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Toddler Trauma

Somatic Experiencing®, Attachment and the Neurophysiology of Dyadic Completion

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ABSTRACT *“Aleppo’s orphans replay their trauma with war games in the rubble” Hollie McKay foxnews.com (December 30, 2016.)*

A combination of Somatic Experiencing (SE) and Play Therapy can be effective interventions for post-surgical traumatized toddlers, using Rescue Role Play in a behavioral sequence to achieve neurobiological “completion” of autonomic, survival imperatives that have been thwarted through the experience of traumatic overwhelm.

Comfort-Seeking (CS), i.e., the toddler’s autonomic behavior of safety-orienting and running-to their Primary Attachment Figure (PAF) for soothing at times of threat arousal, is a phylogenetically ordered, neuro-motor, survival imperative (Levine & Frederick, 1997; Porges, 2011) that completes the toddler’s incomplete survival response (Levine, 2010; Levine & Kline, 2007) and renegotiates neuro-integration from primitive, lower brain, survival structures reconnecting with prefrontal social engagement systems (Siegel, 2012), thereby restoring whole brain neural integration and neurobiological homeostasis in the toddler’s nervous system. When CS is followed by PAF-Somatic-Attachment-Soothing (SAS), the toddler’s nervous system can regulate into Quiescent Attunement (QA), a state related to Quiescent Immobility (Porges, 2016; Kozłowska et. al., 2015) where attuned, secure-attachment in the Traumatized Attachment Dyad (tad) is restored, a phenomenon described as Dyadic Completion (DC).

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INTRODUCTION

This article explores SE with Rescue Role Play with the intent of encouraging triumphant experiences for toddlers to redress neurobiological traumatic overwhelm that occurred at the point of fear-immobilization, in the absence of their PAF. It describes rescue role play within the theoretical constructs of SE, Polyvagal and Attachment theory in the resolution of Toddler Trauma to reconnect the toddler to his PAF in secure, attuned attachment.

Several new terms in the nomenclature of trauma therapy are proposed by combining descriptive terms from SE, Neuroscience, and Attachment theory. Two new theoretical, diagnostic classifications are offered to identify the neurophysiological phenomena of traumatic neuro-dysregulation and whole brain reintegration for traumatized toddlers within the Primary Attachment Dyad (PAD).

Following a literature review and definition of terms, a case study of Little Bill (LB), a 30-month-old, male child with a constellation of symptoms consistent with a diagnosis of Childhood Posttraumatic Stress Disorder, DSM-5: 308.81 (AMA, 2013) will be presented. LB was referred by his General Practitioner for "management of his emotional and psychological problems." Upon interview, it was discovered that LB had experienced post-surgical restraint trauma followed by a state of Tonic Immobility (TI) (Kozłowska, et al., 2015). This traumatic episode inhibited LB's CS behaviors in his then secure attachment to his mother. LB was described as "a normal healthy boy with no communication or behavioral difficulties until he experienced adenoid and grommet surgery." Seven months after his surgery LB's attachment relationship with his PAF had been compromised. His social and self-regulatory behavior had become dramatically dysfunctional.

THEORETICAL FOUNDATIONS OF TREATMENT

Toddler trauma may be described as homeostatic disruption which involves disintegration of neurological communication between the major structures of the brain, where primitive subcortical brain structures hijack and dominate neural integration to drive survival along a flight/fight/freeze trajectory rather than a socially engaged, interpersonal neurobiological process (Levine, 1997; Siegel, 2012; Porges, 2011).

When attuned attachment is compromised in the PAD, psychopathological imperatives for the toddler can be catastrophic due to the neuro-developmental reliance the child has on their PAF for neurogenesis.

Theoretical principles of SE, Polyvagal and Attachment Theory offer insight on the therapeutic utility of toddlers *running-to* their PAF for neurocognitive/behavioral completion of thwarted flight/escape sequences. *Running-to* the PAF during traumatic activation when coupled with PAF-SAS (Somatic-Attachment-Soothing) may result in DC (Dyadic Completion); a reduction or cessation of attachment perturbation and traumatic symptoms. DC offers a hereto undiscovered phylogenetically ordered, therapeutic option for resolving Toddler Trauma.

The primacy of movement is essential in working with early and pre-verbal trauma. Motor patterns that have been thwarted, overwhelmed or incomplete will color the entire perceptual field of the child and later the adult (Levine 2010, 2015). Hence, transmuting these thwarted motor actions can greatly alter the children's pre-reflective sense of self.

The essence of our core, pre-conscious 'body-self' is explored from an analytic and psychodynamic perspective by Krueger (1989). Krueger exemplifies an emerging view in developmental theory: that the core (pre-conscious) 'body-self' comprises an aggregate experience encompassing a wide range of

(embodied) sensory, kinaesthetic and proprioceptive input. Craig (2002, 2009, 2001) has shown how critical body sensations (interoception) are central to core regulation and as such, to our sense of wellbeing. Indeed, Roger Sperry² (1952), made the distinct point that *the fundamental basis of perception derives from motoric potentiality*. It is through engaged movement that each infant generates a pre-verbal sense of “body-self” - a sense of bounded self with agency and power.

After a two-year follow-up, observations indicate that DC offered a behavioral-completion process that resolved LB’s trauma symptoms and restored secure attachment.

Comment on Nomenclature

In response to advances in diagnostic neuroimaging, a paradigm shift in psychotherapy and developmental science from cognitive/behavioral to neurobiological has evolved (Schore, 2012; van der Kolk, 2014). New theories, psychotherapies and diagnostic and phenomenological terms are emerging. SE, a psychobiological model based on survival behavior of wild animals was developed by Levine in 1997. His foundational work precedes much of the new theoretical paradigms. Levine and Frederik (1997) and later Siegel (2010) and Porges (2011) and others proposed therapeutic phenomenon unknown to trauma therapists and an entirely new paradigm in trauma therapy emerged (Schore, 2012). The reader may recognize that there are multiple terms to describe phenomenon in the nomenclature. For example, Siegel’s (2012) Interpersonal Neurobiology, Porges’ (2016) Connectedness, Tronic’s (2007) Mutual Regulation Model, and Schore’s (2012) Interactive Regulation are all neurobiological descriptors of aspects of “Attunement” in attachment theory.

By generating phenomenon-specific terminology for SE treatment protocols, the authors seek to refine the nomenclature of trauma-based

psychopathology and to sponsor research initiatives that specify subtypes and broaden the range of effective interventions to treat toddler trauma.

Coined terms in this document generally combine theoretical descriptors within theories of SE, Polyvagal and Attachment Theory.

Key to Acronyms

SE	Somatic Experiencing
CS	Comfort Seeking
PAF	Primary Attachment Figure
SAS	Somatic Attachment Soothing
<i>tad</i>	Traumatic Attachment Dyad
DC	Dyadic Completion
PAD	Primary Attachment Dyad
TI	Tonic Immobility
TA	Traumatic Attachment
TAD	Traumatic Attachment Disorder
DTD	Developmental Trauma Disorder
CRN	Core Response Network
QA/PAF-SAS	Quiescent Attachment & Primary Attachment Figure-Somatic Attachment Soothing
QI	Quiescent Immobility

Coined Terms

The following terms were necessary to define a neurobiological and attachment related process in a more nuanced form: Traumatic Attachment (TA); Traumatic Attachment Disorder (TAD); Attachment Perturbation; Attachment-Neuroception; Traumatized Attachment Dyad (*tad*); Comfort-Seeking (CS) & ‘Running to’; Attachment Soothing; Somatic-Attachment-Soothing (SAS); Quiescent Attunement (QA); Dyadic Completion (DC) and Rescue Role Play.

Note to the reader. As the concepts offered are highly interrelated, a linear relationship when defining terms was not possible. To have a full appreciation of the use of terminology the reader may need to read all the definitions as a collective whole and return to the terms when reading the case study. A literature review is congruent with descriptive terminology and will enhance the reader’s appreciation of theoretical constructs.

²Pioneering neurophysiologist and winner of the 1981

Nobel Prize for Physiology and Medicine.

Two new diagnostic classifications

Traumatic Attachment (TA)

TA may be a specific, identifiable, trauma-related, subcategory of Attachment Relationships in Attachment Theory which describes the dynamic perturbations between the participants in a Traumatized Attachment Dyad (*tad*).

Traumatic Attachment Disorder (TAD)

TAD encapsulates the dynamic interpersonal, neurobiological dysregulation processes of the *tad* after trauma for one or both participants that ultimately leads to psychopathology for both.

Trauma

Trauma is not in the event but in the nervous system (Levine, 1997) and often occurs when threat immobilization, Freeze becomes coupled with Fear (Porges, 2011; Levine, 1997).

Patterns of Attachment

Ainsworth (1978) identified three patterns of attachment; Secure Attachment, Anxious Attachment and Avoidant Attachment.

Disorganized Attachment

Toddlers show confusion toward the PAF (Primary Attachment Figure) and may shift between Anxious and Avoidant attachment. The attachment relationship is characterized by harm, dangerous erratic behavior, and extreme liability by the PAF (Main & Solomon, 1986). Siegel (2012) observed that, “specific overwhelming events may produce marked effects on the developing mind”...where integrative function is compromised and trauma may produce...“a narrowing of the windows of tolerance for certain emotional states (such as anger, fear and sadness)” (p.330). When one is outside the ‘window of tolerance’ enervated action of the amygdala up-regulates limbic brain function into flight (fear), fight (anger), or fear/immobilization behaviors in response to trauma triggers. Within the window of tolerance, a person can fluidly regulate between excitation and relaxation without moving into extremes or getting fixated in any one pattern of repetitive maladaptive arousal (Levine, 1997).

Connectedness

A biological imperative of neurobiological mechanisms that links social behavior to both mental and physical health (Porges, 2016). Reestablishing connectedness is fundamental to restoring secure attachment after trauma.

Attachment Perturbation: Stage 1. in the trajectory towards psychopathology

Attachment Perturbation occurs when confounding behavioral/affective changes in the PAD disrupts *connectedness* after a traumatic episode where “the child’s dissociation in the midst of terror involves numbing, avoidance, compliance and restricted affect” (Schore, 2012, p. 266). Security in the attachment bond is eroded, allowing the evolution of ‘mutually dysregulating’ (Tronic, 2007) attachment perturbations. TA follows where “security of the attachment bond is the primary defense against trauma-induced psychopathology” (Schore, 2012, p. 293).

Diagnostically, Attachment Perturbation may be the first symptom reported by the PAF, manifesting in their inability to make sense of the toddler’s social and self-regulatory behavior. Early symptoms of trauma might easily be overlooked along the trajectory of evolving psychopathology resulting in misdiagnosis of neurocognitive and behavioral disorders rather than trauma induced disorders.

Traumatized Attachment (TA): Stage 2.

