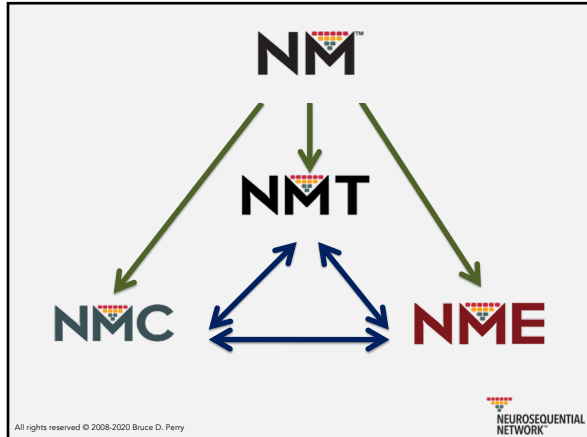


Neurosequential Model Core Slides "Best Hits" Package



"You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete."

- Buckminster Fuller

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Essentially, all models are wrong, but some are useful.

--- George E. P. Box, in Norman R. Draper (1987). Empirical Model-Building and Response Surfaces, p. 424, Wiley. ISBN 0471810339

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WHAT IS NMT?

The Neurosequential Model of Therapeutics is a neuroscience-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.

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The NMT is both an 'evidence-based' and an 'evidence-generating' practice.

The web-based, standardized assessment elements allow the collection of aggregate data to facilitate the ongoing monitoring of a range of individual and program outcomes.

The model is designed to allow iterative modifications to improve program and treatment plan elements.

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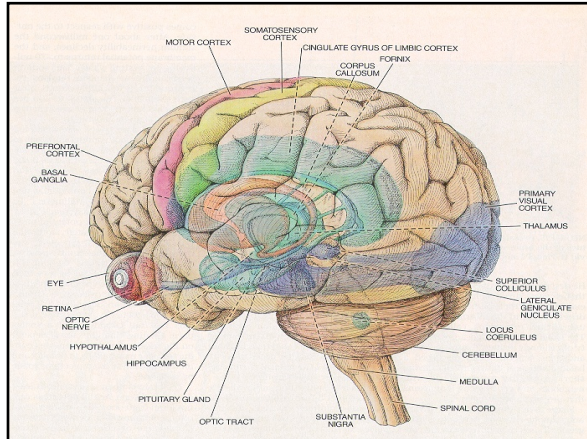
The Neurosequential Model

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.

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Neurosequential Model Core Slides "Best Hits" Package

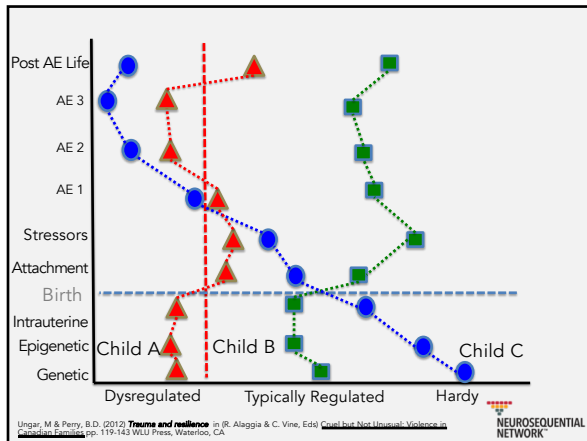


The Neurosequential Model

Each person has a unique pathway to the present and deserves individualized care.

"One-size fits all" approaches rarely meet the needs of the individual – more often they meet a need of the provider (or system).

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The Neurosequential Model

Humans are complex – individually, in families, communities, cultures and across generations.

Overly simple constructs – including the Neurosequential Model – do not capture the depth and breadth of the human experience.

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Relational Complexity in Groups

| Size of Group | Number of Relationships |
|---------------|-------------------------|
| 2 | 1 |
| 3 | 6 |
| 4 | 25 |
| 5 | 90 |
| 6 | 301 |
| 7 | 966 |
| 8 | >3000 |

Adapted from Kephart, W.M. (1950) A quantitative analysis of intragroup relationships. *American Journal of Sociology* 60: 544-549



Neurosequential Model

It is important to understand mechanisms underlying current functioning.

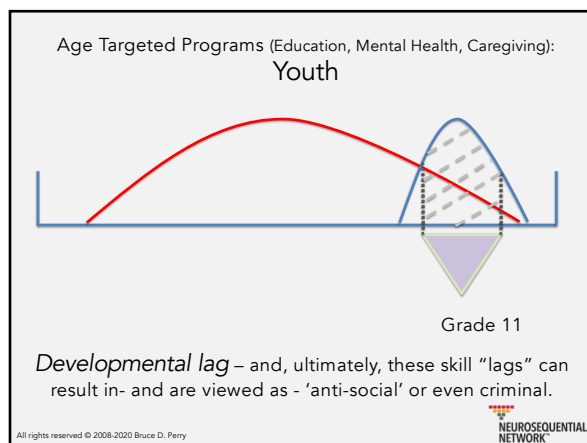
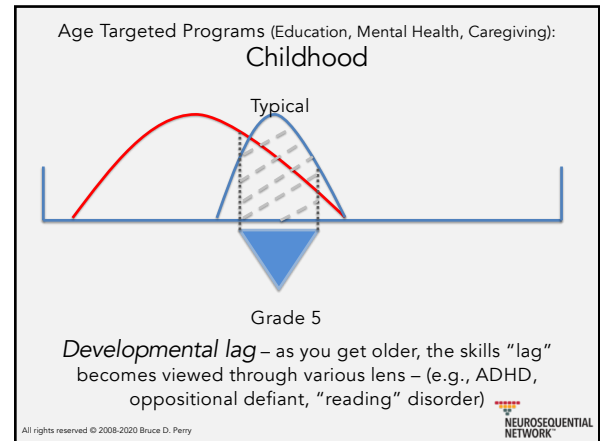
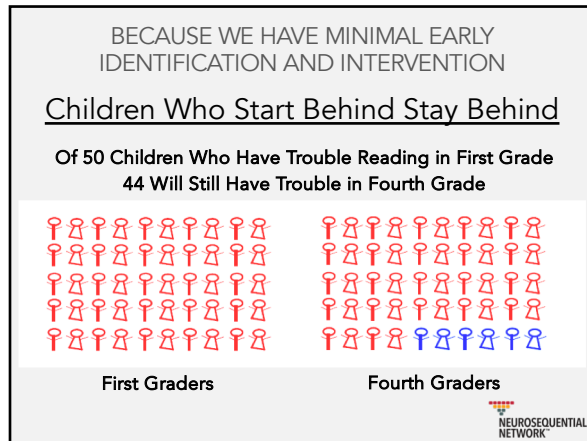
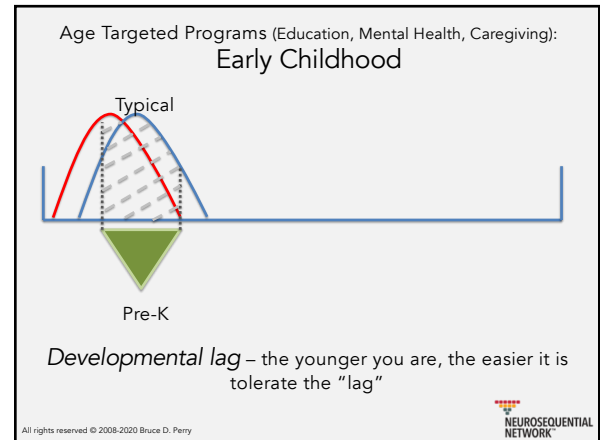
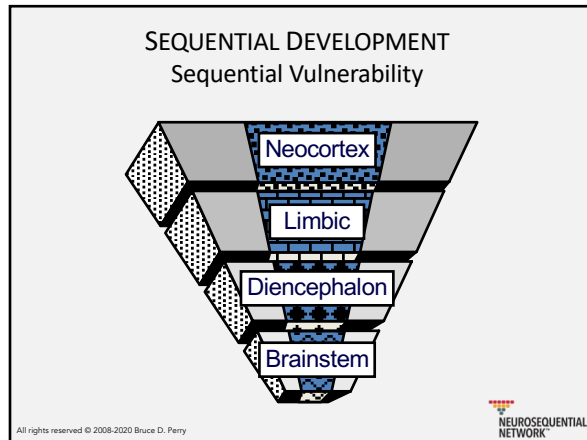
Your understanding determines your solution
- Stuart Ablon (CPS, 2010)

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Neurosequential Model Core Slides

"Best Hits" Package



Heuristic (/hjuˈnɪstɪk/; Greek: "heuriskein", "find" or "discover") refers to experience-based techniques for problem solving, learning, and discovery that that employs a practical method not guaranteed to be optimal, but sufficient for immediate goals. *Where finding an optimal solution is impractical, heuristic methods are used to speed up the process of finding a satisfactory solution via mental shortcuts to ease the cognitive load of making a decision.* Examples of this method include using a rule of thumb, an educated guess, an intuitive judgment, stereotyping, or common sense.

In more precise terms, heuristics are strategies using readily accessible, though loosely applicable, information to control problem solving in human beings and machines.

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NEUROSEQUENTIAL NETWORK

Neurosequential Model Core Slides "Best Hits" Package

NM is not "On the Shelf"

86% of clinical research is never used in direct patient care (Balas & Boren, 2000)

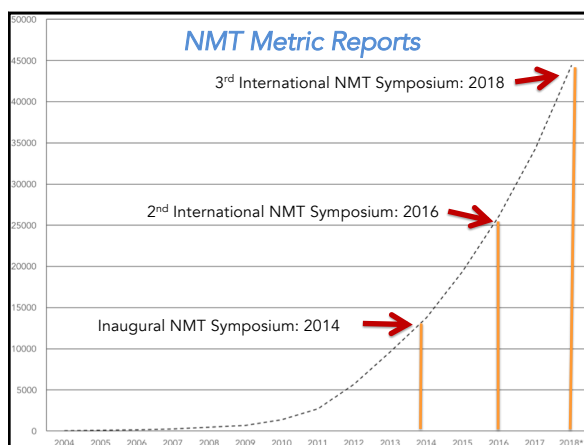
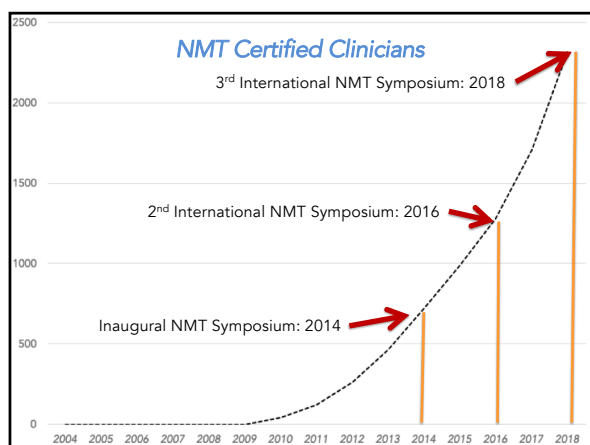
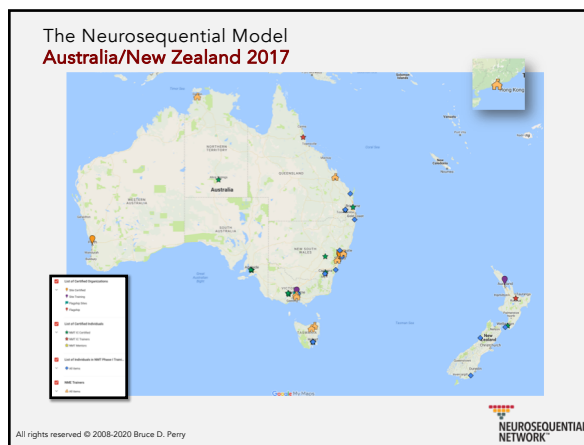
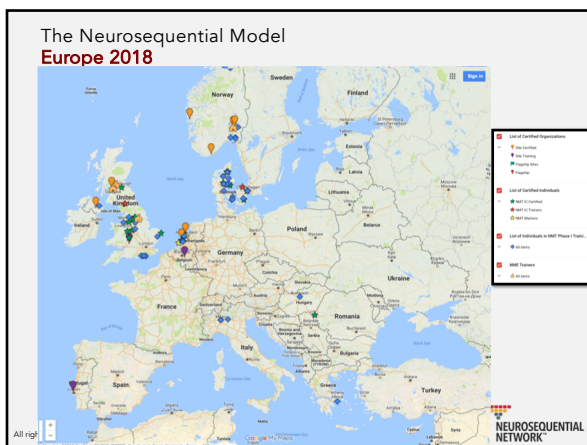
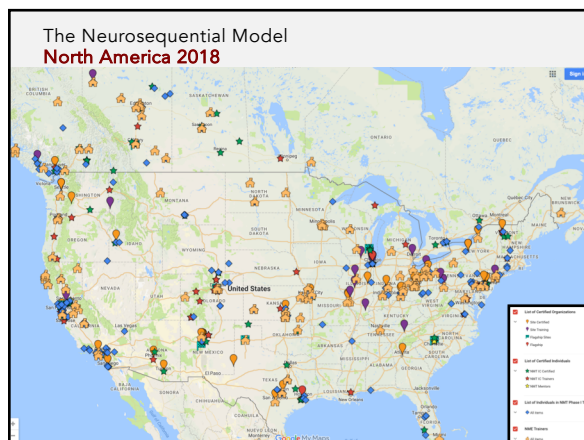
It takes an average of 17 years for the 14% of research that influences clinical practice to get there (Morris, Wooding & Grant, 2011)

