Running head: When the Body is a Dangerous Place

When the Body is a Dangerous Place:

A Map of Trauma & the use Mindfulness in Clinical Practice

by

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A thesis submitted in partial fulfillment of the requirements for the degree of Masters of Counselling (MC)

City University of Seattle Vancouver, BC, Canada site

September 27, 2013

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Abstract

Neurological research demonstrates that while trauma undermines prefrontal cortical functioning, mindfulness strengthens it. A discussion on the nature of trauma is provided which includes neurobiology, attachment theory, and the sociopolitical meaning of trauma. Posttraumatic stress disorder (PTSD) and complex trauma (CT) are defined, and the differences between them are explained in the context of current research and best practices in trauma informed treatment. The physical experience of trauma, the role of memory, and implications for a person's window of tolerance are described. A review of current research on mindfulness, and its efficacy in work with trauma survivors is developed. Aspects of trauma treatment which are beyond the scope of mindfulness are discussed, and suggestions for future research are expanded.

Acknowledgements

I am grateful to my partner, Johannes Grames, and my children, Elias and Joshua, for supporting me throughout this process. Their love, understanding, and generosity in allowing me the time necessary to meet my academic goals, means everything.

I am grateful to my mother, Rosalie Lazar, my sister, Carrie Lazar, and my niece, Skye, for their love and encouragement, and for supporting my boys when I needed to hunker down to study. Your humor, playfulness, and sense of adventure heals my spirit, and gives me energy to move forward.

I want to acknowledge my supervisors, Dina Aguila, and Gareth Llewellyn, as well as my internship comrades, Marcia, Jacquie, Alexandra, and Sam, for making my internship such a positive and enriching experience. Their support helped nourish the ideas developed here.

For her scholarly and editorial support, I'd like to thank Jill Taggart for being there when I needed her, and giving me the gentle feedback that kept me going.

Thank you to Colin Sanders for being my second reader - your feedback and comments allowed me to complete this project with confidence, and recognize the even larger context that must inform the study of trauma.

To my teachers at City University: Steve Conway, Laleh Skrenes, Avraham Cohen, Earon Kavanagh, Michelle Mann, Jacqueline Walters, Glenn Grigg, Deborah Mater, Daria Shewchuk, Heather Mohan Van Heerden, Jim Browne, Christopher Kinman, and Monica Franz, thank you

for creating a supportive learning environment, and bringing the heart of counseling into the class room.

Finally, I'd like to thank my cohort, BC 13 for being the best people with which to walk this path. The diversity, honesty, integrity, and wisdom that you brought made our journey together so insightful and rewarding. I hope we cross paths again and again as we continue to walk this infinite path of learning.

Dedication

I dedicate this work to all the people who have survived trauma. May you find healing and well being, and in spite of the suffering you've endured, teach us all that it's possible to survive, and even thrive, in the wake of trauma.

Table of Contents:

Introduction

The body is an instrument of physical processes, an instrument that can hear, see, touch and smell the world around us (Schore & Schore, 2008, p.17). For a person who has experienced trauma, the body is a dangerous place. Whether trauma's catalyst was an earthquake, hurricane, another natural disaster, or as a result of transgressions by another person, "the child or adult lives in a state of anticipating anxiety, and waiting for the next shattering event" (Crenshaw, 2006, p.33).

Traumatic effects are characterized by heightened arousal, narrowing of attentional resources, constriction of emotional and bodily experience to fight, flee, avoid, or defend against trauma (Courtois, Ford, & Cloitre, 2009). When multiple areas of the brain are called upon to respond to a threat, the body's homeostasis is disrupted (Crenshaw, 2006). The state of dysregulation that results is often beyond cognitive awareness (Crenshaw, 2006), and in the absence of appropriate interventions can be permanent.

As van der Kolk (2012) relates, "Those with PTSD (post traumatic stress disorder), their organism, their being, continue to live in the world as if they were in the trauma...the body keeps remembering, the body knows what has happened and has changed to cope with what has happened to them" (Buczynski & van der Kolk, 2012). Physical helplessness is considered to be "at the core of trauma", and a precursor for the development of long term PTSD (van der Kolk, 2003, as cited in Crenshaw, 2006, p.33).

The diagnosis of post traumatic stress disorder (PTSD) was first included in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM–III; American Psychiatric Association, 1980), largely because of the need for diagnostic nomenclature by which

to describe the adverse reactions experienced by combat troops returning from Vietnam (Courtois, 2008, p.86). A diagnosis of PTSD consists of the following core symptom clusters: "persistent re-experiencing of the traumatic event, avoidance of trauma-related stimuli, and numbing of general responsiveness and chronic physiological arousal" (American Psychiatric Association, 2000 as cited in Thomson, Arnkoff, & Glass, 2011, p.220; Koffel, Polusny, Arbisi & Erbes, 2012).

Lanius, Bluhm, and Frewen (2011) state that in general, PTSD encompasses two different types of emotional dysregulation. The first is characterized by undermodulation of affect, such as re-experiencing traumatic events, and hyperarousal and anger symptoms which are mediated by the absence of prefrontal inhibition of limbic regions. Overactivation of limbic regions, including the amygdala, trigger the second type of emotional dysregulation which is experienced as an overmodulation of affect. This is "often associated with a feeling of subjective distance from emotional experience, such as during acute depersonalization, derealization and analgesia; this is thought to be mediated by midline prefrontal inhibition of the same limbic regions" (Lanius, Bluhm, & Frewen, 2011, p.337).

PTSD may be distinguished from Complex Trauma (CT) which refers to a type of trauma that "occurs repeatedly and cumulatively, usually over a period of time and within specific relationships and contexts" (Courtois, 2008, p.86). Courtois (2008) relates that the term CT came into being over the past decade as researchers found that some forms of trauma were much more pervasive and complicated than others (p.87).

For example, in the case of severe childhood trauma, the expression of genes responsible for the circuits that control our responses to stress are altered when use-dependent systems, such

as the hippocampus and frontal cortex are disrupted by trauma. When these brain regions are impacted by abuse/ and or neglect during sensitive developmental periods in a child's life, their function is often disrupted and may never reach full potential, and in some cases result in permanent deficits (Perry, 2006; Siegel, 2012; King & Lieberzon, 2012).

While the prototype trauma for CT was child abuse, it now extends to all forms of interpersonal violence and attachment trauma (Courtois, 2008). Courtois (2008) states that individuals who were exposed to trauma over a variety of time spans and developmental periods suffer from a variety of psychological problems not included in the diagnosis of PTSD, including depression, anxiety, self-hatred, dissociation, substance abuse, self- destructive and risk-taking behaviors, re-victimization, problems with interpersonal and intimate relationships (including parenting), medical and somatic concerns, and despair (p.87). "Many adult trauma survivors live in unsafe situations and relationships in which they are chronically re-victimized and/or create risk and danger to themselves in ongoing conscious or unconscious reenactments of their original trauma" (Courtois, 2008, p.93), and "Some have no conceptualization of what it means to be safe, and do not believe they can ever be safe" (Courtois, 2008, p.93).

Research on neurobiology supports the view that the body has a central role in creating emotion and meaning (Siegel, 2006 as cited Ogden, Minton, & Pain, 2006). Siegel (2006) states that "for many of those coming to therapy having the intention to pay attention to the body's signals is a purposeful act that can transform a disconnected way of living into a richer, more integrated way of living" (p.251).

Trauma experts such as Bessel van der Kolk assert that because trauma's impact is often beyond the reach of cognitive awareness, therapies which emphasize body awareness, such as

EMDR, sensorimotor psychotherapy, somatic therapies, movement therapies, theatre groups, massage, and martial arts training such as aikido can interrupt the pervasive grip of trauma (Crenshaw, 2006; B.van der Kolk, personal communication, April 15, 2012). Siegel (2006) asserts that by integrating many domains, such as implicit with explicit memory, left with right hemispheres' modes of processing, and mindful awareness of bodily sensations, the pathways to integration are opened, and healing becomes possible (as cited in Ogden, Minton, and Pain, 2006).

Van der Kolk's recommendations have been a source of controversy in the scientific community where challengers argue that he does not have the data to support the efficacy of these non-traditional therapies (Crenshaw, 2006). One aspect of this thesis is to provide a review of neurobiology research which forms the scientific basis for assertions that non-verbal body centered therapies are an effective means to address the impact of trauma.

By placing the onus on the body, it is possible to address the physiological experience of trauma directly, a finding which is validated by modern neural science (Siegel, 2006 as cited Ogden, Minton, & Pain, 2006). Right brain and subcortical structures like the amygdala are centrally involved in emotional processing (Fosha, 2003). "Data supports a pivotal role for the amygdala in the transmission and interpretation of fear and anxiety-inducing sensory information" (Neumeister, Henry, & Krystal, 2007, p.152). Neumeister, Henry, and Krystal (2007) assert that "neuronal interactions between the amygdala and cortical regions enable the individual to initiate adaptive behaviors to threat based on the nature of the threat and prior experience (p.152) Limbic structures such as the amygdala require mediation by the prefrontal

cortex lest overactivation of the former results in persistent traumatic effects, such as those found in PTSD (Lanius, Bluhm, & Frewen, 2011).

Siegel (2012) relates that when the prefrontal cortex is unable to coordinate and balance input from the cortex, limbic, brainstem, and bodily regions, "we can no longer be flexible in our responses, and can lose insight into ourselves, and act from irrational impulses that we feel justified in the moment to turn into sometimes harsh and harmful behaviors" (3-3). Prefrontal brain structures such as the anterior and posterior cingulate, orbitofrontal cortex, and medial and ventral aspects of the prefrontal region (insula and limbic hippocampus) play an important role in facilitating executive functions that are responsible for emotional and social intelligence, and capacity for empathy and self understanding (Siegel, 2012).

