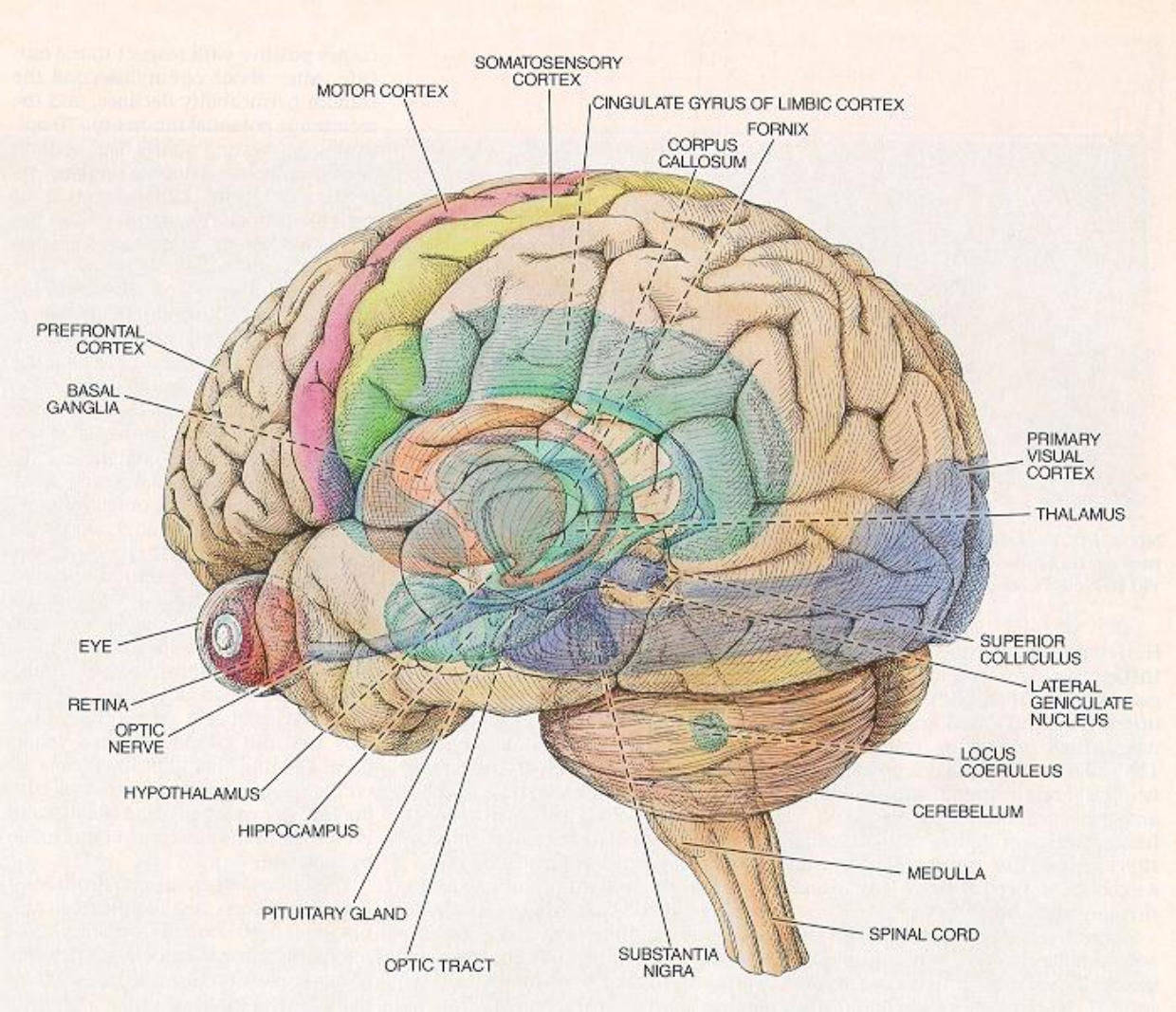
The human brain is not ‘designed’ for the modern world.

For thousands of generations we lived in small, multi-generational groups, with dramatically higher ratios of caregiver to young child.



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Poverty of Relationships

The compartmentalization of our culture has resulted in material wealth yet poverty of social and emotional opportunity.

NEUROSEQUENTIAL NETWORK™

Optimal Early Caregiving

- Present
  - Quantity matters
- Attentive
  - To the infant/child
- Attuned
  - Accurately interpret non-verbal cues
- Responsive
  - Respond to the needs of the infant

NEUROSEQUENTIAL NETWORK™

Creating First Memories

Our first sets of unique sensory stimuli shape neural "networks" which will "encode" and store – in neurons – the template for future sensory stimuli similar to this original sensory experience.

Attachment is, therefore, a collection of complex "memory" templates created during our first caregiving relationships.

NEUROSEQUENTIAL NETWORK™

A Neurodevelopmental Definition of Neglect

- Lack of a specific pattern of experience during development results in abnormal development of a core brain function
- The abnormal development is in those brain systems which *sense, perceive, process, "interpret", and "action"* information related to that specific experience or input.

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Multiple Forms of Neglect

DOMAINS

Emotional

Social

Cognitive

Motor

PATTERN

Episodic

Chaotic

Total/global

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So What? Why does this matter?

Both the STRESS RESPONSE and the REWARD networks in the brain are shaped by relationships in early childhood – in healthy and unhealthy ways.

Relationships have a key role in global health, creativity and productivity of a group

NEUROSEQUENTIAL NETWORK™

State Dependent Functioning

State Dependence of Cognition				
Functional IQ	120-100	110-80	90-60	70-50
PRIMARY Secondary Brain Area	NEOCORTEX *Cortex*	CORTEX *Limbic*	LIMBIC *Diencephalon*	DIENCEPHALON *Brainstem*
Cognition	Abstract Reflective	Concrete Routine	Emotional Reactive	Reactive Reflexive
Mental State	CALM	ALERT	ALARM	FEAR

NEUROSEQUENTIAL NETWORK™

Flock, Freeze, Flight, Fight Continuum

Traditional Fight/Flight	Reflect	Flock	Freeze	Flight	Fight
Primary *secondary* Brain Areas	**NEOCORTEX** *Subcortex*	**SUBCORTEX** *Limbic*	**LIMBIC** *Midbrain*	**MIDBRAIN** *Brainstem*	**BRAINSTEM** *Autonomic*
Cognition	Abstract	Concrete	Emotional	Reactive	Reflexive
Mental State	CALM	ALERT	ALARM	FEAR	TERROR

