

# **The Efficacy of Somatic Therapies in Trauma Recovery**

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Stress is established when the body's ability to maintain homeostasis is perceived to be threatened or under attack (Hornor, 2017). Severe or chronic forms of stress can result in significant physiological and psychological changes that negatively impact quality of life (Hornor, 2017). When individuals experience high levels of distress, their emotional, cognitive and/or physical well-being can become severely compromised (Knight, 2019; Sperry, 2016). Exposure to both acute stressors, like natural disasters and chronic life stressors, such as poverty, can have traumatic short-term and/or life-long effects (Knight, 2019; Sperry, 2016).

A history of trauma is frequently associated with mental health disturbances, such as suicide ideation, depression, anxiety, and substance use (Sperry, 2016). Some people who experience trauma may also meet the criteria for a post-traumatic stress disorder (PTSD) diagnosis, depending on the severity of psychological impairment (Sperry, 2016). In epidemiological surveys conducted between 2001-2010, 70.4% of respondents from the general population (n = 68894) reported exposure to one or more of 29 trauma types (e.g., physical violence, war combat, intimate partner violence) and the mean duration of PTSD was estimated to be six years (Kessler et al., 2017). These statistics suggest that trauma is a commonly occurring phenomenon, and that its adverse effects can persist for prolonged periods of time.

The literature on trauma and its aftereffects has led to the adoption of the 'trauma-informed' (TI) care model by whom, which emphasises principles of safety, trust, empowerment, choice and collaboration with trauma survivors in health care systems (Knight, 2019). A growing body of TI care research has been dedicated to understanding the mind-body trajectory, to determine how clients can be best supported in healing through counselling (Banitt, 2019; Beck, 2017; Knight, 2019; Schauss et al., 2019). Literature on the neurobiological effects of trauma

suggests that elevated levels of stress are associated with negative changes in the brain's hormonal chemistry (Banitt, 2019; Hornor, 2017). Experiencing trauma during periods of critical development, such as in early childhood, is especially detrimental for healthy emotional and cognitive functioning (Taylor, 2010). In the aftermath of trauma exposure, the brain's ability to process traumatic memories also becomes compromised, which can permanently alter its connection with the body's stress response system (Nemeroff & Binder, 2014; Sperry, 2016; Tania, 2019).

Resetting the chronic stress response may, therefore, be an important precursor to helping people live well-adjusted lives after trauma exposure. The use of body-oriented psychotherapies to treat intrinsic memories of trauma, through which the stress response system is triggered, are slowly beginning to gain momentum in the field of counselling (Grabbe & Miller-Karas, 2018). Body-based approaches, such as somatic therapies, seek to treat problems from a holistic perspective by attending to the body and the various non-verbal components of the human experience (Payne & Crane-Godreau, 2015; Tania, 2019). The neurobiological mechanisms by which toxic stress affects the mind offer anecdotal evidence for body-oriented therapies, however, due to a paucity of evidence-based research the efficacy of somatic therapies have not been well established (Almeida et al., 2019; Grabbe & Miller-Karas, 2018; Payne & Crane-Godreau, 2015; Tania, 2019; Williamson et al., 2015). It is, therefore, my intention to review extant literature on somatic therapies in this paper and explore how such alternative approaches can contribute to the development of the trauma counselling field.

The research on TI care has also attempted to understand the mechanisms by which people can experience positive psychological changes after trauma exposure (Nakagawa et al., 2016). Such benefits are referred to as post-traumatic growth (PTG) in the literature and include

higher resilience, empathy, and an appreciation for life (Nakagawa et al., 2016). The prevalence of PTG factors amongst individuals who experience trauma have been associated with better life outcomes, and fewer long-term consequences (Linley & Joseph, 2004). Some neuroscientific evidence indicates that body awareness in trauma survivors can increase resiliency (Haase et al., 2015; Haase et al., 2016). As a prospective counsellor, I seek to understand the neurobiology of trauma and explore the relevance of body-based therapies in promoting healing among individuals with severe or complex presentations of trauma. As such, the topic for my research is an investigation into the efficacy of somatic therapies in treating trauma and fostering resilience.

### **Self-Positioning Statement**

My interest in the nervous system and mind-body connection came to fruition when I started pursuing my undergraduate degree 12 years ago. I recall sitting in the lecture hall for an introduction to neuropsychology class and soaking in every word uttered by my professor. I was fascinated by the intricacies of the brain and how it was responsible for orchestrating every internal and external bodily action. When I eventually transitioned to working with at-risk children, I learned that trauma could disrupt the brain's capacity to respond appropriately to environmental stimuli. I witnessed this occurring in my work with a refugee child who was terrified of attending school, because the sound of school bells reminded her of the war sirens in her home country. As I got to know her better, I learned that despite having conscious awareness of her safe surroundings she found it difficult to stop her body from reacting negatively to the school bell.

My work with such survivors helped me to see how adverse life experiences could prime the brain to operate and stay in survival mode, and consequently lead to the development of post-traumatic stress symptoms. I noticed that some of the clients I worked with continued to

experience significant impairments in daily functioning for years after trauma exposure. In my personal life, I had similar problems with day to day living after being diagnosed with cancer. My cancer diagnosis shattered my perceived sense of safety and had prolonged effects on my cognitive, emotional, and physiological well-being. My healing journey started with a focus on relieving bodily stress through body-based practices, such as meditation and yoga. These activities helped me become more attuned to what was happening in my body and allowed me to take proactive steps to take care of myself. As mindfulness slowly became part of my daily routine, I noticed how conscious efforts to relax my body often helped to expand my distress tolerance.

Over the years I met with several counsellors who utilized different theoretical approaches to address my post-traumatic stress symptoms. My experiences as a client in therapy heavily influenced my beliefs around what contributed to long-term healing and growth in the aftermath of trauma. I developed an unfavourable view of cognitive behaviour therapy (CBT) because I did not experience any noticeable changes in my trauma symptoms after undergoing CBT-informed treatment. My interest in body-oriented therapies developed after I saw a counsellor who treated me using Gestalt therapy. The techniques utilized by my therapist increased my awareness of internal states and helped me tolerate more uncomfortable sensations. I experienced further improvements in my affect and cognition after undergoing eye movement desensitization and reprocessing (EMDR) therapy. My therapist supported me in regulating my body while I visualised difficult memories, until those memories no longer caused me to react negatively. These body-based interventions played a central role in my recovery journey from cancer and gave me immense respect for my body's role in promoting wellness.

My personal and professional experiences have led me to believe that healing from trauma requires a focus on treating the body first, rather than the cognitive mind. Due to my assumptions about trauma recovery, it is important to acknowledge personal biases that can interfere with the credibility of my capstone project. Despite having limited academic knowledge of body-oriented therapies, I am partial to assuming the efficacy of somatic therapies as a trauma treatment modality. Furthermore, I have a bias that makes me inclined to diminish the potency of CBT in supporting trauma recovery.

Since my biases can predispose me to preferential examination of literature on somatic therapies, it is important that I initiate some safeguards to maintain the integrity of my research project. I wish to develop a high level of trustworthiness between myself and the reader, so that the latter can gain an accurate understanding of somatic therapies in trauma work. For my research project to have any merit, I recognize that it will be necessary to use scientific knowledge to support any arguments made in favour of body-oriented therapies. I will, therefore, ensure that the literature incorporated into my paper has been extracted from peer-reviewed journals and published works. I will help the reader gain a well-rounded review of somatic therapies by including multiple sources of information and ensuring that the findings in individual articles have been echoed by other authors.

As my biases will inevitably continue to be present throughout the research and writing process, I will take proactive steps to monitor their interference by keeping a personal journal; this will allow me to record my thoughts and ideas, as they relate to the findings that I come across in various research articles, so that I can track when and how my biases show up. The journal will help me question and challenge my assumptions at every step so that my interpretations and conclusions are based on scientific literature rather than personal opinions.

Additionally, I will seek feedback from external sources to ensure that my paper has been rigorously reviewed and critically evaluated before the final draft submission. These sources will include my project supervisor, and an anonymous second reader, who have pre-existing knowledge on trauma counselling and can help identify gaps in my review of the literature.

## **Literature Review**

### **Trauma**

Trauma occurs when an individual experiences one or more disturbing psychological, emotional or physical situations that have a long-lasting impact on their inter and intrapsychic well-being (Choi et al., 2017; McDonald, 2020). It can be interpersonal (i.e., occurring between people, such as abuse, violence, and torture) or medical (i.e., a response to illness, such as brain injury, chronic disease and motor vehicle accidents) in nature (McDonald, 2020). In a nationally representative sample of adult Canadians, 76% of respondents reported experiencing one or more traumatic events in their lifetime (Ameringen et al., 2008), which indicates that trauma is a commonly occurring phenomenon in the general population. Trauma and its aftereffects can result in mild to severe disruptions in an individual's daily functioning (Laceulle et al., 2019; Rudenstine et al., 2019).

Trauma is a highly subjective experience and there are many idiosyncrasies in symptom presentation, severity, and duration (McDonald, 2020). The same traumatic event can have different manifestations on an individual level, depending on the meaning that has been assigned to the experience (Jackson et al., 2016; McDonald, 2020; Stover et al., 2017). Symptoms of trauma can be an amalgamation of internalised and externalized changes, such as intrusive thoughts, nightmares, mood alterations, social withdrawal, aggression, and self-destructive behaviours (Rudenstine et al., 2019). Trauma survivors often experience cognitive dissonance, a

term coined by Festinger (1957) to explain conflicts between attitudes and/or behaviours that negatively impact an individual's self-consistency (Stone & Cooper, 2001). They may have difficulty integrating traumatic experiences into their overall life narrative, which results in significant intrapsychic distress (Grabbe & Miller-Karas, 2018; McDonald, 2020).

### **Post-traumatic Stress Disorder (PTSD)**

Following exposure to traumatic event(s), it is estimated that 8% of Canadians will develop PTSD (Canadian Mental Health Association, 2013). PTSD is characterised by four symptom clusters in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association, 2013): intrusions (e.g., flashbacks), avoidance (e.g., avoiding reminders of trauma), negative alterations in cognition and mood (e.g., self-blame), and changes in reactivity (e.g., anger). PTSD is considered a chronic disorder as symptom frequency and severity fluctuates over time and depends on many factors, including the degree of exposure to subsequent stressors following a traumatic event (Taylor, 2017). One study estimated that the lifetime prevalence of PTSD in the Canadian population to be 9.2% (Ameringen et al., 2008).