NMT was first manualized in 2008 when the NMT Certification Process was developed

Since then....

- 60,000 metric reports
- over 3000 Phase I trained clinicians
- 10 Flagship sites in three countries (US, Canada, Australia)
- 100 + Phase I NMT Certified Sites and Programs
- 28 countries

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Neurosequential Model Core Slides "Best Hits" Package

| Cumulative Clinicians, Teachers, Caregivers Exposed to the Neurosequential Model | YEAR | Web, Webinars, Books, Live Training |
|--|------|--|
| | 2004 | 6,000 |
| | 2005 | 20,000 |
| | 2006 | 40,000 |
| | 2007 | 80,000 |
| | 2008 | 120,000 |
| | 2009 | 180,000 |
| | 2010 | 250,000 |
| | 2011 | 300,000 |
| | 2012 | 350,000 |
| | 2013 | 400,000 |
| | 2014 | 500,000 |
| | 2015 | 600,000 |
| | 2016 | 800,000 |
| | 2017 | 900,000 |
| | 2018 | 1,000,000 |

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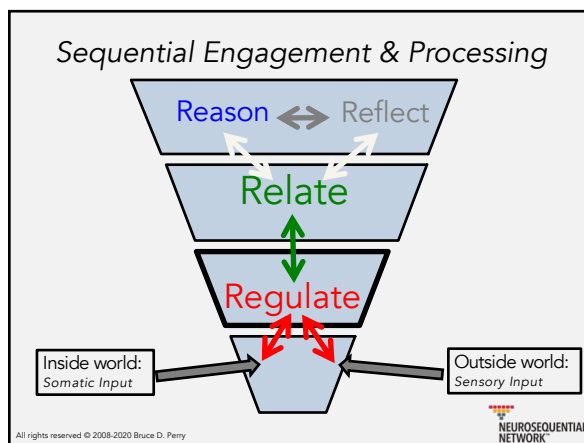
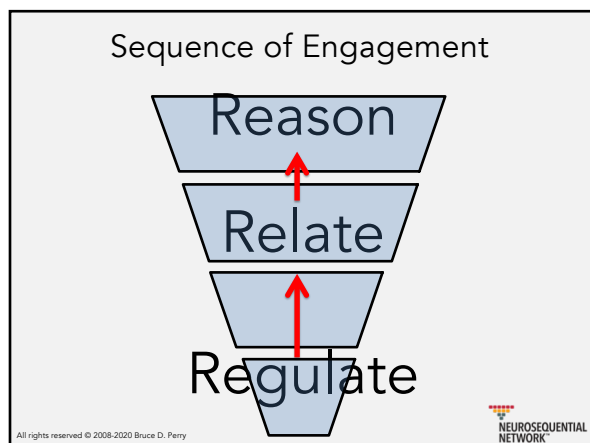
| YEAR | Clinicians Using NMT (Direct) Cumulative | Children, Youth, Adults (Impacted/yr) | Clinicians Using NMT (Indirect) Cumulative | Children, Youth, Adults (Impacted/yr) |
|--------------|---|---|---|---|
| 2004 | 1 | 25 | 10 | 250 |
| 2005 | 4 | 100 | 40 | 1000 |
| 2006 | 10 | 250 | 100 | 2500 |
| 2007 | 12 | 300 | 120 | 3000 |
| 2008 | 20 | 500 | 200 | 5000 |
| 2009 | 45 | 1125 | 450 | 11250 |
| 2010 | 44 | 1100 | 440 | 11000 |
| 2011 | 120 | 3000 | 1200 | 30000 |
| 2012 | 264 | 6600 | 2640 | 66000 |
| 2013 | 462 | 11550 | 4620 | 115500 |
| 2014 | 726 | 18150 | 7260 | 181500 |
| 2015 | 992 | 24800 | 9920 | 248000 |
| 2016 | 1278 | 31950 | 12780 | 319500 |
| 2017 | 1708 | 42700 | 17080 | 427000 |
| 2018 | 2318 | 57950 | 23180 | 579500 |
| Total Direct | | 200,100 | Total Indirect | 2,001,000 |

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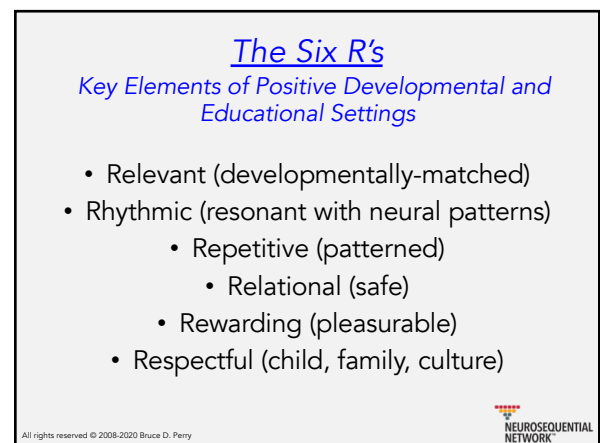
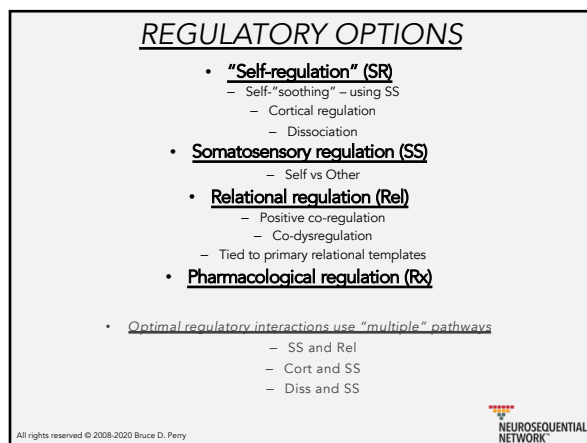
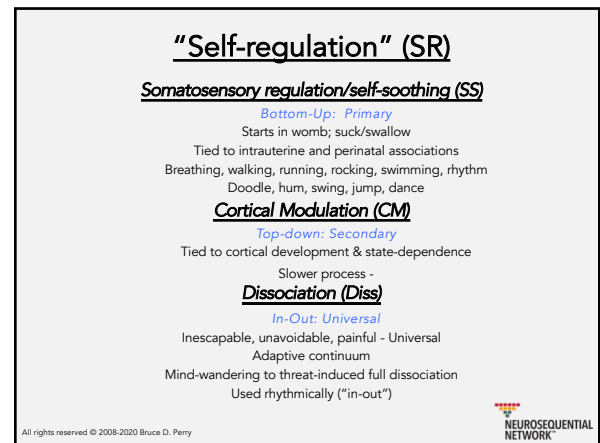
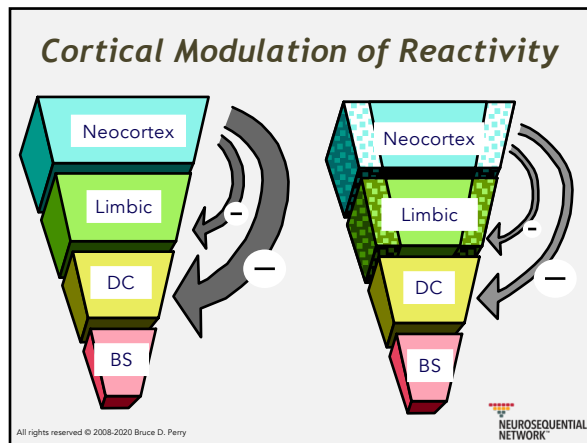
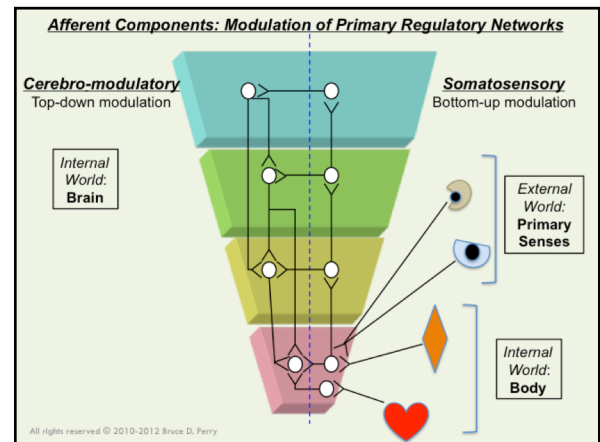
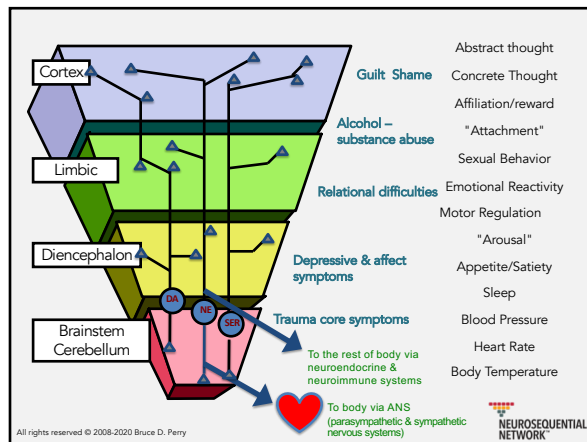


| | | |
|----------------------|---------------------------|------------------------|
| Neurons | 86,000,000,000 | 86 Billion |
| Glia | 111,800,000,000 | 111 Billion |
| Synaptic boutons | 430,000,000,000,000 | 420 TRILLION |
| Synaptic proteins | 8,603,956,000,000,000,000 | 8.4 QUADRILLION |
| Polarizations/minute | 2,581,186,800,000,000,000 | 2.5 QUADRILLION/minute |

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Neurosequential Model Core Slides "Best Hits" Package



Neurosequential Model Core Slides "Best Hits" Package

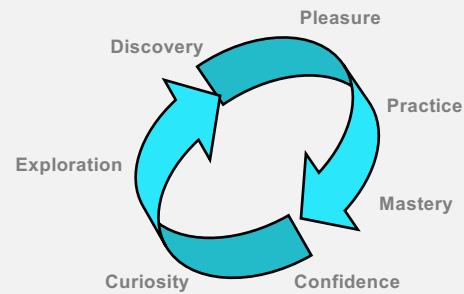
Creating the Relational 'Space' for Optimal Development, Learning & Healing (or How do you like those P's?)

