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Aims & Scope

The International Journal of Neuropsychotherapy (IJNPT) is an open access, online journal that considers manuscripts on all aspects of integrative, biopsychosocial issues related to psychotherapy. The IJNPT aims to explore the neurological or other biological underpinnings of mental states and disorders to advance the therapeutic practice of psychotherapy.

Our mission is to provide researchers, educators, and clinicians with the best research from around the world to raise awareness of the neuropsychotherapy perspective on mental health interventions.

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ATTACHMENT FOCUSED-SOMATIC EXPERIENCING®

**SECURE PHYLOGENETIC ATTACHMENT, DYADIC TRAUMA, AND
COMPLETION ACROSS THE LIFE CYCLE**

Joseph P. Riordan, Abi Blakeslee, and Peter A. Levine

Abstract

Trauma is transposed in the interpersonal neurobiological social dynamics of attachment and may be contagious throughout the life cycle. Trauma and social isolation may be responsible for the alarming widespread changes in human attachment dynamics. Secure attachment may be humanity's most important survival response.

Redefining "secure attachment" to accommodate the dramatic changes in human relationships due to trauma has led to the concept of secure phylogenetic attachment (SPA). Resolving trauma with somatic experiencing (SE) (Levine, 2010) and attachment focused-somatic experiencing (AF-SE) invites the hypothesis that secure phylogenetic attachment is the antithesis of trauma.

Phylogenetics refers to the evolutionary history of relationships between individuals in a species for survival. Human relationships are facing challenges that threaten secure phylogenetic attachment and promote social isolation that may have catastrophic impact on the social evolution of the human species.

Secure phylogenetic attachment refers to evolutionary dyadic survival imperatives of psychoneurotraumatology, the innate capacity to form secure attachments throughout the life cycle. The concept of SPA incorporates neurobiological, neurochemical, behavioral, and affective interpersonal dynamics that promote attuned, connected and engaged attachment between individuals for survival throughout the life cycle.

Regarding the interpersonal neurobiological dynamics of attachment, secure phylogenetic attachment promotes dyadic synergy that is resonant, attuned, engaged, and mutually regulating. SPA invites social dynamics that involve nurturing, support, acceptance, regard, tolerance, love, and respect.

Secure phylogenetic attachment refers also to the evolution of attachment dynamics in a dyad from post-partum infant/maternal regulation through to end-of-life caregiving.

Behaviorally, SPA involves face-to-face, heart-to-heart connection in mutual soothing that promotes interpersonal connectedness and evolutionary survival of the individual, the dyad and the human species. Neurochemically, SPA involves biological processes of trauma recovery as evidenced in neurochemical shifts from cortisol (stress hormone) to oxytocin (love and bonding hormone). Further, SPA promotes an internal neurophysiological balance between parasympathetic relaxation and sympathetic excitation in the autonomic nervous system.

The authors hypothesize that there is a correlation between trauma, attachment perturbation, social isolation, and escalating psychopathology in our communities. Trauma disrupts secure phylogenetic attachment through patterns of relational dysregulation (Schoore, 2012) that in turn generates dyadic trauma (Riordan, Blakeslee, & Levine, 2017). Dyadic trauma contributes to widespread loneliness and social isolation that can be resolved with dyadic completion (Riordan et al., 2017).

SE has utility and efficacy in the treatment of trauma within the individual nervous system (Brom et al., 2017;

Leitch, 2007; Leitch, Vamslyke, & Allen, 2007; Parker, Doctor, & Selvam, 2008). SE works directly with implicit or nonconscious memory and is particularly effective with preverbal infants as well as for accessing preverbal memory imprints in older children and adults. SE works inherently with attachment; however, in this paper the authors combine SE with modern attachment theory and emerging neurological paradigms of traumatology. It will frame somatic psychotherapy in an AF-SE approach.

AF-SE offers neurobiological coordinates and a therapeutic process to address dyadic trauma. It uses interpersonal constructs to understand threat recovery and its role in resolving trauma with dyadic completion. This paper will introduce an AF-SE therapeutic sequence to promote the treatment of dyadic trauma with dyadic completion.

Keywords: attachment focused-somatic experiencing (AF-SE), secure phylogenetic attachment (SPA), dyadic trauma, dyadic completion, functional-somatic experiencing (f-SE), attachment neuroception, post-partum attunement, neurogenic completion, neurogenic trembling

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Trauma, its impact on relationships, and processes toward recovery require broader definitions to facilitate understanding of psychoneurobiological traumatology. Trauma is a “long-term dysregulation in the autonomic and core extrapyramidal nervous system” (Payne, Levine, & Crane-Godreau, 2015, p. 5) that may explain escalating social isolation and psychopathology.

Trauma is a homeostatic disruption that involves disintegration of neurological communication between the major structures of the brain. Primitive subcortical brain structures hijack and dominate neural functioning to drive survival along flight/fight/freeze trajectories where social engagement is compromised.

Dyadic resonance is described by Siegel (2010, p. 54) as “the coupling of two autonomous entities into a functional whole”. Schore (2019a, p. 4) added that dyadic resonance “ultimately permits the inter-coordination of positive affective brain states”, a fundamental characteristic in the construct of secure phylogenetic attachment.

Dyadic trauma occurs when resonance and attuned connectedness (Porges, 2018) in secure attachment alters for both participants in the dyad. Social engagement, governed by mutually integrated whole brain connection, shifts to disorganized social avoidance. Fear and anger drive survival imperatives dominated by limbic and subcortical brain structures. Dyadic trauma is neurologically disintegrating and contagious in attachment dyads and may promote psychopathology throughout the life cycle.

Trauma is treated neurobiologically with somatic experiencing (SE) as an incomplete survival response generated by threat/fear immobilization (Badenoch, 2018a; Levine, 2010; Payne et al., 2015; Porges, 2011). Payne et al. (2015, p.1) suggest one application of SE is to resolve trauma by “completion of thwarted, biologically based, self-protective and defensive responses, and the discharge and regulation of excess autonomic arousal.”

To establish a clear distinction between *completion* as defined above by Payne et al. (2015) and *dyadic completion* (Riordan, Blakeslee, & Levine, 2017), the term *neurogenic completion* is offered as a more nuanced term to describe the phenomenon.

Trauma is not so much what happened to us but, rather, what we hold inside in the absence of an empathic, mutually connected witness.

After trauma, resonance and attuned connectedness in SPA are reestablished by dyadic completion.

Dyadic completion occurs when resonance and attuned secure attachment in the traumatized attachment dyad is restored (Riordan et al., 2017, p 1) through interpersonal neurobiological regulation of nervous systems in attachment relationships characterized by “the capacity to feel safe in the arms of another” (Porges, 2018, p. ix).

Dyadic completion is a homeostatic, mutually regulating phylogenetic process, experienced by another in secure attunement, which originates and draws upon one’s implicit memory of primary attachment relationships (Levine, 2010; Pohl, Young, & Boscha, 2018; Schore, 2019a; Siegel, 2012). Firmly embedded in implicit memory, as the template for future attachment relationships, the interpersonal neurobiology of dyadic completion originates in post-partum neurochemical oxytocin bonding between infant and primary caregiver. Dyadic completion can be established in an attuned connection with another, a fundamental phylogenetic drive in the face–heart connection (Porges, 2011).

Schore (2019a, p. 2) explains:

This first relationship, the one with the mother, acts as a template, as it permanently shapes the individual’s capacity to enter into all later emotional relationships. These early experiences shape the development of a unique personality, its adaptive capacities as well as its vulnerabilities to and resistance against particular forms of future psychopathologies.

In our communities there is widespread relational disconnect, social isolation, and escalating psychopathology (Scaer, 2014; Schore, 2012; van der Kolk, 2014). Dyadic trauma may be complicit

in this escalating social disconnect, which is phylogenetically contrary to survival.

Resolution of trauma requires a process that begins with integration of disrupted whole brain function through the therapeutic processes of SE, utilizing “interoceptive, proprioceptive, and kinesthetic sensations as a therapeutic tool” (Payne et al., 2015, p. 1). Resolution of dyadic trauma requires the presence of an empathic, mutually connected witness.

Enlistment of implicit, post-partum attunement and other resonant, secure attachment memories with attachment focused-somatic experiencing (AF-SE) directly challenges relational disconnect in dyadic trauma. Resolution of dyadic trauma requires reinstatement of secure phylogenetic attachment through an attuned interpersonal–neurobiological (Siegel, 2012) process. This process culminates in dyadic completion and can be promoted using AF-SE.

AF-SE is the process of utilizing SE to specifically involve the interpersonal, neurobiological dynamics of secure phylogenetic attachment to resolve dyadic trauma. The goal of AF-SE is to reinstate SPA through dyadic completion.

Van der Kolk (2014) predicted a “hidden epidemic” (p. 149) of developmental disorders. The concomitant impact of escalating contagious dyadic trauma may be a factor in the widespread experience of loneliness.

The escalating trend of social isolation and associated psychopathology has the potential to alter the evolutionary trajectory of human relationships.

This paper provides a sequential trajectory of trauma and recovery with SE and AF-SE that can be applied and replicated by clinicians to address traumatic social isolation so that those who have been overwhelmed by trauma can once again be held safely in the arms of another.

Core Tenets of AF-SE

- Trauma is in the nervous system and not in the event (Levine, 2015).

- Dyadic trauma manifests in the nervous systems of the participants through the interpersonal neurobiology of the dyad.
- Implicit post-partum attachment dynamics form the neurochemical template (oxytocin) of future attachment relationships and is the foundation for procreative pair bonding.
- Trauma is contagious in attachment dyads (Pohl et al., 2018; Porges, 2018; van der Kolk, 2014).
- The psychopathology of trauma will emerge in the long-term psychoneurobiological dynamics of attachment for both the individual and their attachment relationships (Scaer, 2014; Schore, 2003, 2019a).
- Resolution of trauma requires neurogenic and/or dyadic completion.
- Dyadic completion involves the face–heart connection (Porges, 2011).
- Dyadic completion reinstates secure attachment and counters the dysregulating effects of trauma and dyadic trauma by restoring individual whole brain functioning and interpersonal neurobiological resonance and attunement in attachment relationships.
- Secure phylogenetic attachment is the antithesis of dyadic trauma.

Trauma may contribute to neurodevelopmental, interpersonal and behavioral disorders, and widespread social isolation. Mental health difficulties may emerge across a broad spectrum of presentations including epidemic incidences of relationship breakdown, self-harming, and suicide (Scaer, 2014).

Because trauma enervates subcortical survival networks in fear and vigilance, downregulating or hijacking ventral vagal social engagement networks (Porges, 2016), two secondary and rarely identified symptoms of trauma in relationships are:

- i. significant relationship difficulties characterized by social incongruence, avoidance, conflict or intrusive power and controlling behaviors in pair bonding; and

- ii. a narrowing window of tolerance for and a preoccupation with abandonment, betrayal, and social/interpersonal injustice, which contributes to social isolation.

There is a distinction between relational trauma and interpersonal trauma.

Relational trauma “alters the developmental trajectory of the brain in adolescence and adulthood” (Schoore, 2012, p. 9) and is most prevalent and intrusive in early childhood. Schoore (2019a, p. 43) observes that “care-induced relational trauma is qualitatively and quantitatively more potentially psychopathogenic than any other social or physical stressor (aside from those that directly target the developing brain).”

Relational trauma is also highly dysregulating when betrayal occurs in primary attachment dyads such as first-order relatives, procreative couples, and close friendships. There is a linear sequence between individual trauma that can compromise attachment, which evolves into relational trauma, followed closely by dyadic trauma and psychopathology. This sequence promotes devolving trauma-contaminating cycles that are replicated in existing and future attachment relationships and may culminate in dyadic psychopathology leading to social isolation.

Interpersonal trauma refers to traumatic alienation from others in groups. It manifests in multiple systems such as families, schools, and workplaces. Subcortical survival networks are activated in response to threat vigilance from vilification, marginalization, and harassment (bullying in all its forms) resulting in feelings of isolation, loneliness, and alienation. This dynamic corresponds with the interpersonal neurocognitive definition of trauma in that interpersonal trauma compromises social engagement networks in favor of subcortical survival structures of the limbic and primitive brain and can lead to contagious dyadic trauma.