TA is the early onset of subclinical psychopathology of Traumatized Attachment Disorder (TAD), Developmental Trauma Disorder (DTD) or Childhood PTSD. Perturbation in the attachment dyad includes the loss of secure connectedness, attunement, reciprocity, synchronicity, love and trust (Porges, 2016). TA may kindle the emergence of oppositional behaviors in one or both members of the PAD after a mutually dysregulating traumatic episode (Tronic 2007).

TA: a specific subset in Attachment Theory

TA succinctly identifies the perturbing dynamics of the Traumatized Attachment Dyad (*tad*) and may be identified as a specific trauma based

subset of attachment rupture in Attachment Theory. Untreated, TA becomes entrenched and driven by traumatic perturbation as described in the Polyvagal Syndrome (Porges, 2016) which is the antithesis of secure attachment. Over time, TA becomes entrenched in the neural networks of both toddler and PAF where interpersonal neurobiological attunement that promotes healthy neurogenesis, synaptogenesis and myelinogenesis is compromised. This process, reinforced by ongoing mutually dysregulating behaviors in the PAD may develop into psychopathology for both.

Traumatized Attachment Dyad (*tad*) Stage 3. After a traumatic episode, the PAD devolves into subclinical symptoms of psychopathology that may be confounding and difficult to diagnose. The attachment bond departs from connectedness, neuroceptive attunement and security. *tads* may increasingly narrow the window of tolerance (Siegel, 2012) inhibiting capacity for integration and mutual regulation of arousal (Tronic, 2007). The developmental trajectory of the toddler's mind may evolve towards dysfunctional attachment styles (Schore, 2012, p. 263) that may be mutual and inclusive regardless of which partner in the dyad is traumatized (Tronic, 2007).

Traumatic Attachment Disorder (TAD): Stage 4. Toddler brains are developing structures dependent on the regulating brains of their PAF in a rapid growth ecology described by Siegel (2012) as an interpersonal neurobiological attachment dyad.

The attachment dyad is both fragile and robust under specific circumstance or situations, i.e., fragile to threat events where the PAF is unavailable to regulate fear arousal during threat activation and immobilization episodes; and robust in the interpersonal regulatory mechanisms of a "good enough" attachment bond with the PAF, (Bretherton & Munholland, In Handbook of Attachment, Cassidy & Shafer, Eds. (2008). TAD manifests though entrenched, mutually disruptive, behaviorally reinforced, emerging

symptoms of psychopathology driven by attachment perturbations and TA that significantly impact both participants in the dyad (Tronic, 2007). TAD includes loss of connectedness, synchronicity, reciprocity and neuroceptive attunement and requires therapeutic intervention to prevent pathological attachment style and individual mental health disorders for both participants.

Neurological Trajectory of Pathology

The interpersonal neurobiology of attunement between PAF and child, "stimulate the neural activity that link differentiated areas to one another, which in turn...promote...neurogenesis, synaptogenesis, and myelinogenesis that...literally create a more integrated set of neural circuitry" (Siegel, 2010, p. 228).

If one or both members of the PAD are traumatized, then 'the trauma' is not only in the nervous systems of the individuals but is also in the interpersonal neurobiology of the PAD. Neurogenesis, synaptogenesis and myelinogenesis are compromised in the prefrontal social engagement networks and enervation of the amygdala impacting flight/fight/freeze networks of the lower brain develop disproportionately resulting in neurodevelopmental disorders (Schore, 2012: Siegel 2012).

Hijacked by an enervated amygdala, locked into a limbic brain survival loop of vigilance and/or immobilization, soothing and social connection in the dyad is thwarted and the toddler may not develop social engagement networks vital for survival or social interconnectedness.

DC (Dyadic Completion) restores secure attachment and normal neurodevelopment resumes.

Neuroception

Porges (2011) describes neuroception as "how neural circuits distinguish whether situations or people are safe, dangerous or life threatening" (p. 11). The neuroceptive features of DC may be an important aspect of healing from toddler trauma. Porges, (2016) hypothesizes that faulty

neuroception might lie at the heart of several psychiatric disorders. Traumatic, early life experience can compromise future neurodevelopment and neuroceptive capacity, and often manifest as boundary issues in adult psychopathology.

The traumatized infant cannot neurocept independently and their ability to regulate arousal for social engagement, even in nonthreatening environments, is compromised (Ogden, 2015).

Attachment Neuroception

Levine (2007) asserts the PAF acts as the ventral vagal, social engagement, soothing system for an infant's nervous system until it is myelinated and can regulate itself. The PAF relays to the toddler whether situations and people are safe, dangerous or life threatening. Attachment neuroception is particularly relevant in toddler soothing during medical procedures where the toddler's unmyelinated neuro-survival networks cannot independently neurocept during experiences of pain, immobilization and fear.

Attachment-neuroception, a co-regulating process (Tronic, 2007), may be phylogenetically ordered as a survival behavior compelling the PAF, when stimulated by the distress cries of their infant, to seek proximity and initiate protection and soothing. Traumatic arousal of the "Fear and Defense Cascade" described by Kozłowska, et al., (2015) may be arrested by Attachment-Neuroception at the point of fear arousal thereby avoiding toddler trauma altogether, an important reason to have emotionally regulated PAFs involved in post-operative recovery.

Developmental Trauma Disorder (DTD)

van der Kolk (2014) asserts that children who have experienced developmental trauma through abandonment, neglect or physical/sexual abuse, suffer from a specific array of clinical symptoms leading to DTD. Many crossover symptoms may promote misdiagnosis. Careful history taking can reveal the key defining elements of DTD that can occur within a traumatic episode which is often first observed as posttraumatic

attachment perturbation.

The authors propose that posttraumatic attachment perturbations might be included in the sequela of diagnostic criteria describing DTD.

Interoception

Interoception is the ability to sense internal states and bodily processes (Craig, 2009; Porges, 2011). It is the bottom-up/top-down interoceptive, kinesthetic, proprioceptive, experience of internal states perceived "through interoceptors located on the heart, stomach, liver and other organs inside the body cavity" (Porges, 2011, pp. 76-77). In SE, therapeutic interoception involves guiding the toddler's attention to "instinctive, bodily based protective reactions when dealing with stress and trauma" (Payne, et al., 2015, p.1).

Interoception, involves the insula and anterior cingulate portions of the middle prefrontal areas of the brain connecting and becoming active (Craig, 2009). Siegel (2012) proposes that this integration process is related to self-awareness and "may be the gateway to becoming conscious of our emotions" (p.161).

Polyvagal Theory

The Polyvagal Theory describes a phylogenetically ordered survival relationship between the 10th Cranial or Vagus Nerve, the Autonomic Nervous System (ANS), Sympathetic Nervous System (SNS) and Parasympathetic Nervous System (PNS). It is an enervated process of neuroception and interoception (Porges, 2016). The vagus nerve is the bridge between brain and body that mediates mobilization/immobilization and is also involved in neuro-regulation of the organs. Neuroception/Interoception involves the top-down (cortex) and bottom-up (Somatic/ANS) neuromotor regulation of three states of survival; Social Engagement, Danger and Life Threat.

Polyvagal Syndrome in Toddler Trauma

Development of social engagement systems involves right brain function (Schore, 2012) and the ANS (Porges, 2011). The human brain evolved to survive dangerous and life threat

situations as a phylogenetic imperative for survival but simultaneously evolved social engagement systems for procreative pair-bonding and protection in groups. “To accommodate both fight-or-flight and social engagement behaviors, the new mammalian vagus evolved to enable rapid, adaptive shifts in autonomic state” (Porges, 2011, p.121).

The Polyvagal Network and Dyadic Completion

Porges (2011) describes the polyvagal network as “phylogenetically ordered and *behaviorally linked* to social communication (e.g., facial expression, vocalization, listening), mobilization (e.g., flight/fight behaviors), and immobilization, (e.g., feigning death, vasovagal syncope, and behavioral shutdown)” (p.54). The behaviorally-linked process of mobilization in flight to safety i.e., safety orientation and *running-to* the PAF for attachment-soothing, is therefore a neurobiological platform for therapeutic intervention validated by evolution.

Forced immobilization, in a state of terror overwhelmed LB’s social engagement networks that shifted to SNS arousal such that he could not be soothed by his mother. In an escalating state of overwhelm, LB’s Dorsal Vagal branch of the PNS shut him down into a state of TI which impaired connectedness in his attachment with his PAF.

In contrast, if a toddler has access to their regulated PAF during or shortly after traumatic overwhelm, then mutual, affective, somatic, interpersonal and neurobiological soothing will follow in a phylogenetically honored, automatic evolutionary mechanism identified as DC.

Ventral Vagal System, Social Engagement

Social engagement requires immobilization without fear, which involves the right emotional brain, the Ventral Vagal Complex and the social engagement networks of the cortex. Social engagement requires sympathetic arousal and oxytocin for states of pleasure and confrontation (Porges, 2011). Mediating pleasurable excitation and confrontation without moving into survival states of fight, flight, and freeze

allow humans to stay in connection during higher states of sympathetic charge. In threat situations, it also allows humans to vocalize as a first strategy of distress, rather than moving immediately toward a more primitive survival strategy of fight and flight (Porges, 2011).

Schore (2012) observes that the essential task of the first year of life is the establishment of a secure attachment bond between infant and primary care giver. This process is dependent on, “the mother’s sensitive psychobiological attunement to the infant’s dynamically shifting internal states of arousal” (p.75).

Hedonic Valences In SE

Procedural memory initiates “*approach or avoidance*” or “*attraction or repulsion*” (Levine, 2015, p. 26). Hedonic Valences involving the motor cortex influencing the toddler’s orientation to safety and nourishment and avoidance of threat through “motor acts of stiffening, retracting and contracting” (p. 26). In SE for toddlers the therapist **observes for and tracks** the toddler’s hedonic valences to determine their levels of sympathetic (survival) activation towards Comfort-Seeking or threat avoidance.

SIBAM

SIBAM represents Sensation, Image, Behavior, Affect and Meaning (i.e., cognitive interpretation) (Levine, 1996, 2015). These elements of experience are targets of SE interventions. For LB, fear (**Affect**), was observed as fixed action patterns of facial fear expression, bracing, contracting, retracting, fighting, fleeing, freezing and maintaining territorial boundaries in combination with the phylogenetically ordered survival (**Behavior**) of *running-to* his PAF for soothing, to discharge traumatic arousal states in the toddler’s Core Response Network (CRN). Repeated, titrated sequences of exploration of this sympathetic flight behavior for safely *running-to* the PAF followed by QA/PAF-SAS may complete survival responses and reinstate dyadic attunement, connectedness and (**Meaning**) in DC and secure attachment “I am safe, mummy will protect me.”