NEUROSEQUENTIAL NETWORK™

State Dependent Functioning

Adaptive Response	REFLECT	FLOCK	FREEZE	FLIGHT	FIGHT
Predictable ***De-escalating*** Behavior *(behaviors of the teacher when the child or classroom is in various states of arousal)*	• Calm sounds • Personal space • Predictable touch • Predictable routine	• Quiet voices • Eye contact • Confidence • Rhythmic movement • Clear directions • Somatosensory activities	• Comforting and predictable voice; invited therapeutic touch • Singing, humming, music • Reflective listening • Reassurance	• Calm, quiet, presence • Disengage • Turn off lights, white noise • Reduce sensory input	• Calm affect • Disengage but don't disappear • Adult support • Individual attention
Predictable ***Escalating*** Behavior *(behaviors of the teacher when the child or classroom is in various states of arousal)*	• Loud Noises • Close uninvited proximity • Unpredictable touch • Changes in daily routine or schedule	• Frustration or anxiety • Communication from a distance (like yelling) • Complex directions • Ultimatums	• Raised voices • Raising hands/point finger, sudden movement • Threatening tone • Chaos in classroom, disorganization of materials	• Frustration of teacher • Yelling, chaos • Collective dysregulation of peers	• Physical restraint, grabbing, shaking • Screaming • Intimidating stance
"Mediating" Brain Region	NEOCORTEX Cortex	CORTEX Limbic	LIMBIC Midbrain	MIDBRAIN Brainstem	BRAINSTEM Autonomic
Cognition	ABSTRACT	CONCRETE	EMOTIONAL	REACTIVE	REFLEXIVE
CLASSROOM "STATE"	CALM	ALERT	ALARM	FEAR	TERROR
CLASSROOM CHARACTERISTICS	Reflection and consolidation of new information is actively taking place; or while testing, efficient retrieval of content is possible.	Active teaching can take place; students are internalizing new content and, 'mind wandering' to efficiently store new content.	Learning new content is difficult; students are either disengaging or acting out. Increases in individual self-regulatory behavior seen.	Learning is impossible. Engaging students difficult. Many demonstrate 'freeze' responses that appear oppositional/defiant. Increased acting out.	Aggression, reckless behavior, openly defying rules and authority. Full 'fight/flight" or "shut down."

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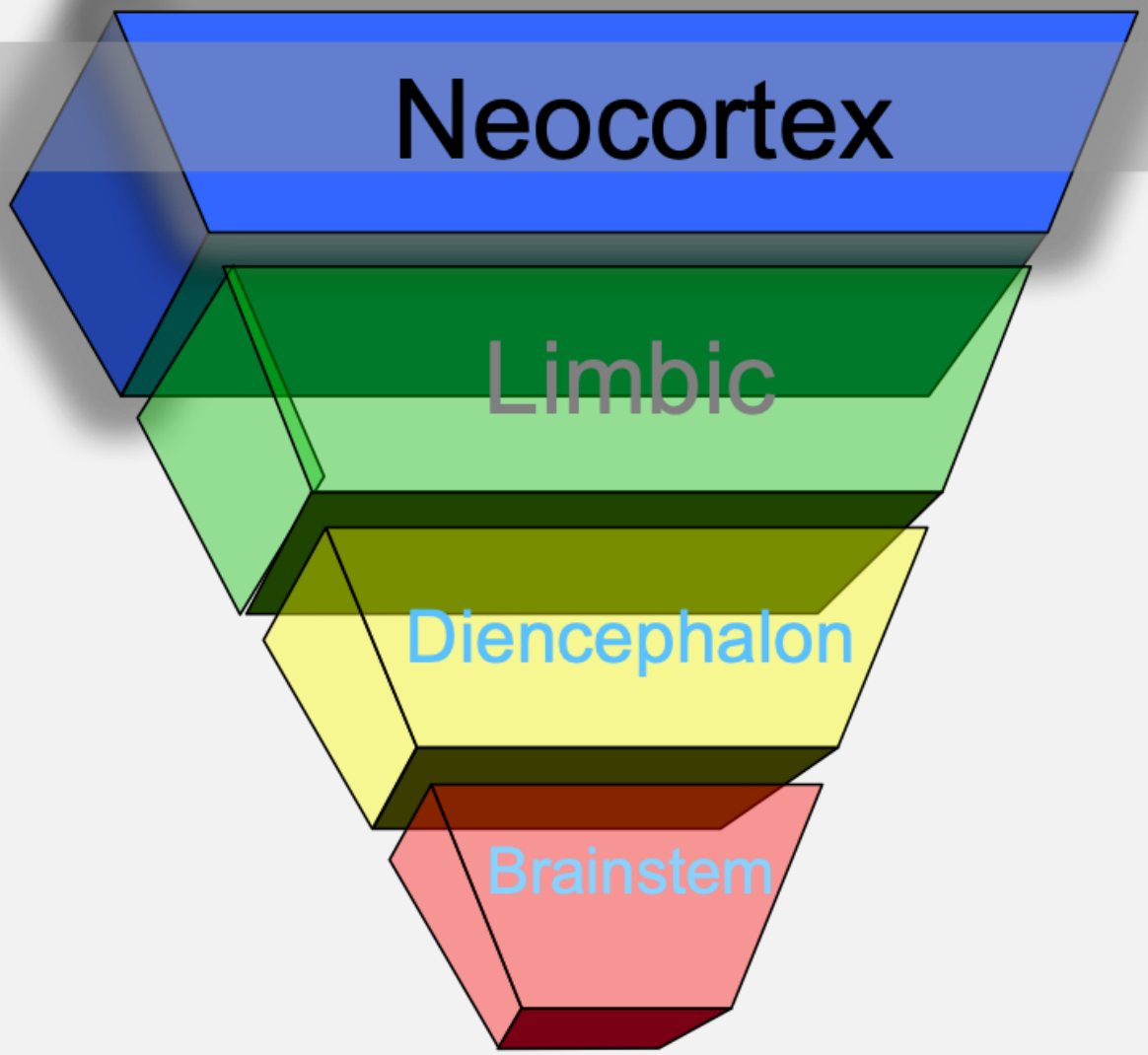
CALM