The insidious nature of trauma contamination infiltrates the interpersonal neurodynamics of attachment (Porges, 2011) through the ventral vagal pathways (Badenoch, 2018a). Cozolino (2014, p. xv) eloquently describes the interpersonal neurodynamics of attachment in his concept of

social synapse:

The *social synapse* is the space between us—a space filled with seen and unseen messages and the medium through which we are combined into larger organisms such as families, tribes, societies, and the human species as a whole. Because our experience as individual selves lives at the border of this synapse and because so much communication occurs below conscious awareness, this linkage is mostly, invisible to us.

Secure phylogenetic attachment is compromised by the loss of resonance and attuned connectedness in the *neurobiology of relational trauma* (Schoore, 2012). Attachment dyads are confounded by trauma-related behaviors associated with flight/fight/freeze or dorsal vagal collapsed states (such as traumatic vasovagal syncope) where whole brain function is compromised by subcortical survival imperatives.

These destructive interpersonal dynamics are associated with fear vigilance and loss of trust, manifest in interpersonal aggression and enervated, trauma-driven subcortical responses to threat that lead to interpersonal alienation, social isolation, and loneliness.

Trauma in the dyad translates into mutual experiences of disorganization, dysregulation, and compromised neuroception (Porges, 2011), the inability to discriminate safety or threat from another (i.e., compromised neuroception). The window of tolerance to prosocial behaviors is narrowed for traumatized individuals who incorrectly perceive threat in routine social interactions. Ogden and Fischer (2015, p. 225) describe this phenomenon as follows:

When we feel threatened, our arousal quickly escalates up, sometimes to hyperarousal levels, to prepare us to flee, fight, freeze, or call for someone to help us. If the survival defenses are unsuccessful, our arousal may plummet into a state of hypoarousal in which we shut down and become still and immobile.

Traumatic attachment dynamics are characterized by threat/fear interactions and by fear- or anger-driven dialogue, aggressive vocal tonality, disgust, and rejection behaviors that are complicit in the development of dyadic trauma.

Trauma is entrenched by concerns about abandonment, neglect, control, abuse, aggression, and violence reinforced by the hedonic valence of *avoidance* (Levine, 2015) a key diagnostic feature of PTSD (DSM-5; American Psychological Association, 2013, p. 271).

Dyadic trauma in all its forms—developmental, relational, interpersonal, implicit, procedural, and episodic—may be observed in the destructive dynamics of interpersonal conflict. Schore (2019a, p. 51) observed that “early relational trauma negatively impacts limbic and autonomic nervous system maturation, producing enduring neurobiological alterations that underlie right brain affective stability, inefficient stress tolerance, memory impairment, and dissociative disturbances.”

These conditions are fertile ground for manifestations of dyadic trauma where interpersonal communication is characterized by minimization, marginalization, vilification, discounting, character assassination, and emotional wounding that may be encountered in couples, families, social groups, schools, organizations, workplaces, and social media. Dyadic trauma therefore generates avoidance, social isolation, and escalating community psychopathology

Social Consequences of Dyadic Trauma

There are significant individual and social consequences for unresolved dyadic trauma.

Trauma affects not only those who are directly exposed to it, but also those around them (van der Kolk, 2014, p. 1).

Social isolation is a serious and growing problem in Australia today. Twenty-five percent of Australian households are single-person homes (Australian Bureau of Statistics, 2016). One in four people are lonely (Abbott, Lim, Eres, Long, & Matthews, 2018) or experience social isolation (Relationships Australia, 2017). Suicide rates in Australia increased by 10% in 2017 to 12.6 deaths per 100,000, a statistic widely under-reported (Australian Bureau of Statistics, 2018). As a result, social isolation is emerging as a major social issue for health care professionals (Abbott et al., 2018; Lim, 2018). This trend may have its origins in the

socially destructive nature of trauma.

Because trauma disrupts mutual regulation (Tronick, 2007), the “visceral feeling of safety” (van der Kolk, 2014, p. 79) is compromised. Relational dysregulation (Schore, 2012) emerges when one or both members of an attachment dyad or family experience dyadic trauma. Schore (2012, pp. 163–164) contends that:

During pre- and post-natal critical periods of right brain cortical–subcortical connections, unrepaired states of dysregulated hyperarousal and hypoarousal epigenetically shape an enduring lowered limbic–autonomic threshold for emotional turbulence, a reduced threshold for disassociation and a hyperreactivity to novelty in the environment.

Dyadic trauma can leave the individual “chronically out of sync with the people around them” (van der Kolk, 2014, p. 79) and in a state of relational disconnect, altering the style and trajectory of their attachment relationships throughout the life cycle.

Secure attachment is an important regulator of individual and dyadic nervous systems (Badenoch, 2018b; Dana, 2018; Levine 2018; Pohl et al., 2018; Porges, 2011; Riordan et al., 2017; Schore, 2012, 2019a; Siegel 2012) because, according to Pohl and colleagues (2018, p.1), “benevolent social relationships, in general, are associated with protective effects against psycho- and physio-pathology not only in the developing infant, but also during adulthood.”

Dyadic trauma, as a contagion, is evident in the observation of Badenoch (2018a, pp. 136–137) regarding *dorsal vagal withdrawal*, a function of the dorsal vagal complex:

Our autonomic nervous system’s ongoing neuroception of some degree of danger may keep our baseline in sympathetic arousal or dorsal vagal withdrawal, states that preclude social engagement. This closes the door to our primary nurturance—each other.

Trauma disrupts the ability to relate to others and to use social behavior to literally regulate vagal function—to calm us down (Porges 2017, p. 170).

The behavior of dyadic trauma is transposed in the interpersonal neurobiology of dyads that compromises

secure phylogenetic attachment.

In the traumatized dyad, the physical body of the traumatized partner carries the impact of trauma (Levine, 2010; Ogden, 2016; Scaer, 2014; van der Kolk, 2014;) that can result in disorders of the self (Schoore, 2003). Affect dysregulation (Schoore, 2012) and evolving attachment perturbation (Riordan et al., 2017) may ultimately lead to attachment disorders (Schoore, 2012; Siegel, 2012) and widespread psychopathology.

Similarly, in trauma, the body carries the impact of allostatic load (the cost of chronic exposure to elevated levels of stress) and endocrine changes due to continual adaptations to environmental challenges (Payne et al., 2015). Trauma results in compromised homeostasis with core extrapyramidal shifts from ventral vagal states (prosocial) to dorsal vagal states (shutdown, freeze, or faint) (Badenoch, 2018b; Payne, et al., 2015; Porges 2011).

In compromised homeostatic states prosocial behaviors defer to self-protective fear vigilance. Psychopathology, mental health, and physiological difficulties for both members in the dyad invariably emerge, compounding allostatic load due to unresolved ruptures in the relationship. Once entrenched, this process—the psychophysiological dysregulation and patterns of misattunement—may continue throughout the life cycle (Pohl et al., 2018; Riordan et al., 2017).

Redefining Trauma

The complexity and scope of events that can contribute to trauma presentations and PTSD is emphasized in the phenomenon of somatic representations (Scaer, 2014). Somatic representations occur when developmental or earlier life trauma generates PTSD. They may also occur when a traumatic episode is triggered by more recent events. People who have experienced a trauma who would not meet DSM criteria for PTSD (American Psychological Association, 2013, pp. 271–274) may still suffer from severe and traumatizing somatic representations (Scaer, 2014). Somatic representations may also contribute to physiological and psychological disorders that compromise attachment in dyadic trauma.

Trauma devastates the social engagement system and interferes with cooperation, nurturing, and the ability to function as a productive member of the clan (van der Kolk, 2014, p. 349).

In a departure from cognitive–behavioral models of traumatology, a somatic neurobiological, interpersonal, and attachment-based model of trauma and recovery will be reviewed. AF-SE emphasizes a bottom-up somatic neurodyadic, and attachment-focused intervention process that supports psychoneurobiological paradigm shifts in the field of traumatology. Trauma is widely under- and mis-diagnosed due to restrictive diagnostic criteria that target the nature of events as the source of trauma. The authors assert that trauma should be redefined to include neurological and dyadic responses and its impact on human relationships and communities.

Diagnostic markers of trauma are changing from experiential, cognitive, behavioral, and symptom-based parameters (American Psychological Association, 2013) to neurocognitive, neurochemical, and functional descriptors of overwhelming, incomplete fear/immobilization episodes (Levine, 2010, 2015; Porges, 2011).

Resolution of trauma requires both neurogenic and dyadic completion within phylogenetic survival–recovery imperatives for the individual and the traumatized dyad (Riordan et al., 2017). Dyadic completion may occur spontaneously in SE; however, where secure phylogenetic attachment remains compromised, targeting dysregulated phylogenetic attachment imperatives with AF-SE can achieve dyadic completion.

To redefine trauma, this article will identify the relationship between trauma and attachment and the positive impact of SE and AF-SE on early childhood development and attachment relationships throughout the life cycle. The authors seek to highlight the influence and destructive impact of dyadic trauma during critical times of attachment, particularly early childhood and procreative pair bonding.

To establish the utility of AF-SE to resolve dyadic trauma, this paper will identify the physiological symptoms for trauma and the relational disconnect that generates loneliness and social isolation throughout the life cycle regardless of when trauma occurs.

Humans are phylogenetically primed to complete incomplete survival responses of flight/fight/freeze to resolve trauma. Traumatic overwhelm compromises whole brain integration and emotional safety in relationships promoting dyadic trauma. Recovery requires an attuned connection with an “other” in secure phylogenetic attachment as the antithesis of trauma.

Theoretical underpinnings from polyvagal theory (Porges, 2011), the core response network (Payne et al., 2015), and the defense cascade (Kozłowska, Walker, McLean, & Carrive, 2015) couched in modern attachment theory (Schore, 2012, 2019a, 2019b; Siegel, 2012) and SE theory (Levine, 2010, 2015) offer conceptualization of secure phylogenetic attachment, dyadic trauma, and dyadic completion with AF-SE.

Polyvagal Theory

Polyvagal theory explains the action of the 10th cranial (vagus) nerve under extreme threat. The theory proposes that humans follow a phylogenetically ordered hierarchy under threat in which the newer structures of the brain respond first (Porges, 2011) followed by an evolutionary sequence of:

- i. the parasympathetic myelinated ventral vagus (social engagement);
- ii. the sympathetic nervous system (flight or fight); and
- iii. the parasympathetic, unmyelinated dorsal vagus involving immobilization or collapse during inescapable life threat.

Core Response Network

The core response network (CRN) is “a complex dynamical system formed by the subcortical autonomic, limbic, motor, and arousal system” (Payne et al., 2015, p. 1). The CRN explains the function and interaction of the deeper, regulatory structures of the nervous systems including the autonomic nervous system, the reticular arousal system, the emotional motor system and the limbic emotional system involved in threat perception, survival, and recovery. These structures interact in complex feedback loops and with the environment

to regulate arousal and reaction to threat.

Defense Cascade

The defense cascade is “a continuum of innate, hardwired, automatically activated defense behaviors” (Kozłowska et al., 2015, p. 1). This theory offers an understanding of human behavior under threat where distinctive neural events in the brain are kindled during and after a traumatic episode corresponding to flight/fight/freeze physiology.

Somatic Experiencing

Somatic experiencing is “the completion of thwarted, biologically based, self-protective and defensive responses, and the discharge and regulation of excess autonomic arousal” (Payne et al., 2015 p. 1). SE offers a comprehensive understanding of trauma recovery through a dynamic engagement of interoception, kinesthetic, and proprioceptive interventions. These interventions reorganize the neural synchrony between lower brain structures allowing an individual to be in a flexible state of relaxed readiness and able to spontaneously respond to current events.

Neurotraumatologists have explored the connection between trauma and secure phylogenetic attachment in the theoretical constructs of connectedness (Porges, 2016), trauma and attachment security (Siegel, 2010), social baseline theory (Coan & Sbarra, 2015), embedded trauma (Badenoch, 2018a), and discordance in dyadic rhythm (Levine, 2015).

All humans share a common genetic inheritance that yearns for warm attachment, including nervous systems that are always looking for connection ... being alone with pain and fear is fundamental to development of trauma (Badenoch, 2018a, p. 26).

Similarly, engaging secure phylogenetic attachment as a mechanism for healing trauma, has been successfully utilized in many interpersonal systems, including coming home programs for war veterans (Baker, 2016; Bobrow, 2015), peer support for PTSD for Nepalese boy soldiers (Morley & Kohrt, 2013) and connectedness for those with addictions (Hari, 2015).

