

**When Chronic Maltreatment in Childhood
Closes the door to Psychotherapy,
Animal-Assisted Psychotherapy Opens a Window:
Interpersonal Neurobiology of Trauma and AAP**



Nancy Parish-Plass

Developmental Trauma

van der Kolk

- * Chronic maltreatment
 - abuse (emotional/physical/sexual)
 - neglect (emotional/physical/educational)
 - witnessing domestic violence
- * Onset in early childhood
- * Perpetrated by someone older than the child, usually within the caregiving system

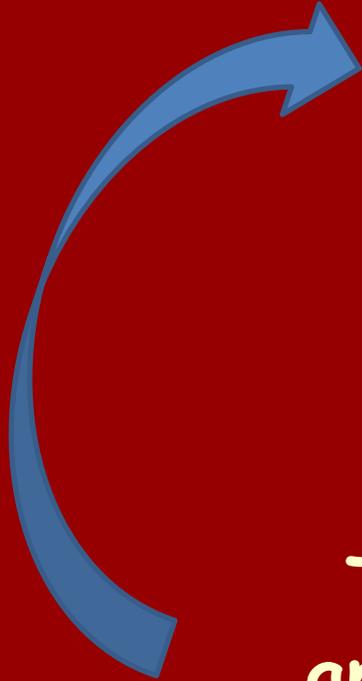
Interpersonal Neurobiology

The brain develops in the
context of the interpersonal world

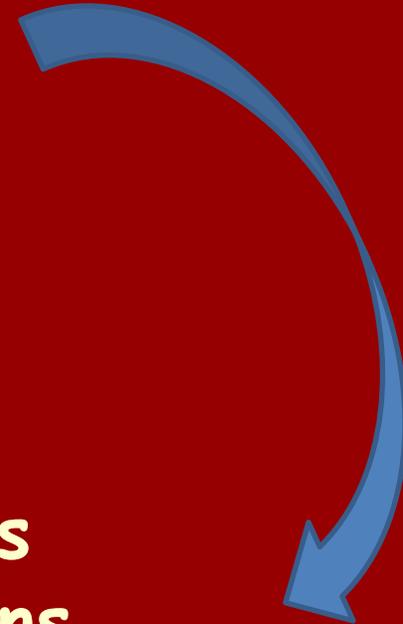
Relationships and interpersonal experiences



**Development and
functioning of the
neurobiological system**



**The quality of relationships
and interpersonal interactions**



Neural Damage Caused By Developmental Trauma

Experiences of chronic interpersonal trauma affect the HPA (hypothalamic pituitary adrenal) axis

- 1) higher baseline of cortisol release
 - > chronic state of physiological stress, anxiety, vigilance

Neural Damage Caused By Developmental Trauma

Damage to neural fibers, synapses and tissues



Injury to, or impediment of the development of
integrative areas of the brain



Disruption of information transfer and communication
between brain regions, neural systems

Neural Damage (con't)

Implications of lack of integration
between parts of the brain

- Separation between cognition (cortex) and emotion (limbic system)
 - > The child operates out of the lower brain
 - > defensive behavior
- Sensory-motor difficulties, physical symptoms
- Problem-solving strategies that are primitive, inappropriate

Neural Damage (con't)

Implications of lack of integration
between parts of the brain

- Emotional, cognitive, sensory and behavioral dysregulation
- Inability to self-sooth
- Chaos - lack of self-control, unpredictability, flooding, intrusiveness
- Difficulty
 - describing and expressing emotions
 - recognizing and describing internal states
 - expressing needs and desires, inner world

Neural Damage (con't)

Implications of lack of integration
between parts of the brain

- Negatively influences numerous neural systems responsible for cognition
 - > Dysregulation in the upper brain
- Difficulty processing incoming information, organizing thought, recognizing emotional states
- Difficulties in attention and concentration - NOT ADHD

Neural Damage (con't)

Implications of lack of integration
between parts of the brain

- Disconnection between the amygdala (implicit memory) and hippocampus (explicit memory)
 - > implicit memory not translated to explicit memory
 - > child responds to unexplained sensory and behavioral reactions and body memory, not language and conscious thinking
 - > no words to express experiences, emotions to self or others
 - > difficulty constructing a meaningful narrative

Neural Damage (con't)

Implications of lack of integration
between parts of the brain

- Disorganization of neural systems mediating social-emotional functioning
 - > difficulty in successful engagement with others
 - > difficulty reading social cues, mentalizing
- Insecure (avoidant) or Disorganized Attachment

Neural Damage Caused By Developmental Trauma

Experiences of chronic interpersonal trauma affect the HPA (hypothalamic pituitary adrenal) axis

- 2) lower levels of oxytocin and oxytocin reactivity
 - > less trust in others
 - > less emotional sharing
 - > less social affiliation
 - > lower ability to reduce fear response
 - > lower ability to manage stress and anxiety
 - > Long-term disruptions in ability to be calmed and soothed through social bonding interactions

Neural Damage Caused By Developmental Trauma (con't)

Implications of neglect:

Less stimulus

- > fewer neural pathways
- > less brain matter
- > primitive strategies

***** Neglect may even cause MORE damage than physical abuse**

Functional Neural Networks are Responsible for Connectivity in the Neurobiological System

Default Mode Network - DMN

- * Highly overlapping network both in its functional and structural connectivity
- * Facilitates observation and contemplation inwards, play, thoughts of the future, daydreaming, imagination, etc.



