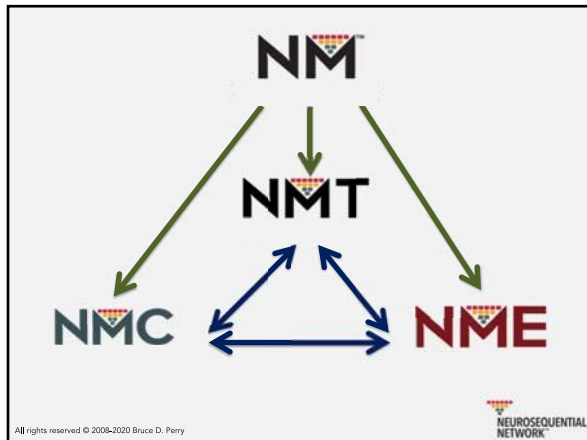


Neurosequential Model Core Slides "Best Hits" Package



"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

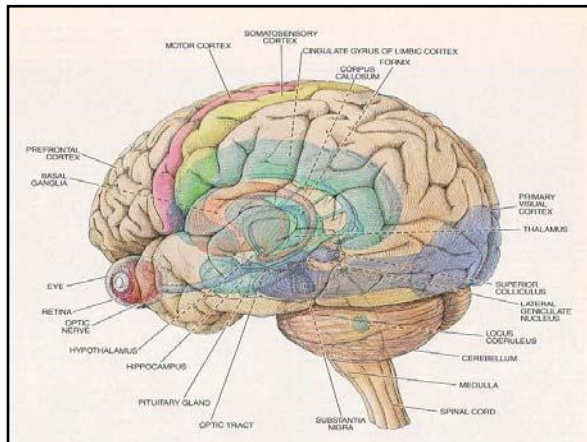
The brain mediates our thoughts, feelings, actions and connections to others and the world.

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

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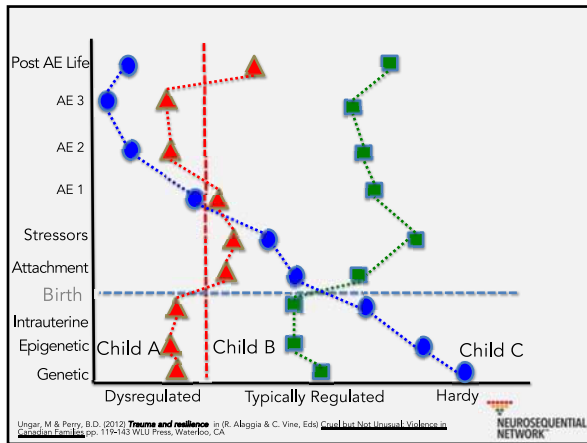


The Neurosequential Model

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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Ungar, M. & Perry, B.D. (2012). *Trauma and resilience in R. Abagya & C. Vine, Eds. (Eds) Child Abuse and Neglect: A Handbook of Contemporary Research*. pp. 119-143 WLU Press, Waterloo, CA

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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.

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.

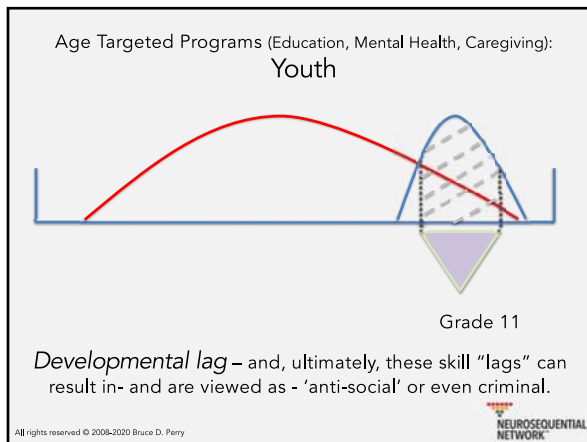
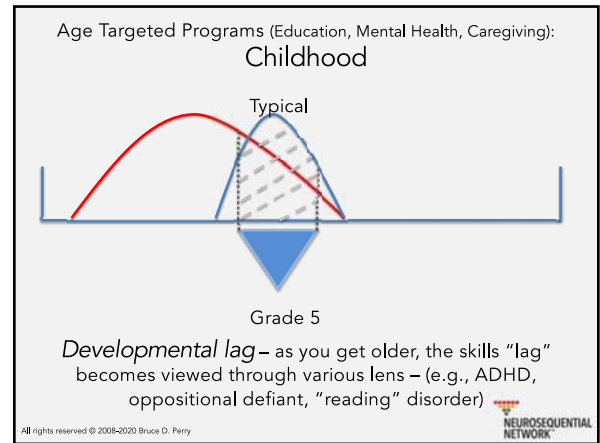
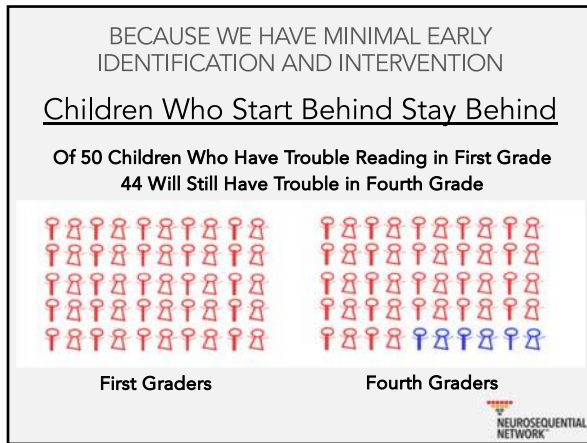
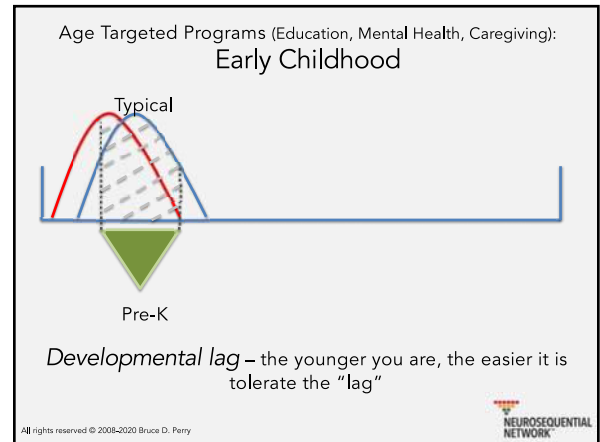
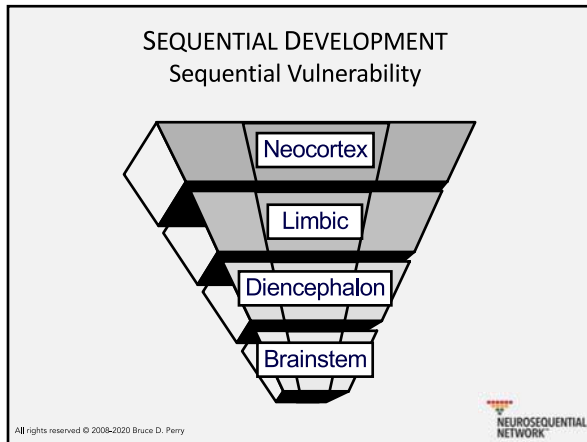
Your understanding determines your solution
- Stuart Ablon (CPS, 2010)

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Neurosequential Model Core Slides

"Best Hits" Package



Heuristic (/hjuˈrɪstɪk/; Greek: "ὕψις", "find" or "discover") refers to experience-based techniques for problem solving, learning, and discovery that employ 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)