Reciprocal connections between dorsalateral prefrontal cortex (DLPFC) and limbic structures, including the amygdala, hippocampus, and ventromedial prefrontal cortex, allow the former to exert control over these structures. "The altered structure and function of these areas have consistently been reported in individuals with PTSD" (Lyoo, Kim, Yoon, Hwang, Bae, and Kim, 2011, p.702).

Because trauma is a pervasive bodily experience which is beyond the reach of cognitive brain structures, words alone are often incapable of releasing the dysregulation that has become a traumatized person's internal map. "Traumatic experiences create structural changes in the human brain that can alter mood, cognitive ability, and behavior patterns" (Kirk & Kirk, 2012, p. 16). When a survivor of trauma has difficulty modulating arousal, attention, cognition, and relational behaviors (Courtois, Ford, & Cloitre, 2009), focusing primarily on word-based

thinking and narratives can keep therapy at a surface level, and trauma may remain unresolved (Siegel, 2006 as cited in Ogden, Minton, & Pain, 2006, p.xiv).

Van der Kolk (2006) asserts that Cognitive Behavioral Therapy (CBT), and psychodynamic therapies which focus on insight and understanding are often insufficient, and ill-suited to the process of decoding physical sensations and preprogrammed physical action patterns that are common in survivors of trauma (van der Kolk, 2006 as cited in Ogden, Minton, & Pain, 2006).

While it is common to think that emotions are processed by cognitive means, the reality is emotional processing occurs on subcortical levels in brain regions such as the amygdala. Limbic regions such as the amygdala are involved in harnessing the body to react to threatening situations, and are not directly mediated by cortical brain structures like the prefrontal cortex. When the body is harnessed to respond to danger by structures such as the amygdala, traumatic experiences may be encoded in visual/imagistic, sensorimotor, and somatic fragments which are non-linear, and non-linguistically mediated (Fosha, 2003). In other words, survivors may re-experience their trauma in the form of intrusive visions, dreams, body movements, sensations or ailments that are not linked with any memory held in conscious awareness.

Our understanding of interpersonal neurobiology is increasingly the impetus for recognizing the presence of trauma, and is an important focus in discussing the nature of trauma in relationships. When disordered relationships are a common feature in a person's life, mental health professionals are increasingly more sensitive to the possibility that childhood trauma may have occurred. Our increased knowledge on the effects of childhood trauma has resulted in an expanded understanding which now extends to all forms of domestic violence and attachment.

From the perspective of neuroplasticity, the brain changes its structure in response to experience through the activation of neurons. This can occur in various ways, such as synaptic growth from preexisting neurons connecting to one another for the first time, or strengthening existing connections, or the growth of new neurons which are then able to grow their synaptic linkages to a wide array of other neurons (Siegel, 2012, 8.6). Through these processes neuroplasticity occurs as our neural structure is shaped by experience (Siegel, 2012).

Neuroplasticity may support an understanding of how trauma shapes the brain, and influences a person's view of themselves and the world around them. It may also facilitate an understanding of the ways in which traumatic effects can be reduced by engaging in therapeutic interventions that strengthen neural pathways undermined by trauma.

As Siegel (2012) suggests, in the same way that negative experiences can alter brain structure in long lasting ways, according to the principle of neuroplasticity there is also a positive opportunity to use the power of attention, defined as "the process that shapes the direction of the flow of energy and information" (Siegel, 2012, 7), to "alter the brain's architecture" (Siegel, 2012, p.8-8). Fosha (2003) states that "affective neuroscience is rich soil for considering how plasticity can provide the ground from which psychotherapeutic healing can take root and flourish" (p.224).

The Therapeutic Impact of Mindfulness on Trauma

Siegel (2006) states that mindfulness is defined as paying attention, in the present moment, on purpose, without grasping onto judgments (p.250). Sustained attention to the present moment, and an accepting attitude toward experience have been operationalized in

research as the "two primary components of mindfulness" (Thomson, Arnkoff, & Glass, 2011, p. 228). Because keeping the observing self in mind is the core issue of all traumatic therapy and all traumatic interventions, mindfulness may be seen as an essential aspect of trauma-informed therapy (Buczynski & van der Kolk, 2012).

Mindfulness is typically cultivated through meditation exercises that emphasize moment to moment awareness of thoughts, bodily sensations, emotions, or activities (Baer, Smith, & Allen, 2004), while intentionally observing and letting go of any distracting thoughts that enter into awareness (Kabat-Zinn, 1990 as cited in Thomson, Arnkoff, & Glass, 2011). Bishop and Colleagues (2004) hypothesize that "mindfulness changes people's relationship to their thoughts, such that thoughts are viewed as subjective and short-lived, rather than accurate reflections of an unchanging reality" (as cited in Thomson, Arnkoff, & Glass, 2011, p.221).

When working with trauma survivors, mindfulness can support the therapist to stay focused on the present moment, and avoid cognitive distortions or possibly mirror neuron system intrusions (of the client) that may influence the therapeutic relationship (Franklin, 2010). Situating oneself in a mindfulness stance can help to "monitor counter-transference and remain more available to the client" (Franklin, 2010, p.162). Moreover, as a result of mirror neurons a therapist's own grounding in mindfulness can encourage a similar state in the client, and influence the latter to develop an internal state of self-attunement. As Germer, Siegel, and Fulton (2005) state,

> Mindfulness on the part of the therapist...supports the development of an attuned relationship because it helps clear the inter-subjective field of unrelated cognitive debris.

> It also offers a way to empathize with suffering by "surrendering" the need to reject suffering, thereby releasing forms of inner oppression (p. 63).

Thomson, Arnkoff, and Glass (2011) state that the rationale for the application of mindfulness and acceptance-based approaches to the treatment of PTSD rests on the notion that posttraumatic symptoms are developed and maintained by experiential avoidance, "defined as an unwillingness to experience unwanted internal events" (p.221). It is often repeated in the psychological literature that dissociation during the time of trauma (peritraumatic) is one of the strongest predictors of PTSD (Thomson, Arnkoff, and Glass, 2011). Thomson, Arnkoff, and Glass (2011) discuss the possibility that existing mindfulness and acceptance-based interventions may reduce rates of PTSD and other negative psychical outcomes when provided to individuals who have recently experienced a traumatic event.

Mindfulness based interventions have been "conceptualized as the clinical antithesis" to trauma symptoms such as dissociation, and disturbances in consciousness, perception, memory, or identity" (APA, 2000 as cited in Thomson, Arnkoff, & Glass, 2011, p.228). Skills such as "emotion regulation, the viewing of trauma-related thoughts and feelings from a nonjudgemental perspective, and acceptance that efforts to control internal experience are largely responsible for the individual's current distress", have been successfully fostered through mindfulness (Thomson, Arnkoff, & Glass, 2011, p.222).

Neurobiology has cast its gaze upon both trauma and mindfulness, and demonstrated that the former undermines prefrontal cortex functioning while the latter improves it, as well as the ability to regulate limbic responses (Crewell, Way, Eisenberger, & Lieberman, 2007 as cited in

Treadway & Lazar, 2009). The fact that trauma and mindfulness are seen to have paradoxical influences on limbic and prefrontal cortex functioning is a compelling focus of this research.

In approaching the two central questions of this research, "What is the nature of trauma?", and "what is the nature of the trauma-informed therapist in the context of mindfulness?", the neurological overlap between trauma and mindfulness will be further developed. It is the aim of this research to facilitate a better understanding of how mindfulness can support therapeutic efforts with survivors of trauma.

In the first part of this manuscript thesis, the nature of trauma will be discussed through the lenses of neurobiology, attachment, and the sociopolitical meaning of trauma in chapters 1, 2, and 3. The physical experience of trauma, the role of memory, and implications for a person's window of tolerance will be developed. My intent is to focus on integrating existing research as well as suggest directions for future research. In chapter 4, an understanding of how mindfulness can support positive outcomes in the therapeutic encounter will be described, as well as aspects of trauma treatment which are beyond the scope of mindfulness. As a result of this process a mindfulness-based trauma-informed theoretical model of therapy will be constructed.

Chapter 1: The Neurobiology of Trauma

Powerful neurogimaging techniques have confirmed Sigmund Freud's declaration that "Anatomy is destiny" (B. van der Kolk, personal communication, April 15, 2013). The field of neuroscience has been critical to identifying how key brain systems are involved in the pathophysiology of trauma (Shin, Rauch, & Pitman, 2006). Neuroscientific research has provided an understanding of how trauma shapes the brain (Crenshaw, 2006; Neimester, Henry, & Krystal, 2007; Southwick et al., 2007).

The revolution in neuroscience has demonstrated that psychological trauma forces certain areas of the brain to become chronically over activated, and others underactivated (Crenshaw, 2006; Neimester, Henry, & Krystal, 2007; Southwick et al., 2007; Shin, Rauch, & Pitman, 2006; Tyler, 2012). For many survivors of trauma their level of arousal, ability to self regulate, and memory function remain hijacked by the sequelae of brain events that occurred while undergoing traumatic experiences.

This chapter will provide an overview of the brain structures which are implicated in trauma, specifically the role of the amygdala to mobilize the body, and its relationships with cortical structures that are known to be involved in fear extinction, such as the dorsolateral and medial prefrontal cortex. Key concepts relating to how trauma is encoded in the brain, the role of memory, and implications for working within a person's window of tolerance will be discussed. As will be developed, the research on neurobiology provides some evidence, and a rationale for assertions that verbal therapies are often insufficient to resolve the effects of trauma because areas such as the amygdala remain outside the realm of cognitive interventions.