Default Mode Network (DMN)



Continues to function when we are in a resting state until a novel situation or possible threat arises, then calls us to turn our attention outwards

- Allows us the luxury of looking inwards while the DMN is ON GUARD
- Allows synthesis of sensory experience of body and internal world
- Allows conscious experience of ourselves in imaginal space
- Allows us to focus on our relationships

Default Mode Network (DMN)



The neurobiological
parallel of

Winnicott

Potential Space

Trauma Damages Functional Neural Networks Responsible for Connectivity in the Neurobiological System

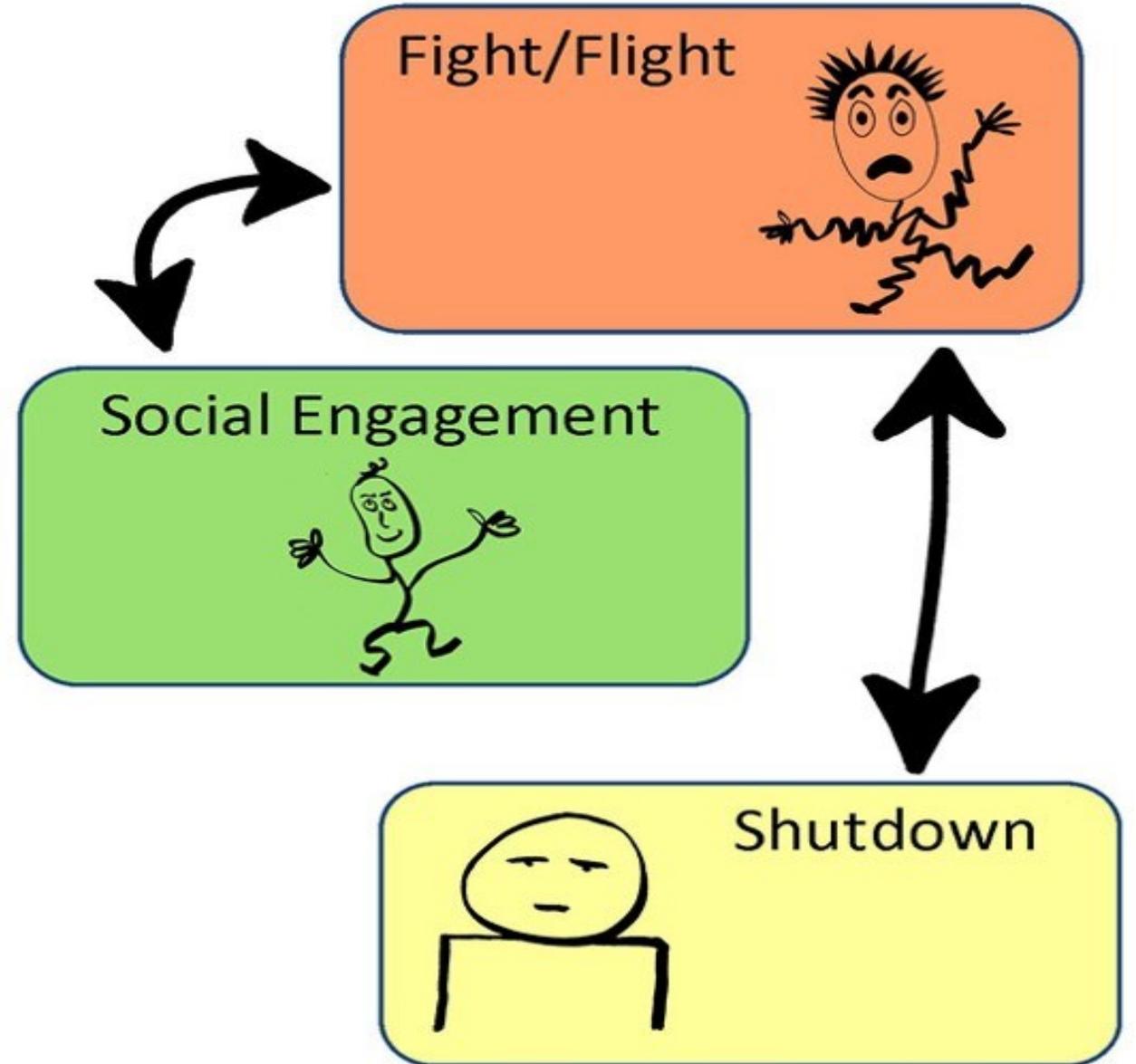
- * The DMN becomes dysfunctional
- * There is no alert mechanism in the case of a novel situation or threat
- * The child must stay outwardly focused
- * Potential space collapses

Polyvagal Theory (Porges)

Hierarchy of the
neural system's
reactions to danger



Hierarchy of Nervous System Response



Polyvagal Theory (Porges)

Hierarchy of the neural system's reactions to danger

Neuroception -

- * Perception and evaluation of threat and safety at the level of neurological circuits **with no cognitive awareness**