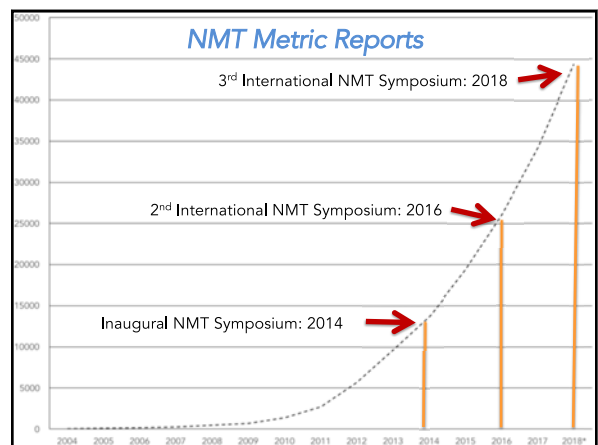
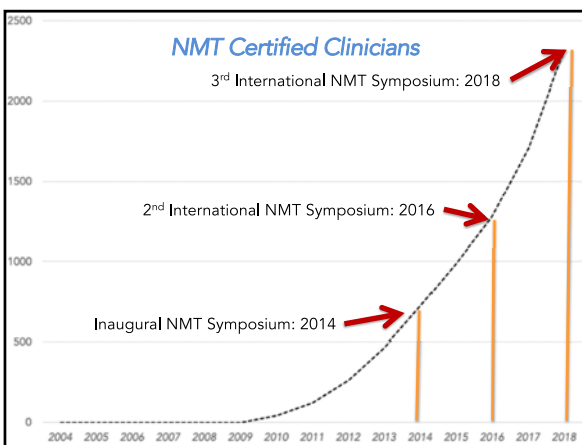
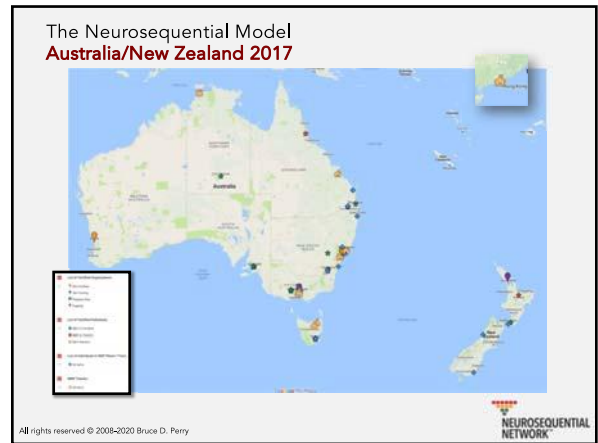
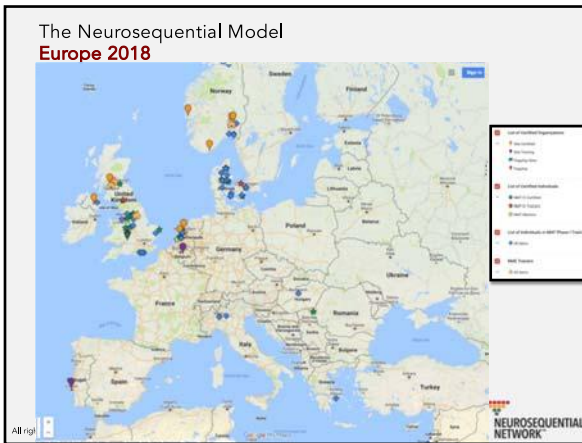
It takes an average of 17 years for the 14% of research that influences clinical practice to get there (Morris, Wooding & Grant, 2011)

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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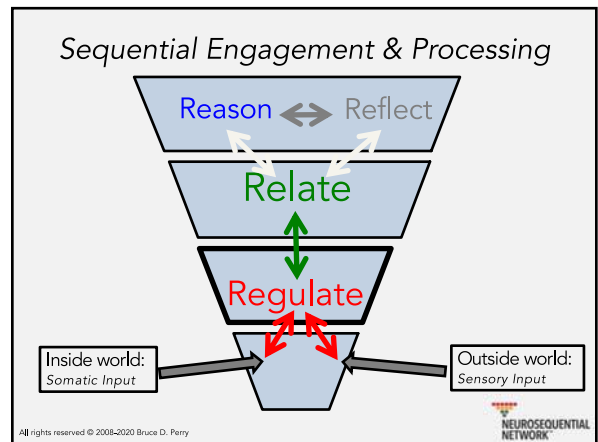
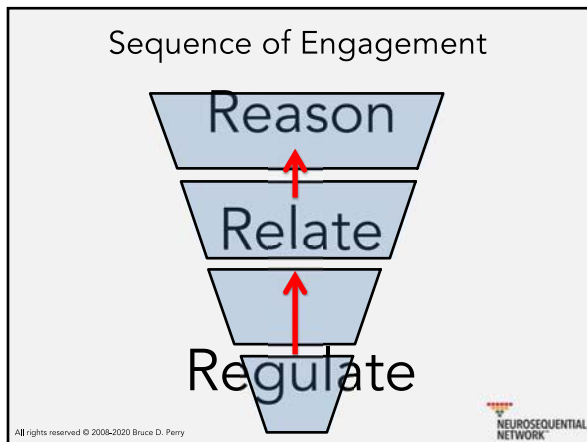
YEAR	Clinicians Using NMT (Direct) Cumulative	Children, Youth, Adults (Impacted/yr)	Clinicians Using NMT (Indirect) Cumulative	Children, Youth, Adults (Impacted/yr)
2004	1	25	10	250
2005	4	100	40	1000
2006	10	250	100	2500
2007	12	300	120	3000
2008	20	500	200	5000
2009	45	1125	450	11250
2010	44	1100	440	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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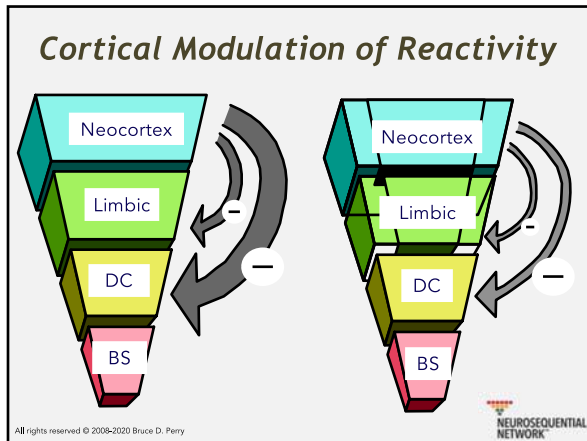
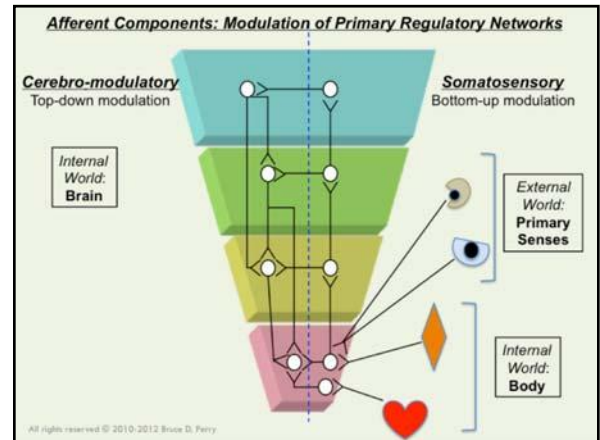
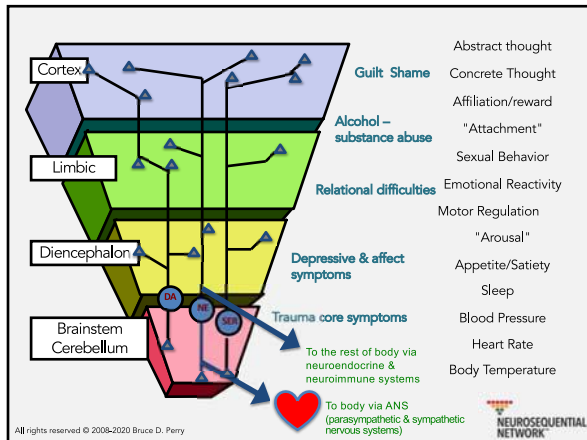
Neurons	86,000,000,000	86 Billion
Glia	111,800,000,000	111 Billion
Synaptic boutons	430,000,000,000,000	420 TRILLION
Synaptic proteins	8,603,956,000,000,000,000	8.4 QUADRILLION
Polarizations/minute	2,581,186,800,000,000,000	2.5 QUADRILLION/minute