Individuals with PTSD frequently experience challenges in arousal modulation, the ability to adapt physiological states according to environmental demands (van der Kolk, 2015), which has a negative impact on their self- and body-awareness and emotional regulation (Lanius et al., 2011; Pole, 2007; Schauer & Elbert, 2010). PTSD symptoms are linked to higher disease burden with patients being at greater risk of developing concurrent physical symptoms (e.g., autoimmune diseases, metabolic syndrome) (Gupta, 2013; McFarlane, 2017; McLeay et al., 2017; O'Donovan et al., 2015; Yehuda et al., 2015) and other psychiatric disorders, such as anxiety and depression (American Psychiatric Association, 2013). Multiple meta-analyses studies have also reported mild cognitive deficits in PTSD patients in many areas of executive



functioning including memory, inhibition attention and information encoding (Brewin et al., 2007; Johnsen & Asbjørnsen, 2008; Polak et al., 2012; Scott et al., 2015).

### **Understanding Trauma from an Attachment Lens**

Bowlby's (1973) attachment theory explains that infants have a basic survival need to maintain physical proximity with primary caregivers. In the context of dyadic relationships children develop schemas that impact how they understand and interact with the world (Bowlby, 1973; Dahlitz, 2015). The internal working model that emerges is encoded via implicit memories and modulates non-conscious emotion regulation throughout the individual's lifespan (Schore, 2011). The way a caregiver approaches a child will, therefore, shape the latter's brain development (Schore, 2012) and influence their ability to attune to self and others (Siegel, 2015). Attachment patterns begin to emerge within the first few months of life, when brain development is occurring rapidly, and social-emotional learning is dominant (Badenoch, 2008). By the time children can communicate verbally, many years of implicit meaning making have already been established (Ogden & Fisher, 2015).

When trusted and available caregivers are present, children develop approach schemas that motivate them to interact with others (Dahlitz, 2015) leading to secure attachments (Bowlby, 1973). However, a lack of availability or trust in a caregiver will compromise communication development (Siegel, 2015) and create avoidance schemas that foster anxious or avoidant behaviours (Dahlitz, 2015). Children who develop insecure attachments are at a neurological disadvantage as their internal working models prime them to experience more dysregulating affective states (Schore, 2014). They may experience chaos and/or rigidity in their responses (Siegel, 2019), which impact their level of intimacy and connection in adult relationships (Masero, 2017).

## **Neurobiological Impact of Childhood Trauma**

Early life exposure to trauma has long-term consequences for neurological and psychological development (Kirlic et al., 2020; Putnam, 2009). Trauma affects the subcortical structures of the brain, which modulate the body's responses to danger and fear (van der Kolk, 2003). Childhood adversity also impacts threat detection, stress response, emotion regulation, interoception (i.e., a conscious awareness of the physiological body), reward anticipation, and self-referential processes (Teicher et al., 2016). Traditional therapies have attempted to resolve these neurological impairments through words and meaning making (Miller-Karas, 2015; van der Kolk, 2003). However, in some children preverbal or unconscious memories of trauma can trigger defense responses that result in diminished visceral states (Mahajan, 2018; Miller-Karas, 2015; Porges, 2015). These memories activate bodily states associated with past traumatic events, making it difficult to process novel stimuli as safe (Miller-Karas, 2015). The body's capacity to accumulate restitutive experiences that support nervous system regulation, therefore, becomes impaired and opportunities for socio-emotional growth may go amiss (Miller-Karas, 2015; Schore, 2001, van der Kolk, 2003).

Children who demonstrate greater resiliency to trauma possess states of personal competence that permit them to have flexible responses to new challenges (Miller-Karas, 2015; van der Kolk, 2003). Their resilience develops in the context of secure attachments where caregivers respond in safe and predictable ways, such as by comforting the child, so that the latter can connect with their environment adaptively (Miller-Karas, 2015). When children do not receive such learning opportunities for self-soothing, their nervous systems adapt to living in perceived danger. This impacts their ability to engage appropriate motor responses, leading to cognitive, affective, and behavioural challenges that can last into adulthood (Porges, 2015; van

der Kolk, 2003). Interventions that foster being attuned to somatic sensations can, however, support positive shifts in executive functioning (e.g., observing before reacting) and allow children to better respond to the demands of their present environment (Mahajan, 2018; Miller-Karas, 2015; Streeck-Fischer & van der Kolk, 2000; van der Kolk, 2003).

### **The Stress Response System**

When the human body encounters stressful stimuli in its environment, the brain activates a complex stress response system, which includes the hypothalamic-pituitary-adrenal (HPA) axis (Hornor, 2017). The HPA axis is responsible for maintaining homeostasis through a negative feedback loop that modulates blood cortisol levels; when the body detects danger, the HPA axis responds by increasing the adrenal release of cortisol (Nugent et al., 2016). Once blood cortisol levels reach an optimal level, typically a few hours after a stressful event, the HPA axis signals the adrenal cortex to stop producing cortisol and helps restore a state of calm (Nugent et al., 2016).

High blood cortisol levels, due to repeated or prolonged activation of the HPA axis, can have a number of consequences, including living in a state of chronic stress (Nugent et al., 2016), having an increased sensitivity to new stressors (Danese & Baldwin, 2017), and reliving parts of past traumatic experiences (Iacona & Johnson, 2018). Prolonged activation of the HPA axis, particularly in childhood is concerning, as it can alter gene expression, thereby disrupting the typical development of physiological, emotional, and cognitive functions (Danese & Baldwin, 2017; Hornor, 2017; Slopen et al., 2013; Sperry, 2016; Szyf et al., 2016).

The stress response system also includes the autonomic nervous system (ANS), which is responsible for initiating physiological changes through its two branches, the sympathetic and parasympathetic nervous systems (Rotenberg & McGrath, 2016). The sympathetic nervous

system (SNS) accelerates the body's 'fight or flight' response by pumping blood into muscles and preparing for action (Roelofs, 2017; Rotenberg & McGrath, 2016; van der Kolk, 2015). The parasympathetic nervous system (PNS) restores the body by decelerating during dangerous situations and promoting relaxation during times of safety (Porges, 1995; Porges, 2007; Roelofs, 2017; van der Kolk, 2015). Proper functioning of the PNS is paramount for the body to recover from stressful stimuli and maintain a healthy homeostatic baseline (van der Kolk, 2015).

Animal studies indicate that the ANS and HPA-axis are deeply interconnected via brain structures (Rotenberg & McGrath, 2016), and play a critical role in co-regulating human functioning through physiology, affect, and cognition (Rotenberg & McGrath, 2016; Williamson et al., 2015). Individuals who live in a state of chronic stress are at risk of experiencing psychological problems, because of an impaired ability to function from a neutral, rather than a defensive state at baseline (Williamson et al., 2015); this creates an incongruence between the demands of their environment and their biological responses, which overwhelms their capacity for healthy coping (Sperry, 2016; Williamson et al., 2015). A pathological state of hyperarousal in the body is also associated with trauma and the development of PTSD (Horowitz, 2011; Yehuda et al., 1998).

### **Contributions of Polyvagal Theory**

The polyvagal theory describes the evolution of the stress response system to include affect and communication as the preferred form of psychological and physical protection (Porges, 2001). The theory draws its name from the vagus nerve, the longest running nerve, that connects the brainstem to vital organs, such as the lungs, heart, and stomach (Ogden et al., 2006a; Porges, 2004; Porges, 2011; van der Kolk, 2015). The vagus nerve relays valuable information about the state of the body to the brain and helps the nervous system select one of

three defense responses (Ogden et al., 2006a; Porges, 2004; Porges, 2011; van der Kolk, 2015). These hierarchical defense responses are controlled by the limbic system (involved in behavioural and emotional responses) (Levine, 1997) and are activated unconsciously (Dana, 2018) through neuroception, a process by which neural circuits differentiate between safe and threatening stimuli (Porges, 2004; Porges, 2011).

When faced with danger, the ventral branch of the vagal nerve activates a social engagement response; this is the preferred form of emotion regulation that establishes safety via connection and relationships, such as by calling for help or negotiating with a predator (Dana, 2018; Ogden et al., 2006a; Porges, 2001). The social engagement system also promotes homeostasis by dampening the release of cortisol via the HPA-axis, thereby inhibiting the stress response (Porges, 2018). If the social engagement system fails to work or is unavailable, the body mobilizes a primal self-protection response via fight or flight (Ogden et al., 2006a; Porges, 2004; Williamson et al., 2015). In situations where mobilization is not effective or fails to activate, the dorsal branch of the vagal nerve resorts to the most primitive defense available for protection, immobilization; some common examples of freezing behaviours are fainting, feigning death, or being submissive to protect from a threat or predator (Ogden et al., 2006a; Porges, 2001; van der Kolk, 2006; Williamson et al., 2015).

The stress response system requires an accurate neuroception of safety to decode the level of threat so that the three defense responses can work together to respond appropriately (Dana, 2018). Healthy functioning of the process is dependent on a person's innate sense of safety and can be impaired in the absence of secure attachments and positive relationships in early life (Porges, 2004). The prevalence of trauma, particularly in childhood, can disrupt the effectiveness of the first-tier social engagement response, and create problems with being attuned

to feelings and body responses, and prosocial development (Ogden et al., 2006a; Perry, 2005; Porges, 2001; van der Kolk, 2006). A limited sense of safety, due to the lack of healthy social interactions, can intensify the perception of environmental threats and prime the nervous system to engage second- or third-tier defense responses (Ogden et al., 2006a; Porges, 2001; Williamson et al., 2015). The inaccessibility of the social engagement response further exacerbates the neuroception of danger and leads to disorganisation in the defense responses (Perry, 2005; Porges, 2001; Porges, 2004; van der Kolk, 2015).

Polyvagal theory is helpful to understanding the neurobiological impairments that occur in the mind-body connection when trauma is prevalent. The repeated activation of mobilization and immobilization responses hosts an environment of hyper- and hypo-arousal respectively (Ogden et al., 2006a) and prevents the body from resolving threats (Kain & Terrell, 2018; Williamson et al., 2015); this creates a feedback loop where the nervous system defaults to fight, flight, and freeze behaviours rather than establishing social connections, which consequently impacts physiological, behavioural and social functioning (Kain & Terrell, 2018; Nemeroff, 2016; Porges, 2004). The inability of the social engagement system to activate and dampen the release of cortisol via the HPA-axis, can also have mild to severe psychological consequences, including depression, anxiety, dissociation, and paranoia (Williamson et al., 2015). Rather than considering such impairments to be permanent, proponents of polyvagal theory suggest that people with trauma can learn new ways of engaging their nervous systems to promote healthy mind-body connections (Dana, 2018; Schlote, 2018).