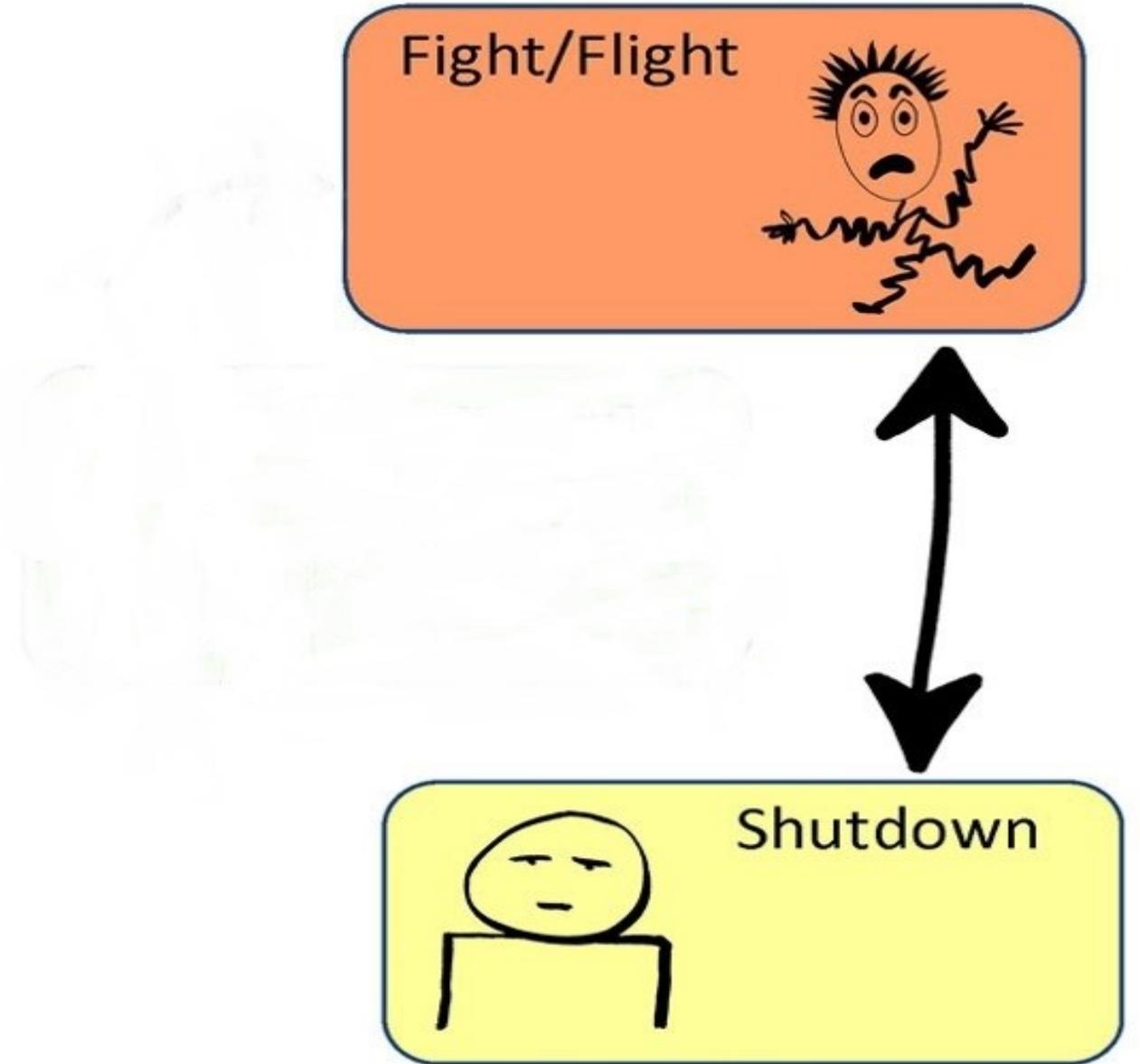
- * Stimulates the vagus nerve for defensive action