Completion

“The drive to complete and heal trauma is as powerful and tenacious as the symptoms it creates. The urge to resolve trauma through re-enactment can be severe and compulsive” (Levine, 1997, p. 174). SE uses the term **completion** to describe therapeutic de-potentialization of extreme, arousal states following trauma that completes a biological defensive response (Levine, 2015; Payne et al., 2015). SE involves neurobiological activation of procedural traumatic memory that accesses polyvagal survival responses and then by titration, gently discharges and reorganizes, physiological survival energy that drives perturbation. This occurs through careful tracking and organization of arousal states that can reinstate implicit traumatic memories into hippocampal (autobiographical) timeline-like ordinary memories. The authors contend that the traumatized toddler’s ‘completion’ also must involve reinstatement of the attuned, secure attachment bond in the processes of DC.

Quiescent Attunement (QA)

QA is an essential step in the process of DC that occurs when the toddler’s nervous system attunes to physical touch and directly accesses the feeling of their PAF’s regulation. QA is the toddler’s response to PAF-SAS after arousal and discharge of incomplete survival responses. QA is characterized by mutual stillness, whole-body muscle relaxation, and an obvious, blissful expression of attuned connectedness in relaxed safety, security and attachment-neuroception.

Dyadic Completion

DC offers a new SE trauma intervention, engaging behaviorally based, action patterns of completion. This is evidenced in the case of LB by *running-to* his PAF for SAS after fear arousal where *running-to* is the toddler’s preferred movement pattern for completion.

Some toddlers may want to leap, crawl, roll or any other variation of sympathetically generated movement in their sequence towards DC. After titrated activation of traumatic memory, hedonic valence sequences may discharge through the toddler’s over-stimulated CRN. After discharge, QA /PAF-SAS reinstates attuned connectedness

and attachment neuroception.

For a child stuck in the survival sequence, the SE therapist can access fear arousal through tracking body-based hedonic valences of trauma-driven procedural memory. Initiation of the “fundamental organismic approach process” (Levine, 2015 p. 26) of DC i.e., *Running-to* as the behavioral element of SIBAM ensures that attuned connectedness is restored via PAF-SAS resulting in implicit trauma memories being shunted into the hippocampus as for normal narrative, time-line memories.

THE SURVIVAL SEQUENCE OF DYADIC COMPLETION

LB was somatically tracked through his survival sequence to Exploratory Orientation. The trajectory of the survival sequence is as follows:

Threat orientation, the focus of the senses towards the source of the threat

Fear arousal, the neuro-emotional response to threat (real or perceived) is driven by sympathetic arousal toward flight/fight

Survival orientation, focus of the senses towards safety proximity (LB towards PAF)

Comfort seeking, fear, visual orientation, arm reaching and *running-to* the PAF

PAF-SAS, the PAF soothes LB with loving embrace touch, face to face, eye contact, soothing voice, stillness (QA) and/or gentle rocking

Quiescent Attunement, LB’s relaxed attuned stillness in the SAS embrace of his PAF

Dyadic Completion, Restoration of attuned secure attachment

Return to Exploratory Orienting, which is a relaxed but ready state. Exploring the environment, to engage in social relationships without overwhelm. Parasympathetic rest and digest, whole brain functioning is restored.

Levine (2015) asserts, “These compelling instinctual emergency responses play a crucial role in the formation and resolution of traumatic memories” (p.25), they are a vital component for future neurogenesis and psychosocial development.

Dyadic Completion: Theoretical Construct

Toddler trauma derails secure attachment requiring a renegotiation of the disrupted PAD. It is hypothesized that perambulating toddlers can access and reinstate healthy whole brain integration through the neuro-motor functions of the CRN during Rescue Role Play of 'escape from threat' i.e., flight, manifest in *running-to* their PAF for safety in the journey towards DC. DC completes the behavioral survival responses of flight and connectedness (Levine, 1997). Secure attachment can be reinstated in the somatic impulses and motor sequences that emerge in the processes of PAF-SAS and QA. This process not only regulates the toddler's overwhelmed polyvagal and CRNs but also reinstates the dysregulated interpersonal neurobiology of the secure PAD.

The Fear and Defense Cascade

The Fear and Defense Cascade, Kozłowska et al., (2015) involves phylogenetically ordered neurobehavioral survival processes of "arousal, flight or fight, tonic or collapsed immobility" (p. 1). Kozłowska et al., hypothesize that "Freezing" is the "flight-or-fight response put on hold" (p. 3) and is initiated as the last survival resort to inescapable situations. For perambulating toddlers 'unfreezing the flight response' is a vital therapeutic intervention window between fear-arousal and DC, initiated by *running-to*.

While completion occurs in the CRN of the individual toddler, young children rely on the interpersonal neuroregulatory processes of QA/PAF-SAS to achieve DC. Simply put, the younger the child, the more reliant they are on PAF-Neuro-regulation to soothe fear arousal.

When a toddler is stuck in the defense cascade, therapeutic intervention by targeting procedural memory through the elements of SIBAM in SE offers a mechanism for individual neurological completion and restoration of attuned attachment.

The Core Response Network (CRN)

The CRN comprises four subcortical structures including: the Autonomic Nervous System, the

Reticular Arousal System, the Emotional Motor System and the Limbic System. These systems "respond to environmental challenges prior to extensive cortical processing" (Payne, et al., 2015, p. 3). By inference, the toddler's underdeveloped social networks are less likely to be involved in resolution of traumatic overwhelm whereas, somatic interventions involving proprioception, interception and kinesthetic-soothing are more likely to regulate their dysregulated CRN (Payne, et al., 2015) to reinstate parasympathetic states of attuned connectedness and attachment neuroception.

The Australian Childhood Foundation, (2011) writes that the Mutual Regulation Model (MRM) Tronic (2007), "consists of sensory stimulation, light and vestibular movement (rocking in a forward-backward manner), or proprioceptive movement, posture and the introduction of calming spaces are further activities that have been shown to promote sensory integration which influences neuroception of safety" (p. 5). Reinstating attachment-neuroception is a vital clinical intervention when treating the *tad*.

Primary Attachment Figure-Somatic Attachment Soothing (PAF-SAS)

PAF-SAS is the spontaneous emergence or therapist-guided use of soothing-touch, voice and movement by the PAF to initiate connectedness and attachment neuroception which may also mutually regulate (Tronic, 2007) the CRNs of the *tad*. In gentle hands-on touch to areas of traumatic activation (bracing, contracting, freezing etc.), soothing (kinesthetic) cuddles and (proprioceptive) rocking the PAF offers comforting voice to reengage the toddler's social networks. The PAF reinstates sympathetic/parasympathetic homeostasis resulting in down-regulation of polyvagal arousal networks of the CRN.

Toddler CS in the threat arousal sequence followed by QA/PAF-SAS is more than contingent communication (Seigel, 2004), it implies the urgency of a trauma/survival imperative. The urgent response to soothe a child's distress cry, to protect, may also be a phylogenetically ordered survival mechanism.

The PAF's timely response is vital to regulate the toddler's state of sympathetic arousal and to ensure their own survival, embodied in the biological success of their genetic lineage. The observer only needs to witness a mother/child reconnecting during QA/PAF-SAS, as in the baby Jack demonstration by Levine (2012), see (Levine, 2015, p 90-91) to understand the affective intensity of healing attunement between the players in the PAD.

Rescue Role Play

Rescue Role Play is the therapeutic conduit between the traumatic episode and DC. Resolution involves accessing procedural memories to "renegotiate" trauma (Levine, 2015, p. 37).

The re-working or renegotiation of a traumatic experience represents a process that is fundamentally different from traumatic play or re-enactment. Left to their own devices, most children, will attempt to avoid the traumatic feelings that their play evokes. But with guided play, *LB was able to "live his feelings through" by gradually and sequentially mastering his fear.*

Titration tracking of SIBAM using interoception accesses procedural memory and allows for discharge of excess physiological survival energy and completes protective imperatives (Payne et al., 2015). The traumatized toddler can "engage *innate movement programs* (action patterns), which are charged by evolution to carry out actions that are necessary for our survival and well-being" (Levine, 2015, p. 37) where *Running-to* may be a significant "*innate movement program.*"

A medical doll was used to stimulate survival responses and initiate LB's motor memory and agency for behavioral action. Survival responses may be objectified and titrated through rescuing a doll in play and *running-to* the PAF at points of activation. Using this stepwise renegotiation of the traumatic event and helping the medical doll LB was able to emerge as the victor and hero. A sense of triumph and heroism almost always signals the successful conclusion of a

renegotiated traumatic event. By following LB's lead (after setting up a potentially activating scene), joining in his play, and making the game up as we went along, LB got to de-potentiate his fear circuitry. In this example, it took minimal direction and support to achieve the *unspoken* goal of aiding LB to experience a corrective outcome. In this way, as LB's motoric potentiality changed, so did his embodied perception of the world, from dangerous to safe, exciting and inviting (Seigel, 2010; Porges, 2011).

The therapist's role in this process is to observe, track and titrate levels of activation (Levine, 2015). The SE therapist follows or guides play towards completion through emergent triumphant experiences where interoceptive/neuroceptive attachment processes reconnect the toddler in the PAD through CS and survival based neuromotor programs such as *running-to* the PAF. When a survival sequence is followed by QA/PAF-SAS, Attuned Connectedness and secure attachment in the PAD is reinstated in the sequence of DC.

Tonic Immobility (TI)

TI is a cascade of autonomic neurological and physiological responses after heightened arousal that can include life threatening arrhythmias, decrease in temperature and respiration which is characterized by bradycardia combined with hypertonicity of skeletal muscles involving the neural circuits of the amygdala, hypothalamus, and periaqueductal grey (Kozłowska et al., 2015; Porges, 2011). "Victims describe subjective experiences of fear, immobility, coldness, numbness and analgesia, uncontrollable shaking, eye closure, and disassociation (derealization and depersonalization), as well as a sense of entrapment, inescapability, futility, or hopelessness" (Kozłowska et al., 2015, p. 10).

Quiescent Immobility (QI)

Kozłowska et al., (2015) define quiescent immobility as "a state of quiescence that promotes rest and healing" (p.1). "Mammals immobilize themselves for essential prosocial activities, including conception, childbirth, nursing, and the establishment of social bonds"

(Porges, 2011 p. 14).

Quiescent Attunement (QA)

QA was first observed by the primary author of this paper in the 'Baby Jack' demonstration video conducted by Levine (2012, 2015). After activation and completion Jack surrendered into the embrace of his mother for the first time, a physical, chest-to-chest melding between Jack and his PAF. It was a reorganization of the instinctual somatic attachment between new born and mother "after birth...heart against heart" (Fisher, 2017, p. 103). QA seems to carry the affective states of bliss in attuned reconnection. This process is even more dramatic in consideration of Jack's distress and physical bracing only moments before. In its most effective form the toddler lays chest to chest with the PAF in a complete state of QI, characterized by stillness and contentedness in an obvious attunement process. The authors contend that QA is an essential re-attunement of the attachment bond and necessary for DC.