- Present,
- Parallel,
- Patient &
- Persistent in Providing
- Patterned, Predictable, Positive doses of
- Protected (safe) experience

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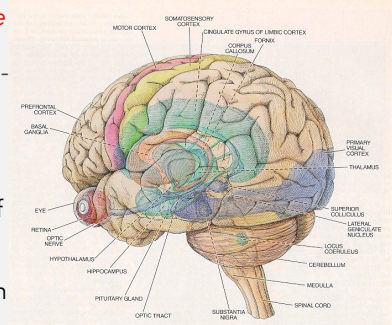
The Cycle of Learning



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The brain –
particularly the human
NEOCORTEX –
allows us to absorb the accumulated and distilled experiences of thousands of previous generation – in a single lifetime.



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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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Poverty of Relationships

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

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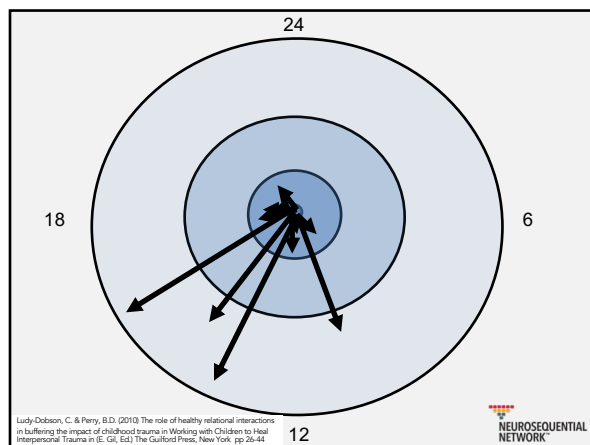
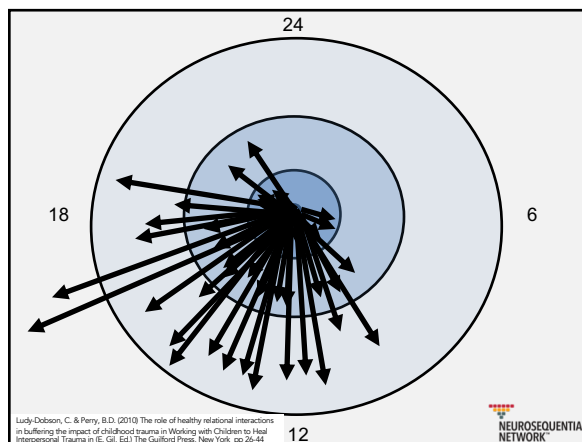
Neurosequential Model Core Slides "Best Hits" Package

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

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On Becoming Humane

Being born a human being does not ensure a child will become humane.

Humans become humane. The capacity to care, to share, to listen, value and be empathic – to be compassionate – develops from being cared for, shared with, listened to, valued and nurtured.

Humane caregiving expresses our capacity to be humane. Inhumane caregiving can decrease or even destroy this capacity.

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The brain develops and organizes as a reflection of our genetic gifts, epigenetic heritage, intrauterine, perinatal and developmental experiences, organizing in response to the pattern, intensity and nature of our sensory and perceptual experience.



Robert F. Anda · Vincent J. Felitti · J. Douglas Bremner · John D. Walker · Charles Whitfield · Bruce D. Perry · Shantia R. Dube · Wayne H. Giles

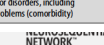
The enduring effects of abuse and related adverse experiences in childhood

A convergence of evidence from neurobiology and epidemiology

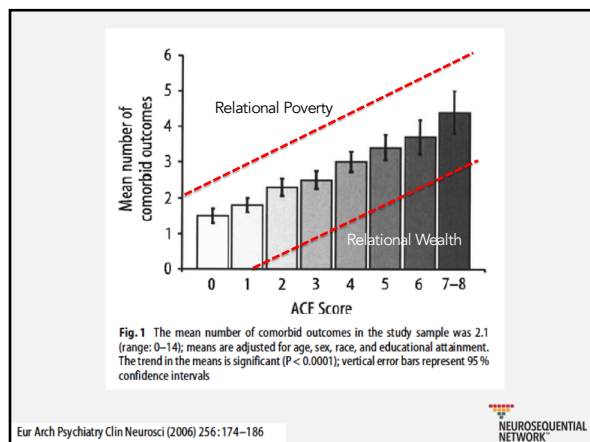
Table 6 Summary of the convergence between neurobiological effects of childhood maltreatment with ACE study epidemiological findings

| Area of function or dysfunction studied | Demonstrated neurobiological defects from early trauma | ACE study findings |
|---|--|--|
| Anxiety, panic, depressed affect, hallucinations, and substance abuse | Repeated stress & childhood trauma → hippocampus, amygdala & medial prefrontal cortex atrophy and dysfunction that mediate anxiety & mood problems | Tables 2 and 3 Unexplained panic, depression, anxiety, hallucinations & alcohol & other drug problems |
| Smoking, alcoholism, illicit drug use, injected drug use | Repeated stress & childhood trauma → increased locus coeruleus & norepinephrine activity, decreased by heroin & alcohol | Table 3 Increased smoking, alcohol and other drug use |
| Early intercourse, promiscuity, sexual dissatisfaction, perpetration of intimate partner violence | Repeated stress & childhood trauma → amygdala defects; role in sexual & aggressive behavior and deficits in oxytocin with impaired pair bonding | Tables 3 and 5 Risky sexual behavior, anger control, risk for aggression against intimate partners |
| Memory storage and retrieval | Hippocampus role in memory storage and retrieval; hippocampal & amygdala size reduction in childhood trauma; deficits in memory function | Table 4 Impaired memory of childhood and number age periods affected increases as the ACE score increase |
| Body weight and obesity | Repeated stress & distress, via glucocorticoid pathways, leads to increased intra-abdominal & other fat deposits | Table 2 Increased obesity |
| Sleep, multiple somatic symptoms, high perceived stress | Repeated stress & distress, via several pathways, leads to increase in other physical problems | Tables 2 and 5 Increased somatic symptoms and disorders, including sleep problems |
| Co-morbidity/Trauma spectrum disorders | Multiple brain and nervous system structure and function defects, including monoamine neurotransmitter systems | Fig. 1 The graded relationship of the ACE score to psychiatric and physical symptoms or disorders, including multiple co-occurring problems (comorbidity) |

Eur Arch Psychiatry Clin Neurosci (2006) 256:174–186



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Contents lists available at ScienceDirect
Archives of Psychiatric Nursing
journal homepage: www.elsevier.com/locate/apn

Beyond the ACE score: Examining relationships between timing of developmental adversity, relational health and developmental outcomes in children

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^b University of Missouri - Kansas City, Department of Psychology, 6800 Cherry Street, Room 211, Kansas City, MO 64116, USA
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ARTICLE INFO

Keywords:
Child trauma
Adverse childhood experiences
Social support
Early-life stress
Regulation
Neurosequential Model

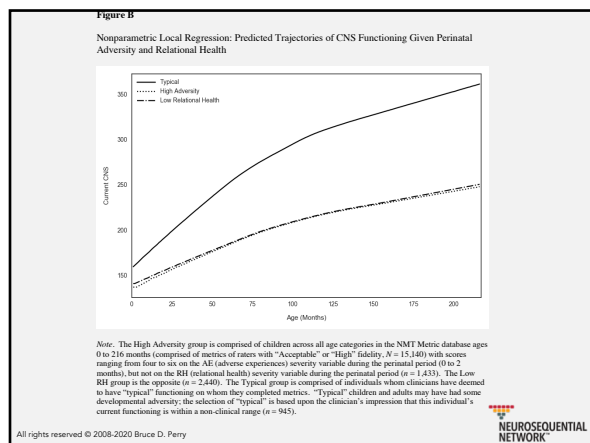
ABSTRACT

Background: The association between developmental adversity and children's functioning is complex, particularly given the multifaceted nature of adverse experiences. The association between the timing of experience and outcome is underresearched and clinically underappreciated. We examine how the timing of both adverse (including potentially traumatic) events and relational poverty are associated with developmental outcomes.

Method: Clinicians using the Neurosequential Model of Therapeutics (NMT), an approach to clinical problem solving, reported on the timing of children's developmental experiences, their degree of current relational health, and current functioning in low brain-mediated domains ($N = 2022$), in 12-year-old children. A regulated hierarchical model produced stable and generalizable estimates regarding associations between the timing of experiences across four developmental periods: Perinatal (0–2 years), Infancy (2–12 mos), Early Childhood (13 mos to 4 years), and Childhood (4 to 11 years) and current functioning.

Results: Perinatal developmental experiences were more strongly associated with compromised current functioning than such experiences occurring during other periods. Perinatal relational poverty was a stronger predictor than perinatal adversity. During subsequent developmental periods, the influence of relational poverty diminished, while the influence of adversity remained strong throughout early childhood. Current relational health, however, was the strongest predictor of functioning.

Conclusion: Findings expand the understanding of the association between the timing of adversity and relatively impoverished experiences and children's functioning. Although only 10% experienced an significantly impactful, relationally enriched environment may buffer these effects.



Children Australia
Volume 43 | Number 2 | pp. 105–115 | © The Author(s) 2018 | doi:10.1017/cha.2018.21

Examining Developmental Adversity and Connectedness in Child Welfare-Involved Children

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²Department of Psychology, University of Missouri - Kansas City, Kansas City, Missouri, USA
³Center for Research Methods and Data Analysis, University of Kansas, Lawrence, Kansas, USA
⁴Department of Psychiatry, Northwestern University Feinberg School of Medicine, Chicago, Illinois, USA

Identifying optimal out-of-home placements for child welfare-involved youth is challenging. Examples of youth recovering within each "out-of-home" placement type (foster, relative, residential) are evident, as are examples of youth who are deteriorating. The heterogeneity in developmental history and current functioning of youth makes blanket policies regarding placement unwise. Examination of developmental heterogeneity and functioning of youth in the welfare system can provide insights about factors influencing outcomes, thereby informing practice, program and policy. We explore whether current relational health (connectedness) promotes positive outcomes for child welfare-involved youth while controlling for developmental risk (history of adversity, and lack of relationally positive, experienced). Clinicians at 19 organizations serving child welfare-involved youth used a neurodevelopmentally informed approach to intervention, the Neurosequential Model of Therapeutics (NMT), which includes metrics to assess the developmental timing of children's risk, "connectedness" and neurodevelopmental functioning (e.g., sleep, arousal, cortical control). Data-driven statistical techniques were used to produce stable, generalizable estimates. Risk during the perinatal (0–2 months) period significantly predicted children's functioning; current relational health predicted outcomes more strongly. Although early life developmental risk has a persistent effect on functioning, relationally supportive contexts may mitigate this risk. Improving relational contexts of child welfare-involved youth, regardless of placement type, is key.