ABSTRACT
Reflective



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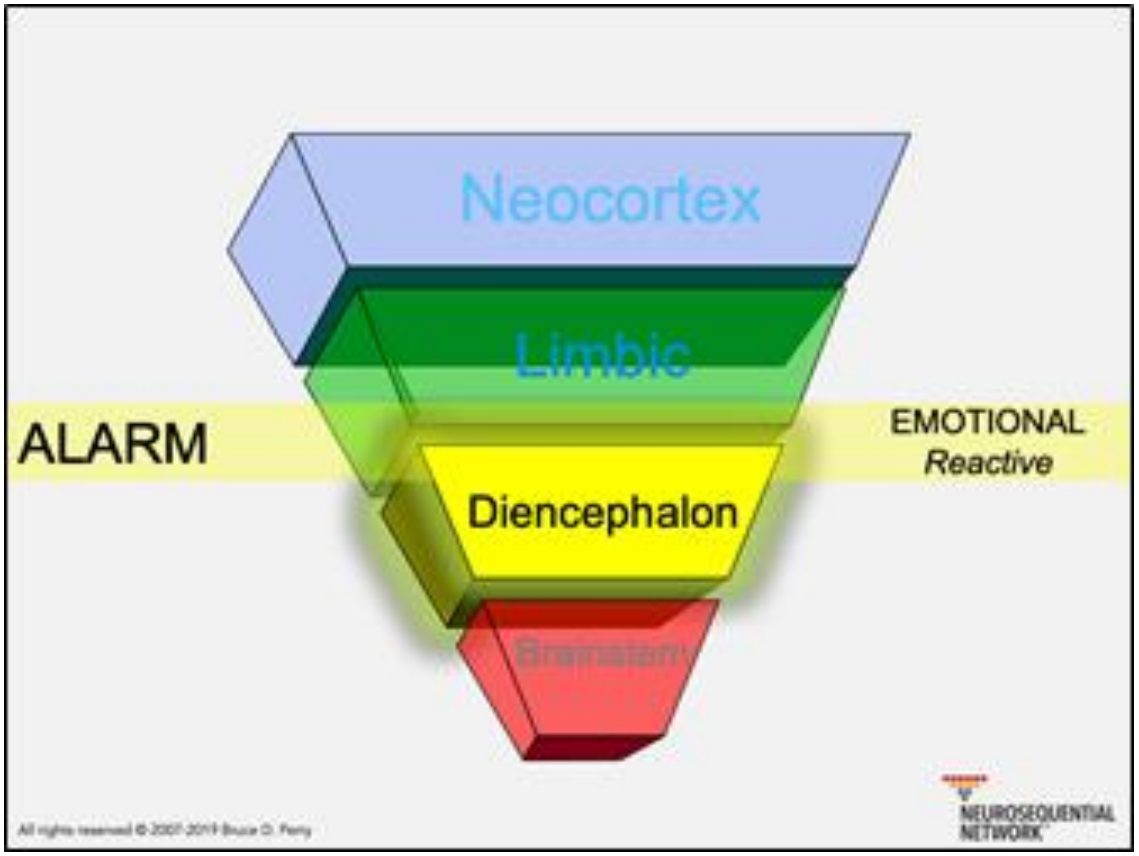
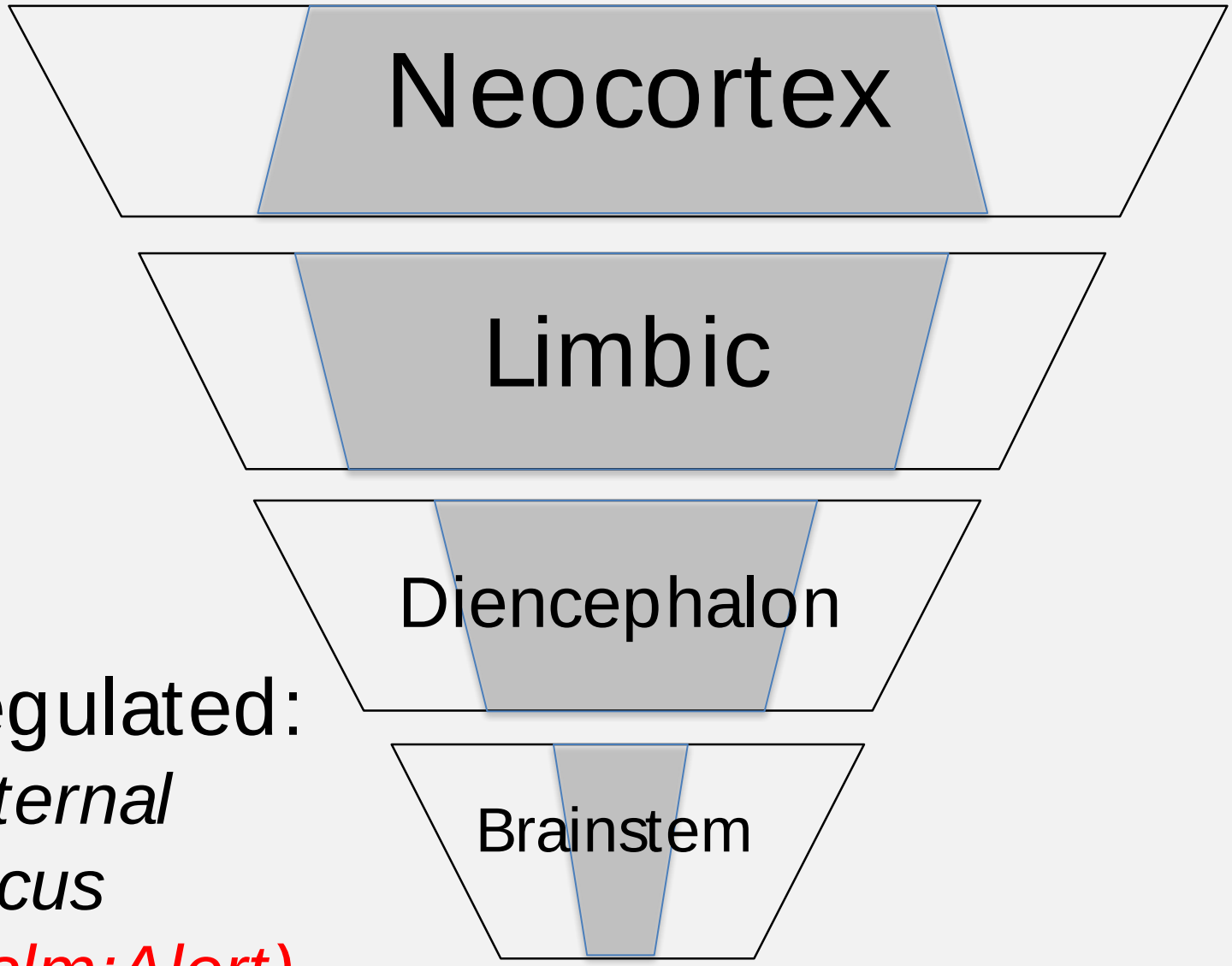
Hyperarousal





Regulated:
External
Focus
(Calm:Alert)

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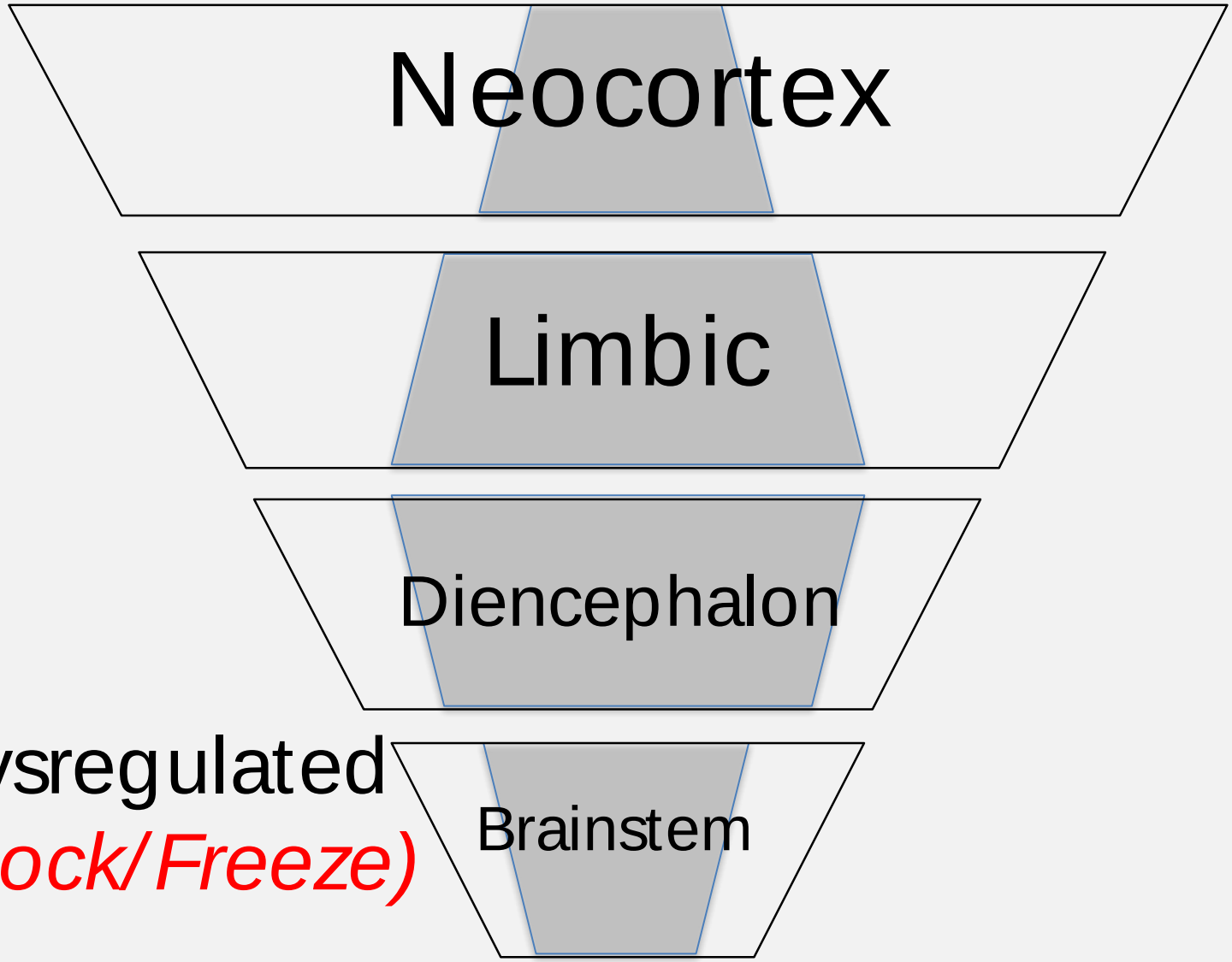