Dorsal Vagal Branch

- * Primitive mechanism
- * Reacts defensively in life-threatening situations



Hierarchy of Nervous System Response



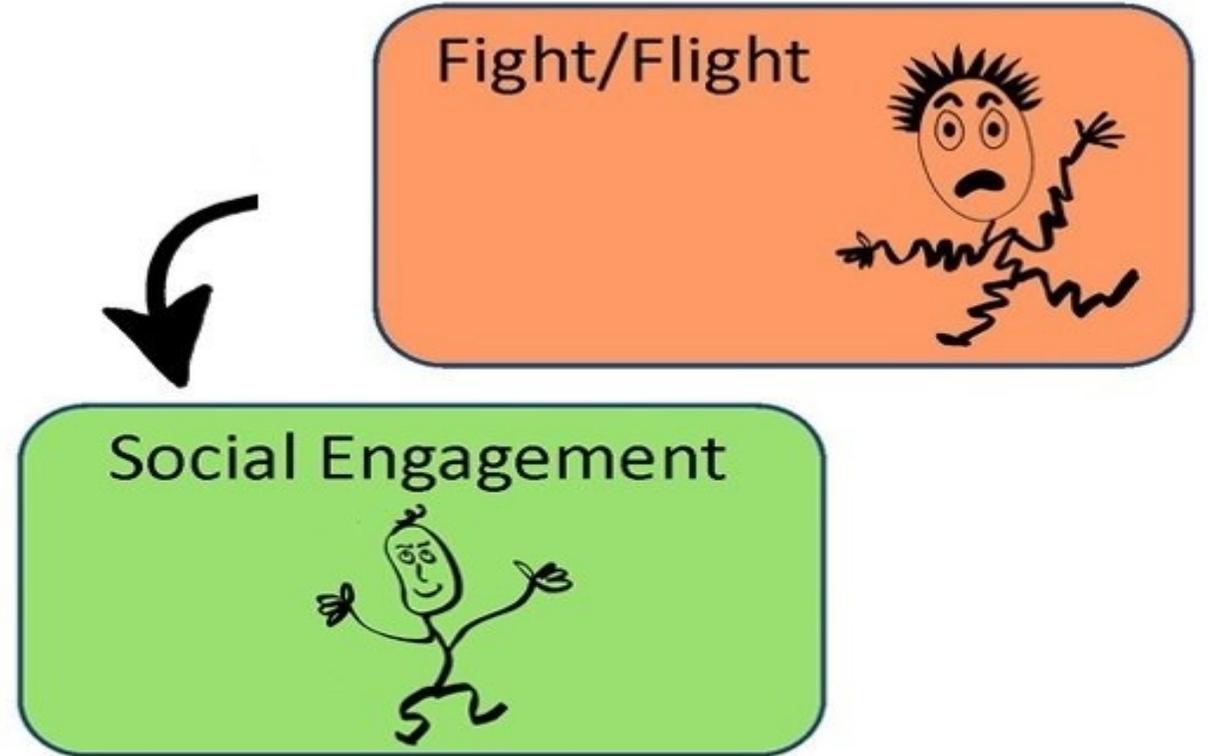
Ventral Vagal Branch

* In Mammals Only

* Allows us to seek safety through social engagement as a protective strategy



Hierarchy of Nervous System Response



Social Engagement for Safety and Lowering of Anxiety

Allowing Contemplation and Self-Exploration



The neurobiological parallel of

Bowlby - Theory of Attachment

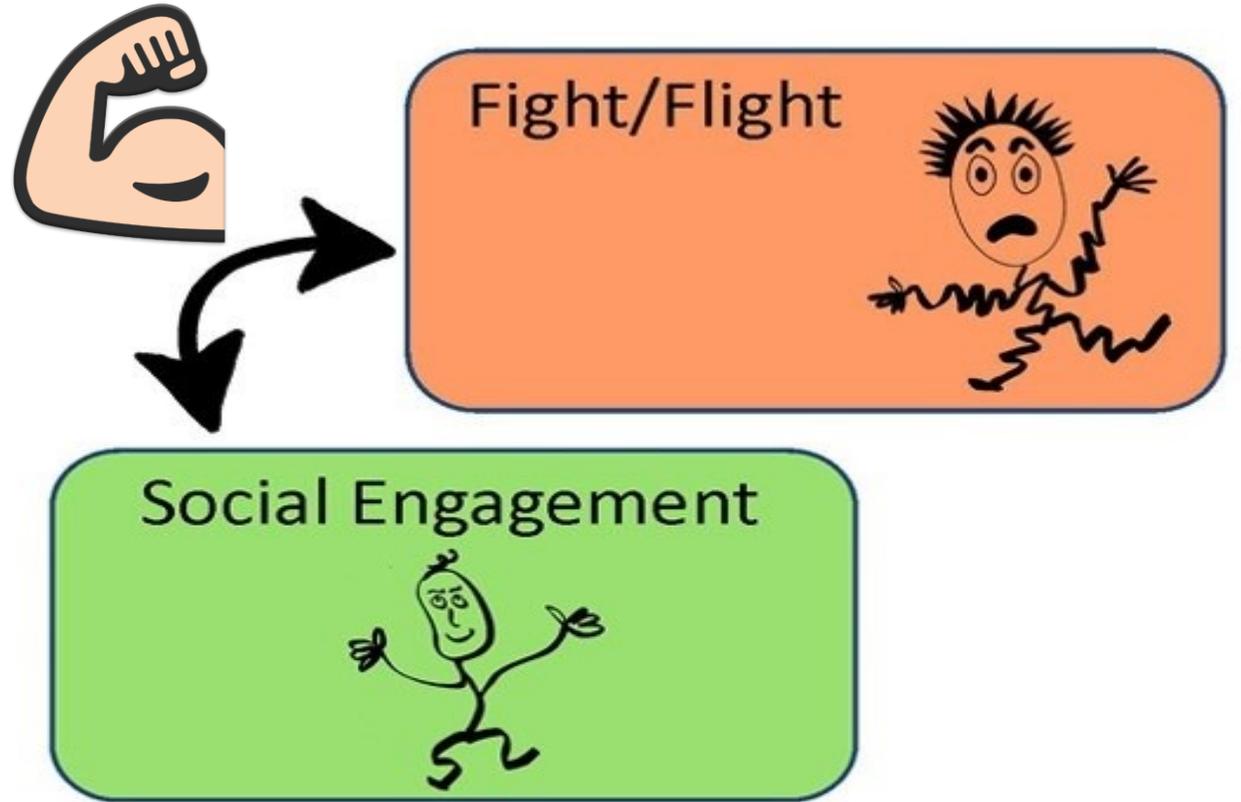
Safe Haven

Secure Base

**Movement along the
ventral vagal nerve:
A neural exercise
strengthening the neural
pathway to
social engagement**



Hierarchy of Nervous System Response



Developmental Trauma

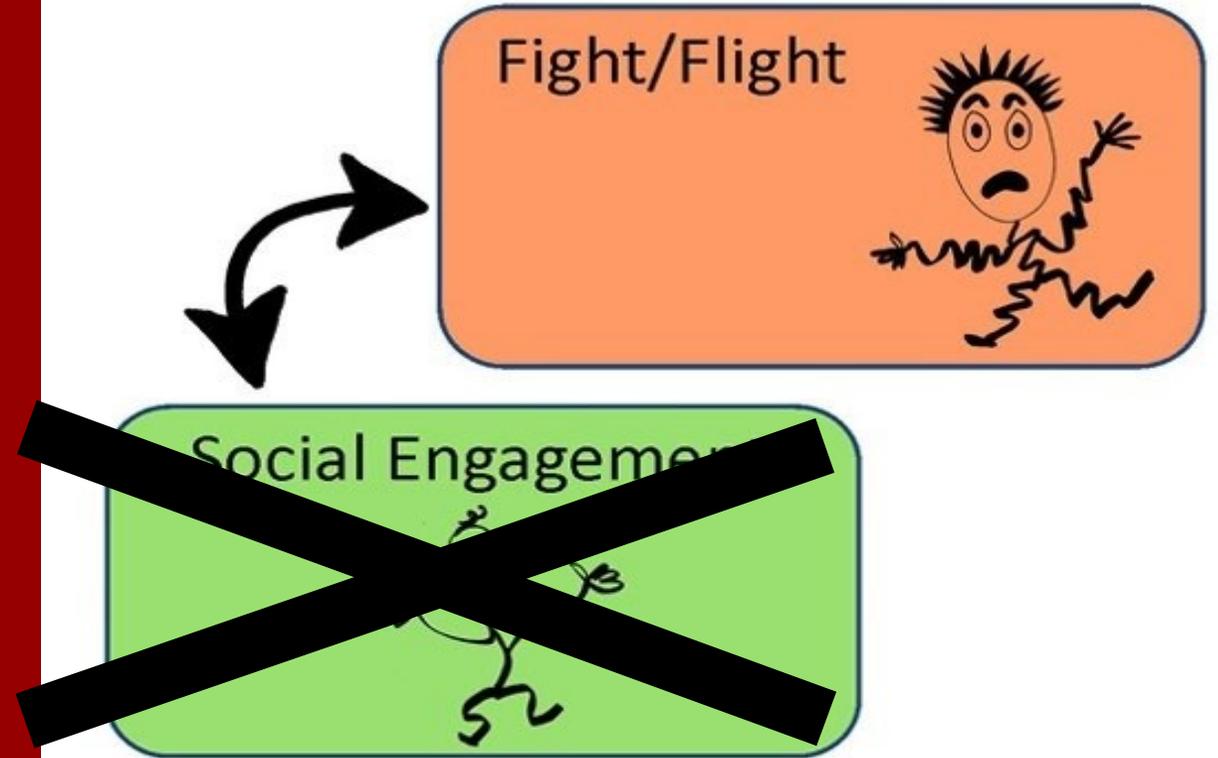
Disuse of the ventral vagal branch results in its atrophy

Chronic release of cortisol damages the ventral vagal branch

Social Engagement for safety is no longer an option



Hierarchy of Nervous System Response



Psychological Implications

- Lowered ability to trust others
- Negative self-image
- Low self-esteem
- Unpredictable Self
- Shame
- Guilt

Goals of Psychotherapy for Developmental Trauma

1) Establishment of the Therapeutic Alliance

healing relationship in therapy characterized by:

- * attunement -> feeling felt by therapist
- * sense of safety
- * healthy relationship model

"The therapeutic relationship may be an especially 'active' ingredient in the remediation of childhood abuse-related PTSD"

Cloitre, Stovall-McClough, Miranda, & Chemtob

Goals of Psychotherapy for Developmental Trauma (con't)

- 2) Recognition of the trauma itself, finding the words, processing the trauma (implicit -> explicit)
-> formation of a meaningful narrative

- 3) Regrowth of neural connective tissue, or linkage
-> Integration within the neural system
-> regulation and ability to express oneself

How Can We Repair the Damage?