Keywords: child trauma, child maltreatment, social support, neurosequential model, regulation

frontiers
in Behavioral Neuroscience

ORIGINAL RESEARCH
published: 16 August 2019
doi: 10.3389/fnbeh.2019.00163

Timing of Early-Life Stress and the Development of Brain-Related Capacities

Erin P. Hambrick^{1,2}, Thomas W. Browner^{1,3} and Bruce D. Perry^{1,4}

¹The ChildTrauma Academy, Houston, TX, United States; ²Tufts University, Department of Psychology, University of Missouri - Kansas City, Kansas City, MO, United States; ³Center for Research Methods and Data Analysis, University of Kansas, Lawrence, KS, United States; ⁴Department of Psychiatry, Feinberg School of Medicine, Northwestern University, Chicago, IL, United States; ⁵School of Adult Health, College of Science, Health and Engineering, La Trobe University, Melbourne, VIC, Australia

Early-life stress (ELS) poses risks for developmental and mental health problems throughout the lifespan. More research is needed regarding how specific ELS experiences influence specific aspects of neurodevelopment. We examined the association between ELS, defined as severe adversity (e.g., domestic violence, caregiver drug use) and severe relational poverty (e.g., caregiver neglect, lack of caregiver attunement), occurring during the first 2 months of life and a variety of brain-

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Connectedness is the key.

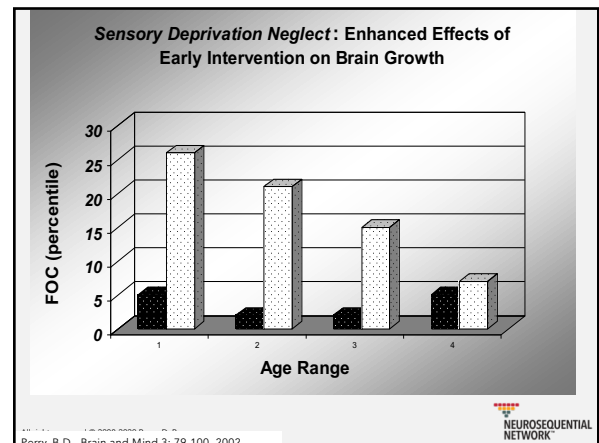
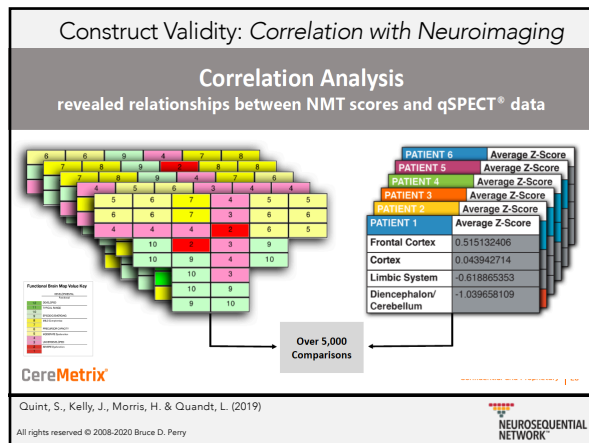
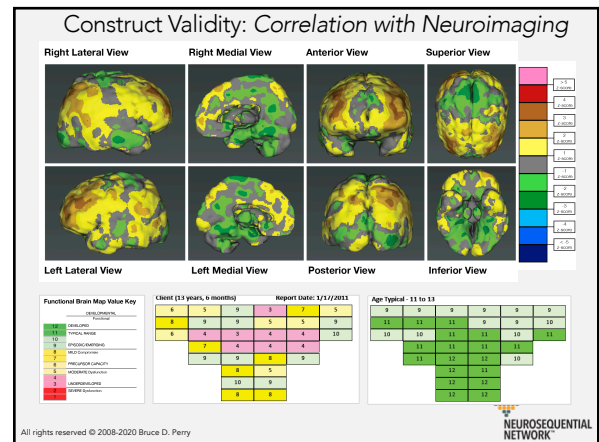
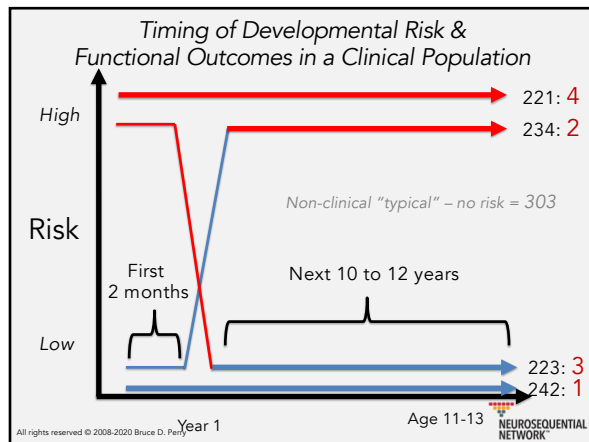
Your history of connectedness is a better predictor of your health than your history of adversity.

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.

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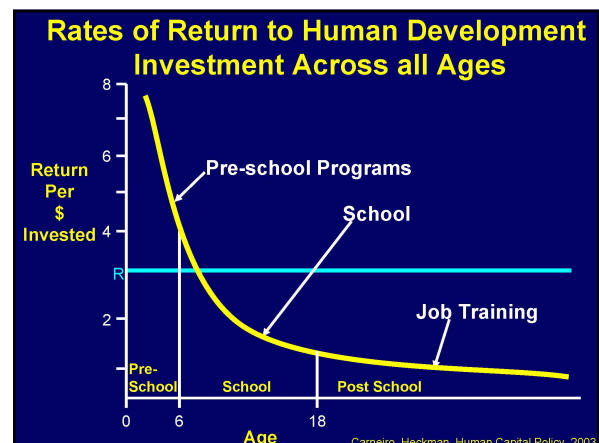


Creating Policy and Practice that Capitalize on Biological Gifts

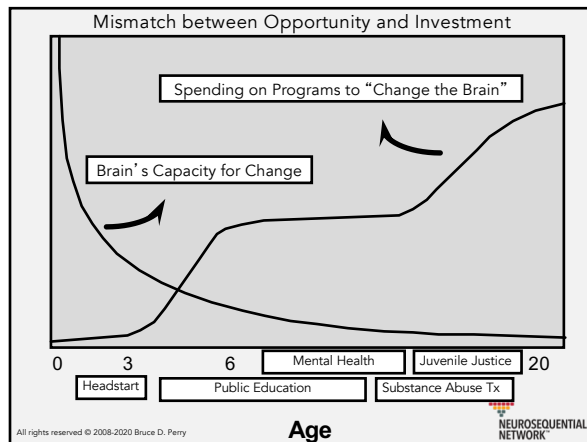
Democracy, public education, suffrage, civil rights – and, ultimately, early childhood investment and communities rich in relational health

NEUROSEQUENTIAL NETWORK

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People not programs change people!

The effective agents of change in any successful program, project or system are human beings.

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NEUROSEQUENTIAL NETWORK

Yet successful programs provide the people, process and "program" elements that put the "right" people together in "right" ways at the "right" time.

The effective agents of change in any successful program, project or system are human beings.

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NEUROSEQUENTIAL NETWORK

NIMH Research Domain Criteria

RDoC

- Focus on genetic, epigenetic, neural network and related biomarkers along with "symptoms"
- The major RDoC research domains:
 - Negative Valence Systems
 - Positive Valence Systems
 - Cognitive Systems
 - Systems for Social Processes
 - Arousal/Modulatory Systems

DSM

- "a diagnostic system limited to clinical presentation could confer reliability and consistency but not validity"
- Minimal focus on mechanism – fundamentally "descriptive" and symptom focused

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NEUROSEQUENTIAL NETWORK

The Challenge of "Diagnosis" in Mental Health

Brain

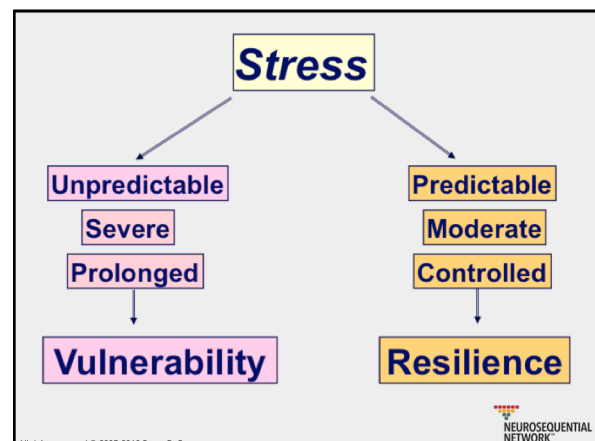
- 84 billion unique neurons
 - 5 times as many glia
 - each neuron 5000 - 20,000 synaptic connections
 - 100s of neurotransmitters
- Hundreds of major neural networks
- Thousands of functions
- 90 % of children/youth in public MH Clinics have 1 of 8 "diseases" – often "co-morbid"

Heart

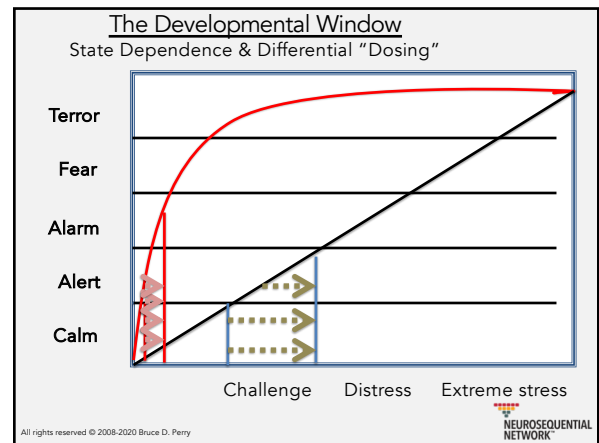
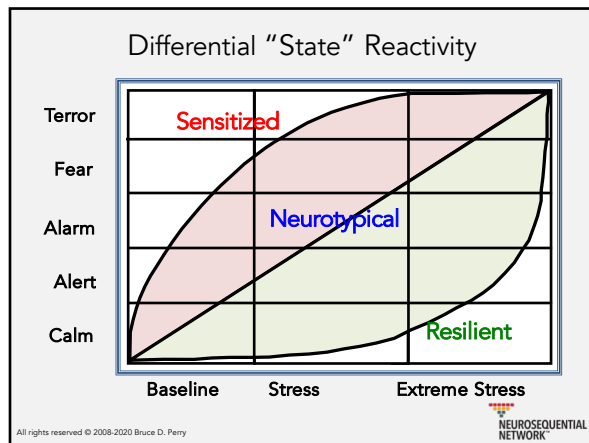
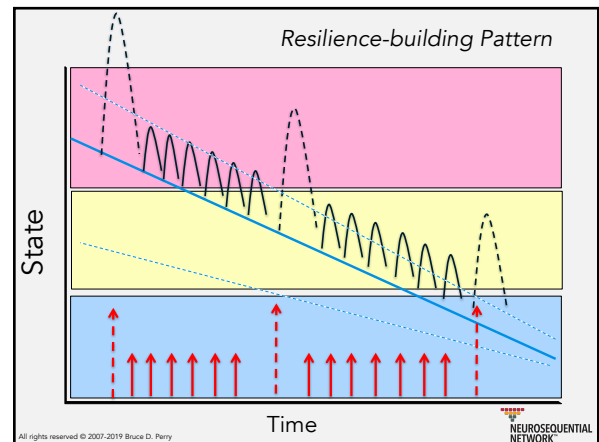
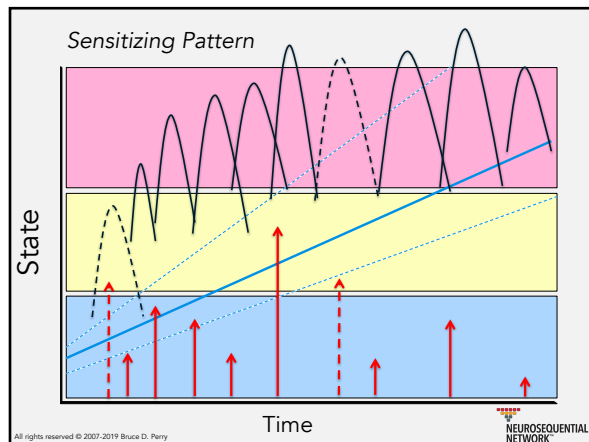
- 2 billion heart cells
- Dozens of major sub-systems
 - Nerve, muscle, vessels
- A handful of major "main" functions
- Hundreds of distinct cardiac "diseases"