Modern attachment theory has focused predominantly on early childhood neurocognitive and emotional development as a primary source of

attachment dynamics (Schoore, 2012, 2019a; Siegel, 2012). However, adults, even those with suboptimal attachment histories, pursue secure attachment (Pohl et al., 2018) throughout the life cycle unless traumatic overwhelm triggers social avoidance and isolation.

Interpersonal neurobiological systems are robust in favorable situations but also highly vulnerable in threat/fear circumstances (Riordan et al., 2017). Creating situations of trust and prosocial attachment neuroception may be important for some individuals in AF-SE. One great resource can be an attuned SE therapist who embodies and promotes the neuroception of safety for dyadic completion.

Dyadic trauma is most pervasive in early childhood and adolescence. Separation from a soothing attachment figure (or a pair-bonding partner) during significant stages of developmental attachment or during critical episodes of traumatic overwhelm (Riordan et al., 2017) can lead to perturbations in the dyad, relational disconnect, and dyadic trauma and may contribute to lifelong psychopathology (Scaer, 2014; Schoore, 2003, 2019a) and physical and mental illness (Mersky, Topitzes, & Reynolds, 2013; Scaer, 2014).

Developmentally attuned adolescents are primed for interpersonal neurobiological pair-bonding and attuned connectedness. This process involves two individual ventral vagal social networks engaging in procreative attachment, drawing on implicit memories of oxytocin-fueled phylogenetic primary attachment drives to connect with each other without fear, in a state of total trust and *quiescent immobilization* (Riordan et al., 2017).

Functional Somatic Experiencing (f-SE)

When AF-SE is extended outside the therapeutic room in face-to-face connection between participants in dyadic trauma for repair, as in the case of Fiona below, who self-soothed with f-SE in the presence of an empathic, mutually connected witness, f-SE can be employed by traumatized individuals during moments of sympathetic arousal or during retraumatization and dorsal vagal overwhelm.

Functional-somatic experiencing incorporates

the practiced effect of mindful neuerosomatic integration (interoception) in real time during activation. Functional-SE involves whole brain interoception for regulation and renegotiation of arousal. Similarly, a polyvagal soothing technique connecting the central nervous system to mindful scanning of the field of threat—hand on chest (ventral vagal) and hand on diaphragm (dorsal vagal) while scanning visually, and 180-degree head turning to perceive the environment as safe or threatening—can delay fear, emotional overwhelm, and panic to reengage homeostatic regulation.

Vignette: Fiona (48) Partner Loss

In general, stressful relationships or even the loss of a partner are associated with psychiatric conditions and health irregularities (Pohl et al., 2018, p. 2).

Since early adolescence Fiona had experienced inexplicable debilitating migraine headaches and vestibular difficulties including vertigo and nausea in an escalating, unexplained and undiagnosed constellation of symptoms. When 14 years old, Fiona fell in love with a boy two years her senior. Before this blossoming romance could actualize into a procreative pair bond, the boy unexpectedly moved across the country, traumatically ending the relationship and severing their oxytocin-driven procreative bond. Thirty-four years later Fiona reconnected with her adolescence romantic interest and her vestibular disorder and migraine headaches suddenly and mysteriously disappeared.

Process

After a year in treatment with SE, Fiona was only able to defer the onset or regulate the intensity of her migraines and other somatic symptoms, downregulating, delaying, and reducing frequency and intensity. However, full resolution was not evident with SE until AF-SE was introduced.

Fiona experienced relational trauma in separation from her adolescent romantic interest. Because Fiona was in a face-heart connection with her partner and phylogenetically primed for procreative engagement, traumatic separation resulted in lifelong somatic symptoms of relational disconnect resulting in dyadic trauma.

Fiona's trauma was self-perpetuating in the constellation of inexplicable symptoms that were "somatic representations of prior trauma" (Scaer, 2014, p. 193).

Fiona—trained in f-SE, skilled in somatic self-regulation, and educated about AF-SE—travelled across the country to physically reconnect with her lost love interest. Neither she nor her lost partner had fully engaged in a secure love bond with another since their forced separation. Over several meetings they engaged in nonsexual physical hugging and face gazing as they reminisced over their lost adolescent love. Instinctively, this couple engaged in the face–heart connection for dyadic completion where mutual neuroregulation and somatic attachment soothing (Riordan et al., 2017) resolved their incomplete survival responses associated with the traumatic separation.

Returning to her home and normal life, Fiona's symptoms eventually reemerged but with a significant reduction in frequency and intensity.

Discussion

In a state of relational disconnect that evolved into dyadic trauma, 14-year-old Fiona experienced escalating somatic symptoms representative of her trauma that ultimately became debilitating. With AF-SE interventions the opportunity to resolve her dyadic trauma emerged in the initial online contact with her lost procreative pair-bond partner. Guided in f-SE and fully informed of AF-SE, utilizing self-regulatory and somatic interventions to down regulate and discharge sympathetic arousal, and understanding the phylogenetic imperatives of the face–heart connection, Fiona resolved to address her illness in dyadic completion. Physically reconnecting in dyadic completion with her lost partner was a deliberate f-SE strategy to reengage with another in mutual comfort seeking and somatic attachment soothing to resolve relational disconnect.

The Face–Heart Connection

The autonomic nervous system is a relational system toned in experience with

others (Dana, 2018, p. 123).

The face–heart connection (Porges, 2011) plays a vital role in secure phylogenetic attachment. The implicit, neurobiological template for secure attachment is the "bond of emotional communication between the infant and primary caregiver" (Schore, 2012, p. 263), a relationship based on the face–heart connection.

When speaking of early childhood attachment, Schore (2012, p. 264) eloquently describes the face–heart connection:

Within a context of visual–facial, gestural, and auditory–prosodic communications, each partner learns the rhythmic structure of the other and modifies his or her behavior to fit that structure, thereby cocreating a specifically fitted interaction. During mutual gaze episodes of bodily based affective communications, the spatiotemporal patterning of the primary caregiver's exogenous sensory stimulation is synchronized with the spontaneous expressions of the infant's endogenous organismic rhythms.

The face–heart connection is the conduit for the information of interpersonal neurobiology (Siegel, 2012). The emotional right brain-to right brain interpersonal neurobiological connection (Schore, 2019b) is established between mother and infant (and procreative couples) through face-to-face gaze and their heart-to-heart physical connection (touch).

Schore (2019a, p. 181) quotes the earlier work of Winnicott (1963), who introduced the concept of "quiet love" to describe somatic attachment soothing:

The calming and soothing dyadic context of "quiet love" represents the down-regulation of strong negative affect from a high-arousal, *sympathetic-dominant energy-expanding state* to a lower-arousal, *parasympathetic-dominant energy-conserving psychobiological state* expressed in comfort and relief from stress. Quiet love associated with left cradling represents Porges' (2011) ventral vagal system in the *nucleus ambiguus* of the right brain that is preeminent in the regulation of state by social engagement, as well as the right-lateralized regulation of emotion and autonomic activity.

The ventral vagal branch of the parasympathetic

nervous system is engaged with producing oxytocin (Pohl et al., 2018), the emotional bonding hormone. The attachment dyad is reinforced in blissful surrender, immobilized in safety, and soothed with gentle proprioceptive movements (like rocking). Mutually regulating processes, through interpersonal resonance and attunement, engage social networks and promote secure phylogenetic attachment.

This process is reinforced and embedded throughout the life cycle within ongoing secure phylogenetic attachments but remains vulnerable when a person in an attachment dyad experiences traumatic overwhelm.

In a traumatized state, interpersonal communication is driven by subcortical limbic processes and governed by heightened sympathetic arousal of flight (fear), fight (anger), and dorsal vagal freeze (shutdown) responses. The freeze response often leads to emotional shutdown, social avoidance, and social isolation.

Trauma compromises neurological engagement of the face–heart connection with sympathetically driven threat vigilance as well as fear enervation through the dorsal vagal complex. Future attachment experiences of dyadic resonance and attuned engagement may become corrupted.

In a literature review of the effects of oxytocin, Rossouw (2018) identified the social impact of oxytocin to increase trust, empathy, social cohesion, increase secure attachment behavior and promote fidelity in relationships. Oxytocin and the other attachment neurotransmitters play a vital role in attachment through the face–heart connection, particularly after birth and in procreative relationships—the bond between partners in adulthood originates evolutionarily from the mother–infant bond since both types of bonds rely on overlapping brain areas and neurotransmitter systems (Numan & Young, 2016).

The negative consequences of trauma may also be mediated by release of oxytocin when attachment dynamics are included in the therapeutic dynamic.

Social relationships are vital for the well-being of humans. The first and most crucial social relationship in life is developed at

birth between the offspring and the parents. The formation of relationships persists throughout life, where new ties are established between individuals and family, friends, co-workers, and partners. Here, the neuropeptide oxytocin (OT) plays an important role in the formation of bonds of many kinds, including those between parents and offspring and between partners (Pohl et al., 2018, p. 1).

When conducting SE there can be a physiological shift between dorsal vagal freeze/fear states and sympathetically dominant flight/fight to a restorative parasympathetic rest-and-digest state. The neurological and neurochemical renegotiation processes in dyadic completion can discharge trauma-driven cortisol and stress-based neurochemistry that is then replaced with oxytocin during somatic attachment soothing, the behavioral and emotional adhesive of interpersonal neurobiological connectedness.

Somatic attachment soothing is a vital component of the face–heart dynamics of secure phylogenetic attachment which involves the regulated mind of the care giver, soothing voice, safe touch (such as hugging) proprioceptive movement (such as rocking) in a face-to-face, heart-to-heart connection.

The face–heart connection is a critical component of the social engagement system; its role in perturbation of the attachment dyad is succinctly described by Porges (2016, p 36):

At birth for mammals the bidirectional neural communication between the face and the heart forms the core of a social engagement system. Metabolic demands, perceived danger, life threat, and illness retract the social engagement system resulting in a face that is not “social” and a physiological state (removal of the vagal brake on the heart) that promotes defensive behaviors.

Neuroception is transferred in the face–heart connection through the bidirectional neurobiological conduits of interpersonal connectedness.

Throughout all stages of the life cycle, threat/fear experiences create visual, (also vocal or touch), orientation for face–heart connection with another. In this phylogenetic human trait, while under threat, the hedonic valence of attraction—“the fundamental

organismic response tendencies of approach or avoidance of attraction or repulsion” (Levine, 2015, p. 26)—forms the basis of dyadic completion. When the dyad is traumatized, resolution of trauma requires reinstatement of secure phylogenetic attachment, which can occur spontaneously with SE but may need to be deliberately engaged with AF-SE to resolve dyadic trauma.

Dyadic completion may be one of humanity’s most important survival imperatives that is overtly demonstrated during face–heart connection. It can even exist between complete strangers in times of overwhelming community trauma.

AF-SE involves deliberate evocation of attachment neuroception (Riordan et al., 2017) and mutual regulation of survival-based arousal. The face–heart connection draws upon the biological template for implicit post-partum attachment dynamics that promote comfort-seeking and somatic-attachment-soothing. A comforting voice and dyadic regulation of affect (Kozłowska et al., 2015) are core elements of dyadic completion. Several vignettes will elucidate this point, including Baby Jack (Levine, 2015) and Little Bill (Riordan et al., 2017) below.

Neuroception is a key component of secure phylogenetic attachment. Levine (2007) asserts that primary caregivers act as the ventral vagal, social engagement, soothing system for the unmyelinated infant’s nervous system until it is myelinated and can regulate itself. The caregiver relays to the infant through attachment neuroception whether situations and people are safe, dangerous, or life-threatening.

Attachment neuroception is a co-regulating process (Tronick, 2007) between those sharing a threat-vigilance experience. Overwhelm and the defense cascade (Kozłowska et al., 2015) may be arrested by attachment neuroception at the point of fear arousal between individuals. Implicit memory of face–heart comfort-seeking and mutual soothing is the counterpoint to threat vigilance. It is also a core element of attachment neuroception for the human species, a phylogenetically ordered human trait.

In the traumatized dyad, bottom-up survival sequences of flight, fight and freeze are enervated through dyadic perturbation generating relational disconnect, a limbic brain function that hijacks whole brain social engagement in the dyad.

Perceptions of safety in attachment (neuroception), are compromised by the impetus of the amygdala, changing the neurophysiology of the brain (Porges, 2011). Implicit, emotional, and procedural memory can generate profound change in hedonic valences of approach and avoidance in fear-driven survival behaviors (Levine, 2015). Traumatized individuals therefore default to ongoing internal signaling of survival addressing futile safety-seeking in social situations with avoidance. This may lead to a self-perpetuating process of contagious relational disconnect and trauma contamination in attachment relationships.