PLAY

Play is considered to be **CRITICAL** in healing the brain and regrowth of brain tissue and fibers

- * Facilitates **BEING** instead of **DOING**
- * Facilitates contact with implicit memories/knowledge
- * Helps working through implicit memories/knowledge through imagination
 - > formation of explicit memories

Repair the Damage - Play (con't)

Imaginative play

- > working through parts of inner world
- > coherent and meaningful narrative
 - > regrowth of connecting fibers between parts of brain
 - > neurological integration
 - > communication between parts of brain
 - > parts of brain function as a system

Repair the Damage - Play (con't)

Practicing relationships

-> neural exercise

-> interpersonal regulation and connection

Play calms down the whole neurobiological system and leads to regulation and the ability to develop emotionally and cognitively

Repair the Damage - Play (con't)

Play - form of self-exploration and expression of experiences, emotions, and thoughts that children may have difficulty, or have a fear of, verbalizing to others or even to themselves

Play Therapy - an attuned adult joining in the play and reflecting back to the child

-> client feels felt

-> client finds the words for experiences, emotions

Barriers to Psychotherapy Caused by Developmental Trauma

- Difficulty Establishing Therapeutic Alliance
- Collapse of Potential Space
- Deficit in ability to symbolize
- Inability to play
- Dysregulation in the therapy setting
- Shame and the presentation of False Self to others
- Loss of touch with Self

Barriers to Psychotherapy Due to Developmental Trauma (con't)

- Neuroception of danger in the therapy setting activates the vagus nerve
 - > fight/flight, freeze, dissociation
- One is cut off from one's inner emotional world
- Implicit doesn't translate to Explicit
 - > Difficulty recognizing, processing the trauma

The Only Hope: Relationships!