"Neuronal circuits are not independently operating mechanisms, each translating into one specific behavioral phenomenon; rather they work in conjunction with multiple pathways and neurotransmitter systems" (Neumeister, Henry, & Krystal, 2007, p.155). It is difficult to determine the degree to which alterations in one system affect functioning in other systems in the same subjects (Southwick et al., 2007). For example, studies which focus on the relationship between trauma and neurotransmitters do not include other neurological variants such as pre-existing vulnerability to trauma in the form of specific gene variants, and environmental risk factors (King and Liberzon, 2012), or the role of benzodiazepine (BZD) receptor dysfunction (Brenner et al., 2000 as cited in Neumeister, Krystal, and Henry, 2007).

Southwick et al (2007) state that research which delineates the exact relationship between trauma related disorders and multiple brain regions or systems is currently lacking due to the financial cost and complexity of such undertakings. Such research may support the notion put forward by Siegel (2012) that in future "we may be able to alter our own internal states" and subsequently "reverse epigenetic challenges", such as those caused by severe childhood trauma (p.8-8). Research of this nature represents an exciting though currently unsubstantiated foray into neurobiologically informed therapy. Consequently, this writing will limit its focus to what is currently known about trauma's impact on the amygdala and prefrontal cortex, two very well researched and trauma relevant brain regions.

While the majority of trauma exposed individuals do not develop PTSD, for those who are impacted by trauma, each area of the brain plays a unique role in responding to danger (King & Liberzon, 2012). The reactions of those involved in combat for whom the PTSD diagnosis

was developed are significantly different from those of immature individuals whose exposure to traumatic stress was ongoing and related to family life (Courtois, 2008).

As Van der Kolk (2013) asserts, the effects of Complex Trauma (CT) and those of post traumatic stress disorder (PTSD) are very different (personal communication, April 15, 2013). CT, he asserts, requires complex treatment (B. van der Kolk, personal communication, April 15, 2013) in large part due to the fact that "secure attachment is at the foundation of optimal mental health and resilience, and operates as a powerful factor against the development of trauma" (Fosha, 2003, p.225). The fact that variant traumatic experiences impact the brain differently is congruent with the view of interpersonal neurobiology that our neurobiology is shaped by our experience.

For adults who were abused as children, especially in cases where traumatic experiences were repeated and cumulative, long-term changes in stress hormone responses, patterns of emotional processing and stress responding are common (Siegel, 2012; King and Liberzon, 2012). Individuals who suffered from early trauma are often unable to "use their emotional responses to guide effective actions and behaviors" (Lanius, Bluhm, & Frewen, 2011, p.333). They tend to "disconnect from their inner emotional life because their extreme emotions make them feel out of control" (Lanius, Bluhm, & Frewen, 2011, p.333).

While an analysis of the precise brain differences between those with CT and PTSD is an important area of study, such an endeavor is beyond the scope of the present discussion on the neurobiology of trauma in general. For the purpose of this writing "trauma" will include effects captured in both CT and PTSD.

The Amygdala and Threat Perception

> "Exposing a person to chronic fear and stress is like weakening the braking power of a car while adding a more powerful engine." (Perry, B., 2006, p.66.)

Both animal models and human neuroimaging studies have established that emotional reactivity is influenced by the neurocircuitry of the amygdala and other limbic and paralimbic regions (King and Liberzon, 2012). The amygdala, like the hippocampus, is considered part of the limbic region, and is the part of the brain that is located in the medial temporal cortex just above the brain stem, and beneath the prefrontal cortex (Siegel, 2012).

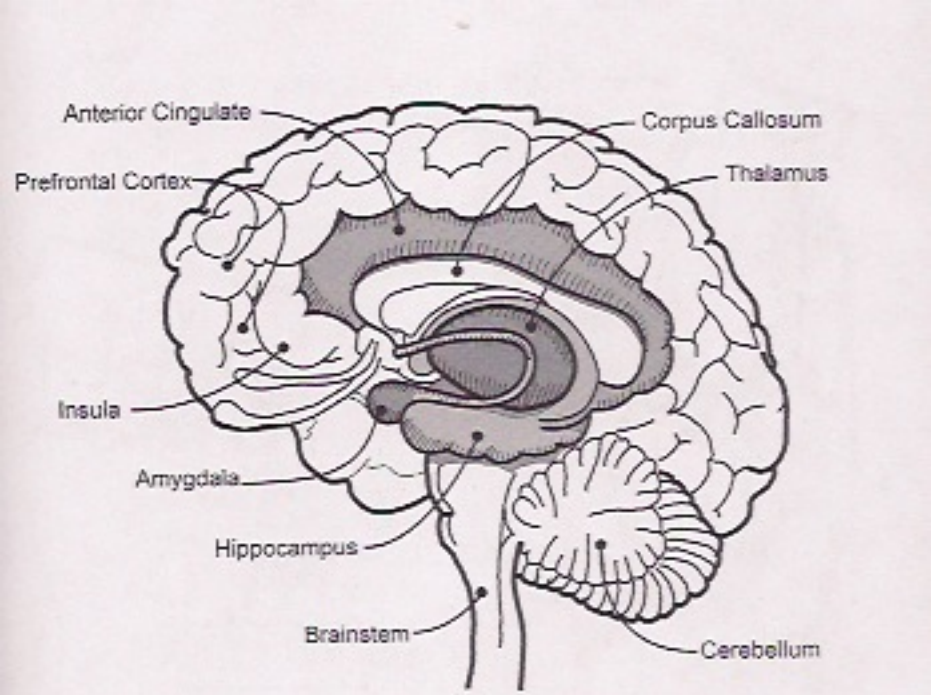

Figure D-2: The Brain. Midline view of the brain revealing the major regions, looking from the left side toward the right. The left limbic region (with the amygdala and hippocampus) is highlighted and its close proximity to the prefrontal and anterior cingulate areas is revealed. The corpus callosum connects the two hemispheres and the thalamus serves as the gateway of sensory input to the brain. Please see text for full descriptions of the functions of these various regions. Copyright © 2012 by Mind Your Brain, Inc. Used with permission by Daniel J. Siegel, M.D., from *The Developing Mind: How Relationships and the Brain Interact to Shape Who We Are* (2012).

Figure 1, The Brain (reproduced from Siegel, 2012, p. F-5)

The limbic area processes emotions, motivations, various forms of memory, is involved in the appraisal of meaning, and is directly linked to our need for attachment relationships (Siegel, 2012). Both the amygdala and the locus ceruleus (a part of the brain stem) are involved

in activating the sympathetic nervous system (SNS) through their inputs into the brain stem nuclei (King and Liberzon, 2012).

Both the parasympathetic (PNS) and the sympathetic nervous systems are "the body's physiological defense systems", and have been referred to as the "physiological bottom of the mind" (Jackson, 1931 as cited in Tyler, 2012, p.128). "The SNS is involved in the fight (aggressive) response and the flight (fear and avoidance response), and the PNS is involved in the Freeze (dissociative) response" (Tyler, 2012, p.128). "Activation of both the PNS and SNS defense systems has been found to interfere with prefrontal cortex functioning resulting in distraction, impairment of working memory, limitations in the ability to consider options and impairment in the decision-making process" (Sanderson, 2008 as cited in Tyler, 2012, p.128).

Hyper-responsiveness of the amygdala has been well established in neuroimaging studies on trauma (Shin, Rauch, & Pitman, 2006; Neumeister, Henry, & Krystal, 2007; King & Liberzon, 2012; Lanius, Bluhm, & Frewen, 2011). In the face of a threat, neuronal interactions between the amygdala and cortical regions "enable the individual to initiate adaptive behaviors based on the nature of the threat and prior experience" (Neumeister, Henry & Krystal, 2007, p. 152). "Multiple organ systems, including the heart, lungs, gut, vasculature, and immune system" are activated by the brain stem in response to inputs from the amygdala (King & Liberzon, 2012, p.68). Van der Kolk asserts that the amygdala is the "smoke detector" of the brain and as such is empowered to decide what is safe, and what is dangerous (personal communication, April 15, 2013).

For those who have survived trauma, the long-term maladaptive effects that result from traumatic experiences are often the result of what was originally the body's adaptive response to

trauma. At the time of trauma, the amygdala's response to stress which involves the SNS as well as multiple organ systems, and communication with cortical and other brain structures, is adaptive because it is a response that is mounted by the body for the purpose of survival.

The problem is when a person continues to live as if the trauma is still going on, and in a state in which the body gets stuck perceiving constant danger (Buczynski & van der Kolk, 2012) which is the case when the amygdala is overactivated, and when dorsolateral prefrontal cortex (DLPFC) and middle prefrontal cortex (MPFC) function is underactive. In this state a person's entire being becomes disorganized such that the immune and perceptual systems are relentlessly fighting, stress hormones continue to be released, and overall physical and mental health is negatively impacted (Buczynski & van der Kolk, 2012).

Understanding the neurobiology of trauma, and the role of brain structures like the amygdala is an important context for recognizing that trauma survivors continue to experience danger even in the absence of the circumstances which originally elicited this response. This knowledge equips those who provide mental health care with a rationale for recognizing symptoms of trauma, and engaging in a trauma-informed therapeutic approach. An important aspect of this discussion includes examining the role of brain structures such as the DLPFC and MPFC in mitigating limbic responses to trauma through fear extinction.