THE SEQUENCE OF TODDLER TRAUMA AFTER SURGERY

Postsurgical Toddler Trauma is often observed as a failure to thrive, oppositional behavior and affect dysregulation. It manifests in traumatic overwhelm and attachment perturbation which erodes attuned connectedness and attachment neuroception.

Trauma may occur because the underdeveloped toddler's nervous system interprets surgery as an inescapable, predatorial attack (Levine, 2010) that can result in TI, "a terminal defense when flight or fight has failed" (Kozłowska, et al., 2015, p. 7). Toddlers require the regulated brain of their PAF in the process of neuropsychobiological attunement to regulate fear arousal. When an overwhelmed toddler's distress calls fail to elicit the required PAF-Attachment Soothing, TI may occur. Attachment perturbations that can develop into psychopathology may follow (van der Kolk, 2014).

Toddler trauma, even in secure PADs can result in attachment perturbation (van der Kolk, 2014) that may resist normal repair (Shore, 2012) where "disrupted attachment wires in a vulnerability to trauma" (Fosha, 2010, p. 43). Incomplete fear/immobilization episodes may compromise "hard wired emergency responses" and "hedonic valance" (Levine, 2015, pp. 25-26) where the traumatized toddler no longer perceives their PAF as secure. Attuned connectedness in the PAD is compromised. If attachment perturbation is untreated it may lead to psychopathology for one or both participants in the PAD (Tronic, 2007).

Theoretical Rational and Evolution of the Case Study

Childhood trauma is routinely misdiagnosed (van der Kolk, 2014). In response to the growing prevalence of developmental disorders van der Kolk (2014) proposed the diagnosis Developmental Trauma Disorder (DTD), to identify children who have experienced developmental trauma as the consequences of traumatic attachment/disruption experienced in early childhood. DTD eloquently and succinctly identifies the trajectory of childhood psychopathology in the trauma based spectrum. The authors propose including '*early childhood post-surgical trauma*' on this list of diagnostic descriptors of childhood trauma-initiating events that may lead to DTD.

The authors offer evidence of congruence with DTD in the proposed diagnostic precursors of TA and TAD that inferentially precede the diagnosis of both Childhood PTSD and DTD when attachment perturbation evolves through an overwhelming fear/immobilization event. Charles Darwin first observed immobilization as contrary to optimal survival when he wrote "prolonged escape or avoidance behaviors would put the animal at a disadvantage" (Darwin, (1872) In van der Kolk, 2014, pp. 75-76). In other words, trauma is getting stuck in the implicit neurological firing of kindled avoidance/escape and fear/immobilization signaling (Levine, 1997). Shore, (2012) asserts that "attachment processes lie at the center of all human, emotional and social functions" (p. 27).

For overwhelmed toddlers, trauma may be healed when healthy neurodevelopment is reinstated through DC and secure attachment.

Misdiagnosis

Childhood PTSD, and by inference postsurgical infant trauma, is often undetected or misdiagnosed as conduct disorders (van der Kolk, 2014) and is well established as risk factors in adult psychopathology (Schimmenti & Bifulco, 2015; MacDonald, et al., 2008).

The pathological trajectory of toddler trauma is poorly understood by clinicians and often leads to misdiagnosis or the possibility of confounding multiple diagnoses of Neurodevelopmental, Neurocognitive and Conduct Disorders.

Mainstream acknowledgement of the growing prevalence of Childhood PTSD indicates the need for effective childhood treatments as well as expansion of intervention options and refinements on established therapies, such as SE (Levine & Kline, 2007; Levine, 2010), to address specific presentations.

DSM-5 Diagnostic Features of Childhood PTSD

The APA in DSM-5 (2013) recognizes medical trauma in childhood PTSD, specifically "medical incidents that qualify as traumatic events involve sudden, catastrophic events, (e.g., waking during surgery, anaphylactic shock)" (p. 274). The authors propose that for postsurgical-recovery/waking toddlers when experiencing terror, pain, disorientation, immobilization and/or restraint (inescapable, predatorial attack), without a regulated PAF present to soothe them may also be considered a "*sudden, catastrophic event*" and therefore be included in DSM-5 Diagnostic Features for Childhood PTSD (p. 274).

The APA, in DSM-5 (2013) makes no mention of neurological antecedents for childhood trauma and makes no reference to the role of attachment in the neuroregulation of early life traumatic experiences. Similarly, the APA appears to have adapted an adult disorder to Childhood PTSD that was primarily introduced into DSM-III, (1980), due to the prevalence and

symptom consistency across war traumatized soldiers, historically and after the Vietnam War. Conversely, the diagnostic criteria for TA, TAD and DTD is based on observable features of attachment perturbation after trauma and considers neuro-developmental and attachment variables in the diagnostic criteria.

Modern attachment, neuroscience and trauma theorists, Fisher (2017); Levine (2010); Ogden (2015); Porges (2011); Shore (2013); Siegel (2012); Tronic (2007); van der Kolk (2014) recognize the link between neurophysiology, attachment and childhood trauma in developmental psychopathology. The authors propose that future diagnostic criteria must therefore consider post-trauma-perturbation, neurophysiology and attachment dynamics to identify, diagnose and treat early childhood trauma.

PAF Utility in Postoperative Recovery

The authors propose that hospital surgical teams include procedures that allow PAFs to be present with their infants to prevent postsurgical trauma.

The assumption that the PAF will regulate a distraught child may not always hold true. Regulation of sympathetic responses where the PAF may be dysregulated, or emotionally unavailable and therefore of little use in regulating their toddler is a significant consideration. Psychoeducation for parents and preconditioning the toddler before surgery (Levine & Kline, 2007) is an obvious option. However, preparation may not always be possible as in the case of emergency surgery. Providing an *Attachment-postsurgical-nurse*, specially trained in somatic soothing may be one possible solution.

Prevalence of Childhood Trauma

The APA in DSM-5 (2013) recognized that the prevalence of preschool childhood trauma may be underestimated because previous criteria were "insufficiently developmentally informed" (p. 276).

Early childhood trauma may be more common than previously understood given an estimated

eighty-five percent of adult mental health problems correlate to attachment disruptions in early or mid-childhood (Siegel, 2012).

Psychiatric medicine has recognized the significance of early childhood trauma in the long-term mental health of those impacted by expanding the diagnosis of PTSD 309.81 in DSM-5 (2013) to include children under the age of six. This inclusion into the mainstream of categorization of psychiatric illness, is a significant validation of the growing realization regarding the catastrophic impact of trauma on the mental health of children and the evidence that adverse experiences in early life can result in adolescent and adult psychopathology.

The Hunter Institute, the Australian Psychological Society (APS) in conjunction with Early Childhood Australia (ECA) published a position statement on ‘The Importance of the Early Childhood Years’ (Lawrence, et al., 2015) where they identified the significant role of relationships and the environment in brain development for early childhood. “Children who are born into chronic violence develop more connections in the part of their brain dedicated to fear, anxiety and impulsive actions”... making them... “hypervigilant and wary” (Moore, 2014, p.2). In Australia, it is estimated the 14% of children and adolescents aged 4-17 i.e., 560,000 children have clinically significant mental health issues (Lawrence et al., 2015) and 7% experience difficulties that are long-term (Australian Bureau of Statistics, ABS, National Health Survey, 2006).

Childhood trauma overwhelmingly emerges in the context of attachment perturbation due to PAF mental health issues. van der Kolk’s (2014) predicted a ‘tsunami’ of developmental disorders emerging from infant exposure to PAF anxiety, depression, adult trauma presentations, drug or alcohol issues, influences of interactive screen technology, domestic violence, natural and man-made disasters such as war or famine as well as those precursors listed by van der Kolk, (2014) which highlights the scale of early childhood exposure to PAF trauma.

Developmental trauma is described by van der Kolk (2014) as "the hidden epidemic" (p. 149). Apart from SE (Levine, 1997, 2010, 2017), Sensorimotor Psychotherapy (Ogden, 2015) and Mindsight (Siegel, 2010), well developed, effective therapies that address child traumatic development and attachment have been limited, particularly for preverbal infants where brain growth is dramatic and verbal communication is limited (Tronic, 2007).

Secure Attachment and the Mutual Regulation Model (MRM)

From observing Tronic’s (2007) ‘mother in still-face’ perturbation demonstrations, it is evident that the PAF/infant interaction that governs infant emotional and neuro-regulation is dependent on mutually attuned, eye to eye, face to face, skin to skin, voice to voice, soothing behaviors between both parties in the PAD. Active, interpersonal, neurobiological and regulating attunement (Siegel, 2012) between infant and PAF, as Tronic proposes in “mutual regulation,” is a model of dyadic attachment.

In a secure, PADs mothers were placed before their infant and requested to hold a ‘still face’ and remain unresponsive to the child. The child, when confronted with the still face of their mother, is quickly overwhelmed into distressed behaviors (such as turning away, arching, agitated tongue movements, drooling, and going slack). This interpersonal experiment highlights the significant reliance young children have on their PAFs to regulate affect and behavior with voice, face and touch. The rapid and dramatic affect-dysregulation that occurs for infants during mother-in-still-face directs speculation at two issues.

Firstly, if the impact of a few moments of unresponsive maternal-still-face in an otherwise secure PAD, can have such a dramatic dysregulating impact on the infant, what magnitude of attachment-perturbation can postsurgical trauma have on the traumatized toddler who does not receive PAF-Attachment-Soothing during fear/distress crying?

Secondly, by inference, when applied to post-surgically traumatized infants, the MRM may validate PAF psychopathology as a precursor to infant/toddler trauma. Further, a distraught and dysregulated PAF in the PAD, coupled with a traumatized toddler, generates massive attachment perturbation, a fertile platform for development of TA, TAD, DTD, childhood PTSD and PAF psychopathology.

Infant/Toddler Neurodevelopmental Distinctions

The authors make a distinction between infants and toddlers.

An infant becomes a toddler when mid-brain neurobiological, limbic structures and motor functions manifest when the capacity to consciously use limbs to seek safety or avoid threat, are functionally available to the toddler. Perambulation, self-determined running from danger (flight) or *running-to* the PAF in CS indicates that the infant, from a neuro-functional and therefore survival point of view, has become a toddler.

Impact of SE on Attachment

SE may reinstate homeostasis, connecting the prefrontal social engagement structures with sub-cortical survival structures of limbic and primitive brain (Levine, 2015). Homeostasis, is achieved by regulating and resetting

Parasympathetic/Sympathetic rhythms to integrate with prefrontal social engagement structures so that the traumatized toddler can interpersonally reengage. SE engages the autonomic/peripheral nervous system in the restoration of whole-brain reintegration after trauma (Siegel, 2012) which includes the CRN (Payne, et al., 2015) and the Polyvagal Network (Porges, 2011).