The trauma happened in the context of **relationships**,
so the healing **MUST** take place in the context of **relationships**
Herman

Relationships and integrative interactions

-> activation and growth of neural fibers, tissue, synapses

Relationships

-> more efficient communications in the integrative areas of
the brain

Social interaction

-> flexibility, adaptability, flowing and dynamic coherence,
energy, stability, health



Animal-Assisted Psychotherapy

Psychotherapy:
same goals, unique medium

- Aliveness - reality at a safe psychological distance
- Facilitates symbolization
- A relational therapy par excellence - Laboratory of relationships
- Client is both participant and observer

Therapeutic Alliance in AAP

Research: Strong TA with avoidantly-attached children is established earlier in AAP

Interaction with animals lowers Cortisol

-> lowers anxiety in therapy, with the therapist

Interaction with animals raises Oxytocin -

-> trust, affiliation

-> social engagement

-> attachment security

-> immobilization w/o fear

Therapeutic Alliance (con't)

- Less complex exchange of affection with animals
 - > sense of emotional safety with them
- State of safety
 - > perceptual bias toward the positive
- Cross-species neuroception
 - > animals interacting with therapist serve as **cues of safety** (Porges)
- Animals as a solution for alliance ruptures
 - > safe haven, secure base

Neurobiological and Psychological Effects in AAP: Expansion of the Potential Space

- * Activity of right amygdala (through perception of animals) provides access to the client's emotional world and their implicit memories
- * Sensory stimulations (sights, smells, sounds) during interactions with animals activate client's implicit memories
- * Therapy environment perceived as safe
 - > Raised content can be worked through

"She thinks
I'm
THE MAN"



Neurobiological and Psychological Effects in AAP: Expansion of the Potential Space

Interaction with animals lowers cortisol

-> Lowers anxiety, blood pressure, heart rate

Animals in the therapy setting

-> Safe Haven when anxiety arises from threatening content

Lower anxiety + feeling of safety

-> Increases ability to be in touch with difficult content

-> expansion of potential space



Anthropomorphism as Symbolization - Reality at a Safe Psychological Distance

- Oxytocin, released by interaction with animals
 -> anthropomorphic tendencies and attribution
 of social meaning
- Mirror neurons, activated by the movement of the animals,
 cause us to ascribe intentions to the animals
- Projection - We observe animal's actions, interpret (or
 misinterpret) their intentions/emotions

Expansion of Potential Space

Animal's Movement Stimulates Mirror Neurons

"Poor Mushu!
Look at her.
She's so sad.
She hasn't had
a hug from
her mother
for 8 years!

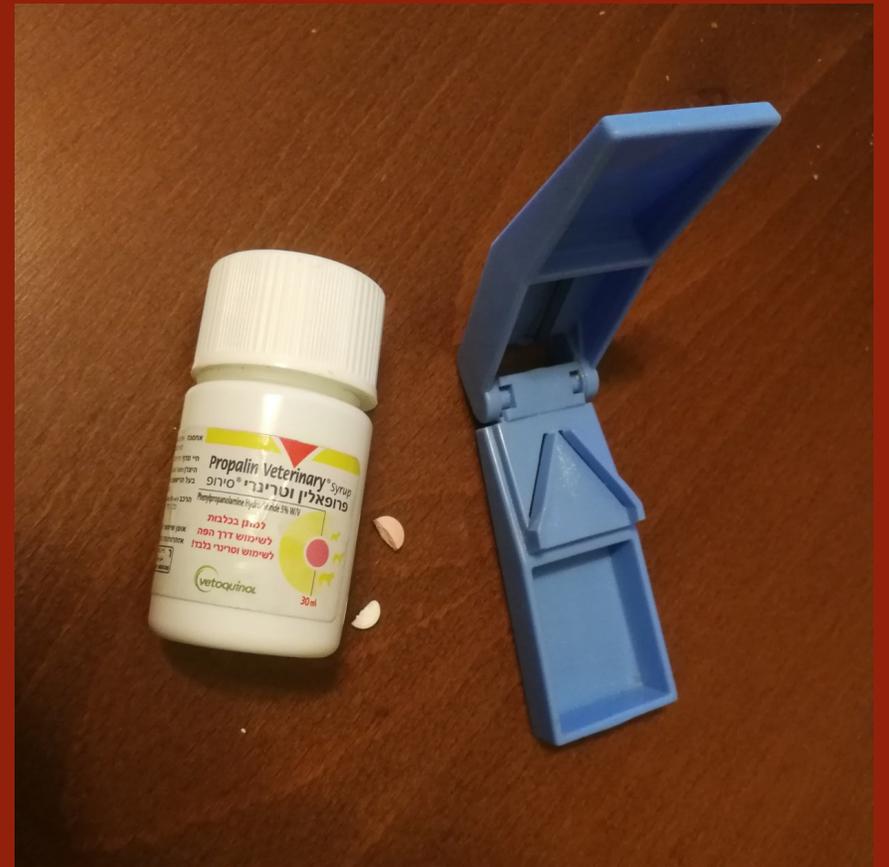


My mother
hugs me all
the time.
I would never
want to be
without my
mother's hug.
Poor Mushu!"