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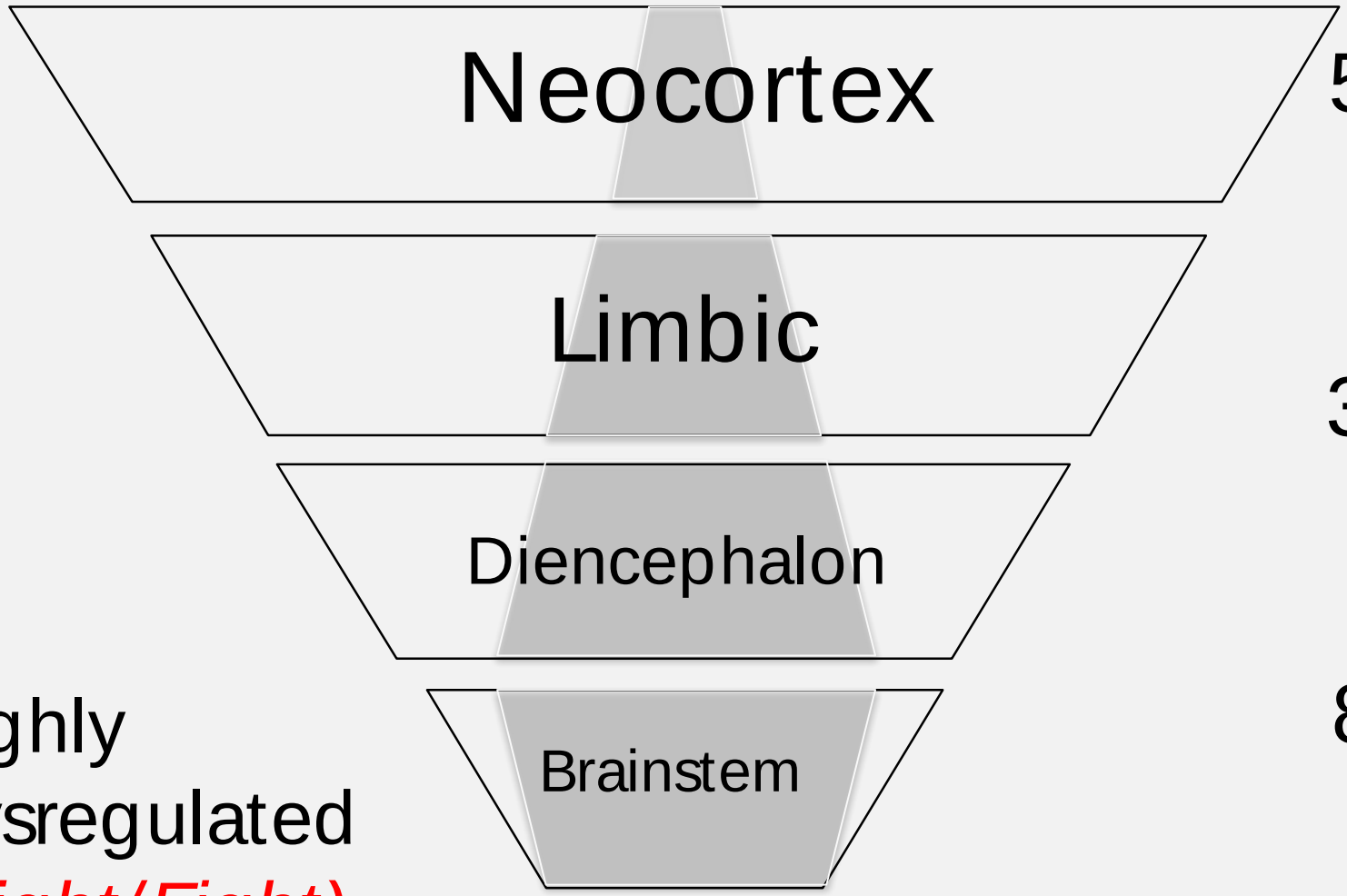

Highly Dysregulated *(Flight/Fight)*

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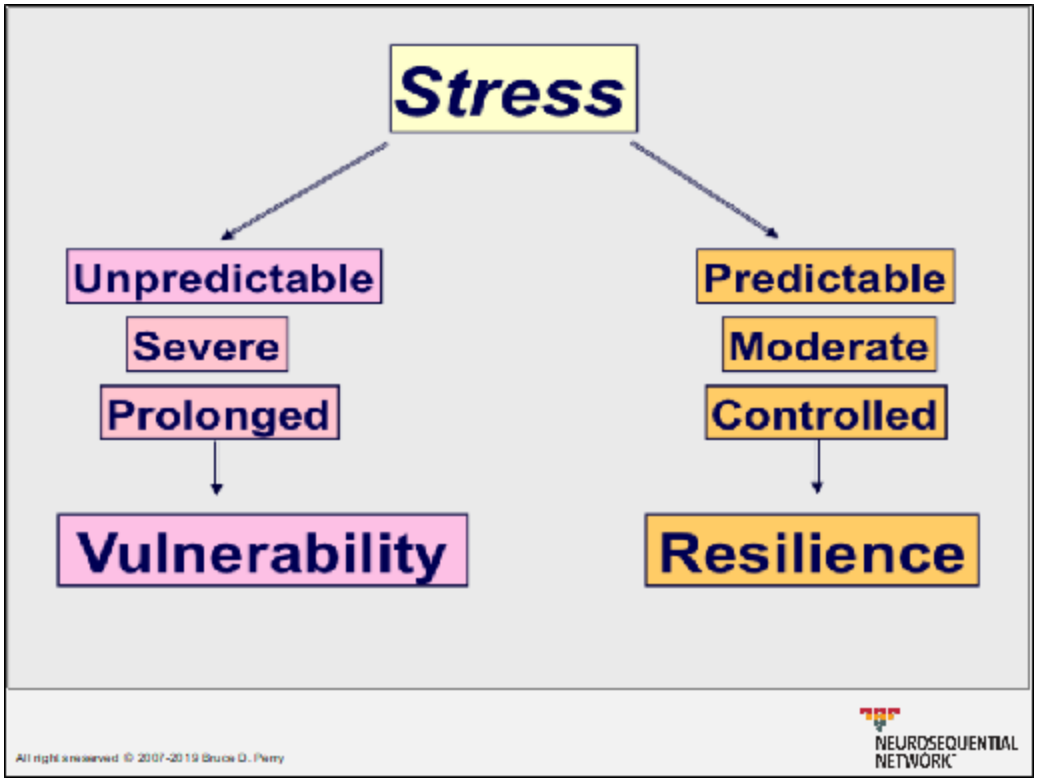
Stress Response System