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NEUROSEQUENTIAL NETWORK

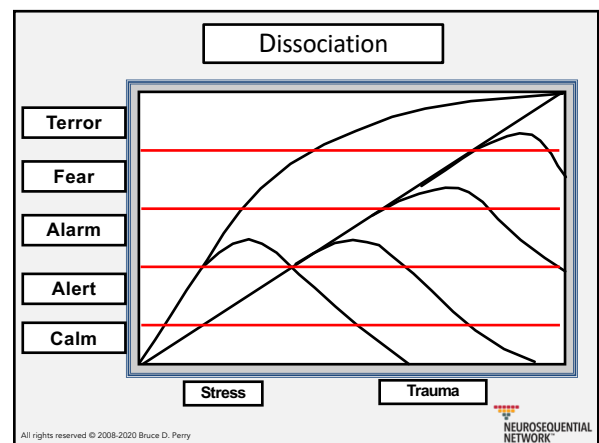


Neurosequential Model Core Slides "Best Hits" Package

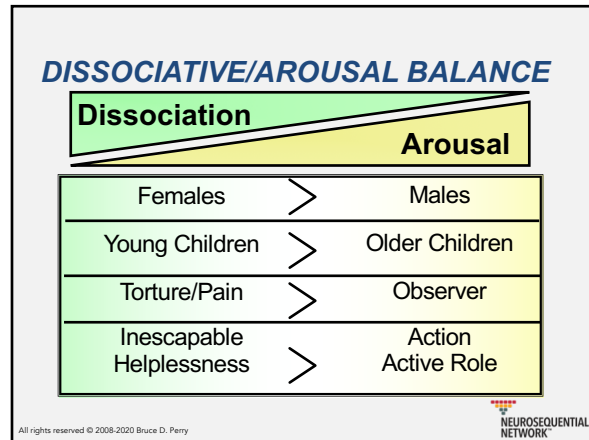


Responses to Stress, Distress, Trauma

- **Heterogeneity of response patterns**
- Adaptive changes in *cognition*
- Adaptive changes in *affects*
- Adaptive changes in *behavior*
- Adaptive changes in *neurophysiology*
- Adaptive changes in *physiology*



Neurosequential Model Core Slides "Best Hits" Package



All Brain Functioning is "State" Dependent

The brain is a rhythmic, dynamic organ.

All functioning of the brain will vary depending upon the "state."

Asleep or wakeful the brain will have varying activation in cognitive, social, emotional, motor and all other brain mediated functions.

Both sleep and wakefulness also have various states which involve shifts in the activity of key neural networks.

Novelty, transition and threat will all shift internal state.

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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 |

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| Sense of Time | Extended Future | Days Hours | Hours Minutes | Minutes Seconds | Loss of Sense of Time |
|--------------------------------------|---------------------|------------------|-----------------|--------------------|-----------------------|
| 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 |

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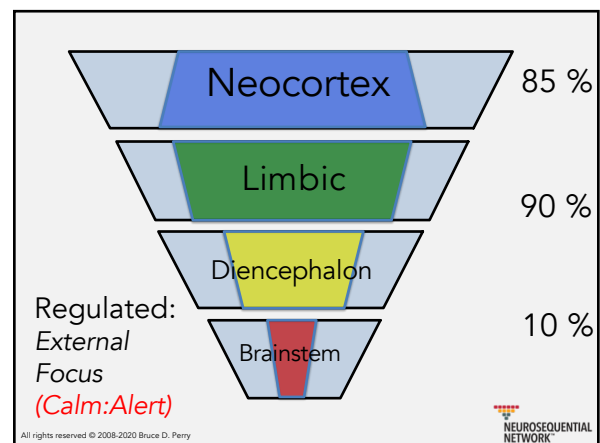
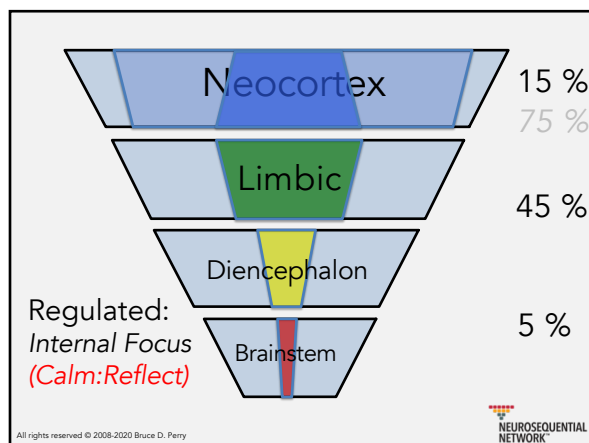
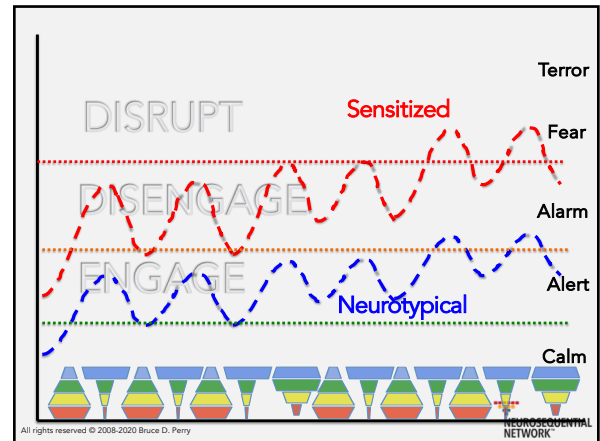
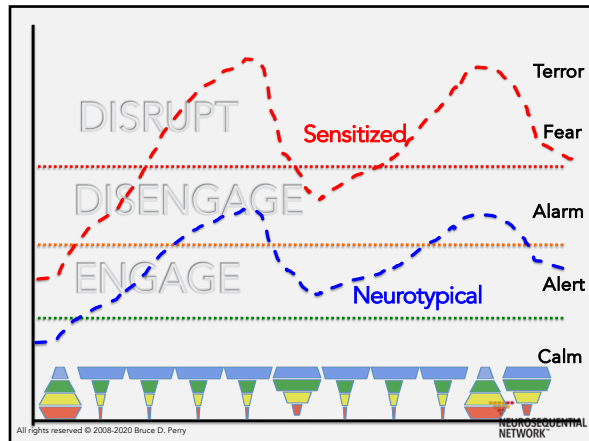
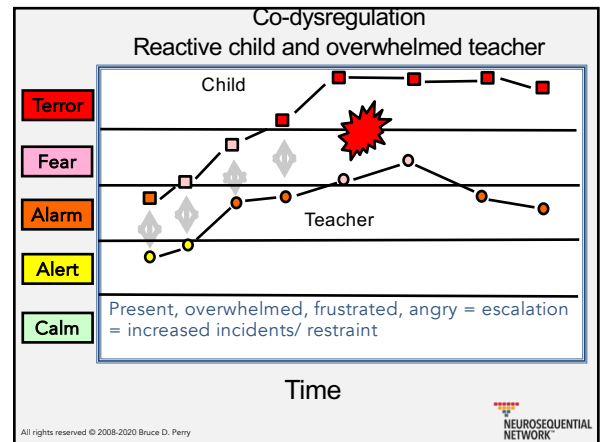
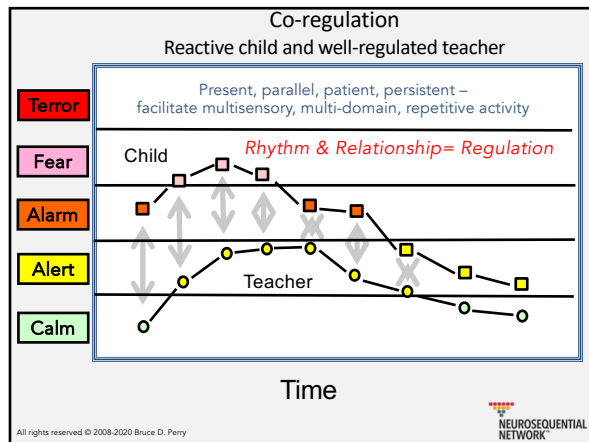
| Adaptive Response | REFLECT | FLOCK | FREEZE | FLIGHT | FIGHT |
|---|---|--|--|--|---|
| Predictable De-escalating Behavior Behaviors of the teacher when the child or classroom is in various states of arousal | <ul style="list-style-type: none"> Calm sounds Personal space Predictable touch Predictable routine | <ul style="list-style-type: none"> Quiet voices Eye contact Confidence Rhythmic movement Clear directions Somatosensory activities | <ul style="list-style-type: none"> Comforting and predictable voice, soothed therapeutic touch Singing, humming, music Reflective listening Reassurance | <ul style="list-style-type: none"> Calm, quiet, presence Disengage Turn off lights, white noise Reduce sensory input | <ul style="list-style-type: none"> Calm affect Disengage but direct discipline Adult support Individual attention |
| Predictable Escalating Behavior Behaviors of the teacher when the child or classroom is in various states of arousal | <ul style="list-style-type: none"> Load Noises Close uninvited proximity Unpredictable touch Changes in daily routine or schedule | <ul style="list-style-type: none"> Frustration or anxiety Communication from a distance (like yelling) Complex directions Ultimatums | <ul style="list-style-type: none"> Raised voices Raising hands/point finger, sudden movement Threatening tone Chaos in classroom, disorganization of materials | <ul style="list-style-type: none"> Frustration of teacher Yelling, chaos Collective dysregulation of peers | <ul style="list-style-type: none"> Physical restraint, grabbing, shaking Screeching Introducing violence |
| "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, violence, behavior, severely lacking rules and authority; Full "fight/flight" or "freeze" state. |