Talk Therapies: CRN, Defense Cascade and Response Flexibility

The CRN is comprised of a ‘complex dynamical system formed by the subcortical autonomic, limbic, motor and arousal systems’ (Payne, et al., 2015, p. 1; Payne & Crane-Godreau, 2015). Kozłowska et al., (2015) has identified the

“Defense Cascade” as reactions broadly associated with flight, fight, freeze and immobility that are mediated by “a common neural pathway; activation and inhibition of particular functional components in the amygdala, hypothalamus, periaqueductal grey, and sympathetic and vagal nuclei” (p.1). Siegel, (2012) identifies ‘Response Flexibility’ as the ability to access incoming stimuli and to modify external behaviors. He goes on to describe, “the middle prefrontal cortex receives direct input from the sensory cortex, which is responsible for perception; the somatosensory cortex and brainstem, which register somatic sensation; the autonomic nervous system which controls bodily functions; the dorsolateral prefrontal cortex, involved in attentional processes; the medial temporal lobe, involved in explicit memory; and the associational cortex, involved in abstract forms of thought.” p. 169.

It is clear from the above descriptors that neuro-regulation is complex and not easily manipulated with cognitive (talk) therapies alone (Wylie, 2004). The immature toddler brain is developing social and survival networks that rely heavily on PAD neuroception even in times of safe, attuned connectedness. Talk therapies have limited capacity where the trauma is procedural for a preverbal toddler.

The Unique Sequential Role of SIBAM in Dyadic Completion

In SE theory, the elements of SIBAM are targets for homeostatic coherence and individual neuro-regulation. *Running-to* the PAF may initiate the defense cascade sequence and resolve the first component of a neuro-physiological and behavioral completion sequence.

QA/PAF-SAS is the vital second component, Meaning Making for the Toddler “*I’m safe*” and for the PAF “*my child is safe and soothed.*” This sequence regulates and completes the homeostatic process for whole brain integration, for both PAF and toddler that is necessary for neuro-regulation and secure attachment in the processes of DC. The return to secure attachment reinstates attuned connectedness and attachment-neuroception, resulting in resolution of toddler trauma.

Here, the phylogenetically ordered, neuromotor, survival, behavioral imperative of *running-to* the PAF for safety and corresponding QA/PAF-SAS validates SE theory, Attachment and Polyvagal Theories where **Dyadic Completion** is the mechanism of completion for the *tad*.

In SE attachment therapy “*Run to Mummy*” is a key therapeutic intervention for perambulating toddlers at the point of high sympathetic activation. The presiding therapist needs to focus on and track the toddler’s body movements, facial expressions and orientation behaviors including turning the head from threat arousal to PAF/CS during the two stages of the freeze response. Firstly, at the alert stage of perceiving threat, and then at the fear arousal stage. The timely encouraging comment of “run to mummy” may trigger the well-established CS neuro-motor structures to translate fear orientation/arousal into physical action for survival, encouraging a shift from freeze/overwhelm to flight, *running-to* the PAF for soothing and attachment-neuroception. The remainder of the sequence is driven by “instinctive, bodily based protective reactions” (Payne et al., 2015, p.1) within phylogenetically ordered deep brain survival structures.

TODDLER TRAUMA AND PROCEDURAL MEMORY

Levine (2015), describes three broad categories of procedural memory, “learned motor actions, hardwired emergency responses, and *approach or avoidance of attraction or repulsion* (hedonic valences)” (pp. 25-26). Procedural memories can become compromising in trauma. “Traumatic memories are fixed and static” and are imprints in procedural memory of overwhelm that do not “yield to change” nor do they respond to new experiences as other memories do (Levine, 2015, p.7).

When observing Levine’s Baby Jack demonstration (2012, 2015), it is evident that Levine is focused on Jack’s nervous system and supported completion and discharge within his CRN (Payne, et al., 2015). After he assisted Jack in a hand push (behavioral completion of a thwarted defense), Levine directed Jack’s

attention to his braced back by placing his hand gently on the area of activation (promoting interoception). Shortly afterwards Jack relaxed into his mother’s soothing embrace allowing QA/PAF-SAS. Dyadic Completion is evident in the immediate and spontaneous aftermath of Jack’s QA. Jack’s hedonic valence for approach and avoidance shifted from threat arousal to Comfort-Seeking in QA/PAF-SAS. Jack and his mother automatically engage in an Infant/PAF interaction that can only be described as an attuned, interpersonal, neurobiological reconnection (Levine, 2015, p. 91) which is the end-game goal of DC. Jack and mother reset their secure attachment bond in a flood of oxytocin and touch driven attunement, described by MacGill (2015) as “one important component of a complex neurochemical system that allows the body to adapt to highly emotive situations” (p. 1).

Toddlers can, from a motor cortex and limbic brain perspective, actively determine their approach/avoidance strategies, giving veracity to their primitive survival motivational rudders (Levine, 2015). After **avoidance** of danger characterized by stress hormones and limbic brain override of social connection, the toddler can actively seek comfort and **approach** the source of soothing and neuro-attachment allowing recovery in QA/PAF-SAS.

The ensuing attunement and mutually regulating affect (Tronic, 2007) of the PAF’s neurobiological influence on the traumatized toddler’s overwhelm, is characterized by a shift from freeze to connectedness and social engagement (Porges, 2016). Furthermore QA/PAF-SAS increases oxytocin production for both participants. This process may be a vital phylogenetically ordered, neurochemical correlate of DC.

Therapeutic Mechanisms: Rescue Role Play and SE

Completion was facilitated by a therapeutically attuned invitation to “*run to mummy*” at the point of trauma activation. Activation was accessed through titrated proximity to medical/surgical toys (see photograph 2.) that

evoked the thwarted procedural threat responses. Sympathetic arousal organized into running through identification with an anatomically correct doll (see photograph 1.)

Photograph 1



Photograph 2



Polyvagal Response to Fear-Immobilization

Waking in pain, disoriented by anesthesia to an alien world of strangers, in a dysregulated state of low vagal tone in the Ventral Vagal Complex, (where shifts in vagal tone facilitate the processes of attention, motion, emotional expression and shifts in metabolic output) (Porges, 2011) toddlers seek comfort and soothing from their PAF with vocalization of distress, which engages the PAF's Ventral Vagal Complex which in turn encourages proximity and social engagement through facial expression, vocalizations and gestures that

regulates arousal. High vagal tone inhibits the SNS response of flight/fight and supports social engagement. In hyper-arousal and without the immediate, socially-engaging PAF-attachment-soothing/neuroception, a secondary survival response results in SNS activation of flight/fight. Unable to behaviorally complete the survival response such as running away from danger or *running-to* the PAF for safety, a third branch of the polyvagal network engages, i.e., the Dorsal Vagal Complex (DVC). When tone from the DVC is high, "immobilization and potential life-threatening bradycardia, apnea, and cardiac arrhythmias may occur" (Porges, 2011 p. 165). Failure to engage the PAF during this critical recovery and reorientation process after surgery is a fertile platform for attachment perturbation (Tronic, 2007; Schore, 2012; Ogden, 2015) and may initiate TA, TAD, DTD or childhood PTSD. From this point on therapeutic intervention may be required to resolve toddler trauma and restore secure attachment.

The Long-term Aftermath of Postsurgical Trauma

Eventually pain subsides, pseudo-attachment is established and overwhelm is somewhat contained by PAF-Soothing. However, a stubborn legacy of the traumatic episode may manifest in activated neural imperatives for survival which are incomplete. Right brain emotional and procedural memory of the PAF, as a source of safety and survival is compromised and prefrontal structures employed in social engagement and PAF comfort-seeking are now heavily influenced by the subcortical, limbic brain. The amygdala, responsible for perceiving threat, is enervated and elevated in all aspects of interaction with the world and may have life-long influence on a person's fear arousal and vigilance (Rabinac, et al., 2011). A toddler may develop an altered perception of threat and safety as the social structures of the brain develop.

Vigilance may be easily triggered by ordinary events observable in oppositional behaviors, affect dysregulation and low tolerance to frustration (Levine & Kline, 2007). As the toddler becomes more socially

dysregulated, avoidance behavior and affect overwhelm occur more regularly. Affect dysregulation may evolve over time from minor intolerance to pathological overwhelm. This liability may be accompanied by intense or prolonged psychological distress i.e., tantrums or emotional numbing. Avoidance of trauma triggers such as routine first aide for cuts and scratches or visits to the doctor can become episodes of re-traumatization. If the toddler remains in high dorsal vagal tone or in collapse, medical intervention in the form of hydration and tube feeding may be required. Poorly understood, post-surgical toddler trauma can often be overlooked in therapeutic history taking leading to misdiagnosis such as Autistic Spectrum Disorder, Oppositional Defiance Disorder, Attention Deficit Disorder and Attention Deficit Hyperactive Disorder (van der Kolk, 2014).

Neuro-regulation and Memory During Dyadic Completion

Heightened fear arousal can lead to an entrenched freeze, heightened vigilance and/or Dorsal Vagal Tone enervated by the amygdala and entrenched in procedural memory as Traumatic Attachment. Social connectedness is impeded when hedonic valances of avoidance are initiated.

Directing attention to physiological indicators of approach or avoidance (Levine, 2015) in threat arousal or Comfort-Seeking stimulates the toddler's neurostructural regulation. PAF-soothing-touch to areas of bracing initiates bottom-up whole brain integration by engaging the toddler's prefrontal social engagement/attachment systems to reconnect with their PAF in Dyadic Completion. A toddler's procedural memory of fear/immobilization/abandonment dissipates through discharge of survival energy in QA, reinstating attachment-neuroception and hippocampal implicit memory of the PAF as safe. The sequence of DC counteracts the dysregulating neuro-survival signature of vigilance and avoidance reinitiating connectedness and whole brain integration thereby limiting psychopathology.

DC might also initiate connectedness with new attachment figures and may offer therapeutic utility where biological attachment figures are no longer available.

Dyadic Completion; Applied Theory

SE involves a process of Resourcing (attending to positive present experience/stimuli), Activation, Therapist-guided Interoception/Proprioception, Discharge, Completion, Neuro-regulation/Integration and Renegotiation of sympathetic/parasympathetic arousal (Payne & Crane-Godreau, 2015).

DC focuses on two nervous systems and the interpersonal neurobiological processes of the PAD, refining the SE process toward: Resourcing, Threat orientation, Safety orientation, Comfort -Seeking, *Running-to* the PAF, QA/PAF-SAS, Dyadic Completion, and Exploratory orienting.

Dyadic Completion, as masterfully demonstrated by Levine (2012) in the Baby Jack demonstration, may be significant in the resolution of TA, TAD, DTD, and Childhood PTSD. At this juncture, SE, Polyvagal and Modern Attachment Theories can be applied to validate an elegant, time honored evolutionary sequence of comfort-seeking and attachment-soothing that can be replicated in clinical settings. SE practitioners unaccustomed to working with toddlers, neuro-psychotherapists and attachment-informed child therapists may have utilitarian access to therapeutic interventions inclusive of SE, Polyvagal and Attachment Theory to resolve Toddler Trauma.