Cortical Structures and Fear Extinction

The prefrontal cortex (PFC) which is located in the anterior part of the brain's frontal lobe is sometimes referred to as the "middle prefrontal group of regions of the frontal cortex", or the "middle pre-frontal area" (MPFA), and also includes the anterior and posterior cingulate,

orbitofrontal cortex, and both the medial and ventral aspects of the prefrontal region (Siegel, 2012).

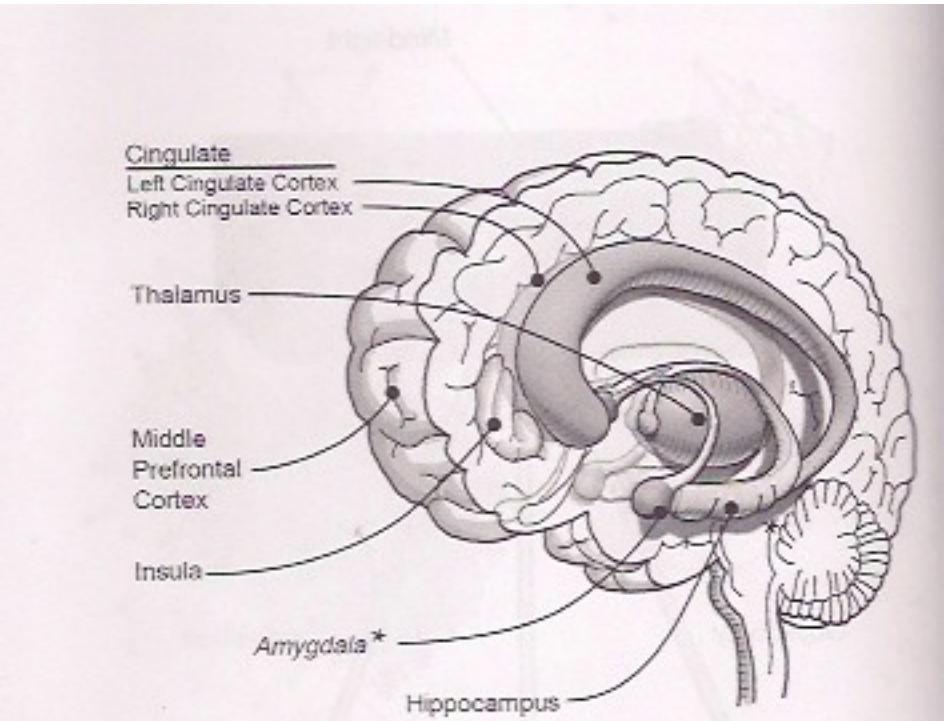

Figure D-1: The Middle Prefrontal Cortex. This diagram reveals the limbic region (cingulate, amygdala, hippocampus) and its relationship to the middle prefrontal cortex (which includes the anterior portion of the cingulate, the orbitofrontal cortex, the dorsal and ventral aspects of the medial prefrontal area, and the ventrolateral prefrontal cortex, which is considered by many to include the insula). Copyright © 2012 by MindYour Brain, Inc. Used with permission by Daniel J. Siegel, M.D., from *The Developing Mind: How Relationships and the Brain Interact to Shape Who We Are* (2012).

Figure 2, The Middle Prefrontal Cortex (reproduced from Siegel, 2012, p. F-4)

The cortex is known for "perceptual filtering, and shaping the nature of what we are aware of as it compares prior experiences of similar events or objects with the ongoing, here-and-now sensory input" (Siegel, 2012, p.5-3). Executive functions such as emotional and social intelligence, capacity for empathy, and self understanding are all derived from the prefrontal cortex (Siegel, 2012).

This region along with the DLPFC has “a wide array of reciprocal connections to the amygdala, limbic structures, and the hippocampus” which in the absence of hyperarousal of the amygdala, “allow it to exert control over these structures” (Lyoo et al., 2011, p.702). The medial frontal cortex structures have been shown to be hypoactive when the amygdala and other limbic regions are in a state of exaggerated activation which occurs as a result of trauma recall or negative emotional cues in PTSD (King and Liberzon, 2012; Shin, Rauch & Pitman, 2006).

The hypoactive tendency of the MPFA in the midst of trauma is demonstrated by neuroimaging scans that reveal when people remember a traumatic event, the left frontal cortex shuts down, and Broca’s area, the center of speech and language is disabled (Crenshaw, 2006). When trauma survivors recount traumatic events “the frontal lobes become impaired, and they have trouble thinking and speaking” (Crenshaw, 2006, p.25). “The activity of verbal recall has been shown to inhibit amygdala-based fear processes” (as cited in Johnson, 2012) which indicates that hyperarousal of the amygdala undermines the MPFC functions. Trauma survivors who are confronted with bodily sensations that are emotionally charged often lack the words to communicate their experience. Rather than unified into one, emotion, cognition, and bodily experiences become fragmented frustrating self-directed and purposeful behavior (Courtois, Ford, & Cloitre, 2009).

As mentioned, an awareness of how trauma can disrupt a person’s ability to put their experience into words is important when working with survivors of trauma in both medical and mental health care settings (Buczynski & van der Kolk, 2012). Care givers who are informed about how trauma can disable left brain and PFC functioning can find other ways to establish safety with survivors of trauma who can’t always put their needs and experience into words.

Lanius, Bluhm and Frewen (2011) state that **"**altered brain responses in brain regions involved in higher-order social cognition (mentalizing and theory of mind)", such as the dorsomedial prefrontal cortex are common in PTSD subjects (p.337). Higher-order social cognition refers to the ability of a human mind to "make implicit assumptions that the behavior of others is determined by their desires, attitudes, and beliefs" (Frith & Frith, 2003, p.59); this may be a function of emotional awareness described as "the capacity to be aware of and describe emotions in oneself and others", as well as "the ability to reflect upon internal affective experience" (Lanius, Bluhm, & Frewen, 2011, p.333).

When the MPFA is not compromised or altered by trauma, it "inhibits the acquisition of the fear response, and promotes extinction of behavioral response to fear-conditioned stimuli that are no longer reinforced" (Morgan & LeDoux, 1995; Quirk, Russo, Barron,& Lebron, 2000 as cited in Neumeister, Henry & Krystal, 2007, p.158). This finding has been demonstrated in lesion studies from which it was found that medial PFC dysfunction can "result in a disinhibition of amygdala activity" (Neumeister, Henry, and Krystal, 2007, p.158).

Lyoo et al. (2011) state that, "the dorsomedial prefrontal cortex and the dorsolateral prefrontal cortex (DLPFC) have been implicated as having a role in fear extinction learning", and suggest that the DLPFC could be pivotal in the conscious regulation of emotion to reduce fear responses (p.702).

The Fear Response

The fear extinction learning paradigm originated in fear conditioning studies originally done with animals and later applied to humans (Phelps, Delgado, Nearing, & Ledoux, 2004). It was found that fear extinction occurs when a conditioned stimulus (CS) (fear provoking experience) was presented *without* an unconditioned stimulus (US) (neutral event) (Phelps et al., 2004). Eventually after a number of trials in which the conditioned response (CR) is diminished or eliminated, fear extinction takes place through a process which is not "unlearning" fear responses but learning fear inhibition (Phelps et al., 2004). This means that on a conscious level fear can be extinguished when the fear provoking stimuli is no longer presented. However, the conditioned response always remains present and can spontaneously reoccur when presented with the CS again.

It is likely that the DLPFC's role in fear extinction learning is involved with asserting cognitive control over the dysregulated fear and anxiety circuits in the ventromedial prefrontal cortex, amygdala, and hippocampus (Lyoo et al., 2011). Lyoo el al. (2011) state that in response to emotional distress, "the DLPFC provides greater cortical plasticity when mobilized for strong and efficient emotional regulation among trauma-exposed individuals" (p.702).

Van der Kolk reiterates that the DLPC provides a sense of continuity in terms of how the self exists over time, and when it's compromised a person has little perspective on what's happening (B. van der Kolk, personal communication, April 15, 2013). He emphasizes the importance of noticing changes in the body, and tracking what happens next which strengthens the DLPC (B. van der Kolk, personal communication, April 15, 2013).

Siegel (2006) discusses nine essential functions of the middle prefrontal processes (see Table 1), many of which are compromised by the effects of trauma.

Table 1

Nine essential functions of middle prefrontal processes (from Siegel, 2006, p 252)

Nine Essential Functions of Middle Prefrontal Processes	
Body regulation:	balance of the sympathetic (accelerator) and parasympathetic (brake) branches of the autonomic nervous system.
Attuned communication:	enables us to tune into others' states and link minds.
Emotional balance:	permits the lower limbic regions to become aroused enough so life has meaning, but not too aroused that we become flooded.
Response flexibility:	the opposite of a "knee-jerk" reaction, this capacity enables us to pause before acting and inhibit impulses, giving us enough time to reflect on our various options for response.
Empathy:	considering the mental perspective of another person.
Insight:	self-knowing awareness, the gateway to our autobiographical narratives and self-understanding.
Fear extinction:	GABA (an inhibitory neurotransmitter) fibers project down to the amygdala and enable fearful responses to be calmed.

Nine Essential Functions of Middle Prefrontal Processes	
Intuition:	being aware of the input of our body, especially information from the neural networks surrounding intestines (a "gut feeling") and our heart ("heartfelt feelings") enables us to be open to the wisdom of our non-conceptual selves.
Morality:	the capacity to think of the larger good, and to act on these pro-social ideas, even when alone, appears to depend on an intact middle prefrontal region.