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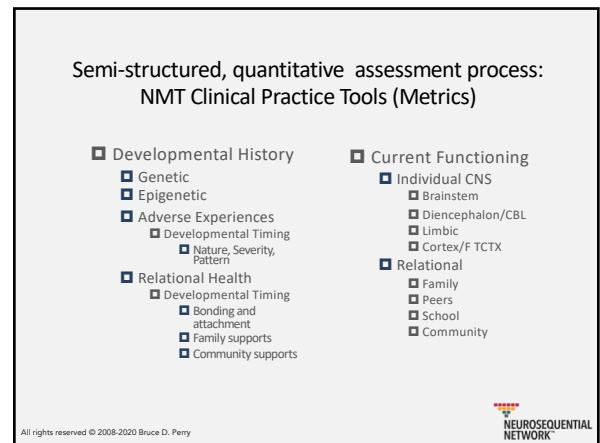
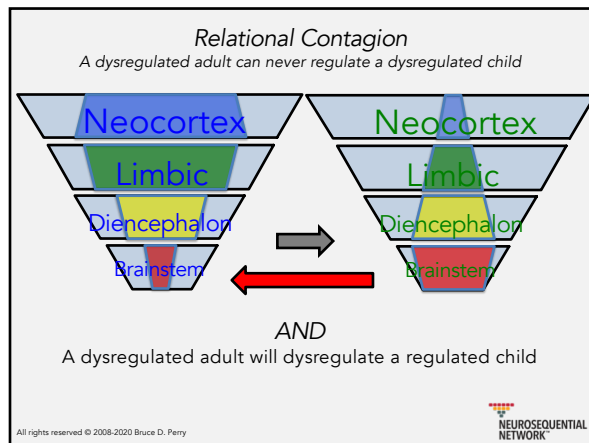
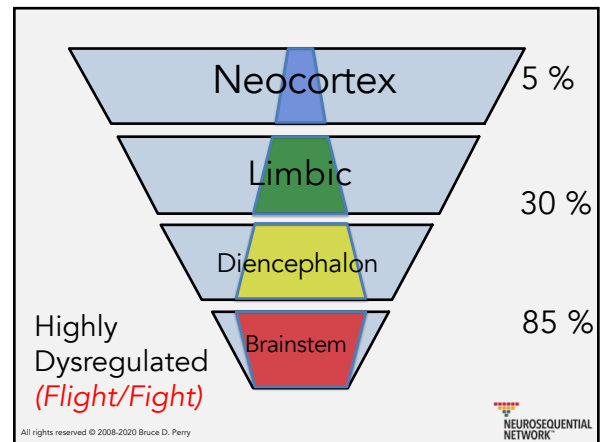
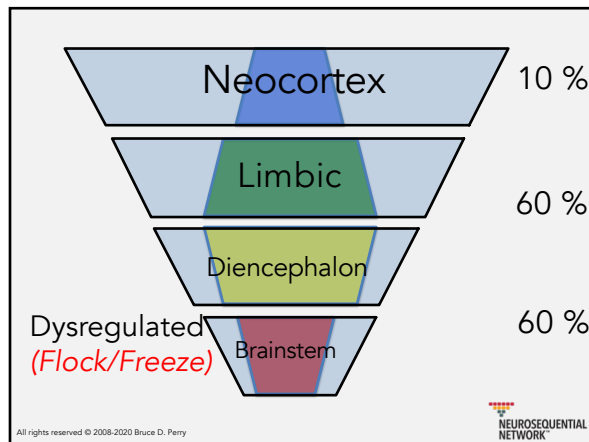
| Organizational Pressures | Resource-surplus Predictable Stable/Safe | Resource-limited Unpredictable Novel | Resource-poor Threatening Inconsistent |
|-------------------------------|--|---|--|
| Prevailing Cognitive Capacity | Abstract Creative (IQ = 120) | Concrete Superstitious/Defensive (IQ = 100) | Reactive Regressive (IQ = 80) |
| Prevailing Affective "Tone" | CALM | ANXIETY | FEAR |
| Systemic Solutions | Reflective INNOVATIVE | Concrete SIMPLISTIC | Fear-based REACTIONARY |
| Focus of Solution | FUTURE Intentional Inflection | SHORT-TERM Serendipitous Inflection | PRESENT Forced Inflection |
| Policies and Practices | Abstract Conceptual | Concrete Superstitious Intrusive | Restrictive Punitive |
| Staff & Supervisory Practices | Nurturing Flexible Enriching | Ambivalent Obsessive Controlling | Apathetic Oppressive Harsh |

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Neurosequential Model Core Slides "Best Hits" Package



Neurosequential Model Core Slides "Best Hits" Package



NMT Brain Mapping Process

- The key indicator of brain organization and neurophysiological status is function
- By creating a simplified construct – the brain map – assessment of key brain-mediated functions can help “localize” neurodevelopmental vulnerabilities and strengths
- This “localization” helps direct developmentally-sensitive interventions

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Neurodevelopmental Risk

- The NMT process involves assessing the timing, nature and intensity of adverse events
- The timing, nature and quality of “buffering” relational health is assessed as well
- An estimate of “developmental risk” is obtained at various times during development by combining the AE and RH scores

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Neurosequential Model Core Slides

"Best Hits" Package

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

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| | | | | | |
|--------------------|-------------------|---------------------|----------------------|----------------------|--------------------|
| Abstract Cognition | Math/Symbolic | Perform | Modulate Impulsivity | Verbal | Values/Beliefs |
| Speech Articulate | Commun Language | SS/Mot Integrate | Time Delay Grat | Self Image Awareness | Concrete Cognition |
| Relational Attach | Attune | Reward | Affect Mood | Psychosex | Memory Learning |
| | Neuroend Hypothal | Dissociate Response | Arousal Response | Primary Sensory Int | |
| | Fine Motor | Feeding Appetite | Sleep | Coordinate LMF | |
| | | Suck/Swal Gag | Attend Track | | |
| | | Temp Metabolic | EOEM | | |
| | | Cardio | Autonomic Regulation | | |

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| | | | | | |
|--------------------|-------------------|---------------------|----------------------|----------------------|--------------------|
| Abstract Cognition | Math/Symbolic | Perform | Modulate Impulsivity | Verbal | Values/Beliefs |
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| | Fine Motor | Feeding Appetite | Sleep | Coordinate LMF | |
| | | Suck/Swal Gag | Attend Track | | |
| | | Temp Metabolic | EOEM | | |
| | | Cardio | Autonomic Regulation | | |

WISC

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| | | | | | |
|--------------------|-------------------|---------------------|----------------------|----------------------|--------------------|
| Abstract Cognition | Math/Symbolic | Perform | Modulate Impulsivity | Verbal | Values/Beliefs |
| Speech Articulate | Commun Language | SS/Mot Integrate | Time Delay Grat | Self Image Awareness | Concrete Cognition |
| Relational Attach | Attune | Reward | Affect Mood | Psychosex | Memory Learning |
| | Neuroend Hypothal | Dissociate Response | Arousal Response | Primary Sensory Int | |
| | Fine Motor | Feeding Appetite | Sleep | Coordinate LMF | |
| | | Suck/Swal Gag | Attend Track | | |
| | | Temp Metabolic | EOEM | | |
| | | Cardio | Autonomic Regulation | | |

TSCC

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| | | | | | |
|--------------------|-------------------|---------------------|----------------------|----------------------|--------------------|
| Abstract Cognition | Math/Symbolic | Perform | Modulate Impulsivity | Verbal | Values/Beliefs |
| Speech Articulate | Commun Language | SS/Mot Integrate | Time Delay Grat | Self Image Awareness | Concrete Cognition |
| Relational Attach | Attune | Reward | Affect Mood | Psychosex | Memory Learning |
| | Neuroend Hypothal | Dissociate Response | Arousal Response | Primary Sensory Int | |
| | Fine Motor | Feeding Appetite | Sleep | Coordinate LMF | |
| | | Suck/Swal Gag | Attend Track | | |
| | | Temp Metabolic | EOEM | | |
| | | Cardio | Autonomic Regulation | | |

Speech/Language Eval

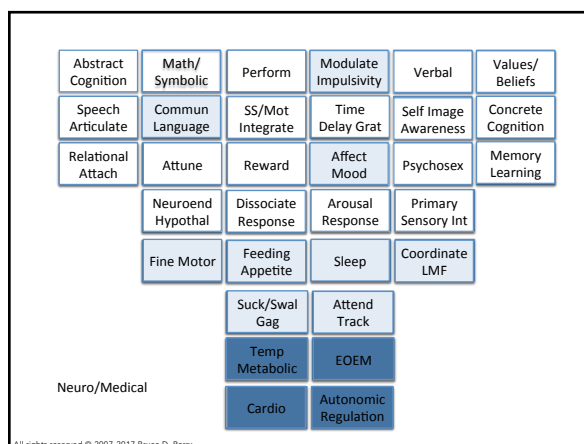
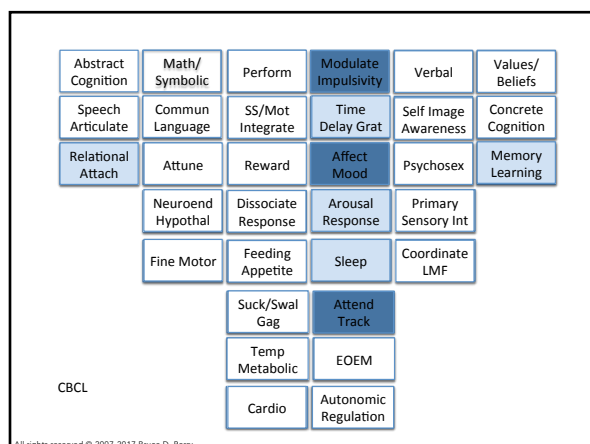
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| | | | | | |
|--------------------|-------------------|---------------------|----------------------|----------------------|--------------------|
| Abstract Cognition | Math/Symbolic | Perform | Modulate Impulsivity | Verbal | Values/Beliefs |
| Speech Articulate | Commun Language | SS/Mot Integrate | Time Delay Grat | Self Image Awareness | Concrete Cognition |
| Relational Attach | Attune | Reward | Affect Mood | Psychosex | Memory Learning |
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| | Fine Motor | Feeding Appetite | Sleep | Coordinate LMF | |
| | | Suck/Swal Gag | Attend Track | | |
| | | Temp Metabolic | EOEM | | |
| | | Cardio | Autonomic Regulation | | |

OT

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Neurosequential Model Core Slides "Best Hits" Package



OUTCOMES

See NM Selected Outcomes and NMT as EBP documents available at www.bdperry.com/handouts

Neurosequential Model of Therapeutics in a Therapeutic Preschool: Implications for Work With Children With Complex Neuropsychiatric Problems

Sharon Barfield
Health Policy and Research Solutions, Lawrence, KS

Christine Dobson
The ChildTrauma Academy, Houston, TX

Rick Gaskill
Sumner Mental Health and Wichita State University

Bruce D. Perry
The ChildTrauma Academy, Houston, TX and Feinberg School of Medicine, Northwestern University

The two studies presented examine the use of the Neurosequential Model of Therapeutics on the social-emotional development and behavior of 28 children participating in a therapeutic preschool program. Results from these studies indicate that the use of the Neurosequential Model of Therapeutics approach to determine the nature, timing, and "dose" of developmentally appropriate activities and interventions within the context of a therapeutic preschool did improve the social-emotional development of the participating children. Interventions and activities were provided in the context of Filial Play Therapy as part of the therapeutic preschool environment. Six-month and 12-month follow-ups suggest gains in social-emotional development and behavior were retained. Implications for future use are discussed.