### **The Social Brain**

Human beings are inherently social creatures who are shaped by the nurturing they receive via relationships (Dahlitz, 2015). Many of the neural systems of the middle prefrontal

cortex, also known as the “social brain” (Cozolino, 2014) are formed within the context of interpersonal relationships (Siegel, 2012a). This region of the brain is considered an interface between the limbic system and the more advanced areas (e.g., executive functioning) of the cortex (Siegel, 2012a). Working in conjunction with ventral vagal activation, the social system mediates communication, emotion regulation and response flexibility (Badenoch, 2008). A well-functioning social brain exhibits cortical influence over the amygdala and effectively modulates overactive emotion responses, such as fear (Dahlitz, 2015). The most primitive parts of the social brain rely primarily on “bottom up” processing of emotional and somatic information (Cozolino, 2014).

### **Window of Tolerance**

The window of tolerance is an optimal zone for autonomic arousal levels, which operates between the two zones of hyperarousal (e.g., hypervigilance, emotional reactivity) and hypoarousal (e.g., numbing, disable cognitive processing) of the autonomic nervous system (Siegel, 2012a; Ogden et al., 2006a). Parallels can also be found between the window of tolerance and polyvagal theory (see Appendix), with hypoarousal occurring during activation of the parasympathetic system and hyperarousal during sympathetic activation (Corrigan et al., 2010; Ogden et al., 2006a). When arousal remains between the window of tolerance, there is an integration of bottom up and top-down processing, and a person can keep operating within the social engagement system (Ogden et al., 2006a). Optimal arousal, where adaptive emotion regulation and information processing can occur (Dahlitz, 2015; Ogden et al., 2006a), may therefore benefit from a well-established social brain via healthy attachments.

Traumatic experiences can make the window of tolerance narrower, making an individual more likely to enter hypo- or hyperarousal states when implicit trauma memories are activated

(Dahlitz, 2015). In these states the prefrontal cortex cannot mediate an integrative and flexible response to stimuli as defense survival mechanisms take control (Siegel, 2012a). Rapid oscillations between hypo- and hyperarousal may also occur as the nervous system tries to achieve regulation, which can be a chaotic and disturbing experience for the individual (Corrigan et al., 2010). Widening the window of tolerance and maintaining the social engagement system, so that higher and lower states of arousal can be experienced without overwhelming the body, is therefore important from a neuropsychotherapy perspective (Dahlitz, 2015; Marzillier, 2014).

### **Top-down Versus Bottom-up Processing**

Human beings are believed to have two main thinking systems, which are described in the literature as top-down and bottom-up processing (Kahneman, 2011). Bottom-up processing is a fast, evolutionarily older system that sends messages to the limbic system and CNS without activating the prefrontal cortex (Field, 2019). Top-down processing is a slower pathway system that utilizes the frontal lobe and executive functioning processes to make decisions (Field, 2019). Siegel (2012b) illustrates the difference between the two systems using the example of a person seeing a rose; in bottom-up processing the rose is noticed with curiosity, whereas in top-down processing it is coded as a flower based on existing schemas. These models are useful in understanding how the human mind is evolutionarily designed to act fast and think slow, for self-preservation purposes (Field, 2019).

In top-down processing behaviours are changed through thoughts and perceptions, whereas in bottom-up processing they are changed through somatic awareness (Caldwell, 2018). Most verbal therapies use top-down processing, by encouraging clients to acknowledge and change maladaptive thoughts (Antonucci, 2020). Neurobiological research shows that the stress response is managed by primitive brain systems that are difficult to access through verbal and



cognitive interventions (Ogden et al., 2006b; van der Kolk, 2015). Verbal interventions focus on the prefrontal cortex, an evolutionarily newer part of the brain, which is shown to have less influence on lower brain areas in traumatised people (van der Kolk, 2015). Therefore, many studies support that trauma survivors may benefit from bottom-up interventions, that start with a focus on physical sensations, to facilitative arousal and affect regulations (Levine, 2012; Ogden et al., 2006b; van der Kolk et al., 2014).

Somatic burden, which is the appraisal of the body's physical symptoms, has also been shown to mediate the relationship between PTSD symptom severity and perceived cognitive deficits (Bartel et al., 2019). It is possible that the chronic activation of stress responses leads to more attention being paid to somatic symptoms, making executive functioning less available (Bartel et al., 2019). High somatic burden may lead individuals to feel powerless in exerting control over their behaviour, leading to distrust of the mind and body (Bartel et al., 2019). It is proposed that treatment of somatic symptoms, that contribute to perceived somatic burden, should be a cornerstone in trauma treatment approaches (Carvajal, 2018; McLeay et al., 2017). It is possible that body-based interventions can help PTSD patients gain relief from somatic and psychosomatic pain (Galovski et al., 2009; Gordon et al., 2016; Kahn et al., 2016; Nakamura et al., 2017; Shipherd et al., 2014; Wahbeh et al., 2014).

## **Trauma Memories**

Human memories are stored in two systems, which together make up the dual processing model (Brewin, 2001; Brewin, 2015). The first of these systems is sensorimotor, which is non-verbal and evolutionarily primitive; the second is verbal, involving declarative memory, which is more complex (Brewin, 2001; Brewin, 2015; Pradhan et al., 2019). Under stressful circumstances declarative memory can become impaired leading to greater influence of non-

verbal memories on behaviour (Fink, 2017). When a traumatic event occurs, there appears to be a disconnect between how the memories are processed by the two memory systems (Brewin, 2015).

Sensory memories of trauma are emotionally laden and are mediated by several brain structures in the limbic and subcortical areas, including the HPA axis, prefrontal cortex and amygdala (Pradhan et al., 2019). Impairments in the neural circuits involved in the modulation of implicit memories can result in the formation and maintenance of trauma symptoms, such as hyperarousal, flashback and intrusive thoughts (Pradhan et al., 2019). In PTSD, the memories become linked to both the original context of the trauma as well as subsequent non-specific or benign triggers, which leads to chronic stress response activation (Pradhan et al., 2019). As popular talk therapies target declarative memories, this often leaves the sensorimotor/non-verbal component of trauma memories unattended (Pradhan et al., 2019).

### **A Bottom-Up Approach to Treating Trauma**

The chronic activation of the stress response compromises a person's awareness of their present environment by affecting the 'bottom-up' processes involved in memory encoding and perception (Fisher, 2019). Although explicit memories of traumatic events, such as childhood abuse or neglect, are not always accessible in the cognitive brain, the experience of the trauma remains lodged in the body (van der Kolk, 2015). The body remembers stressful events in the form of implicit or procedural memories, such as smell and sounds, that trigger the neuroception of threat and engage the body in a defense response (Levine & Buczynski, 2013); this can result in a heightened state of fear and vigilance at homeostatic baseline as the body decides that danger is more prevalent than safety. To deactivate a chronic stress response individuals must, therefore, develop an accurate neuroception of safety in their environment (Williamson et al.,

2015). Since neuroception is automatic and implicit memories are unconscious, it is difficult to introduce change in the nervous system through top-down cognitive processes (Dana, 2018; Porges, 2011).

Developing interoception (i.e., body awareness) can be helpful in reducing chronic stress response activation (Grabbe & Miller-Karas, 2018; Haase et al., 2016; Payne & Crane-Godreau, 2015). Reduced volume and activity in the insular brain structures of trauma survivors indicates that challenges in emotion regulation may result from lower interoceptive awareness (Herringa et al., 2012; van der Kolk, 2015). Findings from neuroimaging studies suggest that there is also an association between lower levels of resilience and less interoceptive awareness and body responsiveness (Haase et al., 2015; Haase et al., 2016; van der Werff et al., 2013). The shared location of interoception and resilience processes in the insular cortex lends support to the idea that developing an internal mind-body awareness can promote emotion regulation via somatic processes (Grabbe & Miller-Karas, 2018; Haase et al., 2015; Haase et al., 2016; Uddin et al., 2017).

Impairments in interoception have also been associated with psychological disorders, such as depression (Avery et al., 2014), anxiety (Paulus & Stein, 2010) and, substance use (May et al., 2014). It is believed that interoception can give trauma survivors access to positive internal resources that increase their capacity for adaptive self-regulation (Grabbe & Miller-Karas, 2018; Haase et al., 2016; Payne & Crane-Godreau, 2015; Pinna & Edwards, 2020; Price & Hooven, 2018). The neurobiology of trauma points to the efficacy of bottom-up processing in treating trauma and promoting resiliency via both interoceptive and proprioceptive (musculoskeletal and kinesthesia) processes (Beck, 2017; Grabbe et al., 2020; Haase et al., 2015; Haase et al., 2016; Payne et al., 2015; Price & Hooven, 2018). A bottom-up approach to treatment looks at the

nervous system as a whole and acknowledges that the body's autonomic and somatic systems are deeply interconnected (Beck, 2017; Grabbe & Miller-Karas, 2018; Levine, 2012; Payne et al., 2015).

### **Mind-body Connection**

Western society has been heavily influenced by principles of Cartesian dualism, which suggests that the mind and body are separate (Field, 2019; Schore, 2012). The mind's capacity for rational cognition and conscious awareness has led it to be held in superior regard, with the prominent belief being that the body is a machine that simply responds to the mind (Field, 2019). The impact of Cartesian dualism can be seen across varying systems, such as the separation of mental and physical health care services (Field, 2019). Most psychotherapy approaches have also emphasised top-down processing, which relies on insight and cognitions to change behaviour (Field, 2019). As a result, the body has been largely ignored, leading to an underemphasis of the importance of physiological processes in promoting mental health.

Body-oriented psychotherapies are based on the idea that mental and physical health are deeply interconnected and work together to promote well-being (Antonucci, 2020). Techniques focus on assessing and treating psychological distress through a focus on the body itself (Shapiro, 2013). The body's sensations, breath and movement are considered the body's way of communicating about internal processes (Caldwell, 1996). Body-oriented therapies support the mind-body connection by increasing attunement and reprogramming autonomic responses (Currie et al., 2019). They use the body as a tool and resource to interrupt maladaptive patterns and promote self-regulation through present-moment awareness (Antonucci, 2020).

### **Somatic Therapies**

Somatic psychotherapy is grounded in an understanding of nervous system dysregulation and its impact on the body due to trauma exposure (Grabbe & Miller-Karas, 2018; Haase et al., 2016). Somatic therapists propose that the overactivation of the ANS permits trauma to continue being experienced in the body through altered internal states, such as flashbacks and hypervigilance (Payne et al., 2015; Levine, 1997; van der Kolk, 2015). Such post-traumatic symptoms can be debilitating because they prevent the engagement of appropriate defense responses (Grabbe & Miller-Karas, 2018; Haase et al., 2016). For instance, when facing a predator, a traumatized person's nervous system may deploy a freeze response, due to dissociation, and by-pass other defense responses that would be better suited for establishing safety. When survival responses are not adaptive, people develop dysfunctional behaviour patterns that affect their ability to manage daily problems (Grabbe & Miller-Karas, 2018; Haase et al., 2016).