When MPFC functioning has been altered due to trauma, survivors may lack any number of the above nine functions due to their brain being stuck in a state of exaggerated limbic response. Because they experience the world around them as a very dangerous place, it is clear that cultivating an environment of safety and stability is paramount (Crenshaw, 2006). As mentioned, the concept of neuroplasticity promises that it is possible to change the brain by introducing new experiences that activate and strengthen hitherto dormant neural pathways. Trauma-informed therapy may be seen as a means to reawaken the fear extinction capacity of the MPFC and associated cortical structures.

The Role of the Hippocampus in Memory Processes

Like the amygdala, the hippocampus is considered part of the medial temporal brain structures. It is important to consider the hippocampus's unique and crucial role in mediating "explicit memory processes, and encoding context during fear conditioning" (Shin, Rauch, and Pitman, 2006, p.68). It has been proposed that the hippocampus functions like an "implicit

memory puzzle piece assembler that clusters the basic building blocks of the various elements of implicit memory together into framed pictures of semantic and episodic memory" (Siegel, 2006, p.253).

The hippocampus appears to interact with the amygdala during the encoding of emotional memories, "a process which is highly relevant to the study of trauma and PTSD" (Shin, Rauch, and Pitman, 2006, p.68). The correlation between PTSD and memory impairment, as well as reduced hippocampal volumes, and abnormal function has been discussed in numerous studies on the neurobiology of trauma (Shin, Rauch, and Pitman, 2006; King and Liberzon, 2012; Neumeister, Henry, and Krystal, 2007; Ruden, 2011; Siegel, 2006; Hayes et al., 2011). It appears that the "massive stress hormone secretion or amygdala discharge in response to a traumatic event may force the hippocampus to temporarily shut down" (Siegel, 2006, p.253).

Siegel (2006) elucidates that, "Memory shapes how we experience the present and how we anticipate the future, readying us in the present moment for what comes next based on what we experienced in the past" (p.252). In order to understand how trauma impacts the hippocampus, and to grasp its integrative role in memory function, it is helpful to understand the different types of memory, and phases of memory consolidation.

Declarative Versus Procedural Memory

> "When you retrieve a memory from where it is stored in the brain, you automatically open it to "edit"" (Perry, B., 2006, p.156).

The declarative memory system draws information and factual experiential knowledge from memory which has already been encoded by the hippocampus (Ruden, 2011). Declarative memory is explicit memory which includes "two forms: factual and semantic, and episodic which is the memory of oneself in an episode in the past" (Siegel, 2006, p.253). As Siegel (2006) relates, "Both semantic and episodic memory appear to require focal attention for their encoding, and when they are retrieved from storage into present awareness, they do have the internal sensation that something is being activated from the past" (p.252). "The hippocampus in particular is necessary to the formation of these specific, contextual memories" (Hayes et al., 2011, p.3).

Procedural memory, the only form of memory that is available to us prior to 18 months of age, is also known as non-declarative or implicit memory, and is the "first layer of memory processing" (Siegel, 2006, p.252). Throughout our lives "we continue to form implicit memories" only some of which are "selectively integrated into the second layer of memory processing, declarative memory" (Siegel, 2006, p.252).

Implicit memory "involves the perceptual, emotional, and behavioral neural responses activated during an experience, which may include our bodily sensations but these have not been studied formally" (Siegel, 2006, p.252). We do not require focal, conscious attention for implicit memories to form, nor do we have the internal sensation that something is being accessed from a memory of the past when we retrieve an element of implicit memory into awareness (Siegel, 2006).

When the hippocampus is disabled by a traumatic event, only the first phase of memory consolidation known as synaptic consolidation can occur. This type of memory is very rapid, happens within minutes and is facilitated by glutamate receptors, norepinephrine, cortisol, and

other chemicals acting in the amygdala and hippocampus (Ruden, 2011). Ruden (2011) speculates that a critical aspect of traumatization occurs when "unimodal sensory content remains synaptically encoded in the amygdala" which "allows us to respond to stimuli as if recalling the event for the first time" (p.36). These traumatic memories are stored below the level of conscious awareness because high levels of cortisol cause abnormal hippocampal activity which alters both the storage and subsequent retrieval of an intense emotional event (Ruden, 2011). This is also referred to as cognitive dissociation in which memories present themselves as free-floating, unassembled elements of perception, bodily sensation, emotion, and behavioral response in the form of episodic flashbacks, intrusive thoughts, or nightmares (Ruden, 2011; Siegel, 2006).

System consolidation is the second phase of memory consolidation which occurs when "synaptically consolidated memories become independent of the hippocampus over a period of weeks to years" after which they are stored in the brain's cortex (Ruden, 2011, p.35). Reconsolidation, the third phase, takes place when "previously consolidated memory can be made labile again through reactivation of the memory trace" (Ruden, 2011, p.35).

Synaptically consolidated memories can only be integrated into the second and third phases of memory consolidation when they are "able to enter the spotlight of attention, and are assembled into the framed pictures of semantic and self memories" (Siegel, 2006, p.253). As Siegel (2006) relates, it is with a reflective focus that "what was once a memory configuration capable of intrusion on a person's life can move into a form of knowing that involves both deep thoughts and deep sensations of the reality of the past" (p.253).

When traumatic memories are able to move beyond the level of synaptic consolidation, those suffering from intrusive sensations, emotions, and other sensory fragments may begin to decipher the source of their symptoms. Such clarity is possible when memories can be processed through the hippocampal pathway and integrated into cognitive awareness. This often coincides with therapeutic interventions that "enhance the client's ability to approach and master rather than avoid internal bodily/affective states and external events that trigger intrusive reexperiencing, emotional numbing or dissociation, and hyper- or hypo- arousal" (Courtois, Ford, & Cloitre, 2009, p.91). In the absence of such therapeutic resolution, "dissociation becomes a physiologically and emotionally mediated symptom and interactional process for many complex trauma survivors" (Courtois, Ford, & Cloitre, 2009, p.83).

The Window of Tolerance

When traumatic memories are confined to the synaptic level of memory consolidation in the amygdala, trauma survivors are vulnerable to dissociation. Dissociation can occur when a person attempts to "adapt to trauma by dividing their conscious attention and placing it only on nontraumatic elements of the environment at that time" (Siegel, 2006, p.253).

It has been proposed that dissociation is associated with the PNS due to its role in slowing down the cardiac and respiratory system, and lowering blood pressure which contributes to the physiological response of withdrawal, immobility, and submission (Perry, 2001 as cited in Tyler, 2012). Combined with the direct effect of trauma on hippocampal function, the tendency to dissociate in the presence of emotionally laden material affects the degree to which

traumatized persons can “become aware of who they are, and what has happened to them”, both of which are “at the core of trauma treatment” (van der Kolk, 2006 as cited in Crenshaw, 2006, p. 33-35). While it is important to recognize that dissociation has adaptational value in the sense that it “supports survival in the face of terrifying events”, when dissociation occurs too frequently “the development of neural networks” that support MPFC processes “is impaired” (Crenshaw, 2006, p. 26).

The window of tolerance is the span of arousal within which a system can maintain the harmonious and adaptive flow of integration (Siegel, 2012, p.33). In this “optimal arousal zone”, a client can “receive and integrate current sensory input while assimilating prior input”, as well as “think and talk about their experience in therapy and simultaneously feel a congruent emotional tone and sense of self” (Ogden, Minton, & Pain, 2006, p.27)

For survivors of trauma the window of tolerance is where they can remain aware of who they are in the present moment while integrating fragments of traumatic memory, and without dissociating into a state of hyper or hypoarousal. Equilibrium in the face of such therapeutic interventions require that “efforts to address traumatic material are balanced with interventions that support the client’s resources for integrating that material” (Ogden, Minton, & Pain, 2006, p. 198). Courtois, Ford and Cloitre (2009) state that in order to achieve the main goals in the treatment of trauma, “dissociative processes and sequestering of emotions, thoughts, perceptions, and memories” must be identified while “encouraging personality integration, and integration of emotions and knowledge that have been dissociated” (p.91).

This chapter provided an overview of brain structures such as the amygdala whose direct relationship with cortical areas involved in fear extinction make it highly relevant to the study of trauma. As was discussed, research on neurobiology reveals that trauma is encoded in the brain, and such coding affects memory, and has implications for working within a person's window of tolerance. The latter provides a rational for assertions that verbal therapies are often insufficient to resolve the effects of trauma.

The next chapter will provide an overview of attachment theory which will include the mirror neuron system, attachment communications, and the physiology of secure and insecure attachment. Self-regulation will be discussed in terms of its relevance for conceptualizing traumatic effects, and trauma-informed therapeutic approaches. A clinical case conceptualization will be provided to illustrate the reciprocal connections that exist between attachment, brain development, and the effects of developmental trauma.

Chapter 2: Attachment

> "Fire can warm or consume, water can quench or drown, wind can caress or cut. And so it is with human relationships: we can both create and destroy, nurture and terrorize, traumatize and heal each other" (Perry, B., 2006, p.5)

> "Relationships are the agents of change and the most powerful therapy is human love" (Perry, B., 2006, p.230).

It is within the realm of attachment theory that the synthesis between brain development, interpersonal neurobiology and trauma is illumined. The axis of this relationship may lie in the brain where "the threat of rejection shares neural circuitry with those for physical pain" (Allen, 2011, p.222). The power of an intimate relationship can either "trigger primal pathways of rage, fear, and demand, or withdrawal", or serve to "deactivate the amygdala" with "spurts of oxytocin associated with a warm relationship" (Allen, 2011, p.222).