PROPOSAL

To examine the therapeutic utility of combining SE, Attachment and Polyvagal theories in recovery of post-surgical toddler trauma. Through the medium of Rescue Role Play, Dyadic Completion will be assessed for therapeutic utility.

LITTLE BILL (LB): HISTORY OF PRESENTING PROBLEMS

Assessment

Clinical interviews with both mother (M) and maternal grandmother (MG) confirmed a constellation of symptoms consistent with a differential diagnosis of Childhood Posttraumatic Stress Disorder (DSM-5: 308.81). LB was observed to have visible, self-inflicted bite marks on his right arm. At presentation, LB was perturbed and disorganized in the presence of his maternal attachment figure and slightly more attuned and secure with MG.

Referral

No mention of postsurgical trauma was identified in the diagnosis of “psychological problems.” There was no previous history of behavioral problems or presentation of psychological difficulties. LB’s relationship with his father and parental separation did not feature significantly in any aspect of his history or presentation. M described LB as ‘a normal healthy boy with no behavioral difficulties’ until the surgery. Since surgery LB’s maternal attachment, social and self-regulatory behavior had become dramatically compromised.

Precipitating History

M stated she was not in attendance to soothe LB post-surgically but, “I could hear his terrified cries,” which fostered considerable distress for her also. M was later informed that LB was physically restrained to prevent him biting the intravenous drip from his right arm. When reunited with LB, M reports she was unable to soothe him for some time and with considerable difficulty.

Five days after discharge, M returned LB to the hospital due to lethargy, weight loss and his refusal of food and fluids. Dehydrated and malnourished, LB was again restrained to insert a hydrating intravenous drip. In a terror/fight response, M describes LB being “held by three to four nurses with a pillow over his chest, arms and legs, a nurse on each leg and arms to insert the needle.” During this episode, M was proximally separated from LB, but visible to him. LB could not be soothed in his terror/fight

response. Already in a state of Tonic Immobility the second “inescapable attack” may be the more significant trauma by initiating low vagal tone of the VVC and high vagal tone of the DVC (Porges, 2011).

Restrained in an ‘inescapable attack’ and with his PAF in visual proximity but in an apparently passive (complicit) stance, may have altered LB’s perception of M as a source of safety and attachment-neuroception and may therefore be an initiator of LB’s attachment perturbation as evidenced by his disorganized attachment behavior towards her.

Diagnosis

When assessed at separate interviews with both M and MG, LB’s observed and described symptoms met criteria for DSM-5 Childhood Posttraumatic Stress Disorder (309.81). Criteria was met under subsections A:1; B: 1,2,4 & 5; C: 1,2,3,5 & 6; D:1,2 & 5; E; & F.

PTSD was selected as best fit diagnosis because LB’s limbic system may have interpreted the restraint episode as a terminal assault as evidenced by his Tonic Immobility and shutdown presentation.

DSM-5 offers only scant symptomatic information under criteria F (p. 274), to explain neurological impairment and developmental delay which is often the dominant feature of childhood trauma with the most far reaching, life-long consequence for both child and PAF.

Because secure attachment is critical to good mental health TA, TAD and DTD may be more appropriate descriptors of childhood trauma. The key difference in diagnostic criteria between childhood PTSD and DTD, TAD are the dyadic perturbations so critical for understanding the loss of healthy neurodevelopment including loss of connectedness, synchronicity, PAD reciprocity and neuroceptive attachment. Combining attachment perturbations with Polyvagal Syndrome descriptors (Porges, 2016) offers significantly more diagnostic insight when treating early childhood trauma.

Presentation and Symptoms

Since LB's consecutive terror/restraint and inescapable attack episodes, his behavior had become increasingly oppositional, defiant, aggressive and self-harming. Symptoms and aberrant behaviors included:

Self-injurious behavior: LB begun to bite himself to the point of bleeding mostly on the right arm in conjunction to increasing intolerance to frustration.

Biting others: LB began to bite his older brother (7 years) and other children in kindergarten settings. Biting occurred during normal childhood competitive situations.

Tantrums: LB had increasingly violent tantrums that escalated over time and ended in self-injurious biting. Prior to his surgery tantrums were rare and mild; biting was not part of LB's behavior.

Sleep Disturbances: Nightmares, nocturnal vigilance, delaying sleep onset, and early waking.

Impaired Relationships, Attachment

Perturbation: LB's comfort seeking behaviors became disorganized in times of frustration. Emotional overwhelm transitioned quickly to rage. When LB would normally seek soothing from M prior to the trauma, he now avoided comfort-seeking and rejected M's attempts at soothing. Often LB would socially isolate. Evidence of LB's procedural memory shifts from approach to avoidance mechanisms became increasingly evident in oppositional behaviors towards his mother.

Mood Dysregulation: M described LB as "changed, not happy, agitated and fussy, intolerant to frustration, often angry and increasingly demanding for my comfort but I could never soothe him."

Avoidance of Trauma Triggers: LB would not allow any medical care including simple Band-Aid application or ointment for minor injury. When presented with a Band-Aid, LB would

become hysterical and highly resistant. He would run away or struggle and fight in panic if Band-Aid application persisted.

Secondary Attachment Figure

LB had a secure, secondary attachment bond to his maternal grandmother (MG). MG attended several of the sessions with LB as M was a single working mother. MG became increasingly involved in LB's treatment. As LB's symptoms evolved, both M and MG became active in home based SE treatment. Several meetings were conducted with MG to strategize and teach rudimentary SE for home based interventions. Simple SE Rescue Role Play games with kinesthetic, interoceptive and proprioceptive touch techniques were offered to M and MG. Both caregivers were psychologically minded and motivated to resolve LB's attachment perturbations.

PROPOSED TREATMENT PLAN

In SE theory, trauma is resolved when homeostasis is reinstated (Levine, 2010; Payne, et al., 2015). Homeostasis is achieved through regulation of the CRN (Payne, et al., 2015). The restitution of whole brain function in adults can be achieved in individual treatment with SE, however, for toddlers CRN regulation must often be conducted within the Traumatized Attachment Dyad to achieve DC.

Proposed SE Intervention Methodology

The treatment plan set out to replicate Levine's intervention with Baby Jack with the goal of titrated Dyadic Completion. Replication focused on empowered 'pushing-away' (fight-completion) and '*running-to*' his PAF (flight-completion) for QA/SAS. LB accessed his sensations via interoception when playing with a doll as the patient. LB was observed for hedonic valences of *Approach and Avoidance* in his completion sequence where *running-to* represented escape and triumph over the 'inescapable predatorial attack'. This sequence completed survival imperatives and restored CRN function through QA/PAF-SAS in DC.

Titration:

Titration included gentle activation of the threat response cycle in Rescue Role Play with LB first soothing the doll and freeing the doll from ‘inescapable attack.’ This involved LB’s self-directed strategies to soothe and rescue the doll, undoing bandages and removal of the offending intravenous drip. It was initially hypothesized that this titrated, empathic rescue role play might precede the main discharge and completion event when LB may identify himself directly as the patient.

As it eventuated, LB declined to play **the patient** requiring a revised treatment strategy. Instead, LB successfully discharged his trauma through initiation of the self-protective strategy of *running-to* his PAF for comfort-seeking with corresponding QA/PAF-SAS.

With verbal encouragement, LB allowed himself to be soothed and physically surrendered to PAF-Soothing. The PAF was encouraged to “hold him gently until he is ready to disengage, place your hand on the braced areas of his back.” Chest to chest embrace was encouraged (but not required) in a game of Activation, Comfort-Seeking, *Running-to* and QA/PAF-SAS for DC.

REVISED TREATMENT PLAN

The processes of Dyadic Completion should be spontaneous but may also may be encouraged. The toddler’s arousal/discharge process may benefit from verbal encouragement at the point of activation in the approach/avoidance sequence.

LB was apparently stuck in disorganized attachment (freeze), unable to seek PAF soothing. Approach valences were therefore verbally encouraged when LB’s SNS began to organize toward defense with a verbal cue of “*run to mummy.*”

Rationale for Revised Treatment Plan

The PAF “acts as the ventral vagal (soothing) system until the infant’s nervous system is myelinated and can begin to regulate itself” (Levine, 2007, p. 11.15).

During the second inescapable attack, LB could not engage in attachment-neuroception with M. LB’s limbic brain hijacked his prefrontal social engagement systems and overrode his neuroceptive attachment bond with M. It is possible that LB interpreted his mother’s apparently passive position to be complicit in the attack which generated attachment perturbation, explaining LB’s oppositional behavior towards M which was less evident towards GM. It is also possible that the oppositional behaviors stemmed from more generalized dysregulation in the CRN and displayed itself more prominently with his PAF.

However, the working hypothesis for treatment centered around M’s attempts to soothe being impeded by LB’s Traumatic Attachment to M. Treatment was therefore re-targeted at LB’s thwarted comfort-seeking behaviors at the point of fear arousal. LB’s PAF avoidance was a sign of sympathetic arousal at the beginning of a survival sequence. When LB displayed signs of activation, his phylogenetically ordered initial response was to orient towards his PAF followed by traumatic hesitancy (disorganized attachment) at seeking comfort from her, as evidenced by his Freeze. At this point, with orienting toward his PAF and SNS mobilization bringing him out of freeze, LB was gently encouraged to “*run to mummy.*” This verbal encouragement reengaged LB’s social networks, refreshing implicit memory of attachment-neuroception enough for him to ‘take a chance’ on PAF-Soothing. Verbal encouragement might have made the crucial difference to initiate comfort-seeking leading to the DC sequence.

PROPOSED PROCEDURE

After initial settling and familiarization of the therapeutic surroundings LB would be introduced to the post surgically-prepped, doll and the toy Doctor’s Kit (see photograph 3 & 4) symbolizing LB’s trauma. Activation of trauma response would be followed by autonomic signs and verbal encouragement toward Comfort-Seeking.

Photograph 3



Photograph 4



First Level of Arousal: Activating traumatic memory for titration and discharge

The therapist would introduce a medical trauma doll and initiate play toward soothing it. Coing and sounds of sympathy would be made as well as inviting LB to notice the plight of the “little boy who needs help.” This would naturally kindle LB’s threat response cycle within proximity to the traumatic memory. It would also Resource LB for the arousal event in the context of fostering his intrinsic empathy for another (self).

LB’s levels of arousal would be closely monitored for freeze or immobility responses. He would be encouraged to “*Run to Mummy*” when orienting towards his PAF or at the slightest defensive organization of SNS activation. Care would be taken to titrate LB’s

arousal with encouragement to seek comfort at the point when he came out of freeze. *Running to the PAF* would discharge flight energy through behavioral completion. Each stage of arousal would include time for discharge, renegotiation and settling of LB’s Flight/Fight response and he would be allowed to set the pace of his involvement with the role play.