Somatic therapies help people resolve their body's manifestations of procedural trauma memories via interoception and proprioception (Grabbe & Miller-Karas, 2018; Haase et al., 2016; Payne & Crane-Godreau, 2015; Payne et al., 2015). They draw on the body's innate propensity to heal and self-regulate by noticing internal states and orienting to responses that promote well-being (Miller-Karas, 2015; Payne & Crane-Godreau, 2015). Somatic techniques provide an alternative to treating trauma through talk therapy, where cognitive insight is not a required precursor for change (Grabbe & Miller-Karas, 2018; Haase et al., 2016). Since trauma is implicitly stored in the body, somatic therapists argue that talking about painful experiences is less effective for healing (Grabbe & Miller-Karas, 2018; Haase et al., 2016). They believe that attending to the body's internal sense of self, via interoceptive and proprioceptive experiences, gives clients access to the autonomic nervous system and paves the road for subconscious

healing to occur (Grabbe & Miller-Karas, 2018; Haase et al., 2016; Payne & Crane-Godreau, 2015).

### ***Somatic Experiencing***

Within the field of somatic psychotherapies, there is one orientation that continues to be highly prevalent in the literature on body-oriented psychotherapies. Somatic experiencing (SE), an approach developed by Peter Levine (1997; 2012; Payne et al., 2015) draws on the concepts of polyvagal theory to provide a pathway for trauma recovery. The model posits that post-traumatic symptoms develop when the body continues to live in fear-based immobility due to implicit trauma memories (Levine, 2010; Porges, 2001). In order for the ANS to reset after a life-threatening experience, biological completion must be achieved through the discharge of excess sympathetic energy (Levine, 2012; Payne et al., 2015).

Animals achieve biological completion after periods of intense arousal via changes in involuntary movements, such as breathing and shaking (Levine, 2012; Payne et al., 2015). Although the biological completion process is also innate to the human nervous system, it can be overridden by cognitive interference, chronic trauma exposure and unfavourable psychosocial conditions for discharge (Levine, 2012; Payne et al., 2015). While there is limited clinical evidence for biological completion in humans, crying and trembling are believed to help reset the nervous system after stressful encounters (Gračanin et al., 2014; Levine, 2012; Payne et al., 2015).

Somatic experiencing techniques aid biological completion in the safety of the therapeutic environment by gently moving clients between states of charge/activation and discharge/deactivation of the SNS and stress response (Levine, 2012; Payne et al., 2015; Payne & Crane-Godreau, 2015). The process, known as pendulation, allows the body to tune into

unpleasant sensations in a titrated way, while maintaining interoceptive and proprioceptive awareness of the present moment (Levine, 2012; Payne et al., 2015). By focusing on procedural memories rather than precipitating events, the stress response is dampened and biological completion is no longer repressed (Levine, 2012; Payne et al., 2015).

### ***Sensorimotor Psychotherapy***

Another popular somatic therapy discussed in the literature is Pat Odgen's sensorimotor psychotherapy, which is a body-oriented talking therapy that aims to resolve post-traumatic symptoms by addressing autonomic and affect dysregulation (Fisher, 2019; Ogden & Fisher, 2015; Ogden & Minton, 2000; Ogden et al., 2006a). Sensorimotor processing is conceptualized in this model as the somatic foundation upon which more complex systems, such as affect and cognition develop (Fisher, 2019; Ogden & Minton, 2000). When the body is overburdened with unassimilated sensorimotor and emotional processes from trauma exposure, problems in somatic processing are believed to create higher-order dysfunction (Fisher, 2019; Ogden & Minton, 2000).

Therapy focuses on processing raw traumatic material from procedural memories and building a felt-sense awareness of physical and emotional states (Fisher, 2019; Ogden & Minton, 2000). As revisiting procedural memories can evoke intense responses, a slow and cautious approach to sensorimotor processing is encouraged so that the body does not leave its window of tolerance and enter hyper- or hypo-arousal (Ogden et al., 2006a). Instead of engaging clients in narrative-talk about their traumatic experiences, which activates brain structures associated with emotional and autonomic reactivity, sensorimotor therapists ask clients to notice their present sensations (Fisher, 2019; Ogden et al., 2006a).

Ogden's approach establishes dual awareness, where the client observes the discomfort associated with distressing memories while simultaneously paying attention to the body's physical, emotional and cognitive states (Fisher, 2019). Dual awareness is believed to be effective because it allows clients to 'hover' above painful memories and distinguish them from the body's states at present so that a better neuroception of safety can be established (Fisher, 2019). A mindful awareness of the body and emotions, that encourages observation rather than reactivity, activates the prefrontal cortex, which inhibits the amygdala and its fear response (Creswell et al., 2007; Davidson et al., 2003; van der Kolk, 2006). By disengaging from the fight, flight or freeze response while traumatic experiences are revisited, the body can recognize safety in its surroundings and begin reorganizing its autonomic defense responses (Fisher, 2019).

### **Efficacy of Somatic Therapies**

Somatic therapies are argued to be intuitive interventions for people living with intrinsic trauma memories (Grabbe & Miller-Karas, 2018), and are believed to be well-suited for the treatment of developmental trauma and PTSD (van der Kolk, 2015). However, scientific research on somatic therapies has been limited (Payne & Crane-Godreau, 2015), due to a slow acknowledgement of the life-long impact of adverse childhood experiences, the exclusion of individuals with complex trauma from research studies and the preference to invest money into evidence-based treatments rather than studying novel interventions (Corrigan & Hull, 2015; Grabbe & Miller-Karas, 2018). It had been suggested that neuroscientific evidence of the role of body awareness in building resiliency be considered "evidence" for the further study of bottom-up somatic approaches (Corrigan & Hull, 2015). In the following paragraphs an overview of the available research on somatic therapies has been provided.



Uncontrolled field studies of SE conducted in Thailand (Leitch, 2007) and India (Parker et al., 2008) with tsunamic victims resulted in 90% improvement in self-reported symptoms (Leitch, 2007) and PTSD symptoms (Parker et al., 2009). Social workers responding to hurricane disasters in the United States also showed significant improvements in resiliency indicators and PTSD symptoms after group and individual SE therapy (Leitch et al., 2009). Furthermore, somatic skills groups focused on affect and nervous system regulation have resulted in symptom reduction, increased use of the self-regulation skills (Citron & Miller-Karas, 2013), and improved psychological quality of life (Briggs et al., 2018) in participants from at-risk communities (e.g., LGBTQ, people of colour, veterans, at-risk youth) in the United States. In-patient group treatments using sensorimotor therapy have also found improvements in self-reported scores for body awareness, dissociation, receptivity to soothing (Langmuir et al., 2012), PTSD symptoms, social functioning and overall health (Gene-Cos et al., 2016). In a case study involving a combination of treatment with CBT and sensorimotor therapy with one survivor of child abuse, improvements were noted in the client's ability to track physiological changes and implement self-soothing techniques (Flynn, 2010).

Although the above-mentioned findings suggest that somatic therapies can help trauma survivors experience a better quality of life, the lack of a control group design makes it difficult to draw empirical conclusions. Levine himself acknowledges that SE is not an evidence-based approach, due to the limited number of clinical trial data available (Payne et al., 2015). The first randomised control trial (RCT) of SE conducted with 63 Israeli civilians, who met the *DSM-IV* criteria for PTSD, demonstrated a significant reduction in post-traumatic symptom severity after 15 weekly SE sessions (Brom et al., 2017). A brief RCT involving 91 Danish patients with co-morbid back pain and PTSD, who participated in 6-12 sessions of SE, also found a significant

reduction in PTSD symptomatology at the post 12-month follow-up (Anderson et al., 2017). The heterogeneity of participants involved in many of these studies also indicates that somatic therapies can be used with diverse populations (Anderson et al., 2017; Brom et al., 2017; Leitch, 2007; Parker et al., 2008). However, a meta-analysis of SE cautions against assuming treatment efficacy, as it not known whether somatic interventions were used in conjunction with conventional treatments (Almeida et al., 2019).

### **Evidence-based Treatments**

The American Psychological Association (2020) provides a list of empirically supported treatments for PTSD, which includes trauma-focused CBT (TF-CBT), cognitive processing therapy (CPT), prolonged exposure therapy (PE) and eye movement desensitization reprocessing (EMDR) therapy. These are considered past-focused treatments as they require clients to explore their trauma in detail and process painful memories, emotions and body sensations (Najavitis, 2015). Many randomised control trials have been conducted with these treatment types, leading them to be coined as “gold-standard treatments” (Greene, 2014).

#### ***Trauma Focused CBT (TF-CBT)***

TF-CBT aims to help trauma survivors improve affect modulation and cognitive coping by addressing painful memories of trauma and engaging in adaptive processing of traumatic events and triggers (Cohen & Mannarino, 2008; Cohen et al., 2011). Treatment interventions are designed to organise fragmented sensory memories and reintegrate them with declarative memories (Kirlic et al., 2020). TF-CBT studies conducted with diverse populations and age groups have shown that it is a successful intervention for PTSD (Damra et al., 2014; Jensen et al., 2014; McMullen et al., 2013; Murray et al., 2015; O’Callaghan et al., 2013; O’Callaghan et al., 2015; Pityaratstian et al., 2015; Shein-Szydlo et al., 2016). However, research on TF-CBT

suggests that interventions are more successful when there are fewer comorbid disorders (Goldbeck et al., 2016; Scheeringa et al., 2011), less amygdala activation (Cisler et al., 2015) and more adaptive executive functioning (Cisler et al., 2016) in participants at the pre-treatment stage. These limitations may make the treatment less optimal for patients who have more complex presentations of trauma.

### ***Prolonged Exposure Therapy (PE)***

PE begins with preparing the client, over several sessions, for repeated exposure to trauma-related cues in a safe setting (i.e., counselling) (Foa et al., 2008; Kirlic et al., 2020). The exposure can be imagined (i.e., the client brings the trauma to mind as if it is re-occurring) or in vivo (i.e., the client faces presently existing triggers of the trauma) (Foa et al., 2008). The goal of PE is to habituate clients to fear-evoking situations in the absence of the feared outcome (Kirlic et al., 2020); this is expected to eventually result in the extinction of distress responses to safe stimuli and cognitive restructuring of the fear response (Kirlic et al., 2020; Watkins et al., 2018). RCTs involving PE have shown that it is effective in improving PTSD symptoms in adults and adolescents (Cusack et al., 2016; Foa et al., 2013; Powers et al., 2010; Rossouw et al., 2016; Rossouw et al., 2018; Watts et al., 2013).