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Neurosequential Model Core Slides

"Best Hits" Package



"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")

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REGULATORY OPTIONS

- **"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

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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)

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Neurosequential Model Core Slides "Best Hits" Package

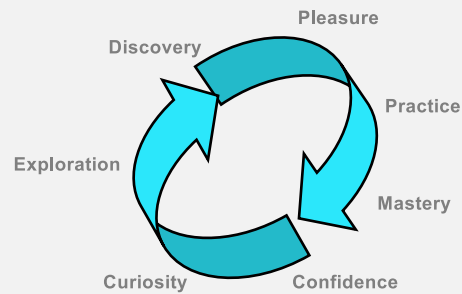
Creating the Relational 'Space' for Optimal Development, Learning & Healing (or How do you like those P's?)

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

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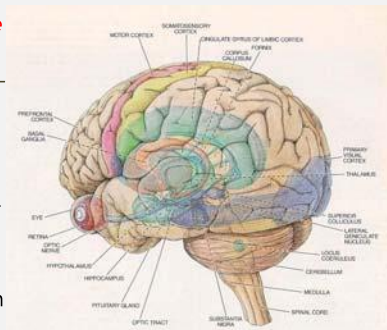
The Cycle of Learning



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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

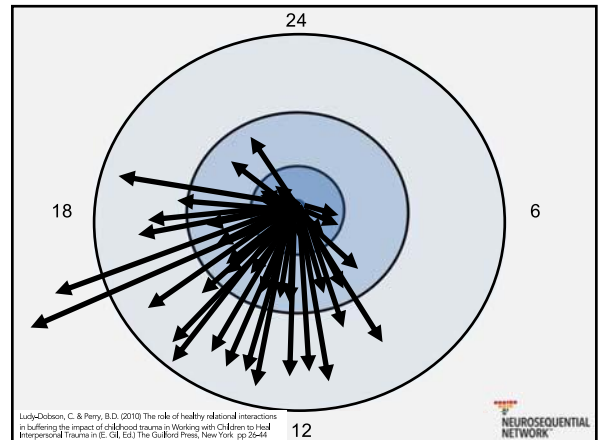
"Best Hits" Package

So What? Why does this matter?

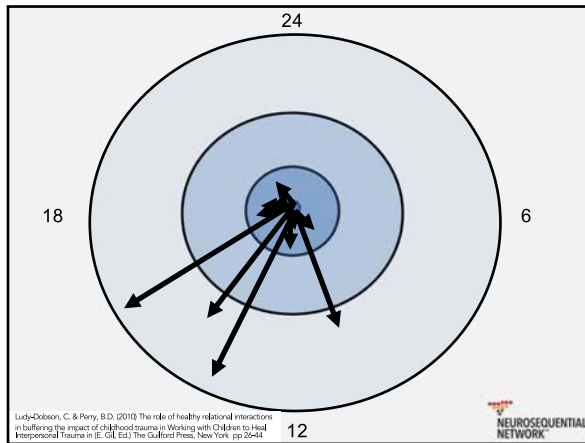
Both the **STRESS RESPONSE** and the **REWARD** networks in the brain are shaped by relationships in early childhood – in healthy and unhealthy ways.

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

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Ludy-Dobson, C. & Perry, B.D. (2010) The role of healthy relational interactions in buffering the impact of childhood trauma in Working with Children to Heal Interpersonal Trauma in (E. Gil, Ed.) The Guilford Press, New York, pp. 26-44



Ludy-Dobson, C. & Perry, B.D. (2010) The role of healthy relational interactions in buffering the impact of childhood trauma in Working with Children to Heal Interpersonal Trauma in (E. Gil, Ed.) The Guilford Press, New York, pp. 26-44



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 - Shanta R. Eshbar - Wayne H. Giles

The enduring effects of abuse and related adverse experiences in childhood

A convergence of evidence from neurobiology and epidemiology

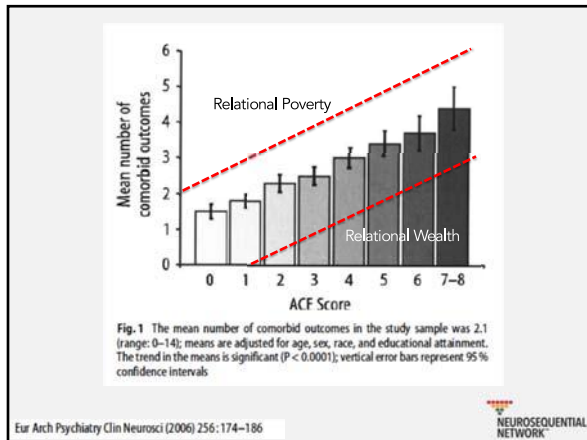
Table 4 Summary of the convergence between neurobiological effects of childhood maltreatment with ACE study epidemiological findings

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 & noradrenergic 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	Hippocampal 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

Neurosequential Model Core Slides

"Best Hits" Package



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

Erin P. Hambrick^{1,2,3}, Thomas W. Browner^{1,2}, Bruce D. Perry^{1,2,3}, Kristie Brandt⁴, Christine Hofmeister⁵, Jen O. Collins⁶

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²University of Missouri - Kansas City, Department of Psychology, 2400 Rock Road, Room 211, Kansas City, MO 64110, USA
³University of Kansas, Center for Research Methods and Data Analysis, 2401 Research Avenue, 4th Floor, Lawrence, KS 66044, USA
⁴Northwestern University, Department of Psychology, 2009 Sheridan Drive, Evanston, IL 60201, USA
⁵University of California Davis School of Medicine, Department of Pediatrics, 2215 Stockton Blvd, Sacramento, CA 95817, USA

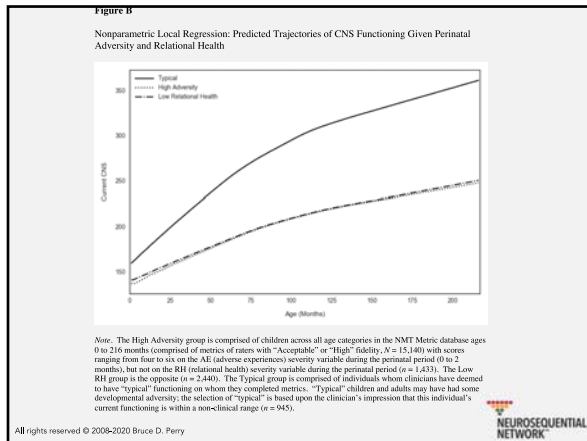
ABSTRACT

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 adversity and outcomes is underresearched and clinically underappreciated. We examine how the timing of both adverse (including perinatal adversity) 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 60 brain-injured disease (n = 202) to 13 (to 10-year-old children), a registered hierarchical model produced stable and generalizable estimates regarding associations between the timing of experiences across their developmental periods (0–2 years, infancy (2–12 years), Early Childhood (13 years to 4 years), and Childhood (4 to 13 years) and current functioning.

Results: Perinatal developmental experiences were more strongly associated with developmental current functioning than each experience 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.

Conclusions: Findings expand the understanding of the association between the timing of adversity and on later-life developmental experiences and children's functioning. Although early life experiences are especially impactful, relationally enriched environments 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, programs and policy. We explore whether current relational health (connectedness) promotes positive outcomes for child welfare-involved youth while controlling for developmental risk (history of adverse, and lack of relationally positive, experiences). 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 month) 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, regularization

frontiers in Behavioral Neuroscience

ORIGINAL RESEARCH
published: 08 August 2019
doi: 10.3389/fnbeh.2019.00148

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

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

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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 attentiveness), 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.