There is often a *depotentialization* of traumatic memory and discharge of incomplete neurogenic survival energy during SE (Blakeslee, 2008). SE and AF-SE allow an expansion of resilience and promote increased tolerance to allostatic load and homeostatic reconnection in secure attachment.

Post-partum attunement is the innate capacity for complete surrender into safety and attuned connectedness in the ventral vagal branch of the parasympathetic nervous system where immobilization in safety (quiescent attunement) is paramount for bonding.

The most intriguing, attractive, and engaging feature of newborn and preverbal infants is their capacity to beguile others in a flood of oxytocin with wide-eyed, open engagement through face-to-face, eye-to-eye, and protection-evoking vocalizations. It is an interpersonal neurobiological interchange that is disarmingly authentic and invites nurturing and protection.

An infant’s face–heart openness in fearless interpersonal engagement is the fundamental essence of secure, attuned connectedness. They embody security through repetitive cycles of regulation from their caregivers.

Post-partum attunement is the quintessential implicit attachment template and social engagement dynamic between infant and caregiver, which is foundational in all future secure attachment relationships. This “phylogenetically most recent

mammalian circuit fosters social behavior and is defined by a face–heart connection in which the neural regulation of the striated muscles of our face and head are neurophysiologically linked to the neural regulation of our heart” (Porges, 2017, p. xv.)

Post-partum attunement is the face–heart connection between newborn and mother or primary attachment figure (Riordan et al., 2017) during the establishment of post-partum secure phylogenetic attachment. This can form or greatly influence the template for future social attachments. The “face–heart connection provides humans and other mammals with an integrated social engagement system that detects, and projects features of safety to conspecifics through facial expressions and vocalizations that are covariates of autonomic state” (Porges, 2018, p. xvi).

Vignette: Baby Jack (Levine, 2015)

Surviving a life-threatening birth and intrusive medical procedures during a C-section, Baby Jack (14 months) was scheduled for gastroscopy for intermittent gastric reflux. Jack and his mother were diagnosed by Dr Levine as experiencing “a basic discordance in their dyadic rhythm” (Levine, 2015, p. 74).

Engaging Jack in a process of completion (action for survival) of his thwarted birth experience, Jack pushed with his feet and hands to complete his incomplete survival imperative, his natural birth experience. Jack released survival energy (heat and crying) and immediately began the process of spontaneous dyadic completion in comfort seeking with his mother in response to his “discordant dyadic rhythm.” Jack’s mother immediately and instinctively began somatic attachment soothing with proprioceptive rocking, hugging, and soft vocalizations in the face–heart connection that was thwarted at the time of birth.

Discussion

Viewing this demonstration is essential to understanding the blissful, dyadic reunion between Jack and his mother. Their episode of spontaneous dyadic completion in comfort seeking and somatic attachment soothing is

the quintessential demonstration of AF-SE and the inspiration for the theoretical constructs identified here.

Physically engaging with his mother, Baby Jack felt safe. He moved from fear immobilization (bracing), to activation of sympathetic arousal (pushing), to a discharge (release) of survival energy (tearful crying) resulting in neurogenic discharge.

In attuned connection and attachment neuroception with his mother, Baby Jack surrendered into quiescent attunement, an event that typically occurs directly after childbirth in the face–heart connection between mother and newborn.

Released from his incomplete survival trauma (freeze) Jack was free to engage with his mother completely with floods of oxytocin and somatic engagement. This phylogenetic face–heart connection (post-partum quiescent attunement) will positively influence his implicit template for future attachment relationships (Numan & Young, 2016; Pohl et al., 2017).

Rupture/repair is a core interpersonal and developmental platform of secure phylogenetic attachment. Cycles of misattunement, attunement, and the resolution of interpersonal disconnect constitute a rudimentary template for the healing process from dyadic trauma to dyadic completion with AF-SE.

However, models of rupture and repair in traditional attachment theory may be inadequate to explain perturbations in the dyad that emerge as dyadic trauma. When a co-participant in a previously secure attachment dyad is the source of the trauma (as in the dysregulated neuroception of combat PTSD or postsurgical trauma), the non-traumatized participant is naïve to, and highly vulnerable to, the fundamental shifts in attachment from attuned engagement to threat vigilance. Rupture in this instance goes beyond repair and may require AF-SE to reinstate secure phylogenetic attachment.

Rupture of primary, secure attachments in early childhood can cause lifelong relational disconnect and dyadic trauma. Dyadic trauma leads to an inability to regulate affective states under stress, particularly fear/terror and aggression. After dyadic trauma, relational style is based on fear vigilance where trauma develops as a contagion that infects and projects into current and

future relationships. Schore (2003, p. 33) explains this dynamic and provides insight into why those who experience early childhood trauma are more prone to psychopathology:

Early failures in dyadic regulation . . . skew the developmental trajectory of the corticolimbic systems that mediate the social and emotional functioning of the individual for the rest of the life span leading to a regulatory failure described as ‘impaired autonomic homeostasis.’

Due to the negative impact on right brain development, early childhood trauma survivors invariably experience more relational trauma and traumatic disconnect throughout the life cycle.

Dyadic Trauma as a Contagion

Based on clinical experience, the authors propose the concept that the contagious nature of trauma is the antithesis of secure phylogenetic attachment. The contagion of trauma often follows a sequence:

TRAUMA => perturbation in the dyad => relational disconnect => relational trauma => dyadic trauma => perturbation in other dyads => social isolation => psychopathology (Figure 1)

From infant to old age, traumatized individuals may require a variety of bottom-up somatic and top-down cognitive interventions to achieve neurogenic and dyadic completion. The nature of the dyad, including history of trauma, rupture/repair dynamics, connectedness/disconnectedness, hedonic valences, openness to future secure attachment and potential for attuned connectedness in dyadic completion will influence treatment with AF-SE.

Dyadic trauma enervates the right brain and the emotional right amygdala (Scaer, 2014), compromising survival responses to ordinary life events (symbolic representations). Relationships are constantly interpreted through the lens of heightened fear vigilance and threat perception resulting in perturbation in the dyad. Fueled by cortisol this traumatic state compromises interpersonal attunement and neuroception in

secure attachment relationships. Prolonged exposure to cortisol is related to many preventable illnesses such as diabetes and hypertension (Scaer, 2014).

Dyadic trauma is characterized as an inability to connect or to soothe or be soothed, leading to alienation and conflict between participants in the dyad or family unit (Caska et al., 2014). For infants this dynamic may present as trauma-induced features of disorganized attachment disorder (Main & Solomon, 1986) where the need for soothing is compromised by the fear of relational trauma.

It is important to note that for infants in situations where primary attachment figures are not involved in neglect or abuse, dyadic trauma can mimic features of attachment disorganization (Lyons-Ruth & Jacobvitz, 2008). This is an important diagnostic distinction.

Healthy relationships return to trust and security after rupture when repair is experienced. Repair in healthy secure phylogenetic attachments involves the social engagement systems of both participants. During normal rupture dynamics, the individual’s nervous system is not compromised by flight, fight or freeze, disruption of neuroception, overwhelm, or activation of the polyvagal network. Nor is the interpersonal neurophysiology of the dyad compromised and therefore does not require neurogenic/dyadic completion.

However, in trauma, where social function and neuroception is altered by traumatic overwhelm, sympathetic/parasympathetic rhythms are interrupted by the polyvagal network (Porges, 2011). Dyadic completion may best be achieved by a bottom-up titrated behavioral resolution of the overwhelm process to physically complete the incomplete survival imperative. This is followed by mutual regulation, attachment neuroception, and attuned connectedness through the face–heart connection.

Modern attachment theory emphasizes right brain dominance in psychotherapy (Schore, 2012, 2019b) and offers insights into the nature of attachment and recovery. In this regard, dyadic trauma and completion viewed through the concept of affect regulation theory can “generate complex models of psychopathogenesis by linking early attachment stressors to the neurobiology of impaired emotional development, enduring deficits in

Figure 1



Figure 1. The sequence of trauma as a contagion. Trauma disrupts social engagement systems in the survival sequence of hyperarousal or hypoarousal. Perturbations in attachment dyads follow in a repeated pattern of relational disconnect and social isolation leading to psychopathology and further dyadic trauma. This process is self-perpetuating and “infects” other attachment relationships. Trauma down-regulates neocortical social engagement systems and enervates threat vigilance in survival responses of flight/fight/freeze. Dorsal vagal shutdown leads to relational disconnect and social isolation. If one participant in an attachment dyad or family network experiences trauma and remains in a potentiated state of survival (incomplete survival response), all connections in the family network can be compromised. This situation often devolves into lifelong relational trauma-based interactions, fear-driven neurological functioning, and attachment-related psychopathology.

affect dysregulation and the genesis of personality disorders” (Schoore, 2012, p. 30).

AF-SE: The Sequence of Dyadic Completion

Humans are hardwired to form secure phylogenetic attachment bonds throughout the life cycle. Reciprocity in attuned connectedness is the interpersonal neurobiological conduit (Siegel, 2012) by which relationships become mutually regulating (Tronick, 2007).

In AF-SE, hedonic valences of attraction may be deployed or targeted at key neurodevelopmental

stages when optimal bonding in secure attachment naturally occurs—those being childhood, preadolescent bonding in close friendship, and procreative pair bonding. These optimal attachment opportunities may be physically and behaviorally engaged during activation of the trauma response for dyadic completion with AF-SE.

Heightened vigilance in hedonic valences compromises neurocognitive processes of polyvagal expression (such as fear avoidance) that may become prioritized over reciprocity and social engagement (Levine, 2015). Driven by the emotional right amygdala (Schoore, 2012), enervated by fear vigilance and a trauma-

conditioned perception of danger, the traumatized individual is more focused on flight/fight survival than social engagement and interprets events from this survivalist position (Scaer, 2014).

SE contends that disintegrated ergotropic and trophotropic states corresponding to sympathetic/parasympathetic shifts, the two principal branches of the autonomic nervous system (ANS), are fully reversible and can counteract allostatic load (Levine, 2015; Payne et al., 2015). Allostatic load may be shared across several parameters of human traumatic experience but is most often embedded in the body (Levine, 2010; Ogden, 2015; Porges, 2011; Scaer 2014; van der Kolk 2014). Treatment of dyadic trauma must address a host of allostatic variables including the interpersonal neurobiology and behavioral interplay that compromises the neurophysiology and emotional security of the dyad.

AF-SE promotes a trajectory that shifts a traumatized person from traumatic overwhelm through neurogenic discharge to whole brain integration, mutual regulation, interpersonal homeostasis, attachment neuroception, increased tolerance to frustration and growing resilience that expands their window of tolerance to threat, incongruence and novelty. This leads to greater positive engagement in phylogenetically secure attachment.

Dyadic completion dissipates attachment perturbations in the traumatized dyad and reengages secure attuned connectedness. Dyadic completion with AF-SE evokes implicit memory of secure attachment, engaging and up-regulating social engagement networks in whole brain sequences of homeostasis. Dyadic completion simultaneously down-regulates traumatic bracing (freeze), the flight-or-fight response put on hold during neurogenic discharge of unresolved survival energy for completion of survival imperatives (Levine, 2015).

Dyadic completion can resolve avoidant threat-vigilant, fear-driven interactions. The process of activation with completion, discharge, and regulation in AF-SE is a transformative, homeostatic reorganization of hedonic valences from avoidance to approach. It often completes the transformation from social avoidance to secure

phylogenetic attachment bonding (Levine, 2015; Payne et al., 2015; Riordan et al., 2017).

During AF-SE, at the point of neurogenic discharge and completion, the physical and emotional release from sympathetic arousal/fear vigilance to parasympathetic rest and digest initiates a blissful somatic sensation that offers opportunity for new connections in the social brain for secure phylogenetic attachment. This blissful, regulating, internal state gives opportunity to engage with and trust another in an oxytocin-fueled drive for social engagement and secure phylogenetic attachment.

At completion of survival imperatives, and in the presence of a safe other, neurochemistry shifts from allostatic overwhelm, stress (cortisol), to homeostatic social engagement (oxytocin). This shift offers the opportunity for emotional reengagement after trauma. The traumatized individual can now engage with another in the experience of whole brain integration. Throughout this sensate shift, physiological and emotional dynamics of trauma discharge and propel the nervous system toward quiescent attunement (Riordan et al., 2017). These shifts also engender reversal of hedonic valences of traumatic avoidance (repulsion) to approach (attraction) in dyadic completion.