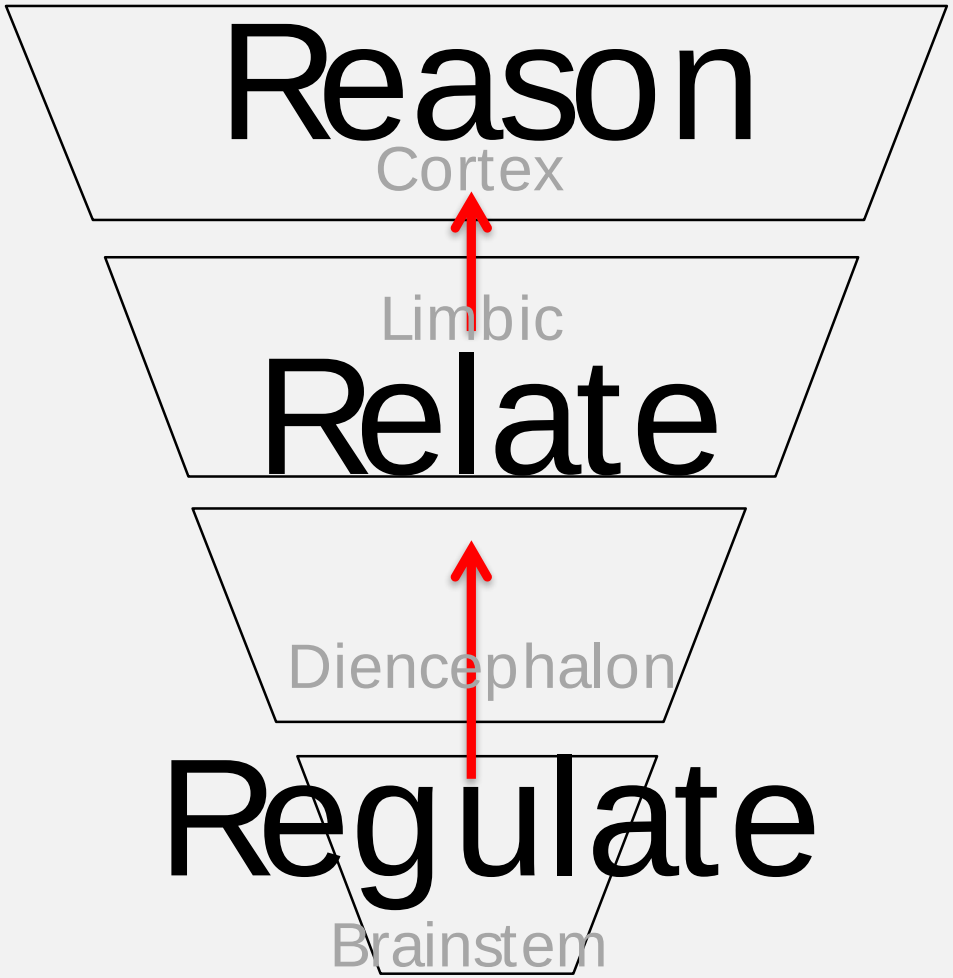


Know the Stage & Watch the State

- Effective relational interactions to communicate, teach, enrich or heal come when the developmental stage and present state of the child/adult are respected
- *Attunement becomes the key*
- Exposure to the core principles of development should be mandatory training for caregivers, educators and therapists

NEUROSEQUENTIAL NETWORK™

Sequence of Engagement



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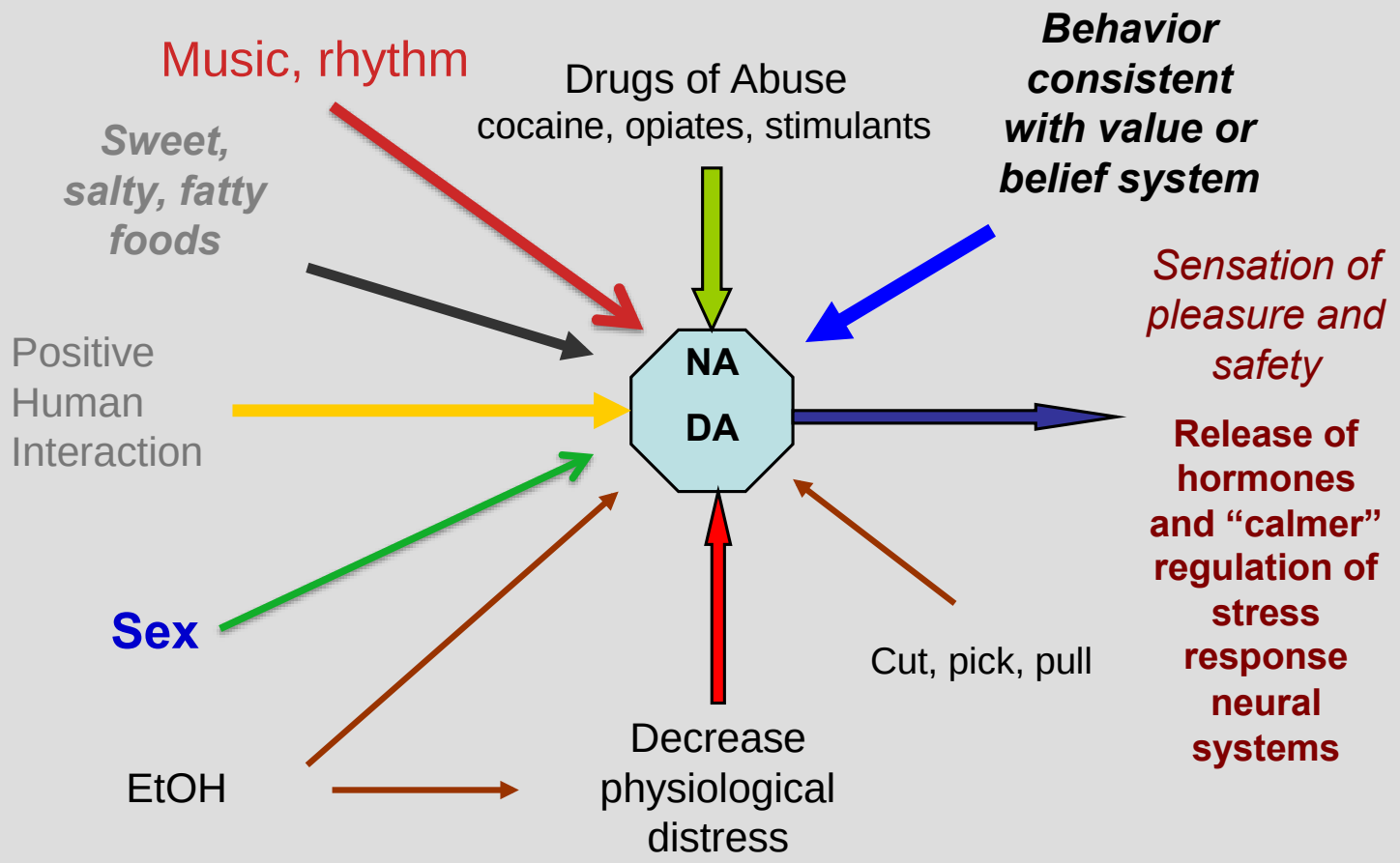
Stimulation of "Reward" Neural Systems in the Human Brain: *Multiple Mediators*