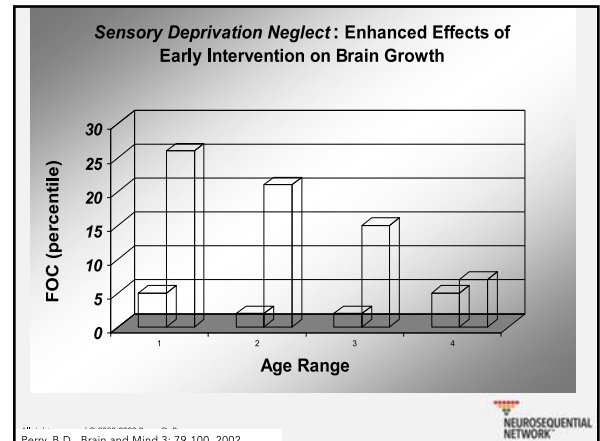
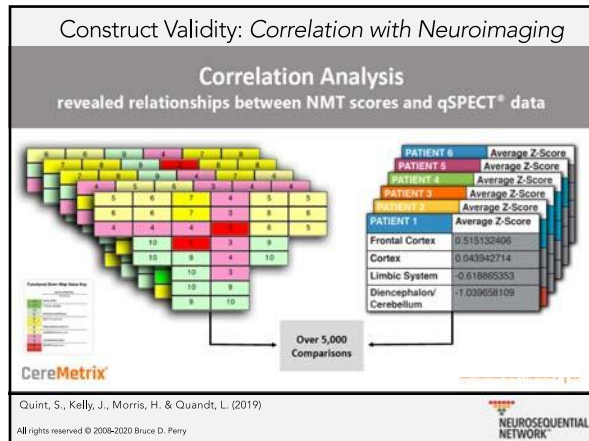
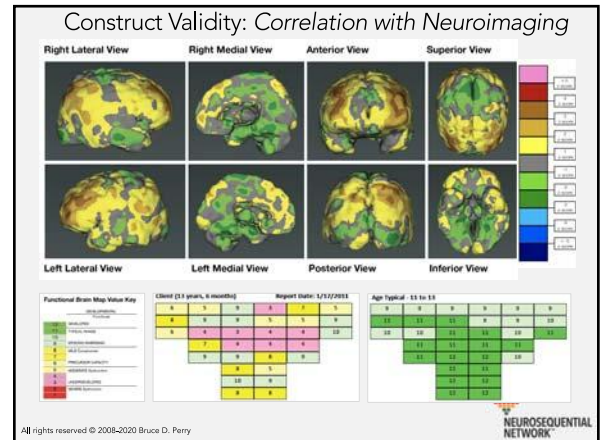
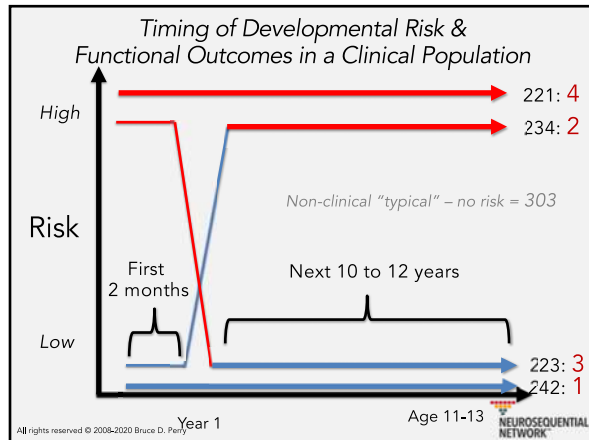
Be with each other. Celebrate diversity. Listen and learn from others. Share time, food, work.

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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Neurosequential Model Core Slides

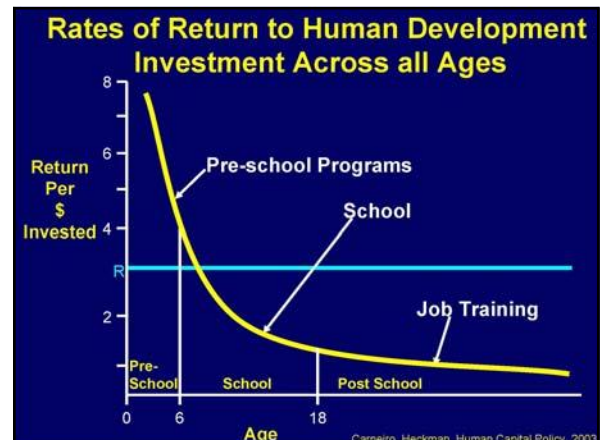
"Best Hits" Package



Creating Policy and Practice that Capitalize on Biological Gifts

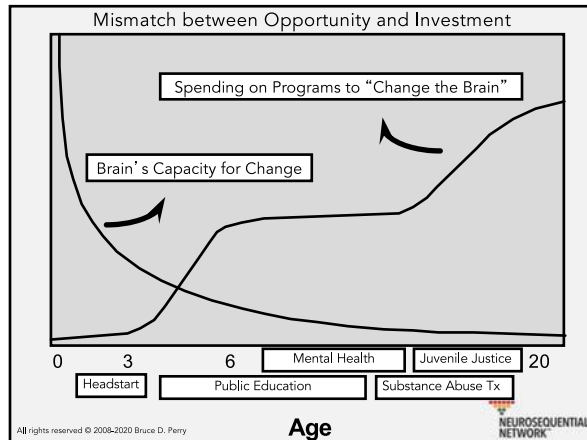
Democracy, public education, suffrage, civil rights – and, ultimately, early childhood investment and communities rich in relational health

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Neurosequential Model Core Slides

"Best Hits" Package



People not programs change people!

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

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.

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

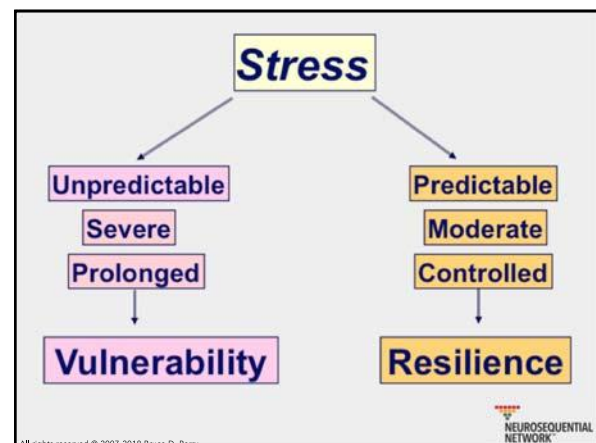
The Challenge of "Diagnosis" in Mental Health

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"