Anthropomorphism as Symbolization - Reality at a Safe Psychological Distance

Play with animals as symbolization, mediated by the therapist:

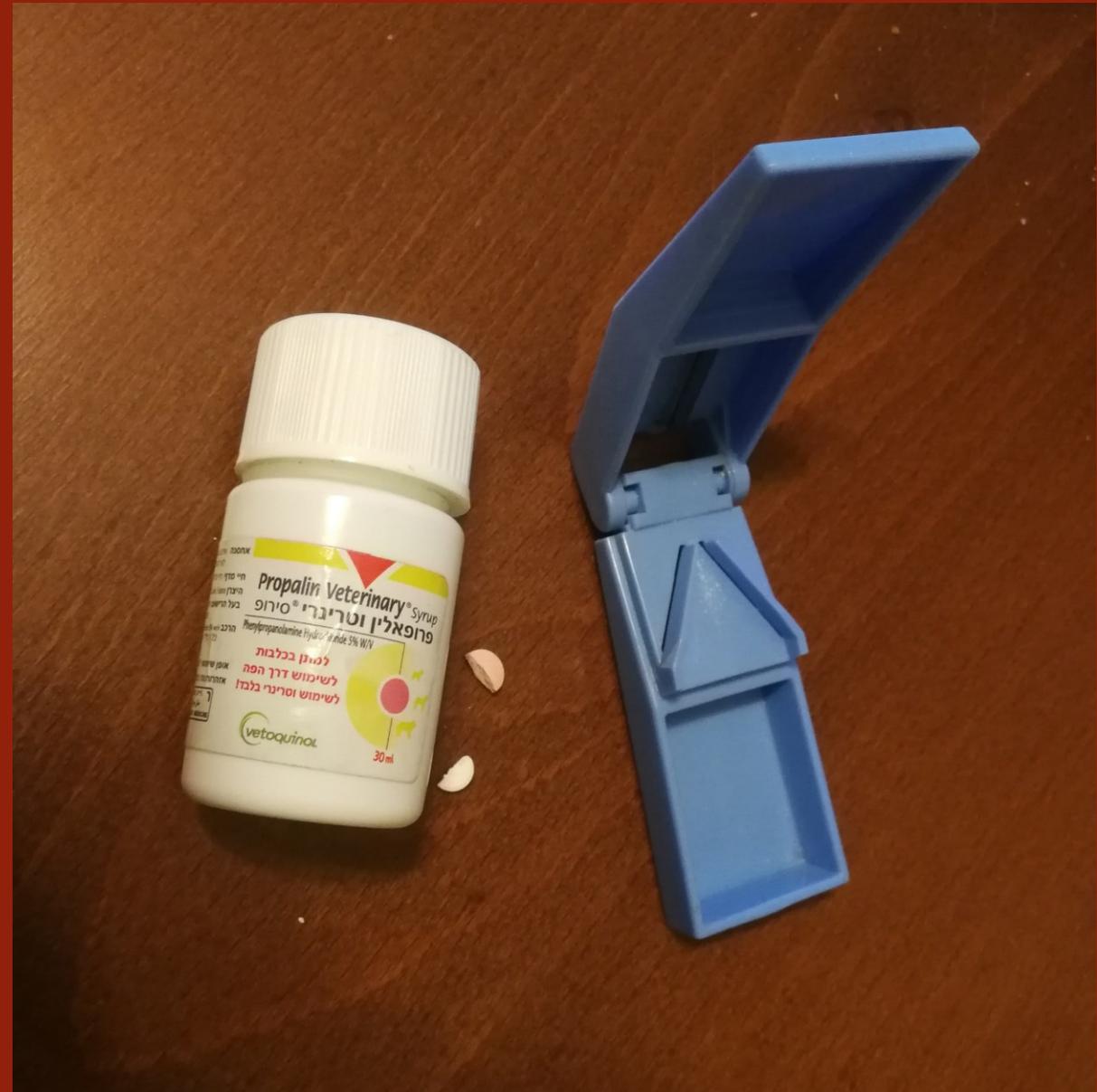
- > Discovery of meaning for unexplained actions and emotions (implicit processed and transformed into explicit)
- > Reconsolidation of implicit patterns and mental modes and creation of alternative neural pathways
- > Neural linkage and integration, contributing to balance, reduction of anxiety, and regulation
- > Facilitation of mentalization processes



"Mushu needs those pills because her heart is hurting because she misses Nana so much!"

“Do they make the heart pills like these for people?”

“My heart is hurting, too.”





Attaining the Ability to Self-Regulate

Interaction/social engagement with animals (and therapist)

- > growth of connective neurological fibers
- > more resilient neural system
- > neural exercise (practice) down-regulating fight/flight --> social engagement
- > ability to self-regulate

Attaining the Ability to Self-Regulate

Implicit transformed into explicit

- > development of narrative
- > integration of left/right hemispheres,
lower/upper areas of brain,
implicit/explicit knowledge and memory
- > calming of the neural system
- > increase of ability to self-regulate

Attaining the Ability to Self-Regulate (con't)

- Mediation and reflection by therapist in interaction with animals
 - > "feeling felt"
 - > increases self-regulation
- Observing interactions between others (therapist-animal, animal-animal)
 - > ability to mentalize, reflect, interpret
 - > increases emotional regulation

Prevention of Dissociation

- Cross-species neuroception of safety due to cues of animals allows client to stay in touch with self
Porges
- Animals as cues of safety: Social engagement with therapist instead of fight/flight, freeze, dissociation

Prevention of Dissociation (con't)

- Activity of right amygdala (stimulated by animals)
-> access to emotional world
- Relationship with the animal
= anchor to emotional world
- Lower cortisol
-> lower anxiety when in contact with emotional world

Prevention of Dissociation (con't)

- Research: Interaction with dogs
 - > increased blood flow to the brain, activity in PFC
 - > grounding, keeping in touch with self
 - > prevents dissociation