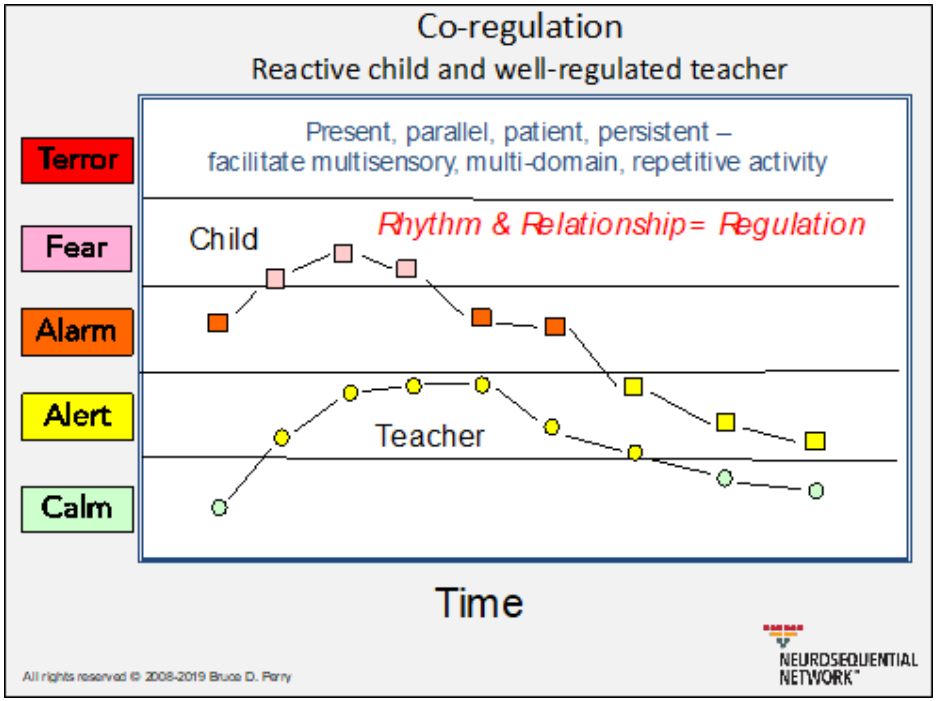


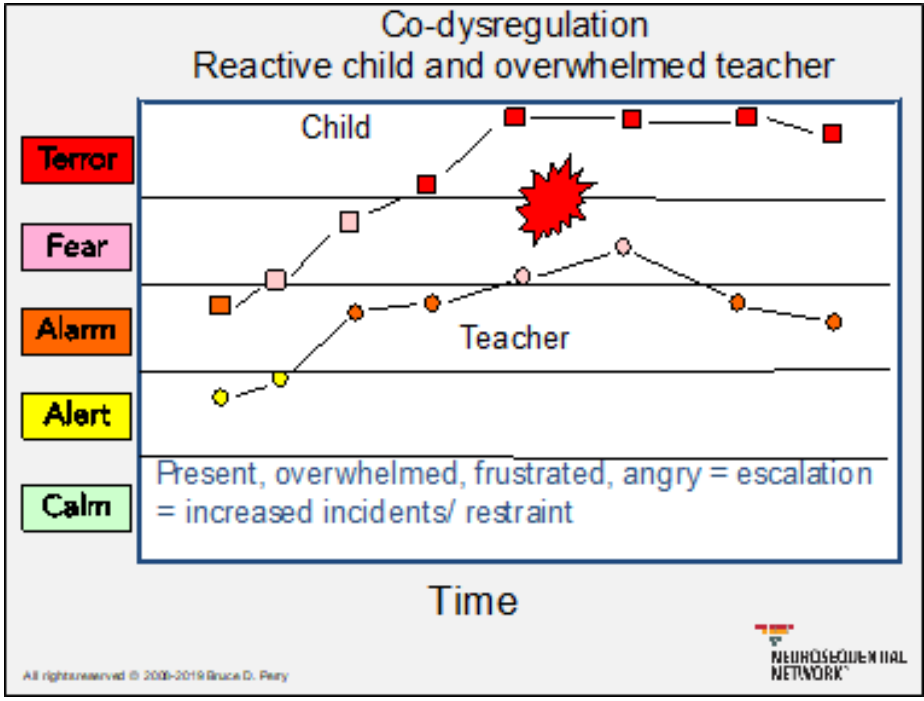
Bonding Behaviors Decrease when the Caregiver is Overwhelmed or in Distress

With increasing threat and distress, an individual's capacity to "give" to others is diminished.