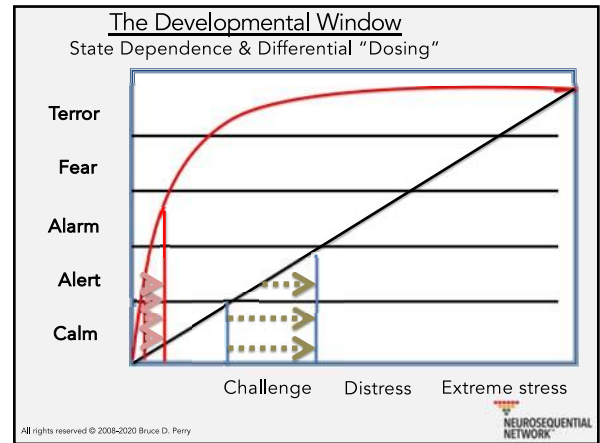
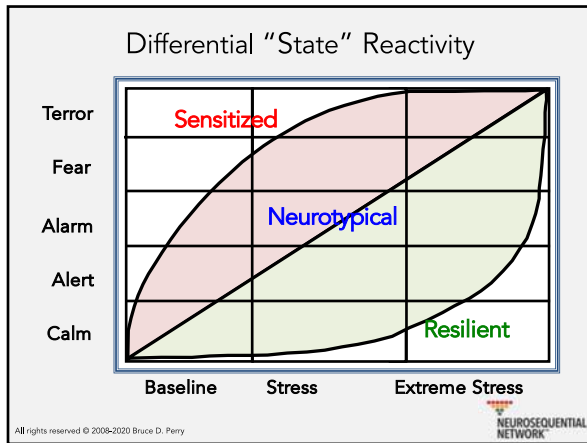
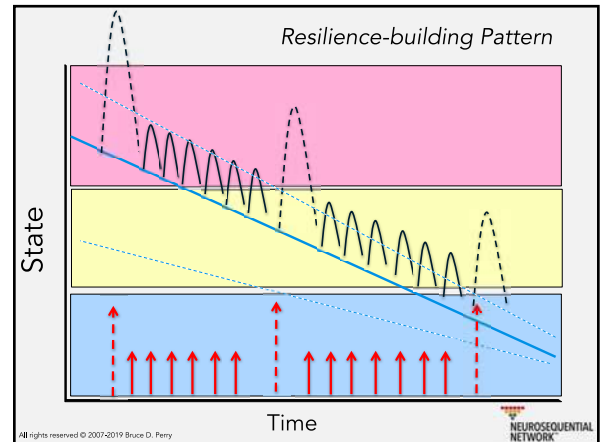
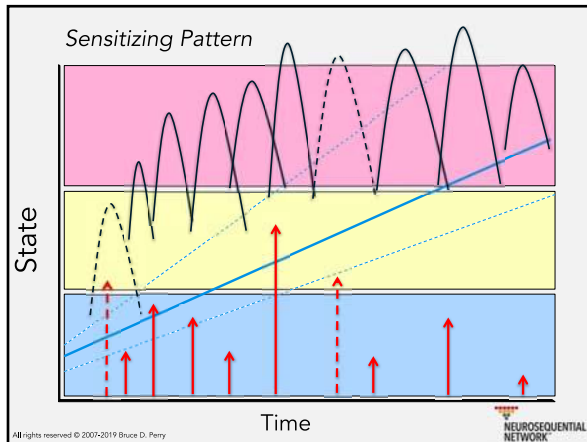
Heart

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



Neurosequential Model Core Slides

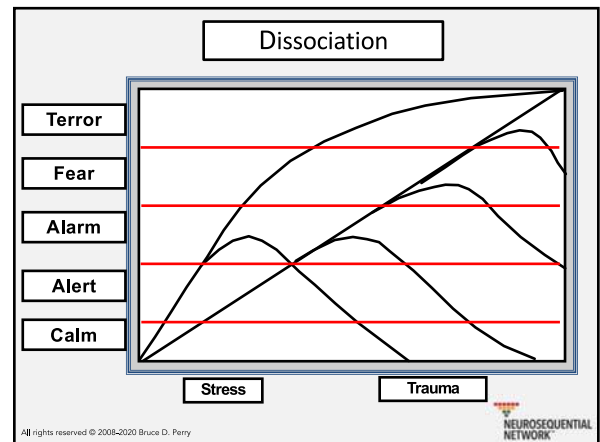
"Best Hits" Package



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 NETWORK



Neurosequential Model Core Slides

"Best Hits" Package

DISSOCIATIVE/AROUSAL BALANCE

Dissociation	Arousal
Females >	Males
Young Children >	Older Children
Torture/Pain >	Observer
Inescapable Helplessness >	Action Active Role

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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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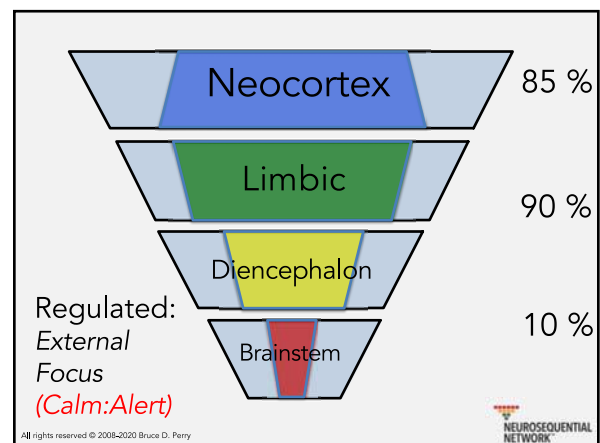
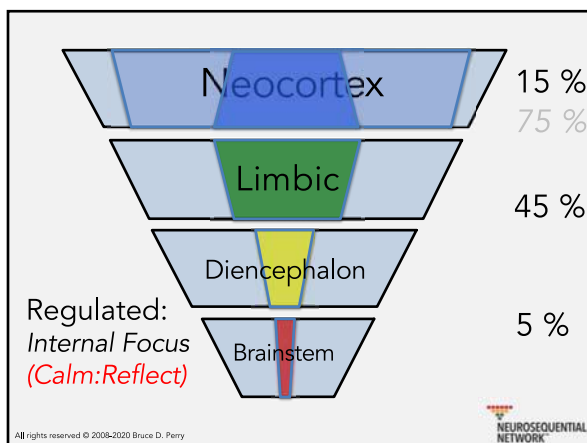
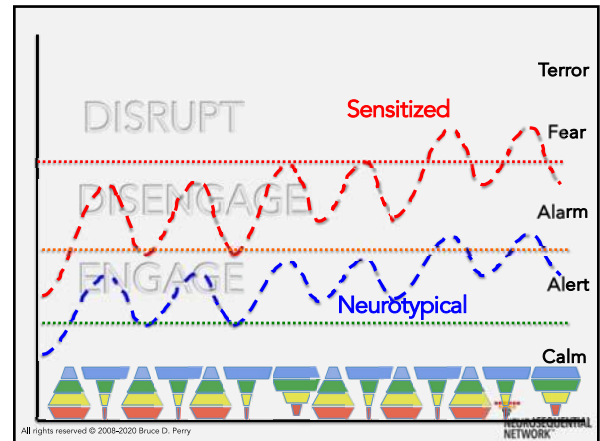
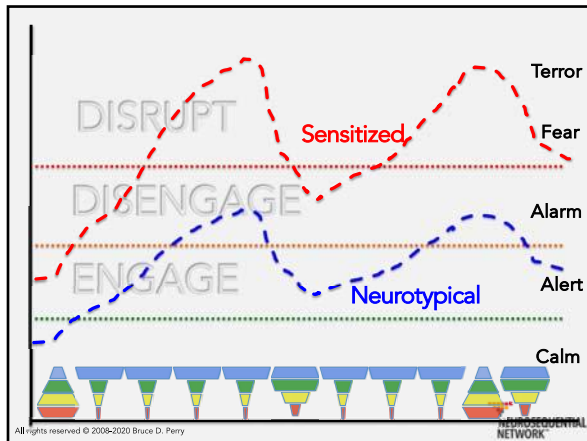
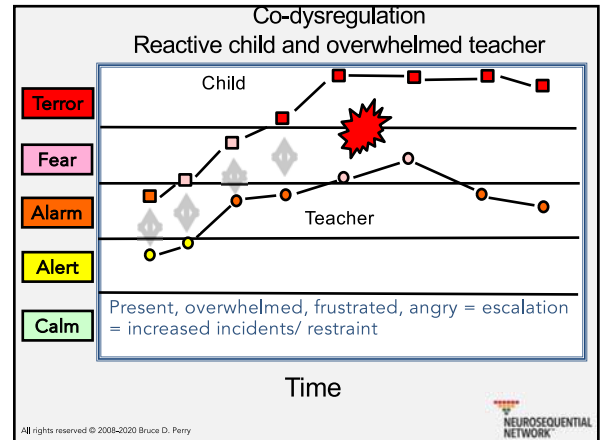
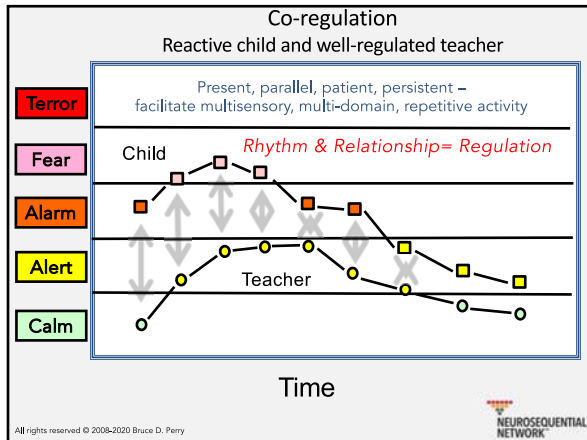
Adaptive Response	REFLECT	FLOCK	FREEZE	FLIGHT	FIGHT
De-escalating Predictable Behavior Behaviors of the teacher when the child or classroom is in various states of arousal	<ul style="list-style-type: none"> Calm sounds Personal space Predictable touch Predictable routine 	<ul style="list-style-type: none"> Quiet voices Eye contact Rhythmic movement Clear directions Somatosensory activities 	<ul style="list-style-type: none"> Conforming and predictable voice, verbal 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"> Largo affect Disengage but don't disengage Adult support Individual attention
Escalating Predictable Behavior Behaviors of the teacher when the child or classroom is in various states of arousal	<ul style="list-style-type: none"> Loud noises Clear unmitigated 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/joint finger, sudden movements 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 violence, grabbing, shaking Overseeing Intimidating threats
"Mating" 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 "stare wandering" to efficiently store new content	Learning new content is difficult, students are either disengaging or acting out, however in individual self-regulatory behavior seen.	Learning is impossible, Engaging students difficult. Many demonstrate "fused" responses that appear apathetic/before, increased acting out.	Aggression, violence, defiance, control, intense rules and authority. Full spectrum of "stare" responses.