At all stages of the life cycle, implicit attachment memory drives homeostatic, behavioral processes of hedonic attraction and repulsion (Levine, 2015). After discharge, comfort seeking provides opportunity for repair and resolution of dyadic trauma where somatic attachment soothing in perturbed attachment relationships consolidate dyadic completion (Riordan et al., 2017) and secure phylogenetic attachment.

Neurogenic completion requires a process of titrated access to the trauma memory, including the traumatic events and interpersonal behaviors that initiated fear immobilization. Overwhelm and dorsal vagal shutdown that precipitated the loss of trust and attuned connectedness is discharged incrementally during SE and AF-SE. In order to achieve dyadic completion, the dyad must engage in a process of accessing the ventral vagus. The ventral vagus serves in a complex and nuanced way of inhibiting excess sympathetic activation through engaging socially with others through, “facial expressions, vocalizations and gestures” Porges (2011, p. 165)

Safe touch is often regulating for a traumatized nervous system. It can also support the renegotiation

of trauma symptoms and reinstate attuned connectedness (Changaris, 2015). Safe touch is a powerful healing dynamic for infants and children who require face–heart engagement and overt somatic attachment soothing. In some situations, especially for traumatized adults, a top-down cognitive value shift and behavioral renegotiation of trust and connectedness in the dyad through therapeutic regulation of affect (Schoore, 2012) may resolve trauma in the dyad with minimal or no soothing touch. However, safe, trauma-informed touch work interventions for adults, if they have suffered early trauma, is often clinically indicated in treatment (Kain & Terrell, 2018).

Comfort seeking and somatic attachment soothing, in its purest somatic form, is observed in caregiver and infant reconnection (as with Baby Jack). Dyadic completion can be achieved symbolically in the presence of an attuned other (the therapist) or can be achieved by the actual repair of a traumatized dyad. Coparticipants in the traumatized dyad can utilize f-SE in self-directed, real-time AF-SE soothing interventions (see

Belinda vignette below).

Attachment Focused-Somatic Experiencing: Trauma, Dyadic Retraumatization and Recovery Sequence

AF-SE offers conceptual insight to explain dyadic perturbation and breakdown of secure attachment after trauma and the processes of reengagement during recovery. Dyadic completion occurs in the sequential shifts from individual trauma to secure phylogenetic attachment in an AF-SE sequence.

Flow of Life => TRAUMA => flight, fight or freeze => somatic overwhelm (hyperarousal or shutdown) => tonic immobilization => dyadic trauma => social isolation => loss of secure phylogenetic attachment => dyadic trauma => dyadic retraumatization (Figure 2)

When SE or AF-SE are introduced, the recovery sequence is as follows:

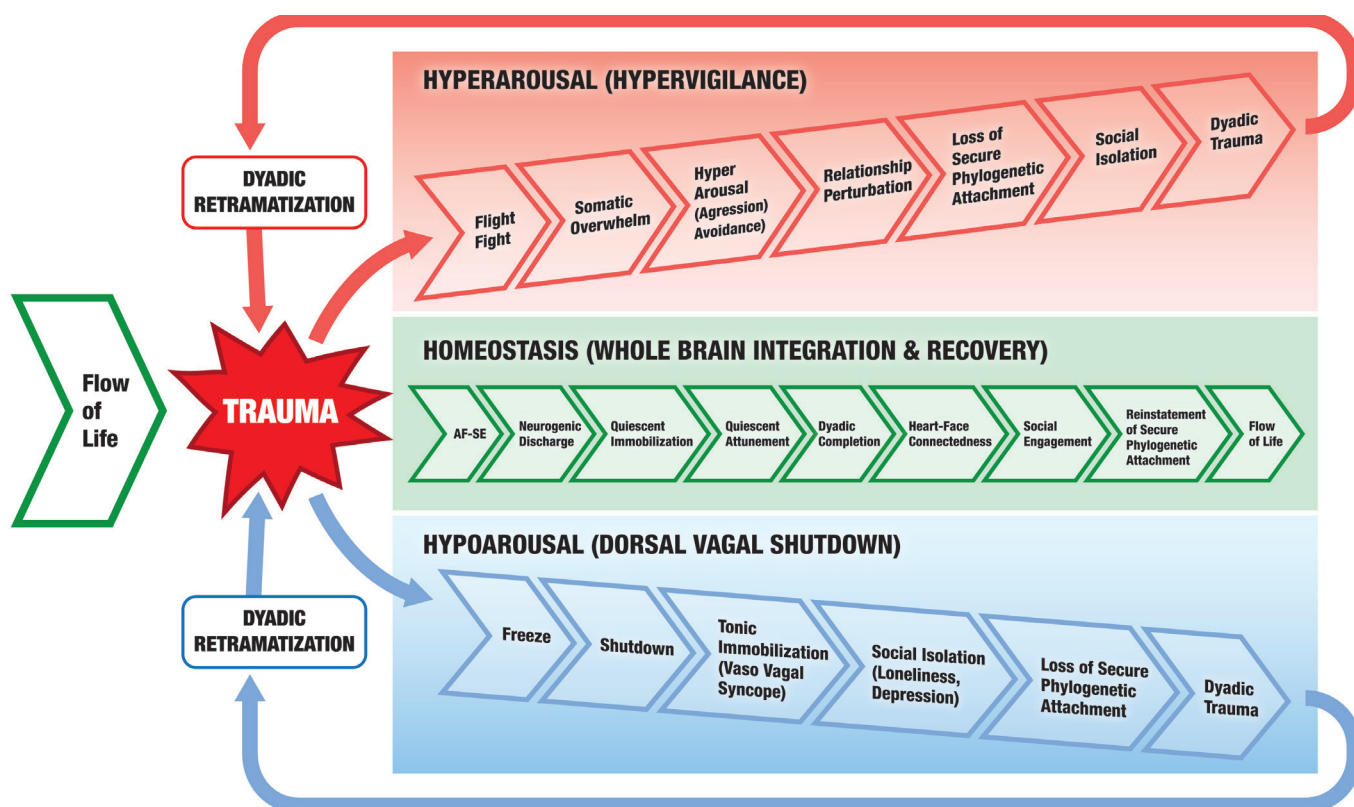


Figure 2. Traumatized nervous systems are dynamic and fluid. During trauma, and during the SE/AF-SE treatment sequence, there may be gradual or sudden shifts from hyperarousal to hypoarousal. Similarly, the nervous system may suddenly regulate into homeostasis. SE therapists are trained in close observation of somatic states and regulate hyperarousal and hypoarousal with titrated SE processes.

AF-SE => neurogenic discharge => quiescent immobilization => quiescent attunement=>dyadic completion=>heart-face connectedness => social engagement => reinstatement of secure phylogenetic attachment => Flow of Life

Quiescent attunement (QA) is an essential step in the process of dyadic completion. It occurs when the nervous system attunes in the face-heart connection with another, allowing for deep restoration of the body and whole brain neural integration. Reinforced by somatic attachment soothing, safe physical touch directly accesses implicit early attachment memory of right brain to right brain post-partum attunement and regulation (Schore, 2019b).

QA is a parasympathetic restoration and attuned renegotiation of secure phylogenetic attachment after downregulation and discharge of incomplete survival responses. QA occurs in a flood of oxytocin characterized by blissful mutual stillness, whole-body muscle relaxation, and an experience of attuned connectedness in a relaxed state of safety and security.

There are many therapeutic pathways to QA, including somatic, ego state, psychodynamic, symbolic, and representative therapies. QA may occur with an attuned other, such as a therapist, primary caregiver, or parent. All share the same characteristics of stillness, blissful acceptance in the care of another and regulation of the nervous system.

Vignette: Little Bill: Infant Postsurgical Trauma (Riordan et al., 2017)

The earliest stage of life indelibly shapes us in basic ways, and, for the rest of the life span, attachment processes lie at the center of all human emotional and social functions (Schore, 2012, p. 27).

Little Bill (23 months) experienced a postsurgical trauma where he was separated from his mother and restrained while comfort seeking (crying for his mother). Little Bill was completely overwhelmed and collapsed in parasympathetic dorsal vagal shutdown. He could not be soothed by his mother when she

eventually connected with him. Over the next seven months Little Bill's behavior became increasingly aggressive and disruptive with self-harming (arm biting) and monumental tantrums. Little Bill had lost attuned connectedness and attachment neuroception with his mother due to his perceived abandonment and traumatic overwhelm that led to his dorsal vagal shutdown. His symptoms mimicked disorganized attachment disorder.

Treatment Methodology

Little Bill was treated with AF-SE in a rescue role play—"run to mummy"—at the point of traumatic activation when rescuing a trauma doll from surgical restraint (Riordan et al., 2017).

At the point of traumatic activation, Little Bill began to exhibit signs of movement away from danger and toward safety. The therapist's cue of "run to mummy" promoted spontaneous comfort seeking. This reengaged his pre-traumatic post-partum memory of his mother as a safe attachment figure who could provide somatic attachment soothing and neuroceptive attunement.

Discussion

Little Bill's incomplete survival response was his inability to accept his mother's comfort at the point of trauma activation. Running to her represented a behavioral completion mechanism for neurogenic/dyadic completion followed by maternal somatic attachment soothing. Little Bill's disorganized attachment symptoms disappeared within the space of five AF-SE sessions, and secure phylogenetic attachment with his mother was fully restored. Little Bill's somatic trauma was discharged and his implicit memory of mother as a safe attachment figure reemerged in his consciousness. Little Bill experienced whole brain integration. After a three-year follow-up, Little Bill remained immune to medical procedure triggers and met all developmental markers. Little Bill fully resolved his trauma through dyadic completion and now enjoys a regulated, attuned, neuroceptive connection with his mother.

AF-SE seeks to engage and utilize the homeostatic, hedonic valence of approach that can reinstate the face-heart connection and discharge traumatic perturbations characteristic of avoidance. Depotentiation of traumatic

memory (Levine, 2015) down-regulates the individual's whole brain perturbations to resolve trauma. AF-SE specifically targets attachment perturbations to de-potentiate dyadic trauma.

Childhood Dyadic Trauma and Surrogate Attachment Figures

Children may have opportunities for resolution of dyadic trauma with surrogate attachment figures when their primary attachment bonds are irrevocably broken. During treatment with SE for neurogenic completion simultaneously establishing trust and security with a new care giver, attachment bonding is a prerequisite of dyadic completion in AF-SE.

Vignette: Preschool Siblings, Parental Neglect (composite case)

Two siblings (a girl, aged 2, and a boy, 5 years) were neglected and undernourished. Left unattended for long periods of time without adult guidance or physical affection a protective attachment bond developed between the children that excluded all others. Both children were diagnosed with childhood PTSD, developmental delay with features of disorganized attachment disorder.

Treatment with AF-SE

Placed in the care of their grandmother, treatment with AF-SE began where the first consideration was to establish conditions for trust in secure attachment with grandmother. Predictability, a fundamental feature of trust, was established in family routines and safety regarding trauma behaviors of flight (avoidance) and fight (aggressive tantrums). The girl established secure phylogenetic attachment with her grandmother and responded well to AF-SE. After successful neuro-regulation with SE and AF-SE she began to meet her developmental markers.

The boy was less responsive to secure parenting. Vigilant, lacking trust in adults, and in competition with his grandmother to nurture and protect his sister, he did not develop secure attachment with his grandmother and

remained oppositional, acting out his traumatic abandonment with rage and isolation. The boy had developed a caregiving relationship with his younger sister that was characterized by physical affection, overt protective behaviors, and aggression towards others who attempted to intrude in their dyad.

After a year of attachment-focused parenting by his grandmother the boy became overtly aggressive towards his younger sister. This prompted a further experience of abandonment, betrayal, and dyadic trauma in his relationship with his sister. To date the boy has not securely attached to a regulated adult and meets criteria for disorganized attachment disorder.

This episode is a complex case of relational and dyadic trauma after parental neglect that represents the quintessential situation described in van der Kolk's concerns for the massive increase of developmental disorders (2014).

Discussion: Neglect Trauma, Young Children and Sibling Relationships

In the journey of neglect trauma, early childhood siblings may go through a sequential process of dyadic trauma with their attachment figure, turning to each other for soothing in the face-heart connection. Displaced sibling attachment is characterized by adopting a caregiving/receiving relational style where the older child adopts a parental, protective/nurturing role and the younger child transfers attachment to the older child.