CITATION
Barfield, S., Dobson, C., Gaskill, R., & Perry, B. D. (2011, October 31). Neurosequential Model of Therapeutics in a Therapeutic Preschool: Implications for Work With Children With Complex Neuropsychiatric Problems. *International Journal of Play Therapy*. Advance online publication. doi: 10.1037/a0025955

NMT in Pre-school Setting (Study 1)

NMT in a Therapeutic Preschool

Table 1. Difference in Pretest and Posttest PSEDRI Scores and Time Series PSEDRI Scores (Social-Emotional Development) for Study 1

| PSEDRI scores | Pretest mean (SD) | Posttest mean (SD) | t | p | d (effect size) |
|---------------------------|-----------------------|--------------------|-------|---------|-----------------|
| PSEDRI composite (n = 13) | 1.79 (.508) | 2.98 (.848) | 6.16 | <.001** | 2.34 |
| Emotion regulation | 1.88 (.449) | 2.86 (.810) | 5.4 | <.001** | 2.18 |
| Helpfulness | 2.04 (.824) | 3.31 (1.22) | 4.4 | <.001** | 1.54 |
| Fair assertiveness | 1.92 (.768) | 3.87 (.768) | 7.5 | <.001** | 2.54 |
| Impulse modulation | 1.73 (.693) | 2.64 (1.01) | 3.8 | <.001** | 1.31 |
| Cooperation | 1.94 (.584) | 3.21 (1.09) | 5.23 | <.001** | 2.17 |
| Empathy | .94 (.668) | 1.77 (1.14) | 3.19 | .003** | 1.24 |
| | Time series mean (SD) | Week 1 mean (SD) | | | |
| PSEDRI composite (n = 13) | | | | | |
| Week 2 | 1.82 (.288) | 1.85 (.430) | -.346 | .73 | -.07 |
| Week 3 | 1.74 (.318) | 1.85 (.430) | -1.39 | .168 | -.26 |
| Week 4 | 2.72 (.799) | 1.85 (.430) | 6.25 | <.001** | 2.02 |
| Week 5 | 2.77 (.670) | 1.85 (.430) | 7.33 | <.001** | 2.14 |
| Week 6 | 3.05 (.753) | 1.85 (.430) | 9.2 | <.001** | 2.79 |

** p < .01.

From: Barfield, S., Gaskill, R., Dobson, C., & Perry, B. D. (2011). *Neurosequential Model of Therapeutics in a Therapeutic Preschool: Implications for Work With Children With Complex Neuropsychiatric Problems*. *International Journal of Play Therapy*. Advance online publication, October 31, 2011. doi:10.1037/a0025955

Article

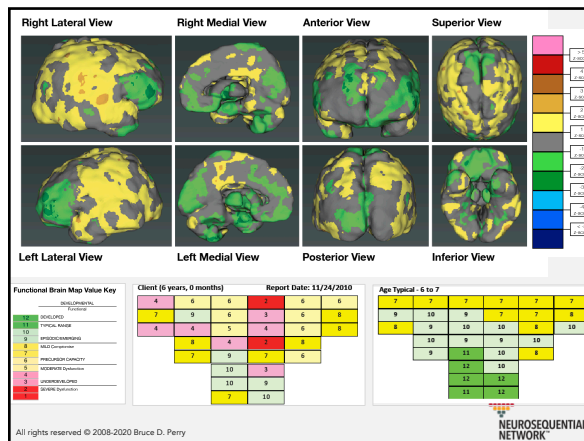
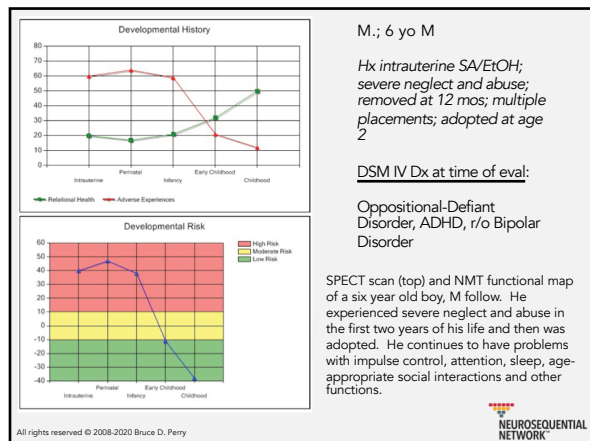
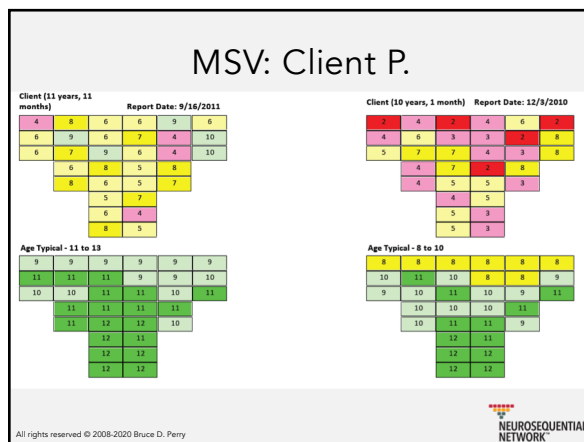
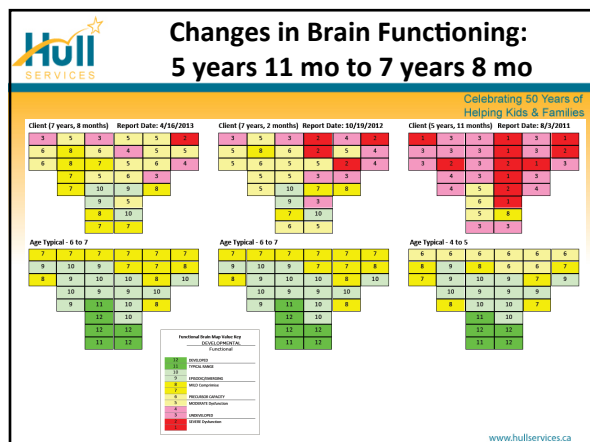
Clinical Improvements in adopted children with fetal alcohol spectrum disorders through neurodevelopmentally informed clinical intervention: A pilot study

Zohreh Zarnegar^{1,2}, Erin P Hambrick³, Bruce D Perry^{4,5}, Stanley P Azen⁶ and Cassandra Peterson⁷

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⁶University of Southern California, USA
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Clinical Child Psychology and Psychiatry
1-16
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RESIDENTIAL TREATMENT FOR CHILDREN & YOUTH
2018, VOL. 00, NO. 00, 1-22
<https://doi.org/10.1080/0886571X.2018.1425651>

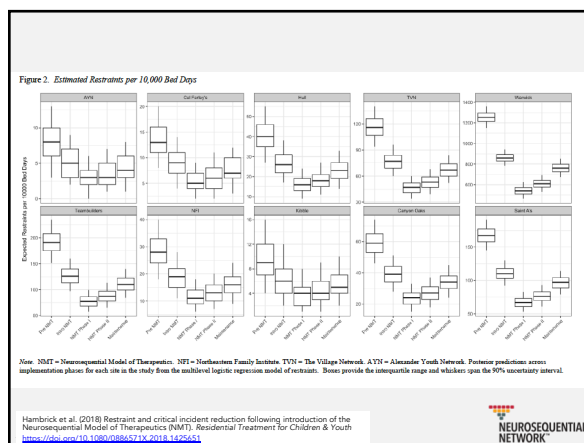
Routledge
Taylor & Francis Group

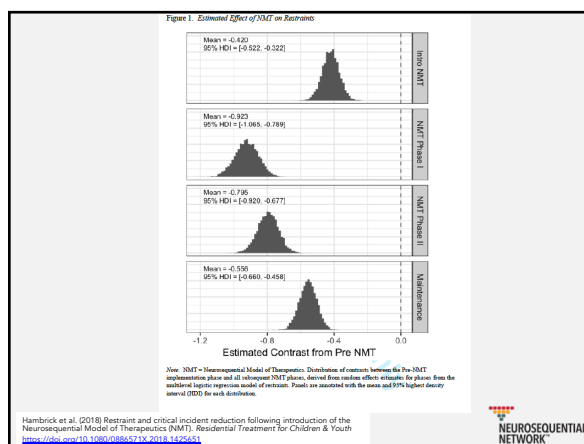
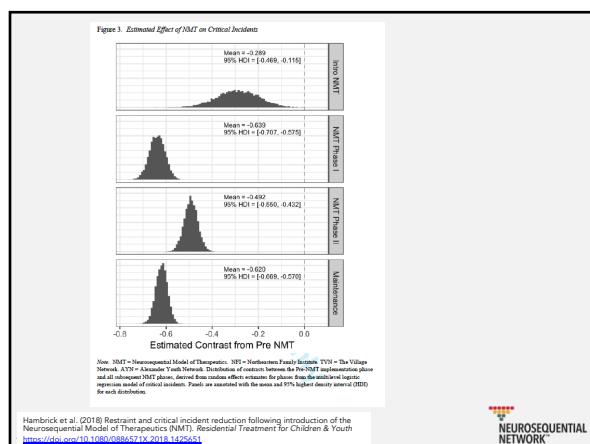
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Restraint and Critical Incident Reduction Following Introduction of the Neurosequential Model of Therapeutics (NMT)

Erin P. Hambrick^{a,b}, Thomas W. Brawner^{a,b}, Bruce D. Perry^{b,c}, Emily Wang^d, Gene Griffin^{e,f}, Toni DeMarco^g, Cara Capparelli^h, Tim Grove^g, Michelle Maikotter^h, Dawn O'Malleyⁱ, Dave Paxton^j, Lorraine Freedle^k, Jeffrey Friedman^l, Joan Mackenzie^m, Katharine M. Perryⁿ, Pete Cudney^o, Jerry Hartman^o, Elizabeth Kuh^l, Joseph Morris^l, Caroline Polales^o and Mark Strother

^aUniversity of Missouri Kansas City, Department of Psychology, Kansas City, Missouri, USA; ^bThe ChildTrauma Academy, Houston, Texas, USA; ^cNorthwestern University, Feinberg School of Medicine, Department of Psychiatry, Chicago, Illinois, USA; ^dHull Services, Calgary, Alberta, Canada; ^eSan Mateo County Behavioral Health, San Mateo, California, USA; ^fNortheastern Family Institute, South Burlington, Vermont, USA; ^gSaintA, Milwaukee, Wisconsin, USA; ^hCal Farley Boy's Ranch, Amarillo, Texas, USA; ⁱClinical and Neuropsychological Services, Charlotte, North Carolina, USA; ^jThe Village Network, Wooster, Ohio, USA; ^kPacific Quest, Hilo, Hawaii, USA; ^lWanwick Family Services, Bensalem, Pennsylvania, USA; ^mKibble Education and Care Center, Paisley, Scotland; ⁿAdministration for Children's Services, City of New York, New York, USA