Acceptance and Expression of True Self

- * Therapist sees, accepts and cares for animals, who unapologetically express their true selves
- * Client's identification with animals
 - > client likely to feel felt and accepted
 - > acceptance of self without shame
 - > expression of true self

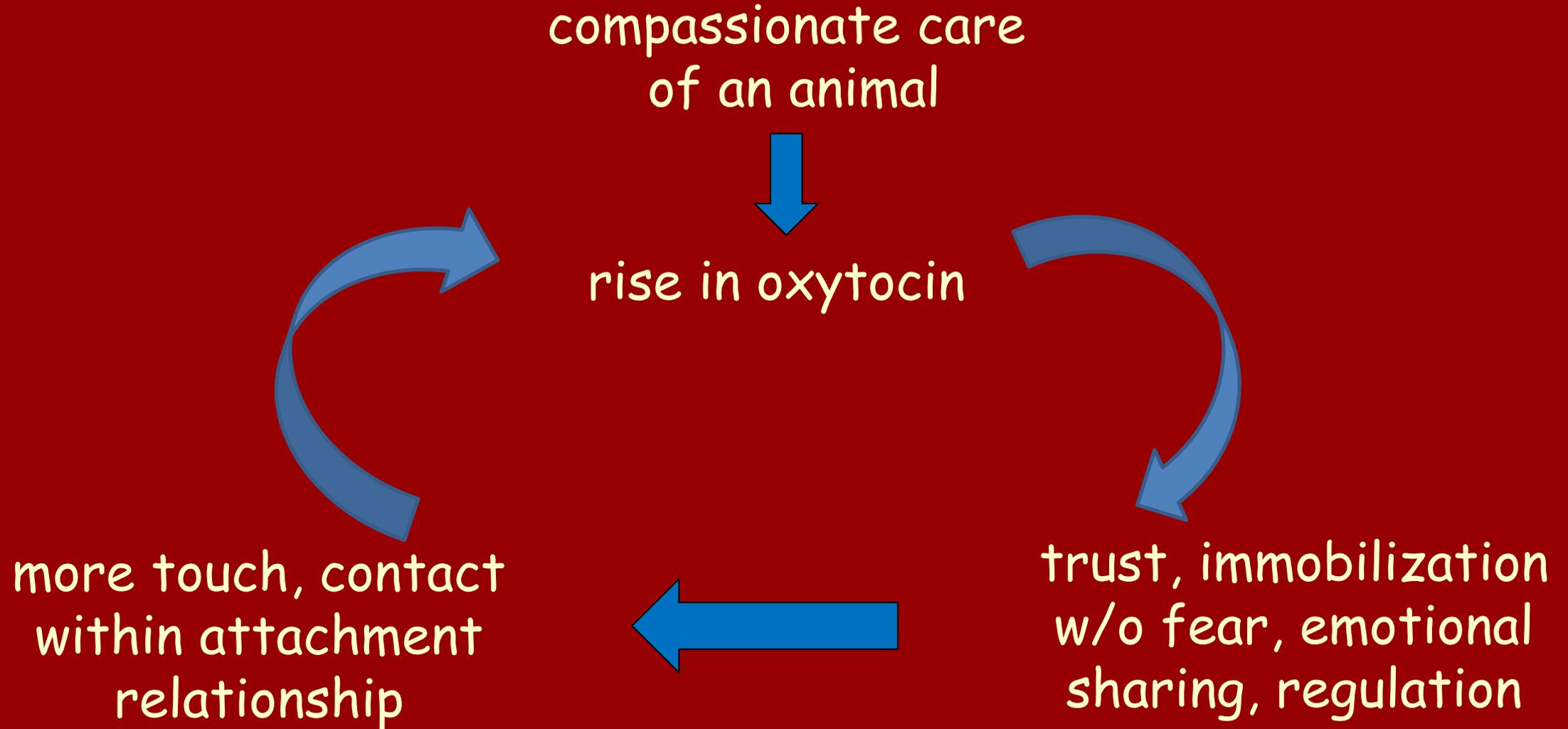
Acceptance and Expression of True Self

- Play with animals:
 - > implicit transformed into explicit
 - > more self-understanding
 - > deeper acquaintance with one's real self

Healing Neurological Effects of the Therapist's and the Client's Altruistic, Caring and Compassionate Behavior

- Altruistic, compassionate behavior changes self-concept:
helpless victim -> helpful actor
- Altruistic behavior activates the ompfc circuitry
 - > stimulation of bonding and attachment
 - > modulation of anxieties and fears

Bio-Behavioral Feedback Loop of Compassionate Behavior



Neurosequential Model of Therapeutics

Bruce Perry

Neurobiologically-Informed Therapy for Developmental Trauma

Working separately with
individual parts of the brain
Gradually from Bottom-to-Top

NMT (con't)

Four Domains:

Sensory Integration - Brainstem

Self-Regulation - Diencephalon

Relationships and Emotions - Limbic System

Cognition - Cortex

WHERE / Dan Pagis

I hid in the room, but I have forgotten where.

I'm not in the cabinet.

And not behind the curtain.

And also not in the big fortress between the table legs.

The mirror is empty of me.

For a minute it seems to me
that I am in the picture on the wall.

If one of these days someone will call me

I will answer and I will know:

Here I am.

Questions? Comments?

You are welcome to be in contact with me
nancyaat@gmail.com

Join my Facebook group
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Neurobiology of Trauma Nerds](#)

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