### ***Cognitive Processing Therapy (CPT)***

CPT involves cognitive activation of traumatic memories, through written accounts, and cognitive restructuring around five themes present in the trauma narrative, including power, safety, trust, esteem and intimacy (Asmundson et al., 2019; Kirlic et al., 2020; Najvitis, 2015; Rutt et al., 2018; Watkins et al., 2018). CPT helps clients reconceptualize their trauma by modifying maladaptive beliefs (e.g., people cannot be trusted, the world is dangerous, etc.) that lead to avoidance and emotional dysregulation (Asmundson et al., 2019; Kirlic et al., 2020; Rutt

et al., 2018; Watkins et al., 2018). Symptom remission is believed to occur when faulty interpretations of the traumatic events are modified and cognitive distortions are addressed (Kirlic et al., 2020; Rutt et al., 2018).

Thus far only two meta-analyses have focused on CPT (Holliday et al., 2018; Lens et al., 2014), however the methodology used in both studies (e.g., including non-CPT trials, not analyzing data from control conditions) limits the conclusions that can be drawn about the efficacy of CPT on PTSD symptoms (Asmundson et al., 2019). A meta-analysis of treatments for PTSD showed large effect sizes for treatment with CPT, however, it only included four randomised control trials and did not assess moderator variables (Cusack et al., 2016). Other studies have found that follow up scores for participants receiving CPT did not differ from those receiving other treatments (Butollo et al., 2016; Maxwell et al., 2016; Sloan et al., 2018). As the number of trials comparing CPT to other interventions for PTSD is limited, it has been difficult to make conclusions about the differential efficacy of CPT (Asmundson et al., 2019).

### ***Eye Movement Desensitization and Reprocessing (EMDR)***

EMDR is an evidence-based therapy that partly focuses on the body to promote psychological healing (Marzillier, 2014). EMDR involves the use of bilateral physical stimulation (e.g., eye movements, finger tapping) to maintain present-moment awareness of safety while recalling a specific trauma memory (Kirlic et al., 2020; Pagani et al., 2015). Although EMDR attends to the client's physical sensations, it is considered to be different from somatic therapies as interventions bear some similarities to CBT (e.g., cognitive restructuring of maladaptive beliefs elicited by a traumatic memory) (Marzillier, 2014).

While focusing on a negative belief, clients visualise a past traumatic scene and pay attention to the physical sensations that come up as they engage in bilateral stimulation

(Marzillier, 2014). The process is continued until the traumatic memory no longer provokes anxiety and leads to a natural change in associated beliefs (Pagani et al., 2015). EMDR focuses on processing sensory memories and fusing with semantic memory so that the trauma can be reexperienced in a different way (Marzillier, 2014; Rodenburg et al. 2009; Shapiro 1989). It is believed to be helpful in eliminating trauma related anxieties through desensitization and reprocessing of traumatic memories (Shapiro, 2005; Marzillier, 2014). Over 30 years of RCTs point to the efficacy of EMDR, when compared to no treatment or placebos, at treating trauma symptoms (Jongh et al., 2019; Shapiro, 2012).

### **The Problem with Randomized Control Trials (RCTs)**

RCTs involving evidence-based treatments have had low retention rates, with participants leaving before the completion of interventions (Greene, 2014; Najavits, 2015). RCTs have been criticized for exaggerating the efficacy of interventions in comparison to studies conducted in real-world settings (Najavits, 2015). Interesting, field research studies of evidence-based treatments for PTSD have also reported higher dropout rates (Schottenbauer et al., 2008; Zayfert et al., 2005). Additionally, RCT participants frequently report residual symptoms at post-treatment (Kearney & Simpson, 2015; Schottenbauer et al., 2008; Steenkamp et al., 2015), which suggests that some aspects of the trauma remain untreated.

RCTs that examine the effects of evidence-based treatment have not focused on the neural mechanisms associated with psychopathology and do not assess the impact of interventions on neurobiology (Kirlic et al., 2020). RCTs have also been criticized for not being representative of front-line clinicians (who often adapt interventions to suit individuals) (Borah et al., 2013; Cook et al., 2013; Cook et al., 2014; Corrigan & Hull, 2015), and clients, as research participant criteria frequently excludes vulnerable individuals (e.g., people experiencing

homelessness, addictions, suicidality and violence) (Corrigan & Hull, 2015; Najavits, 2015; Najavits & Hien, 2013).

### **Implications for Counselling**

A healthcare practitioner's knowledge and implementation of treatment has the propensity to hinder or support a client's healing journey (McDonald, 2020). In order to experience wellness, trauma survivors need comprehensive support that goes beyond the resolution of physiological symptoms (McDonald, 2020). Practitioners can enhance PTG by utilizing neurobiologically-informed treatments to address the root sources of pathology (Dahlitz, 2015; Ross et al., 2017). In the following sections I will discuss how somatic therapies support neurobiological healing in trauma survivors through body awareness.

### **Resilience**

From a combined TI care and somatic therapy framework, adaptive functioning and long-term healing can be supported when there is greater psychological resilience. Resiliency is a mediating factor in symptom manifestation following trauma exposure (Grabbe & Miller-Karas, 2018; Philippe et al., 2011) as it influences the subjective meaning assigned to experiences (McDonald, 2020). Individuals with greater intra- and interpsychic resources are more likely to be resilient when they experience trauma because their self-concept is not affected by their experience (Golenbock et al., 2017; Lannert et al., 2014; Schnyder et al., 2015), leading to fewer adverse effects (Grabber & Miller-Karas, 2018; Phillipe et al., 2011).

Resiliency also has a profound impact on help-seeking behaviours and coping skills in trauma survivors (McDonald, 2020). While individuals have different ways of coping with traumatic experiences, most coping strategies fall into three categories: problem-focused (e.g., positive reappraisal of situations, planning for solutions), emotion-focused (e.g., self-blame,

venting), and avoidance (e.g., distraction, suppression) (Chan et al., 2016). Problem-focused coping styles have been associated with greater positive psychological changes (Chan et al., 2016), otherwise referred to as post-traumatic growth (PTG) in the literature (Roepke, 2015).

Examples of reported PTG outcomes include an increase in personal strength, greater appreciation of life and improved relationships (Roepke, 2015). Increasing resilience, therefore, has the propensity to cultivate PTG and improve coping in face of perceived stressors. Somatic therapy interventions focus on increasing resilience in trauma survivors by addressing the neurobiological correlates of trauma symptoms (Grabbe & Miller-Karas, 2018; Groger et al., 2016). They support adaptations in neural pathways and the mind-body connection (Horn et al., 2016), thereby, improving an individual's access to problem-focused coping resources in stressful circumstances.

### **Bottom-Up Processing**

The body of a traumatised client cannot differentiate between the past and present, which causes it to continuously signal threat (Mulloy, 2019); the resulting affect states and body sensations do not support an adaptive response to a person's current surroundings (Ogden et al., 2006a). Due to the role of the body in contributing to distress, effective treatments for trauma need to address somatic regulation and interoceptive awareness (van der Kolk et al., 2014; Winbald et al., 2018). However, at present the prevailing treatments for trauma presentations, such as PTSD, continue to be top-down approaches that rely on cognitive appraisal to reduce symptomatology (van der Kolk et al., 2014). In somatic therapies the body is considered a resource for facilitating healing, and thus bottom-up processing becomes the primary mode of treatment (Mulloy, 2019). Interventions focus on re-establishing regulatory capacities in the Core Response Network (CRN), which includes subcortical brain regions, the limbic system, and the

nervous system (Winbald et al., 2018). Dysregulation in the protective systems that are a part of the CRN is what somatic psychotherapy proposes leads to the development of adverse trauma effects (Windbald et al., 2018).

Somatic therapists use therapeutic interventions that support CRN regulation by promoting interoception, self-protection, self-awareness, and emotion regulation (Payne et al., 2015). Several physical attributes may be observed in a traumatised body, including breathing restrictions and physical rigidity (Eckberg, 2000). The body's posture and movement relay valuable information about the cognitive, emotional and physical symptoms of trauma. Before these symptoms are addressed, however, safety and trust need to be established in the body (Mulloy, 2019). While it is important to explore the implicit memories of trauma and help reset the chronic stress response, this work happens only when somatic awareness has been established and the body's regulatory capacities have been fine-tuned (Ogden et al., 2006a). This is particularly important if the traumatised client is experiencing complex symptoms, such as emotion dysregulation, dissociation and somatization (Ford & Kidd, 1998; Ogden et al., 2006a; Roth et al., 1997). Such bottom-up processing targets the limbic system, which is responsible for the emotional and sensory parts of trauma, to support self-regulation via the ANS (Caldwell, 2018). The focus becomes to alter the body's behaviour and physical mode of being, via body language, movements and affect, so that safety and security can be sustained (Caldwell, 2018; Ogden & Fisher, 2015).

## **Yielding**

Yielding can be described as any action by the body that supports connection to the environment and creates a sense of safety (Aposhyan, 1999). Yielding patterns start to develop in infancy and provide a foundation for how a person will perceive and interact with their world



(Aposhyan, 2004). When the body is engaged in yielding, it supports self-regulation via the PNS and social engagement system (Aposhyan, 1999; Porges, 2011). The bodies of trauma survivors can have limited yielding capabilities because of chronic engagement of defense systems to prevent re-traumatization (Emerson, 2015). Developmental trauma has particularly adverse effects on the body's ability to yield because of maladaptive physical holding patterns that develop and become reinforced (Macnaughton, 2004).

Somatic therapists use interventions, such as breathwork, that overtime support the body in learning to yield by softening, rather than restricting, in response to environmental stimuli (Mulloy, 2019). They also focus on yielding because such actions provide unique avenues for introducing change into a person's psyche that may not be accessible via talk therapies (Aposhyan, 1999). The primary way in which somatic interventions focus on yielding is by inviting clients to be curious about themselves and noticing the moment-to-moment occurrences in their minds and bodies (van der Kolk et al., 2014). Helping the body identify yielding as a somatic resource leads to increased activation of the ventral vagal system, greater neuroception of safety, and higher tolerance of sensations (Porges, 2011; van der Kolk et al., 2014). These implicit changes increase the client's ability to identify and label their physical, emotional, and cognitive experiences and eventually allows them to choose how they want to respond (Aposhyan, 1999; Ogden et al., 2006a). Interventions that support the development of yield are given the greatest priority in the initial treatment stage because they increase the body's self-regulating resources and help approach traumatic memories in later sessions safely (Mulloy, 2019).