NEUROSEQUENTIAL NETWORK™

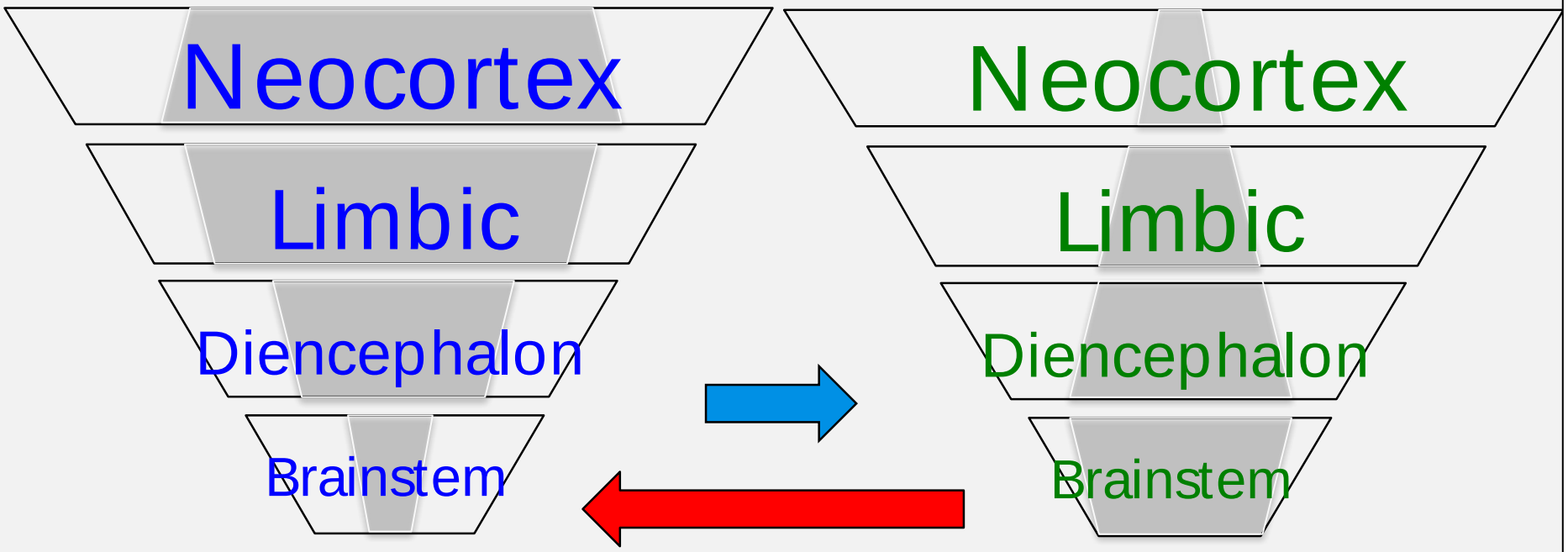
Regulation and Dysregulation





Relational Contagion

A dysregulated adult can never regulated a dysregulated child



AND

A dysregulated adult will dysregulate a regulated child

NEUROSEQUENTIAL NETWORK™

Primary Modes of Regulation

- **"Self-regulation" (SR)**
  - Self-"soothing" – using SS
  - Cortical regulation
  - Dissociation
- **Somatosensory regulation (SS)**
  - Self vs Other
- **Relational regulation (Rel)**
  - Positive co-regulation
  - Co-dysregulation
  - Tied to primary relational templates
- **Pharmacological regulation (Rx)**
- *Optimal regulatory interactions use "multiple" pathways*
  - SS and Rel
  - Cort and SS
  - Diss and SS

NEUROSEQUENTIAL NETWORK™

"Self-regulation" (SR)

Somatosensory regulation/ self-soothing (SS)

Bottom-Up: Primary

Starts in womb; suck/swallow

Tied to intrauterine and perinatal associations

Breathing, walking, running, rocking, swimming, rhythm

Doodle, hum, swing, jump, dance

Cortical Modulation (CM)

Top-down: Secondary

Tied to cortical development & state-dependence

Slower process -

Dissociation (Diss)

In-Out: Universal

Inescapable, unavoidable, painful - Universal

Adaptive continuum

Mind-wandering to threat-induced full dissociation

Used rhythmically ("in-out")

NEUROSEQUENTIAL NETWORK™

Current Relational Health

- A major factor in healing appears to be the nature, quality, intensity and stability of a person's relationships
- The NMT assessment process includes a simple metric that looks at current relational health
- The score on this metric is a key indicator of outcome – good relational stability predicts positive outcome – and poor relational health predicts poor outcomes

Dissociation

DISSOCIATION

- Disengaging from the "external" world cues
- Attending to elements of the "inner" world
- Daydreaming, mind-wandering, reflective cognition

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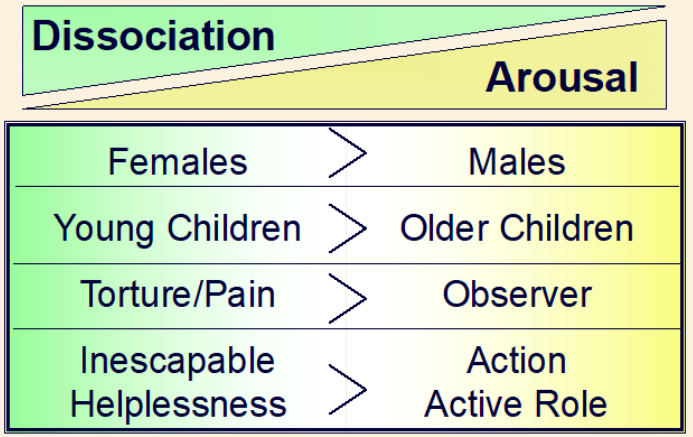
DISSOCIATIVE/AROUSAL BALANCE



NEUROSEQUENTIAL NETWORK

Functional Brain Map Key (Part C)

Abstract Cognition	Math/ Symbolic Cognition	Performance	Modulate Reactivity/ Impulsivity	Verbal	Values/ Beliefs/ Morality
Speech/ Articulation	Language/Communication	Somato/ Motorsensory Integration	Sense Time/Delay Gratification	Self Awareness/ Self Image	Concrete Cognition
Share/ Relational	Attunement	Reward	Affect Regulation/ Mood	Psycho-sexual	Short-term memory/ Learning
	Neuroendocrine/ Hypothalamic	Dissociative Continuum	Arousal Continuum	Primary Sensory Integration	
	Fine Motor Skills	Feeding/ Appetite	Sleep	Coordination/ Large Motor Functioning	
		Suck/Swallow/ Gag	Attention/ Tracking		
		Temperature regulation/ Metabolism	Extraocular Eye Movements		
		Cardiovascular	Autonomic Regulation		

Connectedness is the key.

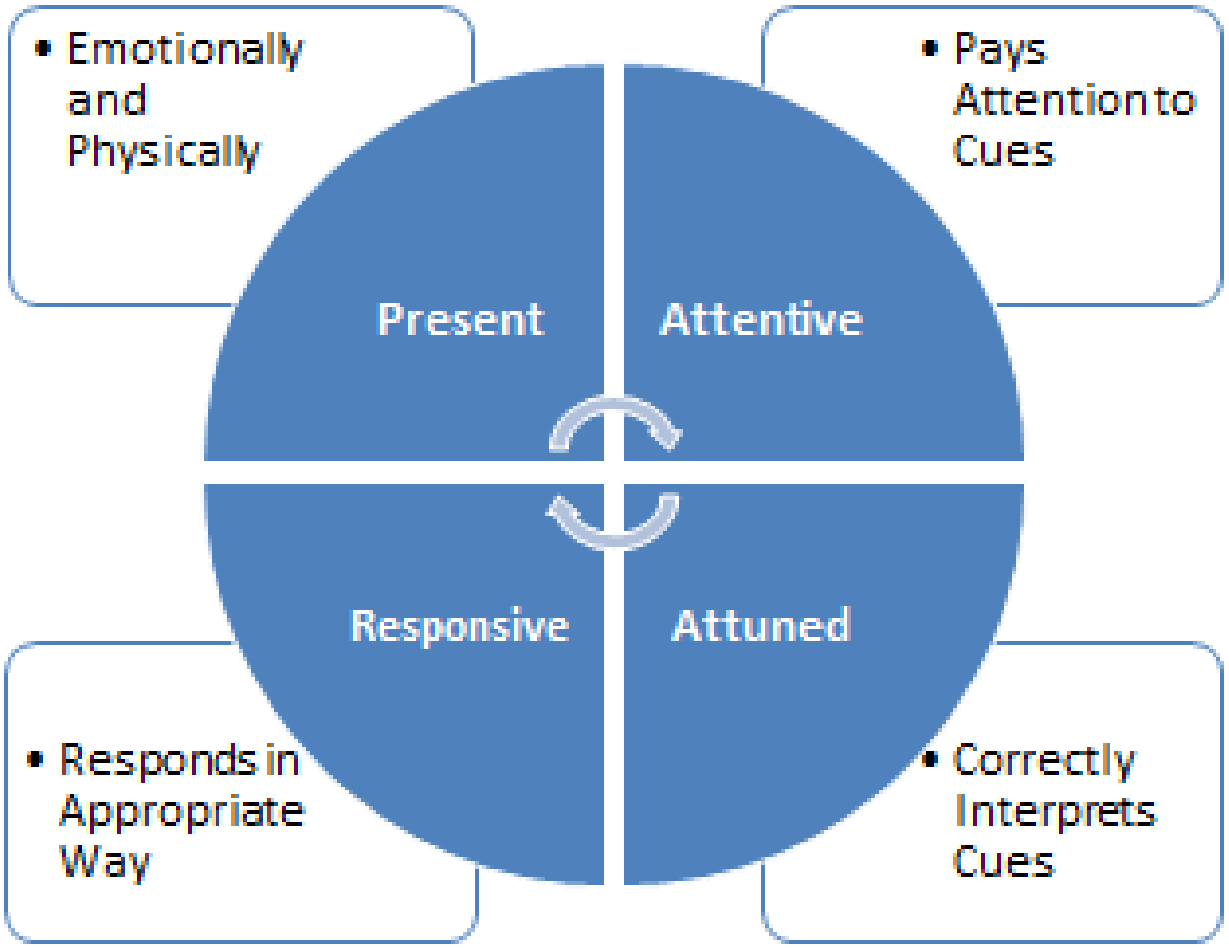
Your history of connectedness is a better predictor of your health than your history of adversity.