Economic Benefits with Introduction of NMT

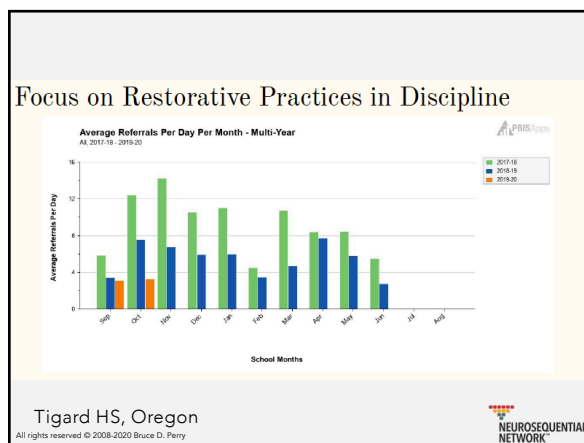
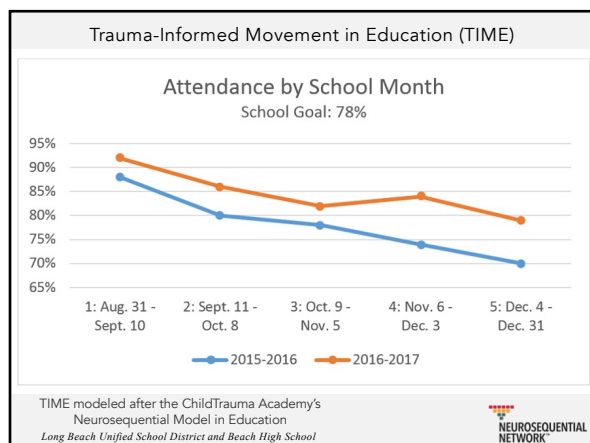
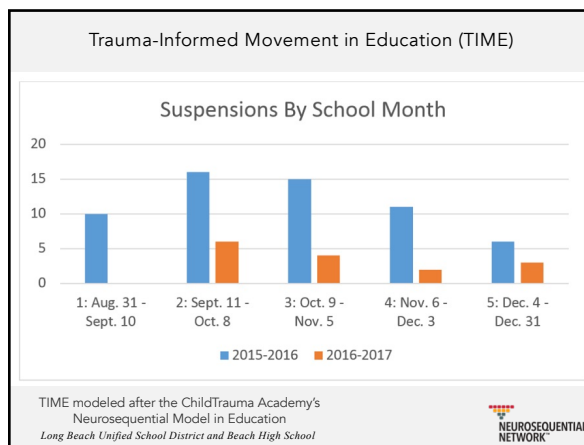
| Site | Program | Pre NMT | | Pre NMT | | Case 1 | | Case 2 | | Worst | | TOTAL | |
|--------------|------------------|---------------|-----------------------|-----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------|-------------------|-----------------|---------|
| | | BE Monthly | % Baseline Monthly | BE Monthly | % Baseline Monthly | % Baseline Monthly | % Baseline Monthly | % Baseline Monthly | % Baseline Monthly | Period Savings | Period Savings | | |
| 1 | NR1 | 100 | 100.0 | 88 | 88.0 | 11.5 | 11.5 | 9120 | 91.20 | 9120 | 91.20 | 13680.0 | 97945.6 |
| 2 | Village Network | 100 | 100.0 | 71.7 | 71.7 | 5229.0 | 52.29 | 4055.0 | 40.55 | 1.0 *** | 1.0 *** | 3658.5 | 14607.4 |
| 3 | Star Network | 100 | 100.0 | 25.2 | 25.2 | 3388.0 | 33.88 | 39.1 (3) | 0.39 | 93.7 (9) | 250.64 | 2149.4 | 2159.2 |
| 4 | Call Facility | 100 | 100.0 | 38.9 | 38.9 | 19.4 *** | 19.4 | 2462.9 | 24.63 | 21.4 *** | 21.4 | 99 | 5871.7 |
| 5 | SIA | 100 | 100.0 | 118.7 | 118.7 | 18396.8 | 183.97 | 3124.0 | 31.24 | 79.8 (2) | 12204.0 | 101.8 (2) | 4115.2 |
| 6 | NR2 | 100 | 100.0 | 58.9 | 58.9 | 111 | 11.1 | 1412.8 | 14.13 | 688.6 | 68.86 | 4511.0 | 36073.3 |
| 7 | NR3 | 100 | 100.0 | 92.9 *** | 92.9 | 10884.0 | 108.84 | 24.9 *** | 24.9 | 21943.5 | 219.44 | 1809.9 | 74645.2 |
| 8 | Telemobilphone | 100 | 100.0 | 112.6 | 112.6 | 13669.0 | 136.69 | 22.5 (3) | 22.5 | 724.1 | 7.24 | 1 | 7234.1 |
| 9 | Wardens | 100 | 100.0 | 45.8 *** | 45.8 | 15486.9 | 154.87 | | | | | | 15486.9 |
| 10 | Kiosk | 100 | 100.0 | 333.3 | 333.3 | 2029.1 (2) | 20.29 | 1158.9 | 11.59 | | | | 2158.9 |
| TOTAL | % Pre NMT | 100.0 | 8326.5 | 51.9 *** | 28941.6 | 33.0 *** | 93510.2 | 27.53 *** | 43337.9 | 37.58 *** | 43622.2 | 153802.7 | |

Ten sites
Three countries (eight states)
Avg duration of site review = 64 months (range 10-132 months)
2744 clinics served in the 10 programs during the duration of the review period

Conservative economic benefit from just the reduction in restraints
\$1,538,027
4,269 restraints (avoided)
51,228 "person-hours" required for "restraint" re-directed

Hambrecht et al. (2018) Restraint and critical incident reduction following introduction of the Neurocognitive Model of Therapeutic (NMT), Residential Treatment for Children & Youth
<https://doi.org/10.1007/s10804-018-0245-1>

 NEUROSEQUENTIAL NETWORK



Neurosequential Model Core Slides "Best Hits" Package

Post Pilot

Tigard High has two new teachers being NME trained **Special Education Teacher** Christy Goodell and **Biology Teacher** Geoff Jarman and two new psychologists being NMT trained Tigard School Psychologist **Lynelle Benit** and District TOSA **Alyssa Anderson**.

Tigard High ARTIC (Attitudes Related to Trauma Informed Care) Survey Data demonstrated an overwhelming positive gain for NME trained staff when compared to non NME trained staff. The mean for all staff improved over the length of the pilot however.

Tigard HS, Oregon

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Graduation Rates Increased in 2017-2018



2017-2018 graduation rate increased by almost 4%

Latin-x increase 16%

SPED increase 21%

Econ. Disadv. increase 9%

ELL increase 10%

Tigard HS, Oregon

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Introduction of NME Columbus Public Schools (2014-2015)

| District | Year | # Office Referrals | # Detention, Suspension or Expulsion |
|------------------------------|---------|--------------------|--------------------------------------|
| Columbus City-- Ohio Ave. ES | 2013-14 | 917 | 129 |
| | 2014-15 | 750 | 83 |
| Columbus City--Livingston ES | 2013-14 | 2719 | 1043 |
| | 2014-15 | 1017 | 811 |
| Graham School | 2013-14 | Not available | 88 |
| | 2014-15 | Not available | 38 |
| The Charles School | 2013-14 | Not available | 97 (3 expulsions) |
| | 2014-15 | Not available | 90 (0 expulsion) |

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Introduction of NME Columbus Public Schools (2014-2015)

Elementary Principal in Columbus City Schools:

"We have decreased our discipline referrals by almost 50% in one year. This means kids are in the classroom more and are developing self-regulation strategies that will help them be successful not only in school but in life."

"I, as the principal, am able to have more time to be in classrooms observing and providing feedback to teachers because my staff is equipped to deal with behaviors in the classroom instead of referring kids to the office for me to deal with."

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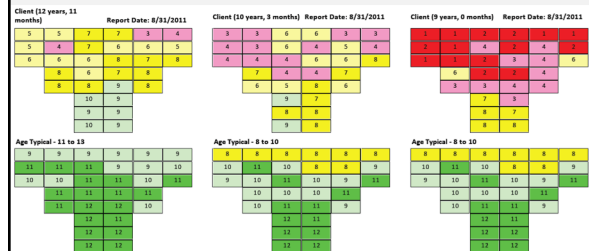
Westerville South HS

- Since NME started in 2017 – 35% increase in attendance
- Graduation rates up from 89.5 to 93.5
- Suspensions decreased by 50%

Ohio
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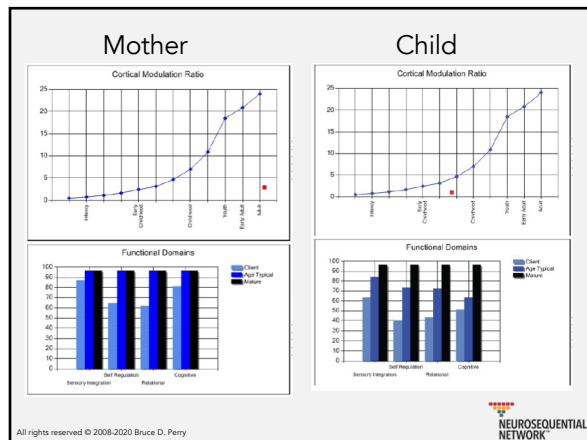
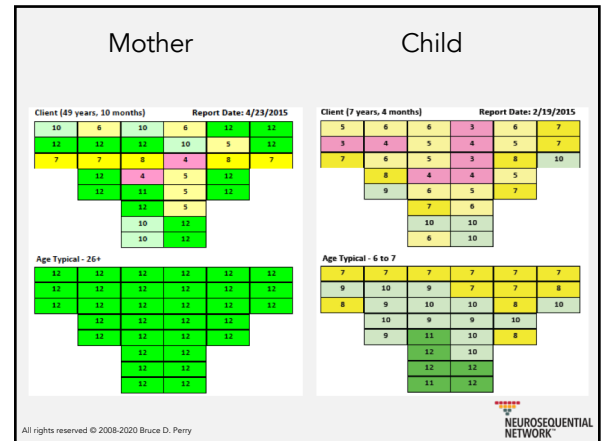
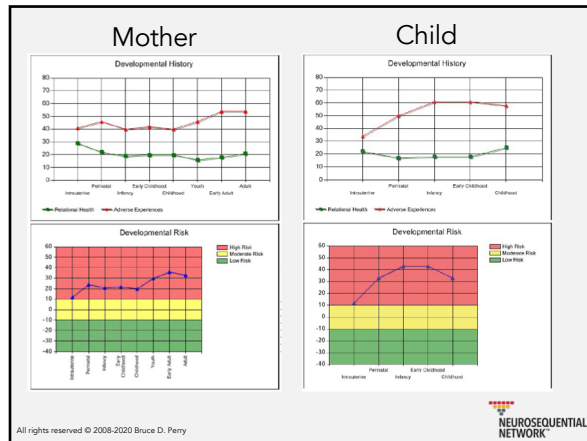
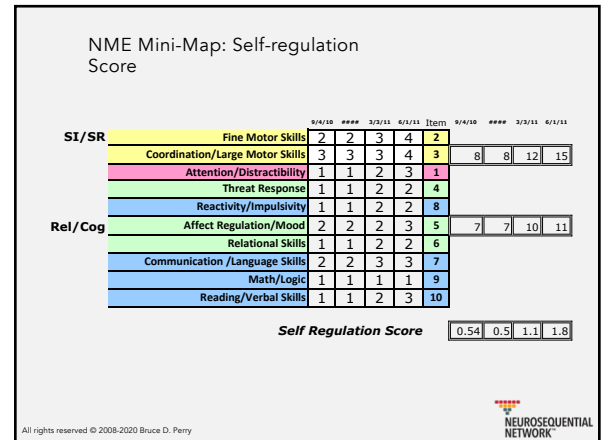
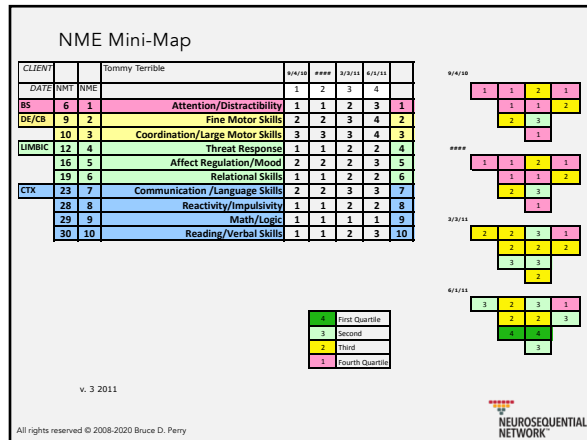
CTA: Client D. s/p Severe Neglect



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Infant and Early Childhood Mental Health Core Concepts and Clinical Practice

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