### **Neural Integration**

The mind is a complex system that regulates its own development with the goal of achieving optimal self-organisation (Siegel, 2015, 2019). A healthy mind is one in which components of the system have fully differentiated and formed intricate links (Siegel, 2019). Mental health is determined by the degree to which the mind can maximize self-regulation through neural integration (Siegel, 2012a; Smith et al., 2015). In particular, childhood trauma can affect interconnectivity and impair the differentiation or linkage of brain structures and functions (Siegel, 2019). Integration affects the flow of information within the body (particularly the nervous system), between people, and the environment (Siegel, 2015). Siegel (2019) has proposed nine domains of neural integration: consciousness, bilateral, vertical, memory, narrative, state, interpersonal, temporal, and transpiration. He suggests that clinicians use these domains as a starting point for identifying the neural correlates of presenting problems and developing neurobiologically-informed treatment plans. While exploration of all nine domains is beyond the scope of my review, clinicians can refer to Siegel's (2010a; 2010b; 2012a; 2019) work to further understand these concepts.

Psychopathology can be attributed to impediments in the neural integration process that result in chaos and/or rigidity (Siegel, 2015; 2019). Symptoms of PTSD, for example, can be reframed as a combination of chaos (e.g. intrusive memories and flashbacks) and rigidity (e.g. hypervigilance and somatic numbing) (Siegel, 2019). Somatic therapists address patterns of chaos and rigidity in the mind by raising conscious awareness and cultivating inner states that promote mental health (Siegel, 2019). States of positive regard, kindness, and compassion, for instance, have been positively correlated with neural integration (Goleman & Davidson, 2017). The somatic therapist attempts to identify patterns of chaos and/or rigidity, such as in the

domains of identity or interpersonal relationships, and fosters integration within the affected domains (Siegel, 2019).

Internal attunement, in the form of mindfulness, can support the restructuring of the brain and lead to greater integration (Makinson & Young, 2012; Siegel, 2015). For instance, meditation encourages greater cognitive, emotional and endocrine integration of the brain that eventually reduces chronic stress response activation (Beck, 2017). Mindfulness activities are, therefore, frequently incorporated into counselling to target affected domains, such as the amygdala and hippocampus and help create new neural pathways (Beck, 2017). With repeated practice, new networks can develop and become defaults for information processing, allowing for the trauma survivor to respond more adaptively to stressors (Hinton et al., 2013).

### **Embodiment**

Embodied intuition is a person's awareness of sensations, emotions and movements in a present moment experience (Fogel, 2013; Kaparo, 2012). Gut feelings, for example, are embodied experiences of intuition that help people attune to their nervous and limbic systems and read their internal body states (Marks-Tarlow, 2014). Increasing embodiment is a fundamental component of somatic psychotherapy as the links between thoughts, feelings and bodily sensations are believed to be inseparable (Levy, 2005; Peña, 2019). Somatic therapists focus largely on embodied intuition to help client's detect momentary body-held states and practice shifting to more restorative states (Levy, 2005; Peña, 2019). Such self-awareness helps a client conceptualise their sense of self as dynamic, increases their ability to relate to themselves in new ways, and leads to greater breadth and depth of movement in their internal world (Beck, 2017). Being present and connected to their sense of self also helps trauma survivors construct new narratives about themselves that are present- rather than past-oriented (Beck, 2017).

## **Implicit Awareness**

In somatic therapies the nonconscious and nonverbal brain functions of the therapist are highly respected, because they contribute to clinical expertise through attunement, empathy, body awareness, and intuition (Schoore, 2003, 2011, 2012). These intrinsic processes offer moment-to-moment awareness and provide a non-linear viewpoint on what is emerging in the therapeutic relationship (Marks-Tarlow, 2014). The intersubjective space, in which affective states are exchanged between the client and therapist, provides valuable opportunities for growth (Marks-Tarlow, 2012, 2014). A therapist can support the process of change by engaging with the client from a place of embodied consciousness; they must use their inner sensory perceptions and feelings to attend to the implicit aspects of the therapeutic relationship (Peña, 2019). Through their embodied presence, the therapist opens the door for the client to have an embodied experience and integrate aspects of the self that were split off, frozen, or out of explicit awareness (Peña, 2019).

## **Clinical Intuition**

From a somatic perspective, clinical intuition can be understood as having an implicit and embodied understanding of self and others (Marks-Tarlow, 2014). Clinicians rely on their embodied intuition to identify and attend to the client's bodily sensations, cognitions, and affect (Beck, 2017; Peña, 2019). Somatic therapists need clinical intuition to safely attend to novel or spontaneous experiences that occur within the intersubjective space (Peña, 2019). They must remain open and engaged in the therapeutic relationship, both through somatic and cognitive awareness, and address any defensive states that arise, such as countertransference and dissociation (Peña, 2019). The intuition of a therapist is cultivated through embodied wisdom and memory which develop over time through a combination of clinical experience, self-

reflection, and mindfulness practices (Peña, 2019). In the absence of such clinical intuition, the therapist may miss valuable opportunities to foster embodiment. Clinical intuition also helps with the treatment of implicit trauma memories, as it gives the therapist greater knowledge and understanding of the client's needs and capabilities (Beck, 2017). It is vital for therapists to develop their clinical intuition through professional and personal avenues so that they have adequate depth and breadth of movement in the intersubjective space (Peña, 2019).

### **Dyadic Regulation**

The therapeutic relationship is considered a nurturing ground for development as it can support a shift in the neurobiology of a trauma survivor (Beck, 2017). A client's internal world is not separate from the clinician, and the interactions that occur with a therapist can be vital for supporting PTG (Beck, 2017; Peña, 2019). When a therapist is fully present in the intersubjective space, they send neurophysiological signals to the client about being heard and accepted, which ultimately increases their neuroception of safety (Geller & Porges, 2014; Porges, 2011). Within the context of the therapeutic relationship, secure attachments between a therapist and client can promote greater integration of self in the latter (Siegel, 2015). The therapist's calming presence activates the client's social engagement system and encourages them to yield to calming and connecting features of the SNS (Geller, 2018).

In the same way as how a parent teaches their child to regulate in the context of their interactions, the therapist helps a client explore new ways of being in the world via the therapeutic relationship (Beck, 2017). The therapeutic connection supports the client in co-regulating and learning implicit self-soothing skills (Beck, 2017). A calm therapist, for example, can evoke a calming response in the client through their grounded presence. Such synchrony is often implicit and occurs naturally in the context of reciprocal experiences of safety (Beck, 2017;

Geller, 2018; Peña, 2019). Therapists can further encourage integration of self by stimulating the cognitive processing of bodily experiences; the client expresses what they feel to the clinician, which increases their mind-body connection and helps them learn new ways of processing information (Beck, 2017). Such dyadic regulation informs the body that it is safe to have new affective experiences and disrupts old patterns of dysregulation. Over time it strengthens a client's attentional control over their ventral vagal system and extends their ability to regulate in other relationships (Geller, 2018).

In summary, counselling approaches that are inclusive of body-oriented interventions can help foster resilience in trauma survivors. Somatic therapies rely primarily on the mind-body connection as a resource for self-integration and the treatment of psychopathology. Bottom-up processes, such as yielding and embodiment support the resetting of the nervous system and lay the neural foundations for new coping patterns to emerge. This healing occurs in the context of secure therapeutic relationships and requires clinicians to utilise their embodied intuition to connect with clients.

### **Fundamental Next Steps for Research**

#### **Plurality in Psychotherapy**

Neuroscience research has begun to bridge the gap between biological and psychological perspectives on mental health (Fenton, 2014); this has led to an ideological shift towards using interventions that promote neuroplasticity in the brain (Gonçalves & Perrone-McGovern, 2014; Schauss et al., 2019). Evidence-based literature in psychotherapy has predominantly focused on the efficacy of CBT and limited resources have been invested in exploring alternative modalities of counselling (Corrigan & Hull, 2015; Leichsenring et al., 2018; Payne & Crane-Godreau, 2015). Furthermore, there has also been a lack of research on how different psychological

interventions address the neural mechanisms associated with pathology (Akiki et al., 2018; Kirlic et al., 2020). Several studies have, however, helped establish the utility of mindfulness practices (Black & Slavich, 2016; Grant et al., 2017; Lang, 2017; Rodrigues et al., 2017; Tang et al., 2015) and somatic awareness in cultivating resilience (Grabbe & Miller-Karas, 2018; Haase et al., 2015; Haase et al., 2016).

Despite the neuroscientific plausibility of body-based approaches in treating the neural circuitries of trauma disorders, such as PTSD, they are less likely to be used in clinical settings (Almeida et al., 2019; Corrigan & Hull, 2015). Although talk therapies can be modified to make them somatically-informed, there may be unique advantages to using body-based therapy with trauma survivors (Grabbe & Miller-Karas, 2018; van der Kolk, 2015). The focus on working with the body's intrinsic memories of trauma in somatic therapies could offer benefits beyond symptom reduction and promote long-term neurobiological changes (Grabbe & Miller-Karas, 2018; Winbald et al., 2018). It would, therefore, be beneficial to conduct more research on existing somatic therapies, such as SE and sensorimotor psychotherapy, to explore their efficacy in promoting resiliency and PTG.

Studies should include people with complex presentations of trauma (Grabbe & Miller-Karas, 2018), comorbid conditions (Kirlic et al., 2020), and those who experience residual symptoms following RCTs with evidence-based interventions (Kearney & Simpson, 2015; Schottenbauer et al., 2008; Steenkamp et al., 2015). In addition to assessing physical and psychological well-being, outcome measures in studies need to examine changes in neurobiological predictors of pathology (Kirlic et al., 2020). It would also be helpful to explore which trauma typologies or related disorders can be better addressed by bottom-up approaches in comparison to talk-therapies (Leichsenring et al., 2018). Additionally, future RCTs should

explore the efficacy of combination treatments involving, for example, CBT and somatic therapies; these will allow researchers to test the synergistic effects of top-down and bottom-up approaches in promoting long term recovery (Fenton, 2014). Such plurality in research could better inform TIC in the future by expanding and optimizing treatment options for trauma survivors in mainstream counselling settings (Kirlic et al., 2020; Leichsenring et al., 2018).