Be with each other. Celebrate diversity. Listen and learn from others. Share time, food, work.

The 'super-power' of humankind is our capacity to connect; it is regulating, rewarding and the major "route" by which we can teach, coach, parent, heal and learn.

NEUROSEQUENTIAL NETWORK™

Characteristics of a Good Caregiver



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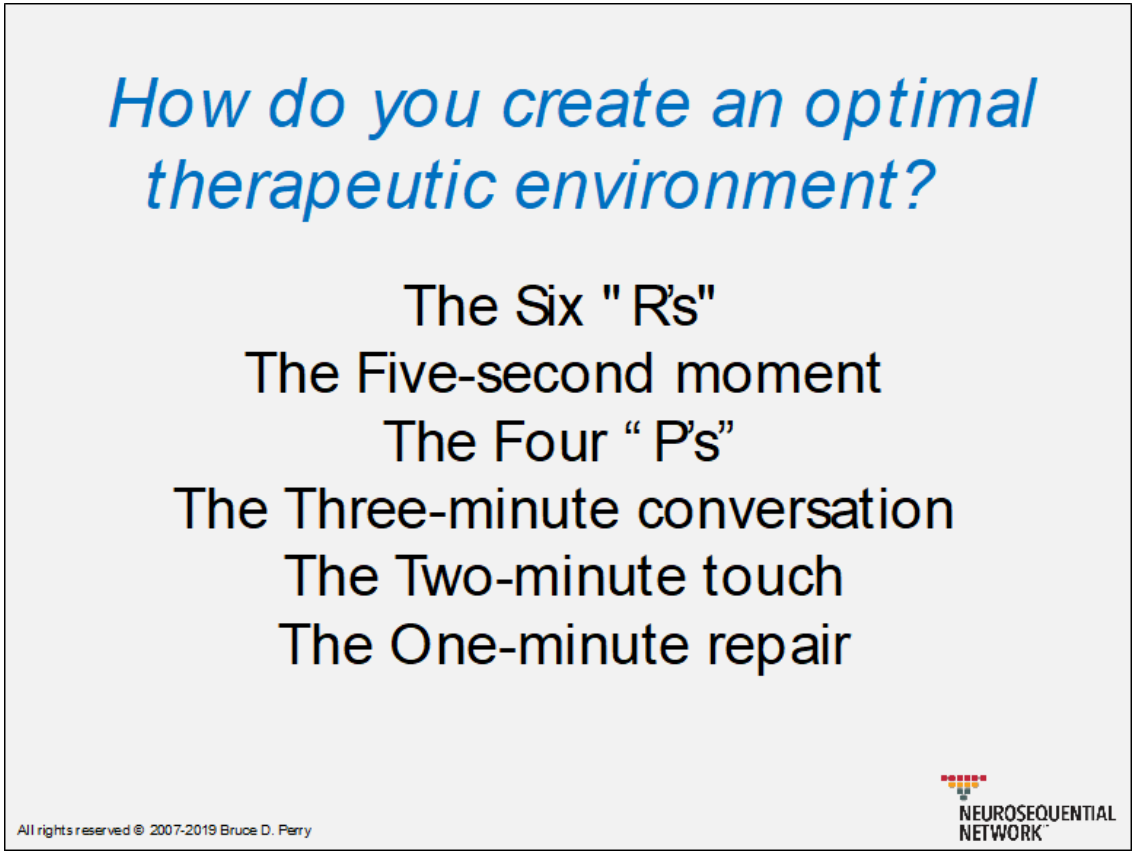
Dosing, Spacing & Resilience



Therapeutic Dosing

What is a "Therapeutic Dose" ?

Neural networks change in response to brief, repetitive stimulations. Typically very brief – seconds long – activations are sufficient to bring about the signal for 'change'.

After a burst of repetitive activation, neural networks become 'refractory' (non-responsive). Sensitivity of synaptic dynamics change as a function of these patterns of activity. For long-term change, a pattern of brief stimulation (e.g., four three-minute bursts of stimulation within an hour) is followed by a consolidation period. During this time, protein synthesis and synaptic micro-architecture is modified in ways that allow changes related to 'memory'.

NEUROSEQUENTIAL NETWORK™

The Six R's
Key Elements of Positive Developmental and Educational Settings

Relevant (developmentally-matched)

Rhythmic (resonant with neural patterns)

Repetitive (patterned)

Relational (safe)

Rewarding (pleasurable)

Respectful (child, family, culture)

NEUROSEQUENTIAL NETWORK™

Therapeutic Dosing

What is a "Therapeutic Dose" ?

This means that a brief, 3-minute interaction can provide sufficient 'dosing' of a therapeutic experience. Embedded in these 3-minutes will be many 5-second moments of true 'connection'. Fully present, listening without judgement and with an 'open heart'.

Ideally multiple '3-minute' doses with many 5-second moments will be provided throughout the day by the child's Therapeutic Web.

Connectedness is the key. Relational health buffers present stressors and helps heal from previous trauma.

NEUROSEQUENTIAL NETWORK™

The Right "Dose" of Stress

A resilience-building, "moderate" and predictable dose will vary by developmental age and by the reactivity and sensitivity of the individual's stress response systems

NEUROSEQUENTIAL NETWORK™

The Four "P's"

Creating the Relational 'Space' for Optimal Development, Learning & Healing

(or *How do you like those P's?*)

Present,

Parallel,

Patient &

Persistent *in Providing*

Patterned, Predictable, Positive doses of

Protected (safe) experience

NEUROSEQUENTIAL NETWORK™

Neurosequential Model of Therapeutics (NMT) – Recommendations

- Selection and timing of therapeutic activities will depend on assessment
- Usually best to start with simple rhythmic and repetitive activities to help the brainstem neural systems to become well organized and regulated
- As brainstem is more regulated, activities can target higher, more complex parts of the brain
- Over time, more conventional individual therapies become possible, e.g. TFCBT, PCIT

(Perry, 2006)

The NMT Metric Report: Recommendations

Essential – Activities crucial to child's future growth in particular area. (Score below 65% of typical age score). Unless functioning in essential area is increased child will lack foundations for future growth and development in this and other areas.

Therapeutic – Activities aimed at building in strength and growth in particular area. (Scores within 65 to 85% of typical age are appropriate for more focused treatment). These activities are important for child's continued growth and improvement in area.

Enrichment – activities providing positive, valuable experiences that continue to build capacity in given area. (Scores are at or above 85% of typical functioning). Activities are designed to enhance and reinforce strengths previously built into areas.

NMN
neurosequential.com

The Neurosequential Model Network

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