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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

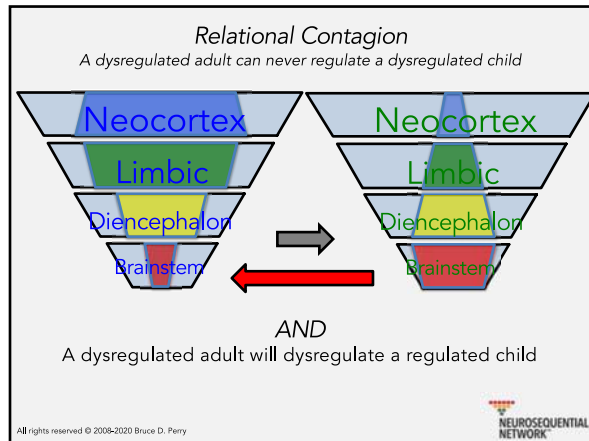
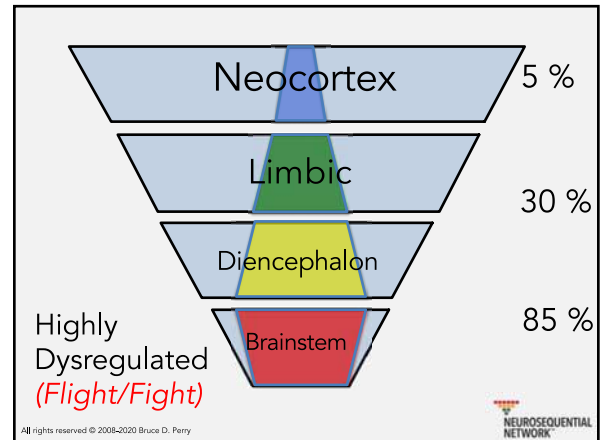
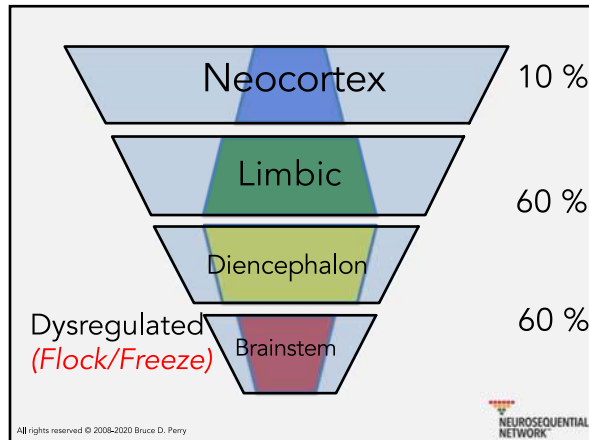
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Neurosequential Model Core Slides "Best Hits" Package



Neurosequential Model Core Slides

"Best Hits" Package



- Semi-structured, quantitative assessment process:**
NMT Clinical Practice Tools (Metrics)
- ▣ **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
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- 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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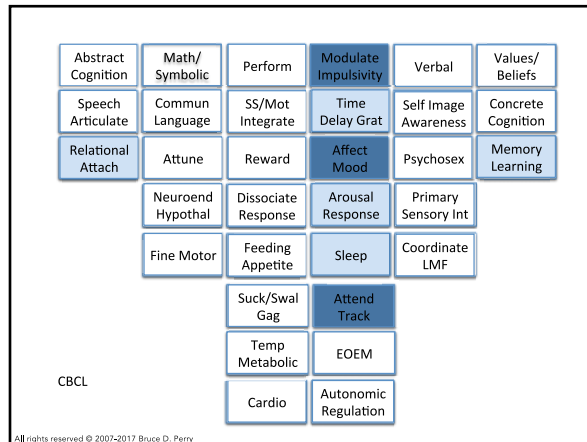
Abstract Cognition	Math/Symbolic	Perform	Modulate Impulsivity	Verbal	Values/Beliefs
Speech Articulate	Commun Language	SS/Mot Integrate	Time Delay Grat	Self Image Awareness	Concrete Cognition
Relational Attach	Attune	Reward	Affect Mood	Psychosex	Memory Learning
Neuroend Hypothal	Dissociate Response	Arousal Response	Primary Sensory Int		
Fine Motor	Feeding Appetite	Sleep	Coordinate LMF		
	Suck/Swal Gag	Attend Track			
	Temp Metabolic	EOEM			
	Cardio	Autonomic Regulation			

OT

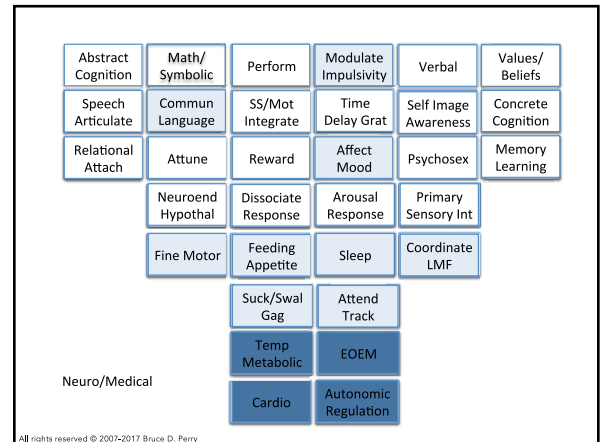
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Neurosequential Model Core Slides

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OUTCOMES

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

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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

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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)	1.82 (.288)	1.85 (.430)	-.346	.73	-.07
Week 2	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*. Online First Publication, October 31, 2011. Doi:10.1037/a0025955

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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