Mutually experienced fear-driven vigilance compromises sibling hedonic valances of attraction where children turn to each other for inadequate caregiving and nurturing. Neglect trauma is a process of repeated perturbation and rupture without repair that can form lifelong, inadequate, implicit attachment templates and a predisposition to social isolation.

The AF-SE surrogate parent must establish secure attachment dynamics as a baseline of predictability concurrent with SE and AF-SE before dyadic completion and secure phylogenetic attachment can be achieved.

In forming new attachments with adult caregivers,

traumatized siblings may experience further dyadic trauma in abandonment from each other resulting in pervasive rivalry, conflict, and even violence between the siblings.

Regaining the capacity for secure phylogenetic attachment with a neurologically attuned and regulated adult is a key component of recovery from trauma for traumatized children who require dyadic completion and a recalibration of sibling attachment style to function within normal sibling parameters.

The overwhelm of burdensome caregiving and inadequate neuroception from an underdeveloped, older-sibling caregiver who cannot adequately soothe compromises sibling relationships throughout their life cycle. Mutual sibling caregiving perturbs immature nervous systems leading to traumatic overwhelm and dyadic trauma that further confounds the destructive impact of parental neglect or abandonment.

Neglect can particularly compromise sibling attachment dynamics from independent, mutually supportive to dependence/controlling interpersonal styles and severely compromise resilience (Kain & Terrell, 2018).

Pendulation is a key dynamic in SE and AF-SE for both the individual and the dyad. Levine (2015, p. 55) describes pendulation as “the continuous, primary, organismic rhythm of contraction and expansion.” He adds that when the traumatized individual is stuck in chronic contraction, a “no-exit fixation entraps the traumatized individual with feelings of extreme helplessness, hopelessness, and despair.”

With a process that includes pendulation and discharge, SE expands an individual’s somatic window of tolerance. It promotes reengagement with another in secure phylogenetic attachment when the hedonic valence of attraction is activated. Implicit attachment memory may be accessed during “discharge and regulation of excess autonomic arousal” (Payne et al., 2017, p. 1) for neurogenic and dyadic completion.

The release of “endorphins and catecholamines, adrenaline-like hormones and neurotransmitters”

(Levine & Buczynski, 2013, p. 3) offers a neurocognitive and neurochemical doorway for reengaging implicit memory of secure attachment.

Vignette: Traumatic Sibling Separation

History

Vince (six years old) presented with acute separation anxiety. His affect was characterized by tears of abandonment and grief, at times lasting for hours. Episodes of encopresis occurred during morning school separations and when separating from regular extended family visits. Vince’s episodes of encopresis were confounded by traumatic hospital procedures to address impaction. Vince had an enduring interpersonal conflict with his older half-sister, aged 15 years.

Four years earlier, the birth mother of his older half-sister invaded the family home and violently removed her daughter while Vince desperately clung to his half-sister in terror; Vince’s sister was a secure phylogenetic attachment figure at this time. Vince’s mother retrieved Vince, and the two siblings were physically and traumatically wrenched apart, not to be reunited for two years.

Treatment

In an AF-SE rescue role-play involving mother and sister, Vince escaped from his mother and symbolically rescued his older sister from the car park, returning her to the therapeutic rooms and his mother’s safe embrace. Vince experienced an immediate episode of quiescent immobilization, characterized by whole-body stillness as his nervous system renegotiated neurogenetic completion. Meanwhile his older sister experienced parasympathetic discharge with heat and sobbing while being held by her loving stepmother in somatic attachment soothing.

Quiescent attunement in a face–heart physical embrace between the siblings resolved their relational disconnect achieving dyadic completion for both Vince and his sister. His separation anxiety ceased immediately and within two weeks normal digestive function returned. Vince and his sister’s relationship returned to a normal sibling attachment style.

Discussion

Vince's traumatic overwhelm during the violent separation from his secondary secure phylogenetic attachment figure generated a trauma trigger (sympathetic arousal regarding the traumatic separation). The routine event of temporarily separating from someone he loved triggered Vince's grief and incomplete survival responses of being forcibly separated from his sister.

Procedural trauma memories of terror, grief, loss, abandonment, and ongoing fears of loss of peripheral attachment figures resulted in high sympathetic arousal. Dorsal vagal shutdown became manifest in the physiological symptoms of repeated cycles of bowel impaction and encopresis.

Vince's neurogenic completion was promoted through a physical engagement of the incomplete survival imperative to "rescue his sister."

In a triumphant oxytocin-fueled reunion, Vince completed his thwarted survival episode by reclaiming and rescuing his lost attachment figure and returning her safely to mum. He then immediately entered the parasympathetic recovery state of quiescent immobilization.

To resolve dyadic trauma and the traumatic memory of abandonment, dyadic completion was required to reattune in secure phylogenetic attachment with his sister to resolve their trauma-driven attachment style. Somatic attachment soothing (hugging in face-heart connection) with his sister mutually regulated their dyadic trauma in quiescent attunement. Normal sibling attachment dynamics resumed.

Adults and Dyadic Completion in the Therapeutic Dyad

Actual face-heart connection and somatic attachment soothing are not always necessary to achieve dyadic completion for those recovering from assault trauma or major intrusive betrayal (such as childhood sexual assault). Dyadic completion may also be achieved when sympathetic

arousal no longer overwhelms the person's capacity and when triggers to external and interoceptive traumatic memory no longer result in avoidance, overwhelm or shutdown. Dyadic completion may be accessed psychodynamically with the SE therapist being the safe attuned other.

Comfort seeking in adult situations may be symbolic in the drive for dyadic completion and may not necessarily require active somatic attachment soothing as in the case of an unavailable other—for example, with a dyadic trauma revolving around a deceased relative.

Dyadic completion depotentiates traumatic memory (Payne et al., 2015) with both symbolic and actual physical connections. This dynamic can occur symbolically in the presence of a safe attuned, entrained other (Geller, 2018) embodied in the SE therapist during the "dyadic regulation affect" (Kozłowska et al., 2015, p. 13; Schore, 2012). Kozłowska and colleagues (2015, p. 13) describe therapeutic dyadic regulation of affect as:

. . . the process of engaging with the patient [which] can promote [a] concurrent shift in sympathovagal balance—up-regulation of vagal activity and downregulation of sympathetic activity—to a mind-body state of interpersonal connectedness and physiological calm. [Furthermore, this dynamic] builds on developmental processes in which the attachment figure acts as a psychobiological regulator and regulation is a dyadic interpersonal achievement.

Vignette: Deirdre: Trauma Doll, Ego-State Rescue

Deirdre, a 72-year-old survivor of systematic childhood sexual assault and physical/emotional abuse, was abandoned emotionally by her mother and routinely abused by her father who had combat PTSD. Deirdre spent much of her adult life in pursuit of therapeutic solutions to her debilitating intrusive memories of life threat, sexual and physical assault, and somatic memory of abuse including her feelings of utter desolation and abandonment. Prominent in her toddler memory was the realization that "I might not survive".

In her early childhood, Deirdre remembers comfort seeking for secure attunement with adults other

than her parents, including her grandmother, who offered her somatic attachment soothing (SAS).

In a comfort-seeking battle for survival, Deirdre's life experience offers an example of an early childhood psyche that can survive emotionally with only the minimal of SAS in attuned connectedness.

Deirdre's traumatic toddler memory included being violently torn away from her grandmother by her father, knowing she was returning to life threat, emotional desolation, and systematic physical and sexual abuse.

Treatment Method

In a trauma doll rescue role-play (Riordan et al., 2017) the therapist placed the trauma doll against Dierdre's knee during activation of her trauma memory to simulate the episode of traumatic separation.

Deirdre's incomplete survival imperative to be held safely in the arms of a soothing attachment figure in quiescent attunement was completed symbolically as she instinctively clutched the trauma doll to her breast in floods of weeping and somatic discharge. A period of quiescent immobilization and attunement followed.

Discussion

Deirdre, herself a grandmother of a toddler, experienced both the felt sense of holding a toddler safely in quiescent attunement and simultaneously experiencing the completion of somatic attachment soothing symbolically in the arms of her beloved grandmother.

During this session that included ego-state engagement for dyadic completion, Deirdre was able to experience early childhood somatic soothing after trauma and the profound neurocognitive regulation of quiescent attunement.

In Deirdre's complex presentation of systematic abuse, one piece of her traumatic memory had achieved completion and her nervous system was more regulated and attuned. She reported that she could hold her toddler grandson

without intrusive memories. Dierdre continues with SE and AF-SE to address the many episodes of her childhood trauma and her resilience continues to increase.

Trauma evokes affect dysregulation in cycles of fear, rage, overwhelm, and shutdown that require regulation (soothing) in connection with an attuned regulated other. Early childhood experiences of somatic attachment soothing in the context of normal rupture repair elicits implicit memory of safe attunement or offers new experiences to form a declarative memory template, symbolic of attuned connectedness through quiescent attunement.

In the vignette below, Belinda found the courage to seek dyadic completion with her abusive parent who suffers from combat PTSD.

Vignette: Belinda (49 years), Daughter of Vietnam Veteran

Returning to Australia with chronic combat PTSD, Belinda's father became addicted to alcohol and prescription medication resulting in violent PTSD-disassociated flashbacks.

Belinda's mother, overwhelmed by her husband's behavior, abandoned her children when her husband was activated in his trauma, leaving 8-year-old Belinda and her two younger siblings, aged 4 and 2, to contend with their traumatized father.

Armed with a machete and triggered into combat ambush flashbacks by sounds of movement in the night, Belinda's father would surprise attack her from behind and hold the machete to her throat as she emerged from her room. Violent response to ambush was a key component for survival in Vietnam jungle warfare.

Developing acute survival skills, Belinda learned to predict her father's traumatic episodes and shepherded her siblings into the relatively safe environment of her bedroom where she would barricade herself and her brothers in for days at a time with supplies of food and buckets for urination and defecation.

Belinda presented in therapy diagnosed with posttraumatic stress disorder (DSM-5 309.81). Fiercely independent and self-educated, she had

birthed and raised two children and was in a loving relationship with a safe man. Constantly vigilant, Belinda was unable to fully experience safe-attuned connectedness and described her experiences of anger, fear and emotional numbing, traumatic flashbacks, and disassociation.

Belinda had never experienced the face–heart connection (i.e., a sense of complete acceptance and safety in a state of loving immobilization), with the exception being the ventral vagal state of post-partum attunement and post-birth bonding behaviors when nursing her newborn children.

Belinda's original goal in therapy was to recover from childhood PTSD and to discharge and regulate sympathetic arousal states so she could experience face–heart attunement and relational neuroception with her husband and adult children.

Functional-SE (interoception: focused awareness of her internal sensations during sympathetic arousal) was employed to down-regulate sympathetic arousal during pair-bonding behaviors with her husband. Freeze immobilization was eventually superseded with quiescent attunement and hedonic valence of attraction to her husband. Belinda was able to experience dyadic completion, quiescent immobilization in joyful, attuned connection with her husband.

SE evolved into AF-SE because resolution of her trauma remained incomplete. Following an extensive program of SE and psychoeducation regarding PTSD and the impact of the Vietnam War on veterans, Belinda resolved to reconnect with her father in an AF-SE process after decades of avoidance.

Traveling to her hometown, Belinda met with her father in a state of trepidation and uncertainty. Using f-SE techniques to titrate her traumatic triggers, self-directed interoception was used to down-regulate and titrate sympathetic arousal associated with proximity to her family home and locations of traumatic overwhelm.

Reconnecting with her ageing father, Belinda discovered a man who had been experiencing cycles of trauma-driven rage and remorse in association with his own trauma triggers for over 50 years. Belinda learned of her father's war trauma and survival having lost 30 friends in combat.

Belinda reframed her experiences of being assaulted as her father explained jungle survival techniques during combat operations. Having experienced her own flashbacks, she understood the dissociative episodes of traumatic overwhelm her father was experiencing during his assaults on her as a child. Dyadic completion with her father was achieved in the shared experience of PTSD and in the face–heart connection (face-to-face communication and hugging) in safe attunement. Belinda no longer experienced sympathetic arousal in his presence nor in the memory of their shared traumatic past.

Validated in attuned mutual connection with her father, Belinda confronted her traumatic demons from childhood and resolved dyadic trauma with her father in mutual completion through AF-SE.

Discussion: Impact of Trauma on Children of Traumatized Parents

When a single family member is traumatized, often all attachment relationships in the family network are also impacted. This can result in relational disconnect and dyadic trauma.