As Perry (2006) affirms, "because both the brain's relational and pleasure-mediating neural systems are linked with our stress response systems, interactions with loved ones are our major stress-modulating mechanism" (p.89). "Just as seeking safety (attachment) is a biological process, so is responding to threat by fight or flight, or by dissociation and withdrawal" (Allen, 2011, p.222). Research in the neurobiology of attachment and trauma suggest that brain regions strengthened by security in attachment provide resiliency to trauma (Fosha, 2003). Secure attachment has also been identified as a key factor in mitigating post traumatic effects (B.van der Kolk, personal communication, April 15, 2013).

In the absence of relationships which foster the development of stress-modulating mechanisms, survivors of developmental trauma often lack fundamental self regulation skills, and adaptive responses to stress. "Numerous studies have demonstrated that insecurely attached children, in particular those showing disorganized behaviors, are at greater risk for psychopathology, behavior problems, stress dysregulation, and poor cognitive performance" (Cyr, Euser, Bakermans-Kranenburg &Van Ijzendoorn, 2010, p.87), as well as vulnerability to develop PTSD in the aftermath of traumatic events (King & Liberzon, 2012). There is also "evidence of profound alterations in stress hormone responses to social stressors and trauma recall in adult survivors of childhood traumas" (King & Liberzon, 2012, p.73).

As Schore (1996) states, "the self-organization of the developing brain occurs in the context of a relationship with another self, another brain" (Schore & Schore, 2008, p. 13). His words echo the findings of MRI studies, and he affirms that the "massive human brain growth spurt (which) occurs in the first two years of life...is overwhelmingly experience-dependent" (Schore, 2002, p.444). Attachment theory and recent findings in neurobiology clearly outline how both secure and insecure bonding within the first three years of life affect brain development and corresponding self-regulation skills. Socially as well as physiologically, the developing self is profoundly affected by the nature of primary attachment relationships.

It is in large part due to advances in brain research that we are able to more deeply understand "the underlying mechanisms by which dysregulating traumatic attachments embedded in abuse and neglect interfere with the organization of particularly, the right brain" (Schore, 2001; Schore 2002 as cited in Schore, 2002e, p.460).

This chapter will provide an overview of attachment theory, including the mirror neuron system, attachment communications, and the physiology of secure and insecure attachment. A discussion of the relevance of self-regulation in conceptualizing traumatic effects, and trauma-informed therapeutic approaches, will also be developed. Elucidating the reciprocal connections between attachment, brain development, and traumatic effects advances neuroscience's current interest in "self-representation in neural systems" (Churchland, 2002 as cited in Schore, 2002, p. 438). In the presence of secure attachment, such representations "coordinate inner body signals to generate survival-appropriate inner regulation" that allow the organism "to act as a coherent whole" (Churchland, 2002 as cited in Schore, 2002, p.438) which are highly relevant to the study of trauma.

Attachment, Brain Development & Self-Regulation

The development of right brain hemisphere operations are "essential to the vital coping functions that support self-survival", and "the human stress response" which is profoundly influenced by the presence or absence of secure attachment (Wittling, 1997 as cited in Schore, 2002, p.446). Optimal maturation of right brain limbic and associated cortical brain structures occurs in the context of secure attachment relationships (Friend, 2012). "When overwhelming stress occurs within early attachments, the impact is toxic for our developing brains" (Friend, 2012, p.115).

Schore (2002) relates that many aspects of human behavior, including non-conscious reception, expression, communication of emotion, physiological and cognitive components of emotional processing, control of spontaneously evoked emotional reactions, the modulation of

"primary emotions", and the adaptive capacity for the regulation of affect, all rely on right brain hemisphere development (Schore, 2002). In the first two years of life infants "show higher right than left hemispheric volumes" (Matsuzawa et al., 2001 as cited in Schore, 2002, p.444) which suggests that the right hemisphere undergoes a growth spurt precisely when infants are wholly dependent on their primary caregivers.

An understanding of how attachment relationships impact brain development has contributed to the emergence of therapies which aim to strengthen brain structures and neural pathways undermined by developmental trauma (Fosha, 2003; Perry, 2006; Friend, 2012; Finn, 2012; Main, Hesse, & Hesse, 2011). Schore and Schore (2008) contribute that "the developmental understanding that arises from this (attachment) theory leads to a corresponding regulation theory of therapy" (p.17).

It is through relationships, as well as self-reflective observation, that healthy self-regulation is developed through integration of prefrontal regions (Siegel, 2006). Secure attachment facilitates the development of "emotional/ self awareness and interoceptive monitoring" which predicts that individuals who face traumatic events will be less likely to be overwhelmed by intense emotional experiences (Lanius, Bluhm, & Frewen, 2011). Self regulation helps individuals to maintain "executive control during reminders of past traumatic events and other stressful life events" (Lanius, Bluhm, & Frewen, 2011, p.335).

When relationships with other people create associated feelings of comfort and security, neural circuitry is developed based on this experience. When it is repeated it becomes patterned into the brain, and can be called upon when needed, such as in moments of hyperarousal. This is accomplished as a result of "nonconscious implicit interactive regulation" which is "the central

strategy that underlies all essential survival functions of the human self system" (Schore 2003a, b as cited in Schore & Schore, 2008, p.11).

Identifying self regulation as the conceptual fulcrum around which many issues related to trauma revolve provides a means through which appropriate therapeutic interventions can be integrated; these may include Bowlby's attachment theory, neuroscience, infant research, and other psychotherapeutic traditions that incorporate an awareness of the centrality of early dyadic regulation, and right hemispheric emotional development, as well as the dynamics of implicit procedural memory (Schore & Schore, 2008). These therapeutic endeavors may offer hope that the dysregulating effects of trauma may be functionally reversed.

The Mirror Neuron System & Attachment Communications

The blue print for all relationships in a person's life begins in the context of the relationship with primary caregivers. It is within the infant-mother (or parent) dyad where the developing infant first experiences intersubjectivity (Schore & Schore, 2008) which reflects what is now known about the mirror neuron system (Franklin, 2010). "The brain is hard wired to connect to other minds, to create images of others' internal states, affective expressions, and bodily arousal systems" (Siegel, 2006 as cited in Ogden, Minton & Pain, 2006, p.xv). It is through the mirror neuron system that we develop our "fundamental capacity to create emotional resonance (which) serves as the gateway of empathy" (Siegel, 2006 as cited in Ogden, Minton & Pain, 2006, p.xv).

In the mirror neuron system "the observer and the observed instinctually fuse at subtle neural levels" (Gallese, 2008; Gallese et al., 2004 as cited in Franklin, 2010, p.161). This occurs

when “humans see or hear another person performing a specific action (and) the same motor circuits are simultaneously activated in their bodies” (Franklin, 2010, p.163). This “implicit, automatic and unconscious process of embodied simulation enables the observer to use his (or) her resources to penetrate the world of another without the need of explicitly theorizing about it” (Gallese, 2003 as cited in Franklin, 2010, p. 163).”

Within this context of “primary intersubjectivity”, the infant learns to “send specific social cues to which the mother has responded” (Schore, 2002, p.441). It is like a “communicational matrix in which both match each other’s psychobiological states, and simultaneously adjust social attention, stimulation, and arousal to each other’s responses”, also known as “mutually attuned selective cueing” (Schore, 2002, p.441). Franklin (2010) describes this as what occurs when “we come to know another’s emotion by allowing it to become born within ourselves” (p.161).

“Emotional awareness” may be seen as an outcome of the mirror neuron system, and functionally mediates interactions with others (Lanius, Bluhm, & Frewen, 2011). Lanius, Bluhm and Frewen (2011) state that emotional awareness “refers to the capacity to be aware of and describe emotions in oneself and others and involves the ability to reflect upon internal affective experience”. Considered the “cornerstone” of emotion regulation, emotional awareness is mediated by cortical structures that have been “linked to the key role of secure attachment with primary caregivers” (Lanius, Bluhm, & Frewen, 2011, p.333). As Schore and Schore (2008) affirm “affective attachment communications facilitate the maturation of brain systems involved in affect and self regulation” (Schore & Schore, 2008, p.9).

The ability to recognize emotions from "visually presented facial expressions requires right somatosensory cortices" (Schore, 2002, p.445). "We are imitative creatures that live by our mirror neuron system" (B. van der Kolk, personal communication, April 16, 2013). We "recognize another individual's emotional state by internally generating somatosensory representations that simulate how (we) would feel when displaying certain facial expression" (Adolphs et al., 2000, p. 2683 as cited in Schore, 2002, p.445). This develops our brain's ability to feel what we feel, know what we feel, and recognize the same things in others. "Optimal attachment experiences allow for the emergence of self-awareness" as we develop "the adaptive capacity to sense, attend to, and reflect upon the dynamic changes...(in our) subjective self states" (Schore, 2002, p. 462).

Overview of Attachment Theory

Attachment theory was born fifty years ago and has "its origins in our evolutionary heritage" (Main, Hesse, & Hesse, 2011, p. 428). Turning to evolutionary theory, John Bowlby developed attachment theory which established the "selective, biologically based nature of a child's attachment to specific, *non-interchangeable* persons with whom the child had had a history of contingent social interactions" (Main, Hesse, & Hesse, 2011, p. 437).