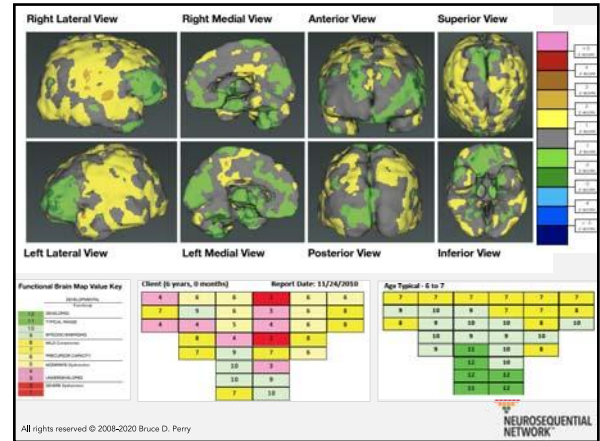
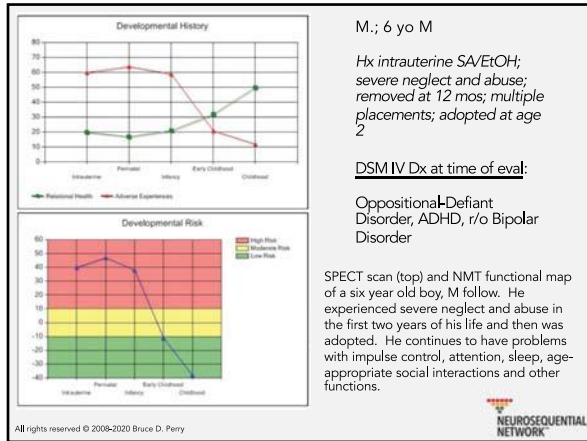
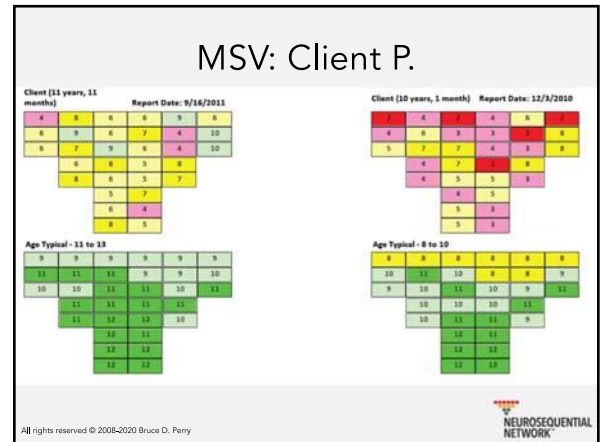
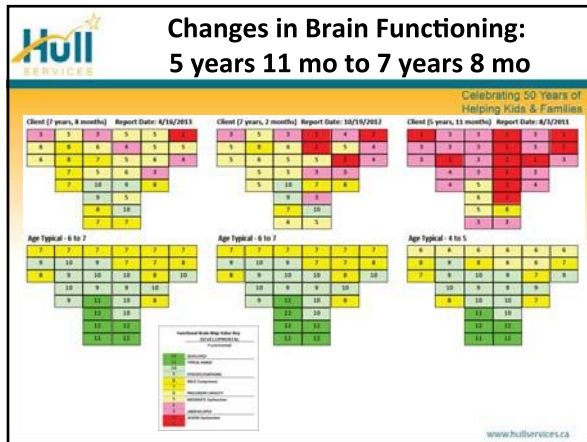
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³School of Medicine, University of Colorado, USA
⁴The ChildTrauma Academy, USA
⁵Northwestern University, USA
⁶University of Southern California, USA
⁷Telerecare Corporation, USA

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RESIDENTIAL TREATMENT FOR CHILDREN & YOUTH
2018, VOL. 00, NO. 00, 1-22
<https://doi.org/10.1080/0886571X.2018.1425651>

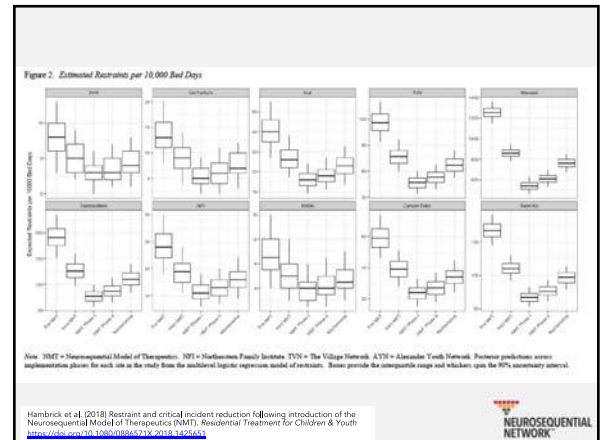
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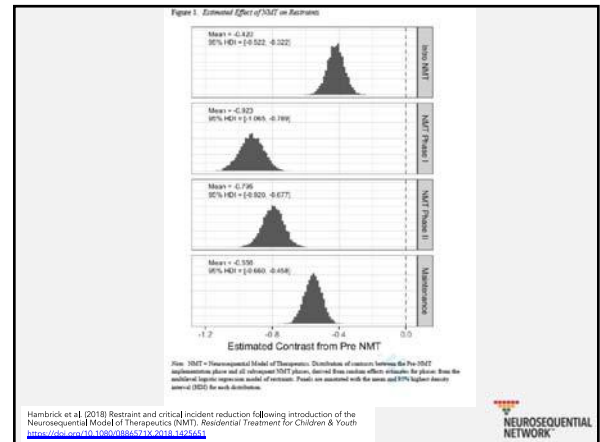
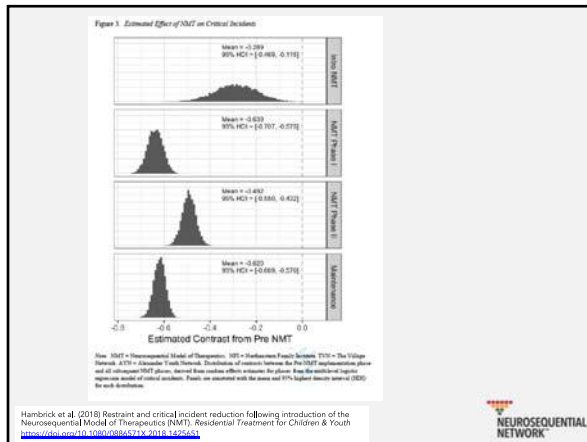
Restraint and Critical Incident Reduction Following Introduction of the Neurosequential Model of Therapeutics (NMT)

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

^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; ^lWarwick Family Services, Bensalem, Pennsylvania, USA; ^mKibble Education and Care Center, Paisley, Scotland; ⁿAdministration for Children's Services, City of New York, New York, USA



Neurosequential Model Core Slides "Best Hits" Package



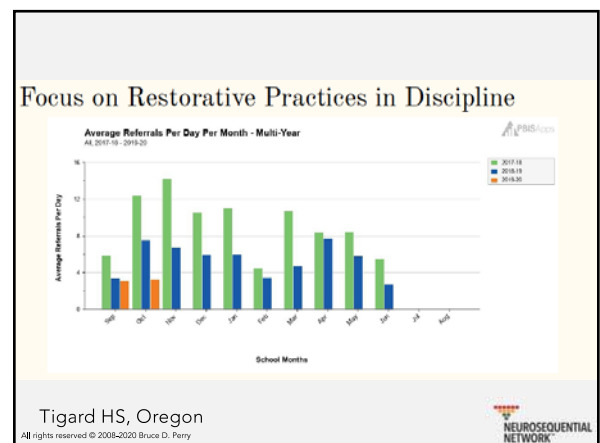
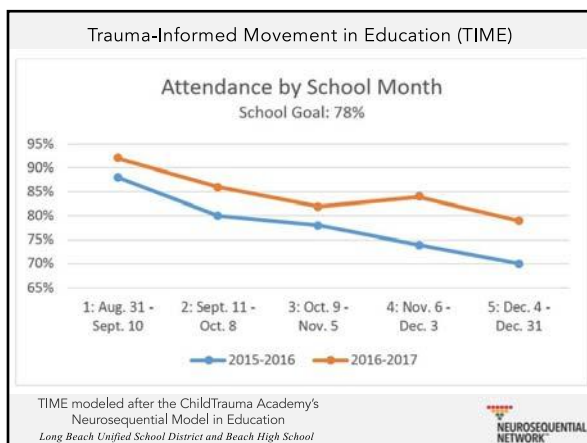
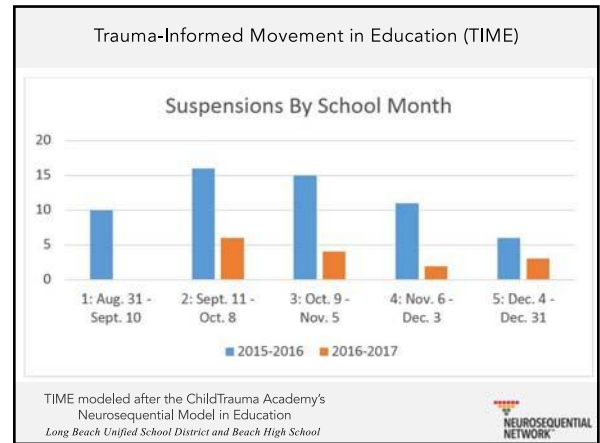
Economic Benefits with Introduction of NMT