The PAF would be instructed to hold LB gently but firmly with emphasis on allowing him to control of the amount of attachment soothing he received. LB’s interoceptive awareness of his bracing through touch would initiate discharge of CRN through “interoceptive, kinesthetic and proprioceptive mechanisms” (Levine, 2010; Payne, et al., 2015) and initiate DC.

Second Level of Arousal

Since his trauma, LB had been panicked by Band Aids and minor first aid. Hedonic valences were triggered with Band Aids and real surgical implements (see photo 5). LB would be encouraged to handle these real medical tools to soothe the doll’s ‘hurt’ by role playing medical care and applying the Band Aids to the doll. Play-first-aid with the doll was considered an empowered titration for activation of LB’s fear of medical procedures. This process would allow LB to reclaim a sense of agency where he was previously in a freeze response.

Third Level of Arousal

LB would be invited to willingly dismantle the intravenous drip from the doll (therapist or PAF may have to do this first to titrate LB’s arousal). LB could apply soothing ‘medical treatment’ to the trauma doll in the form of bandaging and Band Aids and repeat these games until his interest extinguished.

Fourth Level of Arousal

The therapist may then invite LB to access the trauma with himself **as the patient** - through play or story. Inviting the PAF to describe parts of the story is another possible treatment direction while monitoring and responding to LB’s reactions and responses.

It is possible that working through the fourth level of arousal could lead to traumatic overwhelm and re-traumatization. Therefore PAF-SAS requires at least a partial reinstatement of Secure Attachment. This would only be attempted if LB “allowed” or was actively engaged in the process. Rescue Role Play would include both the PAF and LB removing the mock intravenous drip from his arm thereby completing the survival process for LB and reestablishing a secure attachment with his PAF in Dyadic Completion.

ANTICIPATED OUTCOME

It was hypothesized that Rescue Role Play and SE would provide a titrated journey through LB’s procedural trauma memory. The combination of these treatment protocols would complete LB’s survival sequences and subsequently reinstate secure attachment in DC. Procedural memory of trauma could then transpose to the hippocampus as a new narrative memory of successful completion and survival.

TREATMENT SESSIONS

Session 1 & 2

LB was simply allowed to familiarize himself with the room, with minimal introductory communication with the therapist. The unprepped doll (see photo 1.) and the Play Medical Kit was present in the mix of toys (photograph 2.) but LB showed no interest.

Interaction with the therapist was increased to ensure a familiar and safe environment for LB to engage in the activation stage of Rescue Role Play.

Session 3.

The doll was prepared with post-surgery mock-up representing LB’s trauma including intravenous drip, bandages and Band Aids (see photograph 3). LB’s attention was drawn to the doll by the therapist who dramatically soothed the trauma doll, “Oh dear! What’s happened to this little boy?” followed by therapist removing the offending post-surgical apparatus, all the while vocalizing soothing and comfort to the

“hurt little boy.”

LB displayed intense and focused interest and traumatic activation while staying close to and soothed by his PAF (this intense interest is a good indicator that the Rescue Role Play is well targeted to the traumatic memory). GM was directed to place her hands on LB’s braced back to initiate interoceptive, kinesthetic and proprioceptive awareness while also vocalizing soothing sympathy towards the “hurt little boy.”

LB made several tentative approaches towards the doll but was encouraged by the therapist to, “run to GM” at the point of visible activation. Activation was indicated by immobilization, orientation to GM, fearful and worried facial expressions with slowed or stiffening body movements and hesitancy to approach the trauma doll. GM was ready with soothing hugs and interoceptive touch on LB’s braced back and shoulders in SAS. LB allowed short periods of surrender into Quiescent Attunement.

LB made his first hesitant successful approach with encouragement, “let’s help this little boy! Can you help him?” Being more engaged than afraid, LB mimicked vocal and behavioral sympathy towards the “hurt little boy” as he removed the mock surgical apparatus. LB’s first behavioral completion, rescuing the “little boy” by removing the offending postsurgical apparatus, was followed by his facial and body expressions of triumph, smiling, high-five with therapist and *running-to* GM which was reinforced by PAF-SAS hugs with periods of QA where LB surrendered into the hug. This process was repeated several times during the session.

LB independently and spontaneously commenced rescue-play without prompting and became fully engaged in fantasy play to “rescue the little boy.” After several rescues and for the first time since the surgery LB was happy to touch a Band-Aid and engaged in administering a Band-Aid to the ‘little boy.’ This was a breakthrough in his fear and avoidance response and evidence of LB resolving parts of his trauma. With each episode of activation and triumph the therapist encouraged LB to “*run-to*

GM” for hands-on touch and SAS. Often LB would not seem to notice SAS touch as he engaged in the rescue play. After several repetitions LB’s relaxed muscle tone indicated less need for soothing. LB readily engaged in the rescue work with the trauma doll and spent the entire session spontaneously, in self-directed play, going back and forward at moments of activation for hugs with GM with increased periods of QA.

When asked, LB would not allow administration of first aid to himself with Band Aids or bandages.

Homework

GM instructed M in the rescue role play and purchased the same Play Medical Kit to continue rescue role play at home. After each session GM instructed M to replicate the rescue role plays at home.

Session 4.

After initial settling in and replaying established rescue role plays from session 3, it was clear that LB was less activated and therefore less involved in rescuing the hurt boy.

As activation decreased, real but safe surgical instruments could be introduced (see photograph 5) as well as the use of real Band Aids which the therapist applied to GM. LB had previously panicked at the sight of Band Aids but surprisingly engaged in putting band aids on GM and the doll. Much of the session was spent in applying and reapplying Band Aids. LB repeated this rescue role play with Band Aids several times until he again lost interest and began playing with other toys.

Photograph 5



When Rescue Role Play with the doll seemed complete, the therapist invited LB to play “**the patient**” and have the therapist apply a Band Aid to his own small scratches. LB became strongly activated, resisted emphatically and immediately *ran-to* GM for PAF-SAS. As instructed GM soothed him with her voice, face to face gaze, chest to chest and somatic touch until LB settled and surrendered into the QA/PAF-SAS hug and again began to play after Dyadic Completion.

Discussion Session 4.

LB’s panicked reaction to the suggestion of Band Aids administered to himself came close to traumatic overwhelm because it accessed a more significant activation of his traumatic procedural memory where an adult (perhaps much like LB’s surgical Doctors, embodied in the presence of the treating therapist) invited direct medical intervention. To avoid overwhelm, smaller steps should be taken, allowing the toddler to adjust to increased activation.

LB’s completion sequence was by then fully embodied in the physical presence of GM and embedded behaviorally as a Dyadic Completion process involving all five elements of SIBAM. When seeking safety, LB ran to GM in phylogenetically ordered renegotiation of his CRN. Established PAF-SAS and co-regulating QA reengaged his secure social networks with GM. He could be soothed and experience regulation of his fear arousal through SAS

gradually moving closer to DC and secure attachment.

For the remainder of the session LB was more hesitant around the surgical toys and avoided rescue role play or Band Aid application, preferring to play with other toys. This was interpreted as a form of self-directed titration in the trajectory towards DC. No further attempts were made to engage LB in direct medical play, allowing him to discharge flight/fight energy.

Note: LB was setting his pace for his trauma recovery and would not allow any Band Aid application to himself. This must be fully respected as a traumatized child will signal with distress behaviors on how far to proceed and at what pace.

Rescue role plays continued at home until LB finally allowed M to apply Band Aids to his arm for the first time. This was a significant milestone in LB's Dyadic Completion and reconnection with M.

Session 5.

LB again engaged in rescue work with the doll performing surgical procedures in play and repeatedly seeking reassurance and comfort from GM. LB did not move toward rescue role play with himself as "The Patient." LB was again setting his pace for regulation of his CRN. This was the last treatment session with LB.

Follow-Up: Generalized Effect of SE

After session 3, LB's biting behavior reduced to only occasionally and ceased altogether after the 4th session. Sleep returned to normal and oppositional behaviors normalized. Meltdown tantrums disappeared and LB returned to his previously contented and happy self.

DC in SE therapy reconnected LB in secure neuroceptive-attachment with M who conducted homebased Rescue Role Play to the point where LB allowed Band Aid application. Dyadic Completion in SE therefore had a significant generalized effect.

M reported that LB had cut his forehead in a fall and had to receive stitches in the local Doctor's

surgery. LB, with M's encouragement, willingly and calmly allowed the surgical procedure and at no time did he show agitation or up-regulation into flight/fight. Trusting in his now secure neuroceptive-attachment with M, LB could engage social structures of his neocortex in neuroceptive-attachment to accept M's reassurance in the necessity of the procedure. This is an indication of the transformative healing power of SE in Toddler Trauma when phylogenetically ordered, survival behaviors are employed in Dyadic Completion to reinstate secure attachment.

ORIGINAL SE TREATMENT PLAN: REVIEW

The SE therapeutic goal was for LB to behaviorally complete his survival imperative in an empowered, "pushing-away" and escape *running-to* his PAF for DC. However, pushing-away did not appear a component of what LB needed for his completion sequence. It is likely that empowerment was achieved symbolically by LB independently removing the offending intravenous drip followed by *Running-to* his PAF for QA-PAF-SAS and DC. DC was identified as a prominent key feature in renegotiating elements of his trauma. Traumatic procedural memory of inescapable attack was replaced with survival/triumph memory of secure, attachment-neuroception in DC with M and GM. Un-potentiated flight/fight responses were discharged in the SE sessions and the integrated connectivity of LB's CRN was restored. LB was then able to access and integrate social engagement networks with his survival limbic brain functions in homeostasis. The many confounding symptoms of attachment perturbation ceased and the threat of impending TA, TAD, DTD, and childhood PTSD were averted.

Separation from his PAF during and after the actual trauma is theorized to be a primary cause of LB's trauma. Neuroceptive reunion in the PAD was central to LB's recovery. The trauma was not in the event but embodied in LB's nervous system and the interconnected nervous systems of the PAD, which for toddlers is the

source of neuroceptive regulation.

It is argued that if LB and M had been permitted to experience surgical recovery as a dyad rather than LB enduring it alone there may have been no traumatic response. M may have soothed LB before the onset of overwhelm thereby averting the trauma. A regulated verbally soothing PAF, encouraging cooperation in a procedure is the embodiment of attachment-neuroception.

During SE titration, it was discovered that the actual regulating process involved the phylogenetically ordered completion process of *running-to* the PAF in Comfort-Seeking combined with QA/PAF-SAS. Toddler nervous systems although fragile and vulnerable in threat circumstance particularly where the PAF is unavailable to them, are equally resilient and robustly adaptable and responsive to somatic regulation. DC in SE for the PAD, offers a therapeutic medium and a mechanism to renegotiate and reconnect in secure attachment. Furthermore, DC may renegotiate and transpose traumatic procedural memories into an integrated narrative memory of survival and triumph.