By three years of age, and usually within the first year, first attachments are formed, "a fact which has been confirmed across widely differing cultures" (van Ijzendoorn & Sagi-Schwartz, 2008 as cited in Main, Hesse, & Hesse, 2011, p. 429). "Securely attached children use their primary caregiver as a base from which to explore their environments and, when distressed, they retreat to their attachment figure for protection and comfort" (Cyr, Euser, Bakermans-

Kranenburg, & Van Ijzendoorn, 2010, p.88). Attachment is a "species-wide behavior pattern in humans" which is biologically-based, and "rooted in the requirements of survival" (Bowlby, 1969/1982 as cited in Main, Hesse, & Hesse, 2011, p. 437).

Attachment can be organized or disorganized, secure or insecure. Within organized attachment there exist three subtypes; secure, avoidant, resistant-ambivalent (Ainsworth, 1979; Main & Cassidy, 1988 as cited in Main, 1996). Disorganized attachment is described as "the most anxious type of insecure attachment over and above (the) underlying attachment pattern" (Cyr, Euser, Bakermans-Kranenburg, & van Ijzendoorn, 2010, p.88). Infants of secure attachment have mothers who for the most part are aware of their signals, interpret them accurately, and respond promptly and appropriately (Main, Hesse, & Hesse, 2011).

The Physiology and Effects of Insecure & Disorganized Attachment

In disorganized attachment the child is placed in an "irresolvable paradox" of feeling compelled to "seek the parent when alarmed" but feeling unable to either "approach, shift its attention, or flee" (Schore, 2002, p.450). The experience of disorganized attachment is analogous with the absence of choice and feelings of helplessness which occur during traumatic experiences, and have been linked with increased PTSD severity (Mineka & Hendersen, 1985; Abramson, Seligman, & Teasdale, 1978; Maier & Seligman, 1976; Mikulincer and Solomon, 1988 all cited in Johnson, 2012).

Main, Hesse, and Hesse (2011) discuss the findings of multiple studies (Ainsworth's home studies; Sroufe et al.'s follow-up studies; Sroufe and Waters, 1977b; and Spangler & Grossmann,1993) in which insecure-avoidant infants behaviorally masked their distress but

through measurement of heart-beat and cortisol levels it was found that they were expressing their distress physiologically. When infants must adapt to home environments where attachment relationships are either "intrusive, rejecting, or inconsistently responsive" (Cyr, Euser, Bakermans-Kranenburg, & van Ijzendoorn, 2010, p.88) their heightened state of stress is revealed in their physiological responses.

Heart rate has been recognized as a valuable barometer of stress-induced states in cases where traumatized individuals are unable to use language to convey their experience (Perry, 2006; van der Kolk, personal communication, April 16, 2013). Heart rate, like several other involuntary autonomic functions, is regulated by the sympathetic and parasympathetic nervous systems, both of which are activated by the amygdala and other right brain limbic structures. Secure attachment behaviors have been shown to result in a regular heart rate. Heart rate variability and breathing can also influence brain stem areas of the brain, and impact corresponding autonomic stress modulating activities (B. van der Kolk, personnel communication, April 16, 2013). In other words, secure attachment behaviors do indirectly influence autonomic stress modulating mechanisms by means of their impact on heart variability and breathing.

When the emotional brain is activated by sensory triggers of past trauma, habitual protective devices are engaged (Siegel, 2006 as cited in Ogden, Minton & Pain, 2006). Changes in sympathetic and parasympathetic activation can then "interfere with executive brain functions", which often results in "behavioral regression" (Siegel, 2006 as cited in Ogden, Minton & Pain, 2006, p.xv). Perry (2006) states that "regulating heart rate during stress and controlling stress hormones are two critical tasks that require that the brain keep proper time" (p.

142). He points out that the rate at which people rock their babies is about eighty beats per minute which is the same as a normal resting adult heart rate (Perry, 2006).

Secure attachment may be seen as the mammalian evolutionary mechanism by which advanced neural circuits are recruited in support of the human social engagement system (Porges, 2011). According to the polyvagal theory, the vertebrate autonomic system develops in three phylogenetic stages, which are "behaviorally linked to social communication (e.g. facial expression, vocalization, listening), mobilization (e.g. fight-or-flight behaviors, tantrums, or behavioral meltdowns), and immobilization (e.g. feigning death, vasovagal syncope, and behavioral and physiological shutdown)" (Porges, 2011, p.121). Porges (2011) explains the phylogenetic structure and function of the polyvagal system:

> "In this phylogenetically organized hierarchy, the nearest circuit associated with social communication is used first. If that circuit fails to provide safety, then the older survival-oriented circuits are recruited sequentially. From a developmental perspective, the oldest circuits develop first, and the newest circuit develops last leaving it the most vulnerable to neural insult and the most sensitive to postpartum experience" (p.119).

The vagus function is to act "as a restraint, or brake, limiting the rate at which the heart can beat and functionally calming the individual" (Porges, 2011, p.122). "When vagal tone to the pacemaker is low, there is little or no inhibition of the pacemaker, and the heart rate increases" (Porges, 2011, p.122).

The development of this evolutionarily based neural circuitry depends on secure dyadic interactions between infant and primary care giver. It is through myelinated vagal pathways which develop between 30-32 weeks gestational age to approximately six months post partum that the vagus exerts its influence over the autonomic system and corresponding social engagement behaviors (Porges, 2011).

Porges (2011) suggests that "the loving caregiver's facial features and vocal prosody (trigger) temporal corticolimbic pathways which dampen defensive reactions and recruit the vagal brake to calm" (p.125). Like heart rate variability, the lens of polyvagal theory reveals how neurological systems, which are the foundation of social engagement over the life span are profoundly influenced by secure attachment.

In the absence of secure attachment, "the neurobiological processes that are involved in the processing of emotion and affect regulation in optimal development" are compromised (Fosha, 2003, p.224). In the case of severe childhood trauma, the expression of genes responsible for the circuits that control our responses to stress are often altered (Siegel, 2012, p. 8-7; King and Liberzon, 2012). This, in addition to long-lasting epigenetic regulatory changes, often lead to a situation where a person's overall resilience is compromised (Siegel, 2012; King and Liberzon, 2012).

Epigenetic research has "begun to uncover the inherent leverage of subjective experience" (Johnson, 2012, p.53) such as in molar epigenetics which focuses on "the interface between behavior and biology" (Johnson, 2012, p.46). Molecular epigenetics, the other direction of epigenetic investigation, "focuses on the relationship between genotype and phenotype,

specifically the mechanisms through which genotypes respond to environmental stimuli to produce different phenotypes" (Johnson, 2012, p.46).

"Phenotypes are specific traits that are under at least partial control of genes...such as hair or eye colour" (King & Liberzon, 2012, p.66). "Genotypes moderate environmental effects, through effect on susceptibility to risk environments" (Rutter, 2002 as cited in Broekman, Olff, & Boer, 2007, p.13). Broekman, Olff, & Boer (2007) point out that "adverse environment has little effect if the genetic susceptibility is absent, while it may have a large effect when the genetic susceptibility is present" (p.13).

Both molar and molecular epigenetic research are relevant in uncovering how mechanisms such as dissociation become "an intergenerational process in many abusive families, related in part to unresolved trauma and loss at a parental level" (Courtois, Ford, & Cloitre, 2009, p.83). Such research may enhance our understanding of how "experience modifies physical makeup, such as the function of the central nervous system, manifested through changes in cellular, neural circuitry, DNA, molecular, and behavioral aspects" (Sweatt, 2009 as cited in Johnson, 2012, p.46).

Epigenetics is also relevant to our understanding of PTSD through empirical studies which demonstrate that "epigenetic processes (are) at work in associative fear conditioning, hippocampus-dependent spatial memory, and learned fear extinction processes" (Sweatt, 2009 as cited in Johnson, 2012, p.46). These biological and behavioral phenomena play critical roles in PTSD acquisition and persistence (Nemeroff, 2006; Shin et al., 2006), and are therefore helpful in conceptualizing therapeutic goals and interventions (Johnson, 2012).

Clinical Scenario[1]

The following is a clinical example of a fictional client who experienced insecure and disorganized attachment as a child, and currently deals with issues related to difficulty with self regulation, anxiety, dissociation characterized by hyperarousal, and disordered relationships.

For the first seven years of her life Sharon lived with her mother, father, and two siblings in a small rural town. Sharon states she does not remember much prior to age seven, but that her mother often beat her and she never felt safe. She acknowledges that her mother was herself a victim of sexual abuse by a family member.

When Sharon was seven her mother accused her father of rape and he was deported to his native land of Algeria. Sharon states that this rape never happened and that her mother fabricated it so that she could marry another man with whom she had been having an affair. Sharon's step father sexually molested her between the ages of eight to thirteen years. She states that her mother sanctioned the abuse, and that she is very angry with her mother and step father. She is estranged from a son who she had at eighteen years of age as a result of numerous sexual encounters with various men. Sharon states that she gave her son up out of fear that she would sexually molest him.

Numerous authors have discussed the relationship between insecure attachment styles and relational deficits which often result in intergenerational trauma (Friend, 2012; Charuvastra & Cloitre, 2008; Harwood, 2012; Saunders, Jacobvitz, Zaccagnino, Beverung, & Hazen, 2011). This relationship is evidenced in Sharon's case as her mother's sexual abuse lead to her own insecure attachment with her mother, and consequent insecure attachment with her son.

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[1] This case study is the invention of the author and was not taken from an actual clinical example.

Sharon is forty-six years old, Caucasian, lives alone, and is on disability and describes herself as living in an almost perpetual state of hyperarousal. She presents wearing very provocative clothing, heavy make up, and speaks very loudly about personal matters while in ear shot of other clients waiting in the therapy reception area. Sharon states that she is frustrated with the dysfunctional relationships in her life, particularly with men.