Site	Program	Pre NMT (Months)	Pre NMT (Cost)	Post NMT (Months)	Post NMT (Cost)	Period Savings	% Savings	Per 100 Children (Monthly)	Period Savings	% Savings	Per 100 Children (Monthly)	TOTAL
1	NR	100	488	381.0	11.5 (24)	805.6	0.0 (24)	9120.0	0.0 (24)	0.0 (24)	9120.0	39945.6
2	VR/Equine	100	172	2511.0	17.7 (3)	2295.0	13.3*** (12)	6100.0	13.3*** (12)	6270.0	14595.0	154074.4
3	San Mateo	100	279	1400.0	25.2 (8)	8384.0	59.3 (13)	7410.0	10.7 (16)	22503.6	4,041.6	59792.0
4	Cal Farley	100	253	3896.0	44.6*** (11)	28427.9	31.4*** (12)	23376.0	49.1*** (29)	58751.7	106555.6	
5	SA	100	323	5076.0	118.7 (19)	21836.4	48.3*** (23)	33124.0	73.8 (20)	122304.0	100.8 (24)	44182.2
6	Hill	100	171	442.0	58.9 (11)	2824.8	13.8 (5)	3755.7	11.4*** (12)	4856.6	45.9 (16)	75576.2
7	ATN	100	320	14662.0	62.9*** (17)	10480.0	24.8*** (19)	23423.5	38.4*** (18)	185947.9	45.7*** (36)	238266.4
8	Tampa Bay	100	124	1643.0	23.5*** (5)	724.1						724.1
9	Wendell	100	14	4533.0	34.6*** (6)	15248.9						15248.9
10	Knox	100	128	2333.0	22.5*** (12)	21556.9						21556.9
TOTAL	% Pre NMT	100.0	8326.5	\$1.9**	284914.6	33.0***	383510.2	27.53***	433379.0	37.58***	436223.2	1538027.0

Ten sites
Three countries (eight states)
Avg duration of site review = 64 months (range 10-132 months)
2744 clients 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

Hambrick et al. (2018) Restraint and critical incident reduction following introduction of the Neurosequential Model of Therapeutics (NMT). Residential Treatment for Children & Youth <https://doi.org/10.1007/s10826-018-1254-4>



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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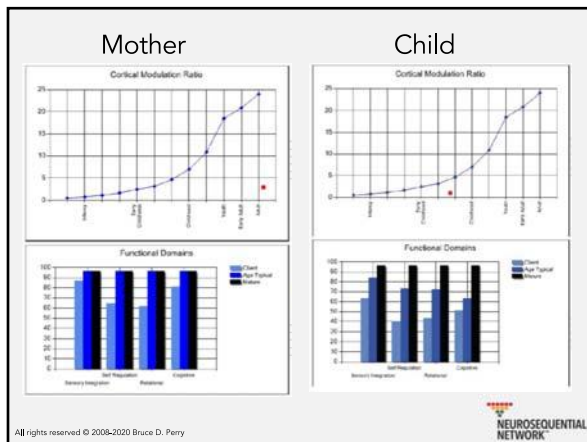
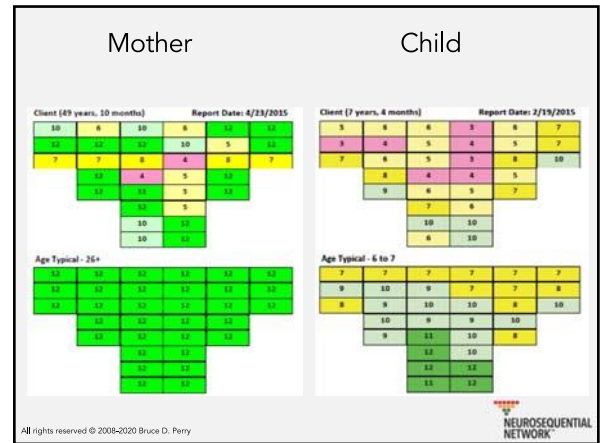
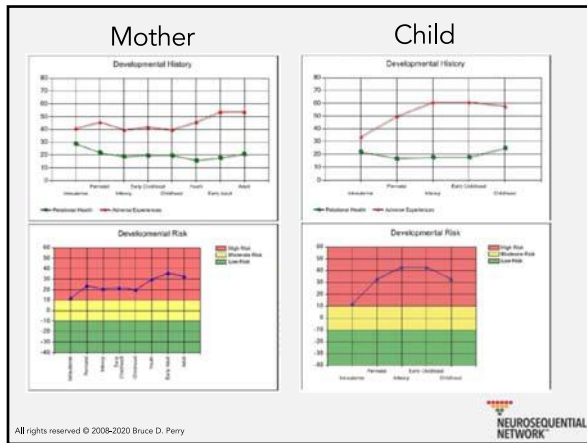
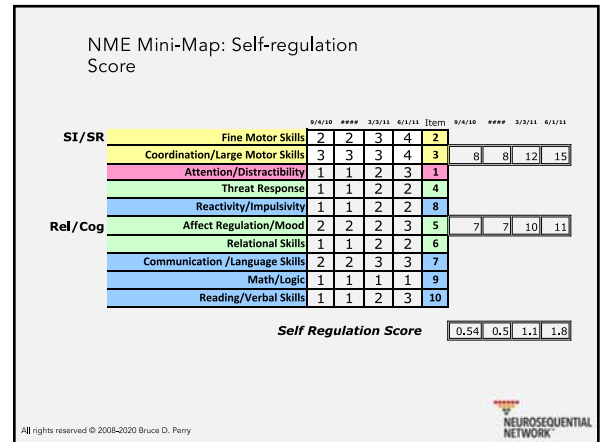
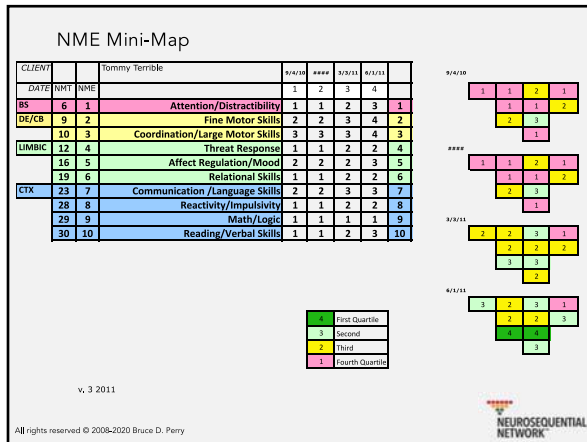


CTA: Client D. s/p Severe Neglect

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Infant and Early Childhood Mental Health Core Concepts and Clinical Practice

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