Traumatized parents can often bring their dysregulated, vigilant interactive style into parenting while relating to each other. In Belinda's case, relational disconnect and dyadic trauma from both her parents who either abandoned or assaulted her represented a significant burden of dyadic trauma and emotional disconnect.

Resolution of dyadic trauma with AF-SE followed many months of treatment with SE and self-directed f-SE techniques to down-regulate triggers before Belinda could approach the source of her significant assault trauma and relational disconnect with her father.

Enjoying attuned connection with her husband and children, Belinda has regular contact with her father and continues to use self-directed f-SE and AF-SE techniques to regulate arousal states in her

relationships.

The Trajectory of Trauma and Recovery

A linear trajectory of the behavioral and neurological indicators of traumatic overwhelm and recovery, from threat alert to whole brain integration, is offered as a template for treatment of dyadic trauma.

A linear progression from trauma onset (threat alert) to neurogenic and dyadic completion (a return to exploratory orienting and healthy risk-taking), including the most common feedback loops and diversions in recovery, may clarify processes of trauma, treatment, and recovery with AF-SE.

Clinicians seeking to treat trauma within an attachment/dyadic model of top-down cognitive and bottom-up somatic intervention will have an overview, guide, or yardstick to interpret better outcomes within the paradigm shift of emerging clinical neuropsychotherapy.

Polyvagal theory (Porges, 2011), core response network theory (Payne et al., 2015) and defense cascade theory (Kozłowska et al., 2015) complement each other. They highlight different aspects of the complex neurological nature of trauma.

Modern attachment theory and SE theory explain the interplay between trauma, attachment, and dyadic completion, offering interpersonal neurodyadic mechanisms for recovery.

The authors, based on clinical experience, offer the following sequence of observable survival behaviors and neurological markers in the processes of trauma and recovery with AF-SE.

A. Threat-Survival Sequence

- a. Threat alert
- b. Arrest of movement
- c. Assessment (Friend or foe? Approach or avoid?)
- d. Defensive orientation

- e. Arousal (threat perception or fear)
- f. Survival orientation
- g. Ventral vagal prosocial engagement
- h. Action to avoid threat/danger
- i. Active (sympathetic) defensive responses
 - i. Flight
 - ii. Fight
- j. Passive (dorsal vagal) defensive responses
 - iii. Freeze (tonic immobility with collapsed or rigid musculature)
- k. Disintegrated brain function

a. Threat Alert

Threat alert may begin as a top-down sensory awareness of threatening stimuli from the environment or a bottom-up interoceptive awareness of internal threat sensations. The core response network becomes activated, involving key structures of the brain including hypothalamus, the amygdala, hippocampus, and septal region, the basal ganglia, red nucleus and periaqueductal grey, and structures of the reticular arousal service as “a complex dynamical system which can enter various discrete functional and dysfunctional states” (Payne et al, 2015, p. 3).

After alert, the arousal stage can activate the defense cascade through the core response network/polyvagal network initiating the sequences of flight/fight/freeze. During the alert stage, the nervous system can instantly determine the nature of threat and respond with a variety of neurocognitive, behavioral, polyvagal and autonomic responses through phylogenetic, physiological pathways and neural sequences for survival.

b. Arrest of movement

Arrest of movement is a simultaneous sympathetic/parasympathetic moment of immobilized arousal that can occur in relation to perceived top-down cognitive (real or imagined) threat in the environment. It may also occur with bottom-up somatic threat sensations within the body (such as pain in the viscera). Animals in the wild that arrest will become camouflaged or less

detectable to potential threat as they assess their environment.

c. Assessment

The integrated brain, through the five senses and interoception, analyzes and determines:

- the source of the threat;
- the nature of the threat; and
- social, limbic, primitive responses.

The assessment phase will only shift into flight/fight if a threat is perceived as sympathetic and promotes an ergotropic state. If there is nothing perceived as threatening, sympathetic/parasympathetic rhythms will regulate and the assessment network will return to homeostatic (trophotropic) function.

d. Defensive orienting

Defensive orienting is the focus of any of the five senses toward the source of the threat. Lojowska and colleagues (2018, p. 1) describe defensive orientating as follows:

An adaptive response to threat requires optimized detection of critical sensory cues. This optimization is thought to be aided by freezing—an evolutionarily preserved defensive state of immobility characterized by parasympathetically mediated fear bradycardia and regulated by the amygdala-periaqueductal grey (PAG) circuit. Behavioral observations in humans and animals have suggested that freezing is also a state of enhanced visual sensitivity, particularly for coarse visual information.

e. Arousal (threat perception or fear)

During a cognitive or interoceptive experience of threat there is a corresponding up-regulation of sympathetic arousal. Arousal is the first, necessary step in activating the defense cascade, which is described by (Kozłowska et al., 2015, p.1) as “a continuum of innate, hardwired, automatically activated defense behaviors.”

Arousal (threat perception) without

phylogenetic completion is the primary state that leads to neurogenic overwhelm and trauma in many forms.

Sympathetic nervous system arousal occurs when biological, behavioral and neuro-emotional response to threat (real or perceived) is driven toward flight (avoidance) or safety orientation (comfort seeking). Fear arousal activates the defense cascade where events from fear arousal to the activation of the polyvagal network are initiated and mediated by “a common neural pathway: activation and inhibition of particular functional components of the amygdala, hypothalamus, periaqueductal grey and sympathetic and vagal nuclei” (Kozłowska et al., 2015, p.1).

Payne et al. (2015, p. 8) describe fear as “a trauma-oriented impulse” that would “rapidly lead to a vicious cycle of intense fear, sympathetic arousal, loss of clarity, intrusion of memories, increased distress, and a state in which further therapeutic progress would be difficult.”

f. Survival orientation

Survival orientation is necessary for children who rely on adults for security and attachment neuroception. People will visually scan (or orient through one of the five senses), to locate sources of safety or reassurances from another in the face–heart connection. For the infant or child, safety orientation is observed as seeking primary attachment figures. For adults and teens safety orientation is observed as seeking validation or denial of threat involving visual cues, facial expressions, body language, and vocalization of another. For both infant and adult safety orientation is a neuroceptive dynamic that initiates ventral vagal and social engagement networks. Payne and colleagues (2015, p. 8) assert that “the ventral vagal serves as a complex and nuanced way of inhibiting excess sympathetic activation (‘stress’) through engaging socially with others.”

g. Ventral vagal prosocial engagement for survival

When threat is perceived, social engagement networks will first default to minimize threat with prosocial engagement to mediate danger, such as call for help or negotiate problems. In socially attuned individuals, neuroceptive engagement can diminish threat engaging the ventral vagal systems of a protagonist (threat from another). Infants instinctively appeal to attuned adults with sophisticated prosocial visual and auditory cues to socially engage, protect, or

soothe.

h. Action to avoid threat/danger

Action to avoid threat/danger may first involve social engagement. However, if social engagement fails, the limbic brain will utilize ergotropic and hedonic valences to mobilize into action for survival with active flight or fight.

i. Activate (sympathetic) defensive responses

i. Flight

Flight follows sympathetic arousal with physical mobilization to move away from threat or towards safety.

Flight is a fear-driven process that may be neurocognitive (top-down) or driven by the right emotionally geared amygdala (Schoore, 2012), a (bottom-up) limbic brain sequence.

Fear may involve a variety of defensive or avoidant behaviors including physical retreat from threat, such as: stepping back, ducking, evading, constricting a muscle to pull away, or running away, among others. For perambulating infants “running-to” their primary attachment figure for protection (Riordan et al., 2017), is a hardwired protective response to avoid the perceived consequences of threat.

An entrenched flight response may generalize into habituated avoidance of anything that is perceived as threatening (a key diagnostic feature of PTSD) that may lead to a narrowing of life’s choices and social isolation.

ii. Fight

The limbic system may also cascade into aggression (Kozłowska et al., 2015) in an attempt to protect oneself or others from harm. The fight response is also hardwired and necessary for survival. An entrenched fight response may manifest in explosive anger initiated by a conditioned neural pathway and/or frustrated efforts to avoid overwhelm in any perceived threatening situations.

j. Passive (dorsal vagal) defense response

If flight/fight responses fail, freeze or shutdown (collapse) neurodynamics of the dorsal vagal branch of the trophotropic, parasympathetic, polyvagal network will engage to preserve life.

iii. Freeze

Freeze may manifest in tonic immobility with collapsed or rigid musculature. The freeze response follows incomplete flight/fight sequences. When prolonged, it can lead to a dominant state of ongoing tonic immobility (Kozłowska et al., 2015).

Tonic immobility is a parasympathetic, dorsal vagal response to inescapable threat where the action-based, limbic brain’s defense responses have failed. A variant of tonic immobility, collapsed immobility, is a state where muscle tone is lost and consciousness compromised in dorsal vagal shutdown. Untreated, collapsed immobility can result in trauma-based disorders such as PTSD or traumatic attachment dynamics that inhibit social connection and compromise mental health.

The action of collapsed immobility is described by Kozłowska and colleagues, (2015, pp. 10–11) as a “threat-induced fainting mediated by neural circuits involving the extended amygdala, hypothalamus, and periaqueductal grey, as in tonic immobility . . . with the addition of cerebral ischemia mediating a loss of muscle tone and changes in consciousness.”

Collapsed immobility may manifest in vasovagal syncope (fainting) during triggered episodes of past trauma often associated with medical procedures such as taking blood. Vasovagal syncope can impede function on many levels. When deeply entrenched and in response to sympathetic arousal vasovagal syncope can seriously impede social connectedness. Many who experience vasovagal syncope have a morbid fear of collapse in public arenas, especially teens who have a high need for connectedness and acceptance with peers. Real danger may occur in driving phobia where vasovagal syncope is a conditioned response to threat.

The lasting effects of an incomplete freeze response may devolve into dissociative states. Overwhelming fear/threat can result in collapsed immobility that can trigger conditioned episodes of vasovagal syncope at the onset of even minor threat triggers. Schore (2019b, p. 237) elucidates on the dorsal vagal complex “when the dorsal (or ‘reptilian’) vagus is activated, dissociation follows. The metabolism is speedily shutdown, heart rate drops rapidly, hiding behavior and passive withdrawal are initiated, and a hypoaroused physical collapse may be triggered.”

More than any other traumatic state, the freeze response in all its forms—avoidance, passive aggression, depression, and disassociation—promotes relational disconnect and dyadic trauma. Freeze kindles significant neurochemical changes in the brain and shifts hedonic valences from attraction to repulsion. This leads to the loss of attachment bonds and social isolation. Pohl and colleagues (2018, p. 1) write: “The subsequent dysfunction of the OT system (oxytocin) results in detrimental physiological as well as psychological effects.”

In a state of freeze, somatic, physiological and mental health conditions will proliferate and negatively impact relational dynamics throughout the life cycle.

Similarly, with collapsed immobility, a state of rigid freeze (braced musculature) can occur after trauma to even minor arousal states such as unexpected (safe) touch. In procreative and attachment bonds rigid freeze responses can generate perturbation in the dyad. Repeated episodes may contribute to dyadic trauma in attachment relationships.

k. Disintegrated brain function

During and after trauma, whole brain function is superseded by survival strategies of the limbic and primitive brain such that social engagement networks and cognitive function, of lesser priority during traumatic survival episodes, are down-regulated. Threat vigilance can generate avoidance and conflict in relationships leading to relational disconnect, dyadic trauma and social isolation.

The threat survival sequence described in this section lists markers for interventions with SE and AF-SE. Survival behavior and neurological sequences displayed in the traumatized individual’s involuntary movements can be seen in a client’s presentation. The SE therapist is trained to read and interpret these neurocognitive markers and engages them as windows into ANS recalibration and dyadic completion.

By knowing the markers for somatic intervention, the next section regarding recovery sequences offers therapists an opportunity to understand the processes and behaviors of trauma recovery with AF-SE.

B. Regulation, Depotentialization, Discharge and Recovery Sequences

- a. Homeostatic action toward completion
- b. Activation
- c. Fear regulation
- d. Comfort seeking
- e. Somatic attachment soothing
- f. Quiescent immobility
- g. Quiescent attunement
- h. Neurogenic trembling
- i. Dyadic completion and trauma memory depotentialization
- j. Whole brain integration and renegotiation
- k. Return to exploratory orientation and healthy risk-taking
- a. Homeostatic action toward completion**

The human organism seeks homeostasis in the sequence of sympathetic/parasympathetic equilibrium (Scaer, 2014). It works toward homeostatic regulation, an “active, neurally modulated process in which physiological systems vary within viable ranges” (Porges, 2011, p. 87).