During LB's hereto considered *incomplete* SE therapy (after session 5), LB experienced an accidental head wound requiring minor surgery involving injection and stitches to his forehead. This real life minor emergency eloquently validated the efficacy of DC in SE in what could have been another traumatizing episode. PAF-Attachment-neuroception in the face of further surgical trauma engaged LB's social networks in dyadic connectedness (trust) confirming the reinstatement of secure attachment-neuroception with M.

FURTHER GENERALIZED RECOVERY EFFECTS

Several weeks after stitches were removed, again without traumatic activation, LB accompanied his older brother to the school dental bus where he voluntarily climbed into the dental chair and allowed a dental examination. For a toddler who had

suffered overwhelming trauma associated with mouth, throat and ear surgery, this was another significant validation of SE-Dyadic Completion as a tool in treating Toddler Trauma.

At three months' post-treatment, M reported another ear infection requiring LB's admittance to hospital. Prior to disembarking the car to enter the hospital LB stated "you're going to stay with me aren't you mummy?" to which M responded, "I will keep you safe and I will not leave you." LB again allowed ear, nose and throat examinations and surgical procedures by doctors in medical-threat circumstances without traumatic overwhelm. The secure-neuroceptive-attachment bond between LB and M had deepened through SE-Dyadic Completion and was secure enough to revisit trauma in a real situation without traumatic activation or overwhelm.

This affirming interplay between LB and M is a clear indication of the now secure neuroceptive-attachment bond between mother and toddler, where LB's nervous system had been integrated, returning to the pre-surgical state of secure-neuroceptive-attachment. Connectedness (Porges, 2016) between toddler and mother had been renegotiated through SE-Dyadic Completion utilizing the medium of the attachment dyad where LB's CRN, Polyvagal network and prefrontal social engagement networks were once again integrated in a secure interpersonal neurobiological attachment bond with M.

The therapeutic utility of SE-Dyadic Completion in Toddler Trauma and the dynamically regulating role of *running-to* the PAF for QA/PAF-SAS offers an alternative intervention process and an effective refinement to the SE therapy process within the "toddler" neuro-developmental stage of attachment. DC in SE may offer a treatment process to divert the course of Childhood PTSD and DTD allowing traumatized toddlers to develop healthy social engagement after traumatic overwhelm.

CONCLUSION

Dyadic Completion combined with Levine's (2010), SE treatment for early childhood trauma (Levine & Kline, 2007), offers a modality consistent with modern attachment theory (Siegel, 2012; Schore, 2013), current neuroscientific theory (Porges, 2011, 2016; Schore, 2012; Siegel, 2012), and established child play therapy, validating the importance of secure attachment (Ogden, 2015; Tronick, 2007)

and behavioral completion in Rescue Role Play to address early childhood trauma.

SE-Dyadic Completion offers important considerations in both the prevention and occurrence of post-surgical, Toddler Trauma and resolution of TA, TAD, DTD and Childhood PTSD.

REFERENCES

- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation*. Hillsdale, NJ: Erlbaum.
- American Psychiatric Association., (2013). *Diagnostic and statistical manual of mental disorders; Fifth edition*. Arlington, VA. American Psychiatric Association.
- Australian Childhood Foundation: Protecting Children. (2011). *Discussion Paper 18: Polyvagal theory and its implications for traumatized students*. Retrieved January 23, 2016, from www.childhood.org.au
- Bowlby, J. (1969). *Attachment* (Vol. 1) New York, NY: Basic Books.
- Cassidy, J., Shaver, P. R., Eds. (2008). *Handbook of attachment; Theory, research and clinical applications 2nd Ed*. New York: Guilford Press.
- Craig, A. D. (2009). How do you feel-now? The anterior insula and human awareness. *Nat. Rev. Neurosci.* 10, 59-70
doi:10.1038/nrn2555 Craig, A. D., (2002). How do you feel?
- Interoception: the sense of the physiological condition of the body. *Nat rev. Neurosci.* 3, 655-666. doi: 10.1039/nrn894
- Craig, A. D., (2001). Spinothalamic lamina I neurons selectively sensitive to histamine: a central neural pathway for itch. *Nature Neuroscience*. New York 4.1 72-77.
- Craig, A. D., (2002). How do you feel? Interoception: the sense of the physiological condition of the body. *Nat rev. Neurosci.* 3, 655-666. doi: 10.1039/nrn894
- Craig, A. D., (2001). Spinothalamic lamina I neurons selectively sensitive to histamine: a central neural pathway for itch. *Nature Neuroscience*. New York 4.1 72-77.
- Fisher, J. (2017). *Healing the fragmented selves of trauma survivors*. New York: Routledge.
- Fosha, D. (2010). Healing attachment trauma with attachment (...and then some!). In M. Kerman (Ed.), (2010). *Clinical pearls of wisdom: 21 leading therapists offer their key insights*. New York: W.W. Norton & Co.
- Kozłowska, K., Walker, P., McLean, L., Carrive, P. (2015). Fear and defense cascade: clinical implications and management. *Harvard Review of Psychiatry* July; 23(4):263-287.
- Krueger, D. W., (1989). *Body self & psychological: a developmental and clinical integration of disorders of the self*. Brunner/Mazel: Uni Michigan
- Lawrence, D., Johnson, S., Hafelcost, J., Boterhoven de Haan, K., Sawyer, M., Ainsley, J. & Zubrick, S. R. (2015). The mental health of children and adolescents. Report on the second Australian child and adolescent survey of mental health and wellbeing. The importance of the early childhood years. Hunter Institute of Mental Health, Australian Psychological Society & Early Childhood Australia. (2016). APS: Australia. Canberra ACT: Retrieved January 8, (2016).
<http://www.health.gov.au/internet/main/publishing.nsf/Content/mental-pubs-m-child2>
- Levine, P. A., & Frederick, A. (1997). *Waking the tiger: Healing trauma*. Berkeley Cal: North Atlantic Books.
- Levine, P. A., (2007). *Somatic Experiencing: Intermediate Year: Introduction/Overview*. Unpublished Somatic Experiencing Practitioner Training Manual. Copyright © 2007 by Foundation for Human Enrichment, 6685 Gunpark Drive, Suite 210, Boulder, Colorado, 80301. Copyright under International, Pan American and Universal Copyright Conventions.
- Levine, P. A., (2010). *In an unspoken voice: How the body releases trauma and restores goodness*. Berkeley Cal: North Atlantic Books.

- Levine, P. A., (2012). *Baby Jack: Somatic Experiencing Demonstration*; Unpublished demonstration.
- Levine, P. A., (2015). *Trauma and memory: Brain and body in a search for the living past; A practical guide for understanding and working with traumatic memory*. Berkley Cal: North Atlantic Books.
- Levine, P. A., Kline, M. (2011). Use of somatic experiencing as a PTSD prevention tool for children and teens during the acute stress phase following an overwhelming event. In V. Ardino (Ed.), *Post-traumatic syndromes in children and adolescents*.
- Levine, P. A., Kline, M. (2007). *Trauma through a child's eyes: Awakening the ordinary miracle of healing; infancy through adolescence*. Berkeley Cal: North Atlantic Books.
- MacDonald, H.Z., Beeghly, M., Grant-Knight, W., Augustyn, M., Woods, R. W., Cabral, H, et al. (2008). Longitudinal association between infant disorganized attachment and childhood posttraumatic stress symptoms. *Development and Psychopathology*, 20 (2), 493-508.
- MacGill, (2015). Oxytocin: What is it and what does it do? [wwwM.medicalnewstoday.com/articles/275795/php](http://www.M.medicalnewstoday.com/articles/275795/php)
- Main, M., & Solomon, J. (1986). Discovery of a new, insecure-disorganized/disoriented attachment pattern. In M. Yogman & T. B. Brazelton (Eds.), *Affective development in infancy* (pp.95-124). Norwood, NJ: Ablex.
- Moore, T. (2014). Understanding the nature and significance of early childhood: New evidence and its implications. <http://www.rch.org.au/> In APS Australia (2016). *The importance of the early childhood years*. Hunter Institute of Mental Health, Australian Psychological Society & Early Childhood Australia.
- Ogden, P. (2015). *Sensorimotor psychotherapy: Interventions for trauma and attachment*. New York, W. W. Norton & Company.
- Payne, P., Crane-Godreau, M. A. (2015). The preparatory set: a novel approach to understanding stress, trauma, and the bodymind therapies. *Human Neuroscience* <http://journal.frontiersin.org/journal/16#archive>
- Payne, P., Levine, P. A., & Crane-Godreau, M. A. (2015). Somatic experiencing: using interoception and proprioception as core elements of trauma therapy. *Frontiers of Psychology* 4 Feb 2015. 10,3389/fpsyg, 2015.00093
- Porges, S. (2016). *The neurobiology of trauma, attachment, self-regulation & emotion*. RNV042910, DVD, Recorded April 8, 2016, PESI Publishing & Media. www.pesi.com
- Porges, S. (2011). *The polyvagal theory; Neurophysiological foundations of emotions, attachment, communication, and self-regulation*. New York: W. W. Norton & Co.
- Rabinac, C. A., Angstadt, M., Welsh, R.C., Kennedy, M. L., Phan, K. L. (2011). Altered amygdala resting-state functional connectivity in post-traumatic stress disorder. *Front Psychiatry*; 2: 62. Published on line 2011 November 14, doi: 10.3389/fsyt.2011.00062
- Schimmenti, A. Bifulco, A., (2015). Towards a better understanding of the relationship between childhood trauma and psychiatric disorders: Measurement and impact on addictive behaviours. *Psychiatry Investigation*: Jul: 12.3: 415-416. <http://doi.org/10.4306/pi.2015.12.3.415>
- Schore, A. N. (2012). *The science of the art of psychotherapy*. New York: Norton.
- Siegel, D. J. (2010). *Mindsight*. New York:

Bantam Books, Random House Inc.

Siegel, D. J., (2010). *The mindful therapist*. New York: Norton.

Siegel, D. J. (2012). *The developing mind: How relationships and the brain interact to shape who we are*. New York: Norton.

Tronic, E., (2007). *The neurobehavioral and social-emotional development of infants and children*. New York; Norton.

van der Kolk, B. A. (2014). *The body keeps the score: Mind, brain and body in the transformation of trauma*. New York: Penguin Group (USA) Inc.

van der Kolk, B. A. (2016). *Trauma, attachment & neuroscience*. RNV043550. DVD, Recorded April, 22, 2016: PESI pub.

Wylie, M. S. (2004, January/February). The limits of talk: Bessel van der Kolk wants to transform the treatment of trauma. *Psychotherapy Networker*, 30-41.