### **Interoception**

The field of interoception is relatively new and research thus far has mostly focused on the neuroanatomical validation of an interoception system (Pinna & Edwards, 2020). While the psychosomatic implications of interoception have been proposed in the literature, there is a need to explore this area further by gathering clinical data on the associations between interoception and various CRN regions, such as the limbic and nervous system (Ceunen et al., 2016; Di Lernia et al., 2016; Duschek et al., 2017). Future research should also attempt to better understand the intricate facets of the interoception system, such as interoceptive awareness, sensitivity, and accuracy, and their neurobiological effects (Forkmann et al., 2016; Kleckner et al., 2015; Pinna & Edwards, 2020). In addition, research must be conducted to develop models of multidisciplinary intervention that promote psychological wellness via the interoception system for trauma survivors (Pinna & Edwards, 2020; Kemp et al., 2017). Such research would support counsellors in identifying and using treatment strategies that promote interoceptive health, thereby improving coping and resiliency.

### **Neuroinflammation**

In some PTSD survivors, symptoms continue to persist after treatment with trauma-focused interventions (Berger et al., 2009; Schottenbauer et al., 2008; Steenkamp et al., 2015), which suggests that the underlying mechanisms of trauma are not being addressed in current



patient care (Quinones et al., 2020). It has been hypothesized that interactions may exist between neuroinflammation and the adaptive functioning of the fear learning and extinction responses (Quinones et al., 2020), which contribute to neuroception of safety and affect modulation. Limited information is available on the role of inflammation in the development, progression, and maintenance of neural pathways involved in trauma trajectories, such as PTSD (Quinones et al., 2020). It is important to understand and address any chronic inflammation that may occur in the brain because of its potential widespread effects on physiological and psychological health via impairments in the CRN (Quinones et al., 2020). Addressing such a gap in the literature could support the identification of central biomarkers for trauma-related disorders that could then be targeted in the prevention and treatment of trauma (Quinones et al., 2020). Understanding the relationship between inflammation and the trauma response could also provide new avenues for the development of therapeutic interventions that are neurobiologically-informed and promote PTG through neuroplasticity.

While there is a propensity of evidence-based literature on the benefits of mindfulness and somatic awareness in building resilience, further research needs to be conducted to validate the neurobiological benefits of somatic therapies, particularly in the treatment of complex trauma. Furthermore, research on the role of interoception and neuroinflammation in psychopathology is still in its infancy and further investigation may advance our understanding of trauma neurobiology and improve treatment interventions.

## **Recommendations for Practice**

### **Fostering Mindfulness**

The purpose of mindfulness is to increase access to internal resources (e.g. attention, intention, and attitude) that support non-judgmental and objective engagement in moment-to-

moment experiences (Kirlic et al., 2020). Mindfulness supports shifts in perspective that allow for greater control over thoughts, behaviours, and emotions, and improve perceptions of experiences (Shapiro et al., 2006). Research shows that practicing mindfulness has a myriad of benefits and overall improves physical, cognitive, and social outcomes (Borquist-Conlon et al., 2017; Creswell, 2017; Ortiz & Sibinga, 2017; Zack et al., 2014; Zenner et al., 2014).

Furthermore, mindfulness can reduce experiential avoidance, increase awareness of conditioned internal states (Treanor, 2011) and uncouple associative learning (Brewer & Garrison, 2014). It has also been suggested that mindfulness supports coping by targeting the neurobiological mechanisms of chronic stress and supporting downregulation (Bauer et al., 2019; Kirlic et al., 2020; Ortiz & Sibinga, 2017; Taren et al., 2015; Tomasino & Fabbro, 2016; Zeidan et al., 2015). The following sections provide an overview of the foundational mindfulness practices utilised, and recommended, in somatic therapies.

### ***Breathwork***

Breathing is the most basic form of yielding and is directly connected to arousal states and emotional regulation (Aposhyan, 1999; Ogden et al., 2006a; Victoria & Caldwell, 2013). It is one of the first patterns to form in infancy, and provides a foundation for further development (Cohen, 1993). Factors such as physiology, genetic predispositions and trauma history can result in restrictive or rapid breathing (Antonucci, 2020) that contribute to various problems, including tension, immobility, anxiety, fear, and poor body awareness (van der Kolk et al., 2014; Victoria & Caldwell, 2013). Breathwork allows for better engagement of internal yielding resources to bring about positive physical, psychological and emotional states (Aposhyan, 1999; Caldwell, 2018; Fogel, 2013; Kuppusamy et al., 2017; Pramanik, 2010; Saraf, 2016). Trauma survivors are less likely to have awareness and control over their breath due to chronic dysregulation

(Antonucci, 2020). Body psychotherapists focus on breathwork as it reduces physiological and psychological distress via ventral vagal activation in the ANS (Antonucci, 2020; Caldwell & Kaur, 2013; Fogel, 2013; Porges, 2011, van der Kolk et al., 2014).

Breathing exercises should support trauma survivors in developing a sense of curiosity about the power of the breath in promoting voluntary regulation (Emerson, 2015). Conscious breathing can interrupt passive states, such as rumination and worry, and encourage awareness of how breath can be used to support the window of tolerance (Ogden et al., 2006a). For example, therapists can guide clients to identify their worry, pause in the narrative associated with the worry, provide verbal counts for inhales and exhales, and notice changes in the sensations, feelings, and thoughts (Antonucci, 2020). They can increase present-moment awareness by encouraging the client to notice where and how the breath moves in their body, and its effects on internal sensations (Emerson, 2015; Ogen et al., 2006; van der Kolk et al., 2014). The client can be invited to place their hands on the belly, chest or rib cage to draw attention to the breath's movement in the torso and notice changes in internal states as each breath is allowed to become smoother and longer (Caldwell & Kaur, 2013; Emerson, 2015; Ogden et al., 2006a).

Somatic therapists support clients in developing “good” breathing patterns, which consists of three aspects: an inhale and exhale balance, relaxed flow of breath, and an ability to adapt to changes in internal and external circumstances (Caldwell, 2018). A repeated emphasis on breathwork in counselling can help a trauma survivor develop voluntary modulation of arousal (Schwartz & Mainberger, 2018) to support regulation when it comes time to process traumatic memories (van der Kolk et al., 2014). However, learning to yield via breathwork can bring up deep sensations of unease, which makes it important to move slowly so that a trauma response is not evoked (Aposhyan, 1999). Therapists can help a client recognise when and how

they leave their window of tolerance by establishing a baseline of sensations, emotions and thoughts, and noticing any changes (Rothschild, 2010).

Conscious breathwork may, however, be inaccessible or contraindicated for highly dysregulated clients whose neuroception of safety is severely impaired (Mulloy, 2019; Ogden et al., 2006a; Victoria & Caldwell; 2013). In such instances the therapist can still support clients in understanding and building yield by bringing awareness to the breath without any emphasis on alteration and asking the client to share what they notice (Doll et al., 2016; Emerson, 2015). The therapist must continuously monitor the client's cognitive, affective and somatic experiences during breathwork and modify their interventions to support self-regulation (Antonucci, 2020).

### ***Present-Moment Awareness***

Present-moment awareness occurs when there is continuous monitoring of a current experience, rather than preoccupation with the past or future (Cardaciotto et al., 2008). Bringing a client's awareness to the present moment can disrupt patterns of past- or future-oriented cognitions that contribute to rumination and worry (Antonucci, 2020). Such states may lead the brain to perceive imagined threats as real, thereby activating the body's nervous system in preparation for danger (Siegel, 2012b). It is important for clinicians to foster present-moment awareness, since action can only occur in the present, and a focus on the past or future leaves a client stuck in states of remembering and planning (Caldwell, 1996). The therapist can help a client attune to the present moment by, for instance, inviting them to scan their physical space and noticing shapes, colours and objects (Antonucci, 2020). Present-moment awareness also reduces a client's reliance on avoidance strategies, such as distraction and denial, to manage distress and increases their repertoire of stress responses (Antonucci, 2020; Donald et al., 2016). An intentional focus on the present moment can help break the pattern of thinking in the past or

future and dampen the chronic activation effect of such cognitions on the stress response system (Antonucci, 2020).

### ***Interoceptive Ability***

Somatic therapies operate on the fundamental notion that the body receives messages before the brain registers them (Antonucci, 2020). In a well-working system interoception receptors inside the body send information about what is occurring to the brain, thereby allowing the latter to engage in self-regulatory processes (Antonucci, 2020). The messages sent via interoception about internal states, such as breathing pace and heart rate, play an important role in supporting the body's ability to take care of itself (Caldwell, 2018). Somatic therapists help their client's listen to their bodies and foster somatic awareness in order to improve self-regulation skills (van der Kolk, 2015). They build interoceptive ability by training their clients to mindfully attend to internal experiences through noticing, feeling and sensing what is occurring in the body (Antonucci, 2020).

For example, the therapist may verbally invite the client to scan their body for somatic sensations, notice their posture, and allow for intuitive bodily adjustments to occur (Antonucci, 2020). The ability to turn attention inwards and focus on moment-to-moment sensations, emotions, and thoughts is necessary to foster well-being from a somatic psychotherapy perspective (Siegel, 2012b). It is important to note that therapists do not attempt to evoke traumatic memories directly, as this could lead to further reinforcement of dysregulating circuits in the CRN (Winbald et al., 2018). Instead they take a slow approach to treating pathology by first identifying resources and supporting corrective shifts in states (Ogden et al., 2006a). As a client develops interoceptive skills their sense of safety, power, and competence increase, and their body is better able to remain within its window of tolerance.

### ***Focusing***

An individual's felt sense is connected to their experiences of problems and the implicit memories that form in the body (Antonucci, 2020). Focusing is a technique used to increase a client's awareness, sensitivity, and attentional control over their felt sense ((Antonucci, 2020; Gendlin, 1981). Somatic therapists build a client's repertoire of focusing skills by actively inviting them to notice, sense, and feel their internal states in therapy (Koster et al., 2011). Building somatic awareness of the felt sense is important as it can lead to greater insight about the body's role in modulating regulation and help alter habitual responses to stressors (Antonucci, 2020).

Focusing involves bringing a client's attention to specific areas of the body and helping them notice internal somatic sensations during moments of discomfort (Antonucci, 2020). For instance, the therapist can verbally guide the client to locate physical or figurative areas of the body that help them feel grounded, such as their feet or heart center (Antonucci, 2020). The conscious movement of attention to different areas of the body can reduce attachment to negative emotional material and disrupt the activation of the stress response system (Koster et al., 2011). With time focusing, in combination with breathwork, trains the nervous system to down-regulate and increases the felt sense of being grounded (Antonucci, 2020), leading to change in implicit memories.