Similarly, in AF-SE, functions of the orbital frontal cortex for social engagement facilitates bonding where the ventral vagus is enlisted. A function of dyadic

completion in AF-SE is for the client to be engaged in interpersonal neurobiological homeostasis.

Homeostasis may be reinstated through a physical process in the shift from contraction or bracing (freeze) to expansion (release of brace tension), a pendulation between contraction to expansion. Opportunities for dyadic completion emerge after an expansion when attachment dynamics are emphasized and targeted therapeutically in AF-SE.

b. Activation

To achieve homeostasis in SE (i.e., regulation of sympathetic, parasympathetic, and polyvagal states for whole brain integrated functioning), the trauma memory must first be accessed. In AF-SE, accessing the trauma should occur in an attuned, entrained connection with another—the regulated, attuned and entrained neurophysiology of the somatic therapist, a parent, or safe attachment figure.

Traumatic sensations, memories and images are gradually discharged in the processes of fear regulation with pendulation between sympathetic arousal and parasympathetic rest-and-digest states. The skillful AF-SE therapist titrates pendulation in a graduated process towards whole brain integration and organismic homeostasis.

c. Fear regulation

There are two branches of the parasympathetic nervous system, the ventral and dorsal vagal complexes (Porges, 2011). The ventral vagal complex supports social engagement while the dorsal vagal complex promotes shutdown and immobility.

Shutdown and immobility in the parasympathetic dorsal vagus complex are initiated by a real or perceived life threat that is fused with fear activation arousal. Immobilization with fear is often both traumatizing during an event and can be re-traumatizing if experienced after. However, during SE and AF-SE, homeostatic discharge and pendulation can promote quiescent immobilization, a state of quiescence that promotes rest and healing and quiescent attunement with an attuned entrained other promotes homeostasis. Payne et al. (2015, p. 8) identify that the core response network has “intrinsic mechanisms for

restoring inner regulation and autonomic balance; it is the role of the SE therapist to facilitate this process.”

When activation of a traumatic fear response is supported by pendulation in a secure, safe engagement with another (embodied in the AF-SE therapist), intrinsic mechanisms for attachment are primed and ready for engagement in dyadic completion with AF-SE. Each pendulation between contraction and expansion in the ANS is accompanied by release of trauma physiology through neurogenic discharge and results in an increase in capacity for allostatic load. The renegotiation of flight/fight/freeze responses further expands the individual’s window of tolerance and the dyad’s capacity to engage in attuned connectedness.

d. Comfort seeking

Comfort seeking originates in the implicit memory of secure attachment. It may be observed in another’s behavior as a state of fear activation. These individuals become agitated (physical restlessness) and scan their visual field rapidly in search of social engagement and protection from a threat. If they find an attuned other who can protect or reassure them, they may be able to neurocept safety through the face–heart connection and instinctively move toward safety.

Neuroception, one’s capacity to determine threat or safety, is enhanced and validated by engagement with another.

In dyadic completion, the moment of neurocognitive shift from sympathetic activation to parasympathetic regulation (comfort-seeking) represents the beginning of reengagement toward dyadic completion and secure phylogenetic attachment.

The AF-SE therapist engages the moment of comfort seeking, strengthening feelings of secure attachment safely in the empathic, soothing comfort of another. This simple social engagement process is embodied through eye contact, soothing voice, and/or safe touch after or during discharge. Attachment neuroception is a fundamental aspect of dyadic completion.

e. Somatic attachment soothing

SAS is literally the physical and emotional connection between two individuals where one seeks comfort and the other offers soothing. Embodied typically in the

mother–infant relationship, SAS is an essential phylogenetic human trait to ensure survival through bonding. SAS is most significant in postpartum attunement, early childhood and procreative pair bonding but remains the quintessential attachment dynamic throughout the life cycle.

f. Quiescent immobility

Quiescent immobility is enhanced and expanded in AF-SE during the processes of pendulation by initiating implicit attachment memory and dynamics of interpersonal care and trust during dyadic completion and quiescent attunement.

g. Quiescent attunement

In its purest form, quiescent attunement is characterized as “mutual stillness, whole-body muscle relaxation and an obvious blissful expression of attuned connectedness in relaxed safety, security and attachment-neuroception with another” (Riordan et al., 2017, p. 48).

Quiescent attunement may also be achieved symbolically during neurogenic completion with a safe and attuned AF-SE therapist, a process that promotes dyadic completion.

Guiding the processes of neurogenic and dyadic completion may include top-down/bottom-up cognitive/somatic integration, cognitive insight to enhance the process of dyadic completion with validation, vindication, resolution, and redress of attachment perturbations.

Some adults and almost all children may require more direct safe comfort seeking and somatic attachment soothing (safe touch) for quiescent attunement. To achieve full neurocognitive integration and regulation of trauma symptoms, this can be negotiated in AF-SE sessions by involving existing safe attachment relationships, a parent, or attuned partner.

Quiescent attunement can also be achieved symbolically in age-focused, ego state, psychodynamic rescue therapy (see Deirdre vignette) where the attachment figure may be unavailable to the client.

h. Neurogenic tremoring

Neurogenic tremoring is “a particular type of sequence involving shaking and trembling” (Levine, 2013, p. 2) involving sensations of heat, movement, or physiological energy transfer in the body and “tingling, tremoring, shaking or limb jerking” (Kozłowska et al., 2015, p. 18) including muscle twitching or symbolic spontaneous body movements or postures that may initiate a limbic brain process of discharge.

It is theorized that neurogenic tremoring may be related to coming out of a physiological state of tonic immobility and is, according to Payne and colleagues (2015, p. 11), “an opportunity for therapeutic intervention, . . . a sign of the system’s attempt to begin restoring normal function.” During neurogenic tremoring there is a somatic discharge from a maladaptive freeze response.

Neurogenic tremoring is a process that helps a traumatized person regulate and release fear activation. Discharge of thwarted states of high arousal during the shift out of freeze, through a high sympathetic activation cycle and into to a parasympathetic restful state regulates the system into quiescent immobility. Quiescent attunement often follows spontaneously.

Neurogenic tremoring can be observed in the short film, [*Trauma Bear*](#), in which a polar bear was immobilized with a tranquilizer dart for research and relocation. This film shows the action of neurogenic tremoring as the bear comes out of freeze after the flight response was interrupted by the tranquilizer dart. The polar bear visibly completes flight and fight behaviors in neurogenic discharge that resets whole brain integration for survival. Humans, too, experience this effect while coming out of freeze, a phenomenon clinicians often observe during SE sessions (Levine, 2013).

Individuals who experience a neurogenic tremoring sequence during treatment with SE and AF-SE often return dramatically to full relational function. They also experience a transformation and new-found value in their attachment relationships (see vignette below: Steve: Impact Trauma and Neurogenic Tremoring).

Neurogenic tremoring can have profound implications for dyadic completion in that body sensations, often for many years locked into a state of physical preparedness for impact or harm, are finally replaced by a new blissful state of quiescent immobilization.

In the presence of another, neurogenic tremoring followed by quiescent attunement promotes secure phylogenetic attachment. Social engagement networks come back online, enervated by discharge of flight/fight/freeze energy and neurochemical expression of comfort seeking with release of oxytocin in social engagement, attachment neurochemistry.

Social engagement networks engage in an attuned connection with another, embodied in the sensations of physical release and relief, supported by neurochemical regulation of arousal states into deep calm and comfort, a state of attuned face–heart connectedness.

Vignette: Steve: Impact Trauma, Neurogenic Tremoring

A decade prior to attending therapy, Steve, a 42-year-old police officer with 20 years of police service, experienced multiple injuries in a life threat motor vehicle accident where an offender deliberately rammed his police vehicle. Steve recovered after many months in hospital and transferred into a nonoperational branch of the police service, prosecuting offenders.

In a state of unresolved PTSD and relational disconnect in self-imposed isolation from his attachment relationships, Steve had determined to excel as a prosecutor and prosecute as many offenders as possible. This was at the cost of his family life, his health, and psychological well-being.

Disconnected from his wife and children (two daughters aged 15 and 3), and overwhelmed with his self-imposed burden of work, Steve attended therapy for PTSD.

During SE he experienced neurogenic tremoring, completing his incomplete survival response by discharging the incomplete survival energy of escape from the motor vehicle he was trapped in.

During quiescent immobilization and AF-SE resourcing (mindful consideration of his relationship with his wife and daughters), Steve, in a state of neurogenic completion, also experienced dyadic attunement and a

reevaluation of his attachment relationships. The attuned, blissful reconnection with his loving wife and daughters resulted in significant value shifts regarding his self-imposed work mission.

Resolved in his trauma and attuned for attachment, Steve reviewed and resolved his relational disconnect with his wife and children. At his last therapy session, Steve recounted resetting his career goals, a stronger emotional bond with his wife and daughters manifest in “clothes shopping with my older daughter and playing ‘Barbies’ with my 3-year-old.”

Discussion

For Steve, after neurogenic tremoring, a neurocognitive and neurochemical pathway for dyadic completion spontaneously emerged. Subcortical survival platforms shifted to social engagement driven by oxytocin. He was able to realize and respond to his lost secure phylogenetic attachment bonds with his family.

By inviting AF-SE resourcing (directing cognitions towards Steve’s relationships) Steve completed the shift from dyadic trauma and relational disconnect to dyadic completion, resulting in a reorganization of his life goals and attachment behaviors.

Trauma invariably compromises connectedness when pair bonding departs from face–heart connectedness and reciprocity. Attachment neuroception and mutual regulation is replaced by a self-protective and defensive survival-based relational style under allostatic load.

In follow-up AF-SE, Steve continued to be aware of his need for attuned connectedness. He actively pursued dyadic completion with his receptive family members. This resulted in a significant shift in his work ethic and life goals and resolution of his PTSD symptoms validating the assertion that secure phylogenetic attachment is the antithesis of trauma.

i. Dyadic completion and traumatic memory depotentiation

In AF-SE, depotentiation of trauma memory in dyadic completion can have profound positive impact on attachment neuroception and the face–heart connection. This process can depotentiate traumatic

memory and rewire traumatic implicit memory into hippocampal narrative memory. The traumatic memory transposed into narrative memory encourages social engagement systems to return to full function and affirms dyadic completion and a return to secure phylogenetic attachment.

j. Whole brain integration and renegotiation

The human organism constantly seeks homeostasis through shifting between ANS sympathetic/parasympathetic cycles during spontaneous pendulation. The defense cascade (Kozłowska et al., 2015) postulates that as exposure to trauma increases, more primitive, subcortical neural functions become enervated and override and dominate neurological function and behavior in social relationships.

Dyadic completion in AF-SE reverses this process by engaging and enhancing early life memory of secure attachment toward comfort seeking and somatic attachment soothing in the face-heart connection with another. Trauma memories and sensations are replaced by whole body, blissful states that may be dramatically pleasurable during quiescent attunement and dyadic completion.

Social engagement, mutually regulating neuroception, exploratory orienting and healthy risk-taking return to pre-trauma states, promoting secure phylogenetic attachment as the antithesis of trauma.

k. Return to exploratory orienting and healthy risk-taking

Exploratory orienting is a relaxed but ready state. Exploring the environment, a person can be available to engage in social relationships without fear or overwhelm. Parasympathetic rest and digest in whole brain functioning is restored. For infants this is an important developmental process that ensures exploratory and developmental learning. For adults there is a return to healthy aggression, social connection, and risk-taking where “in an unspoken voice . . . the body releases trauma and restores goodness” (Levine, 2010, Title Page).

Summary and Conclusions

Here we have defined and clarified the relationship between trauma, dyadic trauma, secure phylogenetic attachment, and recovery with dyadic completion within the SE and AF-SE framework.

The impact of trauma on attachment during critical developmental stages throughout the life cycle has been explored to provide therapeutic trajectories for treatment and recovery using AF-SE.

AF-SE can be applied across a range of therapeutic trauma-based presentations to reinstate secure attachment with dyadic completion.

AF-SE is a heuristic treatment modality that requires a creative application of SE, neuropsychotherapy, and modern attachment dynamics to resolve psychophysiological symptoms of trauma including the interpersonal and social consequences of dyadic trauma.

Within the complex, evolving paradigm of neuropsychological traumatology, AF-SE may emerge as a universal psychoneurobiological intervention for the traumatized dyad in all its permutations. AF-SE may ultimately culminate in a centralized theory validating the hypothesis that secure phylogenetic attachment is the antithesis of trauma.

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