### ***Therapeutic Presence***

A clinician's embodied presence is a significant resource for a client's growth and development and should, therefore, be seen as a way for them to prepare for therapy (Geller, 2017). The therapist communicates safety and fosters an environment for growth through the prosody in voice, gentle facial expressions, soft eye contact, open body posture and attuned

presence (Geller, 2018; La Barre, 2013). Therapists can establish greater mastery over their therapeutic presence by striving to be more aware and engaged in the moment-to-moment experiences of their personal and professional lives (Geller, 2018; Fogel, 2013). As clinicians practice self-regulation in the context of their own relationships and environmental stressors, they become finely attuned to their nervous systems and gain attentional control over their body's regulatory capacities (Geller, 2018). With repeated practice this personal development work can help a therapist readily engage with clients from a place of calmness, empathy, and healing (Geller, 2018).

It is important for therapists to fine-tune their ability to activate their ventral vagal system on command so that they can engage without reactivity (Geller, 2018), particularly when working with clients who are distressed, dissociated, or dysregulated. An optimal therapeutic presence also helps a clinician sense what is emerging in the relationship, attune to ideal moments for certain interventions, and deliver treatment in the most impactful and meaningful ways (Geller, 2018). It allows them to listen to the verbal narrative of the client, while simultaneously listening with their senses to what is being expressed by the client's body (Geller, 2018). When therapists are present, their interoceptive awareness can be a resourceful indicator of the client's experience and provide information about whether they need to slow down, establish safety or proceed with an intervention (Geller, 2018; Peña, 2019). In addition to practicing regular self-care therapists can also increase their embodied presence by grounding themselves before sessions (Geller, 2018). As little as five minutes spent on a centering exercise prior to a session (e.g., deep breathing) has been associated with improved treatment outcomes and lower psychological distress for clients (Dunn et al., 2013).

### **Reflexive Self-Statement**

My personal beliefs and worldviews have been heavily shaped by ideologies around dualism, which have inevitably led me to assign greater value to my rational and cognitive mind. For most of my life, I thought of my body as a vessel that carried my brain and had largely dismissed its power to promote healing and wellness. In the process of completing my capstone project, however, I have become more aware of the resources in my body that contribute to self-actualisation as a person and a therapist. I have gained a better understanding of what it means to have present-moment awareness, both within and outside of the therapeutic setting. I have started to tap into the wisdom of my body by attuning to internal somatic states; this awareness has helped me understand the processes occurring in my mind and given me greater insight on my needs. By noticing how these attunement processes affect my lived experiences, I have started to value the importance of the mind-body connection and recognise the vital role it plays in promoting resilience.

My formal training as a counsellor trainee, for the most part, has been centered around talk therapies that utilise the pathways involved in top-down processing to encourage positive change. Although I had previously learned that it was important to incorporate bottom-up interventions, such as meditation, in my practice, I had always perceived these activities as a means of treating cognitions. However, I now think about mindfulness as not just a way of relaxing and grounding, but rather as a way of living a more connected and embodied life. Learning about somatic therapies has given me the opportunity to think about the therapeutic process in new ways, through which I can treat implicit problems and promote better mind-body connection. While it is important to attend to the spoken elements of communication in counselling, I have learned that I must also be attentive to the non-verbal interactions occurring in the intersubjective space.



The knowledge I have gained from this capstone project has led to subtle changes in my therapeutic approach. I have noticed a marked improvement in my capacity to support highly dysregulated clients and a reduction in my feeling of helplessness as a professional. I have sensed myself attuning more often to a client's body and fostering mindful awareness of their feelings and bodily sensations. My treatment interventions often center around building somatic resources and helping clients learn the skills needed to move themselves out of discomfort and towards calm. In my work with trauma survivors I have become exceptionally cognisant of disconnection between the body and mind and have focused my treatment planning efforts on promoting greater integration of self. I have also started utilizing my clinical intuition and embodied consciousness more intentionally to understand how I can reduce the activation of a neurobiological trauma response in therapy.

My capstone project has introduced me to new modalities of counselling and contributed to my growth as a counsellor trainee. It has also sparked my interest in continuing to learn more about the mind-body connection and better understand how I can foster integration in my therapeutic practice. As I move forward in my counselling career, I aim to seek further training in specific counselling approaches to develop a repertoire of advanced skills that will help me treat implicit memories that create suffering for trauma survivors. Through ongoing clinical practice, I also want to further decipher how I can incorporate elements of somatic therapy into my preferred therapeutic orientations of narrative therapy and solution-focused therapy. Furthermore, I want to explore the use of somatic interventions from a culturally-informed framework so that I can continue to appreciate the nuances and variabilities in human experiences.

## **Conclusion**

There is considerable variation in how trauma is experienced in the mind and body. Some people may develop adverse effects post-trauma, particularly following early life exposure, that lead to physiological, cognitive and/or emotional disturbances. Neurobiological research suggests that trauma exposure can lead to chronic activation in parts of the brain that are involved in arousal modulation (Horowitz, 2011; Ogden et al., 2006a; van der Kolk, 2003; van der Kolk; 2015; Yehuda et al., 1998). Such changes can prime a person to perceive their environment as dangerous and lead them to become stuck in a feedback loop where the body is continuously reliving the trauma. This reduces a person's tolerance for distress and increases their likelihood of experiencing states of hyper- and hypo-arousal in response to daily stressors. In these dysregulated states it becomes difficult for a trauma survivor to access the intrinsic and external resources that would help with problem-solving.

Trauma survivors also have the capacity to experience positive changes, or PTG, after traumatic events; resilience is believed to be a mediating factor in a person's capacity to experience PTG. Thus, it is important to increase resilience in trauma survivors so that they can cope adaptively to stressors and have a lower risk of experiencing re-traumatization. From a neurobiological perspective, resilience can be promoted by repairing and strengthening the neural networks affected by trauma. This raises important questions about how therapeutic interventions can be used to enhance resilience and reduce the adverse effects of trauma. The contributions of the polyvagal theory suggest that the human brain has evolved to optimise regulation via the social engagement system (Dana, 2018; Ogden et al., 2006a; Porges, 2001, 2004, 2011). The therapeutic relationship, as a result, offers a possible avenue for fostering resilience and neutralizing the trauma response.

Most conventional talk therapies, such as CBT, rely on the brain's top-down processing pathways to support PTG. However, impairments in these neural circuits may limit executive functioning capacities and reduce the quality of treatment outcomes. Approaches that rely on bottom-up processing may, therefore, be a viable alternative or addition to conventional therapeutic modalities. Somatic therapies offer a body-based approach to treating the adverse effects of trauma and promoting neurobiological resilience. Somatic therapists work on the assumption that the body holds implicit memories of trauma that reactivate the trauma response. They use interventions to increase conscious awareness of these memories and transform the meaning that the body attaches to them.

Somatic therapies focus on increasing a client's present moment contact with their internal environment. Mindfulness interventions, such as breathwork, are used to foster greater awareness of bodily sensations and how they can be used to yield to soothing and calming states. There is a strong emphasis on the relationship between the therapist and client, and the utilisation of dyadic regulation to promote coping. Through social contact, the therapist invites the client to experience greater embodiment and reintegration of the self as a whole and healthy being. With time and repetition these positive interactions increase the client's resilience to trauma and allow them to safely process the implicit memories connected to chronic dysregulation (Antonucci, 2020; Geller, 2018; Hinton et al., 2013; Ogden et al., 2006a; van der Kolk et al., 2014). As new ways of responding to stress become habituated, the neural pathways involved in affect modulation start to repair and transform, thereby increasing a person's ability to experience PTG.

Somatic therapies offer an interesting and novel approach to working with trauma, that point towards the plausible benefits of bottom-up approaches in promoting resiliency, coping, and PTG via the treatment of underlying dysregulation. However, research on somatic therapies has

been limited and the efficacy of their practical application remains undetermined. Future research on neurological wellness should focus on how bottom-up approaches, such as somatic therapies, can be useful in treating trauma and increasing resilience to tolerate future challenges. Examining the effects of combination treatments that target change through top-down and bottom-up processing pathways would also support the development of more effective treatment plans. Research efforts must also continue to focus on better understanding the neurobiological mechanisms underlying trauma, including interoception and inflammation.

The role of the body in treating trauma and fostering resilience can have significant implications for the way practitioners approach trauma counselling in the future. The estimated 9.2% lifetime prevalence of PTSD among Canadians (Ameringen et al., 2008) also suggests that conventional treatment options may be insufficient for meeting the needs of some trauma survivors. Somatic therapies can support further expansion of TI care services by offering greater depth and breadth in the treatment of trauma. Further evidence-based research on the efficacy of somatic therapies in promoting neurobiological healing is, therefore, imperative for the growth and development of the TI care field.

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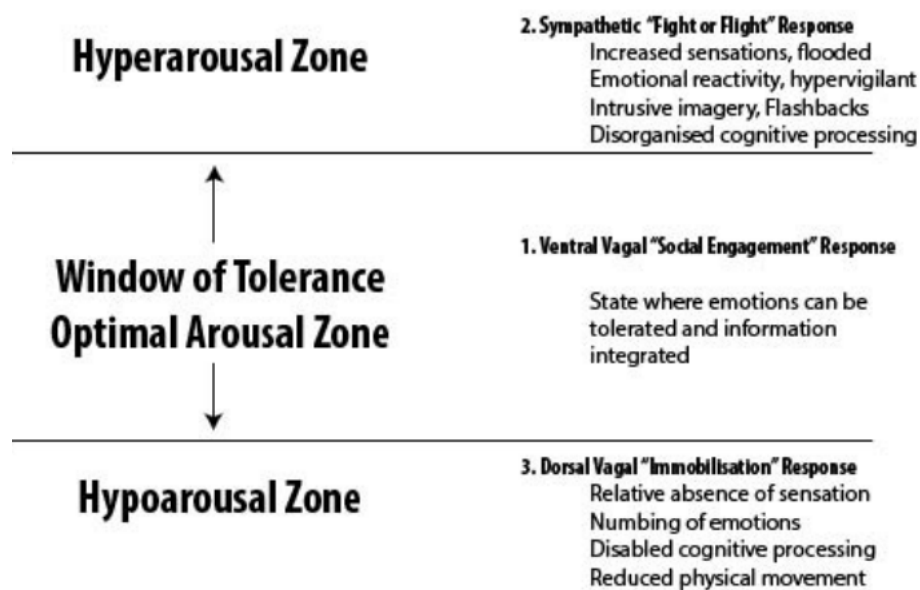
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## Appendix

# Window of Tolerance



Appendix. Parallels between the window of tolerance and Polyvagal theory. Image taken from Dahlitz (2015).