Sharon suffers from nightmares, intense anxiety, and a chronic difficulty with managing her emotional states. In one moment her mood escalates to a state of fury with others, and in the next she is weeping profusely about the lack of supportive relationships in her life. Sharon has an ongoing struggle with alcohol which she uses to numb painful feelings, specifically flashbacks of the sexual abuse which appear to her in disturbing somatic and emotional fragments that trigger hyperarousal, and more drinking.

Sharon is an example of a person whose "capacity to process and regulate emotion which is fundamental to human relatedness" has been "substantially affected" by complex traumatic experiences (Fosha, 2003, p.225). Her current experience is a "maladaptive, long-lasting, and multi-dimensional consequence of chronic, early, and interpersonal (developmental) traumatization that is known to be the essence of Complex PTSD" (Sar, 2011, p.2). Sharon was diagnosed with so-called borderline personality disorder when she was eighteen.

Attachment theory might assist in understanding Sharon's behaviors in the following way: in the midst of early exposure to "frightened or frightening parenting experiences", Sharon likely developed an insecure attachment pattern, such as "type D disorganized-disoriented" (Hesse & Main, 2006 as cited in Friend, 2012, p.114). Neurobiological alterations, including hyperarousal of subcortical brain regions such as the amygdala, and changes in

sympathetic, parasympathetic and hippocampal function, may have resulted from Sharon's abusive home life. Her lack of self regulation and impulse control, as well as emotional reactivity and inability "to ascertain the appropriate social context for behavior" is a common feature in those whose prefrontal cortex was undermined by developmental trauma (King & Liberzon, 2012, p.87).

Complex trauma is not currently a valid Diagnostic Statistical Manual V (DSM) diagnostic category so those who suffer from its effects can "also be diagnosed as having somatoform, dissociative, mood, eating, substance use, and/or borderline personality disorders" (Van der Kolk, 1996 as cited in Sar, 2011, p.1). Sar (2011) states that complex trauma has "suffered from unresolved conceptual dilemmas", and "neither current body of knowledge nor the existing structure of categorization allow a fully integrated conceptualization (of complex trauma)".

In order for survivors of complex trauma like Sharon to receive appropriate treatment, it is essential that a "trauma-related disorders section" be developed (in the DSM) which "would facilitate integration of knowledge and expertise about interrelated and overlapping consequences of trauma" (Sar, 2011, p.7).

Social Bonds, Protective Factors & Earned Security

Social bonds provide safety in much the same way that a harness strapped to a mountain climber provides security in the midst of uncertainty. Traumatic experiences come uninvited, and in the face of "an event that is threatening, unexpected, and uncontrollable", "positive social

support conveys care and protection of an individual by members of their group" (Charuvastra & Cloitre, 2008, p.308).

Attachment theory confirms that brain architecture is shaped by the biological, social, and psychological elements that underlie early dyadic interactions. Secure attachment facilitates one's capacity to receive social support, and social support is a protective factor in the development of PTSD. As Charuvastra and Cloitre (2008) attest, "There is accumulating evidence that phenomena such as social support, social cognition, and attachment organization contribute to emotion regulation under conditions of traumatic stress" as well as negating risk for, and/or increasing protection against, posttraumatic stress disorder (PTSD)" (p.302).

Both retrospective and prospective post traumatic stress studies "consistently identify perceptions of social support both before and after a traumatic event as an important factor in determining vulnerability to the development of PTSD" (Charuvastra & Cloitre, 2008, p.301). Perceived social support has been shown to mediate the development of PTSD symptomatology, and "positive social network interactions can facilitate resolution of PTSD while negative interactions contribute to its maintenance (Charuvastra & Cloitre, 2008, p.306). Van der Kolk (2013) relates that research on psychological outcomes in the aftermath of the September 11th tragedy indicates that a high incidence of social support both prior to, and in the aftermath of, the planes crashing into the twin towers resulted in a lower incidence of PTSD (personnel communication, April 15, 2013).

Individuals who were deprived of secure attachment in childhood often have difficulty creating and maintaining close and trusting intimate relationships in adulthood. According to Saunders, Jacobvitz, Zaccagnino, Beverung, and Hazen (2011), "An increasing body of

prospective longitudinal research has confirmed a robust relation between insecure attachment in infancy and later deficits in social and emotional competence during childhood, adolescence, and adulthood" (p. 403).

Secure attachment allows higher cortical regions to develop optimally. In disordered or insecure attachment hyperarousal of subcortical fear-processing regions often translates into "lifelong effects on the response to traumatic stress (which) imprint themselves into the biological organization of the stress response" (Charuvastra & Cloitre, 2008, p.312). Disruptions in stable brain regions dealing with core regulatory functions, the limbic system, and the neocortex are often commensurate with difficulties "modulating social affiliation, including the ability to be calmed and comforted by social bonding interactions" (Charuvastra & Cloitre, 2008, p.318).

Among the protective factors shown to mitigate the impact of traumatic events, social support and community cohesion have been identified as increasing a person's resilience to post traumatic stress (Gelkopfa, Bergera, Bleicha and Cohen Silver, 2012). After peritraumatic dissociation, social support is the second strongest predictor of PTSD risk (Charuvastra & Cloitre, 2008) which is congruent with "recent discoveries in developmental biology of stress response" that indicate "the attachment system is active throughout the life cycle in times of stress" (Charuvastra & Cloitre, 2008, p.312). In light of these findings Charuvastra and Cloitre (2008) affirm that:

> "considering the sizable impact that social factors have on the development of PTSD, it is important to connect the social and psychological paradigms to the rapidly advancing biological paradigms that have, so far, overlooked social interactions as they influence anxiety, fear, and stress response" (p.313).

Because social support may "modulate the trauma victim's capacity to approach and process trauma-related feelings" it is likely a positive force in negating avoidant symptomatology and behavior which are "the most consistent predictors of poor outcome among trauma victims (Charuvastra & Cloitre, 2008, p.308). Just as secure attachment facilitates adaptive responses to stress and self-regulation skills, avoidant behavior increases the likelihood of PTSD. Yehuda and colleagues (2001) found that adult offspring whose parents had PTSD were "more likely to develop PTSD than those whose parents did not have PTSD (as cited in Charuvastra & Cloitre, 2008, p.312).

Earned security refers to "the extent to which individuals can change from an insecure early attachment in infancy to a secure state of mind in adulthood" (Saunders et al., 2011, p.403). Research on earned security may reveal the extent to which children who lacked secure attachment with their primary caregivers but received emotional support from alternative support figures are able to "internalize healthy relationship strategies", and "transcend their negative working models from childhood" (Saunders et al., 2011, p.405).

"According to attachment theory, over time the internal working model becomes increasingly resistant to change" (Bowlby, 1973 as cited in Saunders et al., 2011, p.406) which predicts that the sooner children with unloving parents come in contact with alternative support to fulfill their need for comfort when they are distressed, "the more likely they are to transform their working models" (Saunders et al., 2011, p.406).

Long-term therapy has also been shown to provide survivors of childhood abuse and insecure attachment with an earned security experience. In the course of therapy patients are able to "rework their working models of attachment" (Saunders et al., 2011, p.407), and cultivate

reflective functioning (RF) which "refers to one's ability to reflect on one's own experiences so as to make inferences about the mental states of oneself and others" (Fonagy, Steele, Steele, Higgitt, & Target, 1994; Steele & Steele, 2008 as cited in Saunders et al., 2011, p.407). Saunders et al (2011) affirm that "high RF may be an important pathway to earned-security for individuals with adverse childhood experiences" (p.407). It's possible that in the presence of RF avoidant behavior is diminished, and therefore earned security may, like social support, provide some protection from PTSD.

Research on earned-security has shown that in the presence of loving alternate care givers, survivors of childhood abuse are often "able to break the cycle of abuse and provide adequate care for their children". This is demonstrated by Sauders et al. (2011) who affirm that "earned-secure mothers were as likely as continuous-secure mothers to have securely attached infants" (p.416). Future research may endeavor to marry the concept of earned-security with neuroplasticity, and seek to refine our understanding of how earned secure relationships can facilitate restoration of neural pathways that were compromised by insecure attachment.

This chapter provided an overview of attachment theory, including the mirror neuron system, attachment communications, and the physiology of secure and insecure attachment. Self-regulation was discussed in terms of its relevance in conceptualizing traumatic effects, and trauma-informed therapeutic approaches. A clinical case conceptualization was provided as a way of demonstrating the reciprocal connections that exist between attachment, brain development, and the traumatic effects in developmental trauma.

The next chapter will develop an understanding of the sociopolitical meaning of trauma which may be seen to arise from systemic issues such as the global market economy, human

rights abuses, misuses of power, and patriarchal or discriminatory beliefs. A discussion of the current PTSD diagnosis and its historical development is provided to shed light on the ways that medical diagnosis has been used as an instrument of power, either to grant acknowledgement and resources or to deny them in the treatment of various traumatic effects.

Chapter 3: The Sociopolitical Meaning of Trauma & Misuses of Power

The PTSD diagnosis was first included in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM–III; American Psychiatric Association, 1980) in order to have a means to describe the disruptive post traumatic effects that impacted combat troops returning from Vietnam (Courtois, 2008). While the PTSD diagnosis has served an important function in identifying the symptoms that result from certain kinds of trauma, it does not address the kinds of trauma which are developmental, have resulted from systemic forms of oppression, or from the violence that stems from economic and political transformations in the developing world (Kleinman & Desjarlais, 1995). To the extent that an individual's experience is not captured by the PTSD diagnosis, the treatment of trauma is only effective insofar as it is integrated with local understandings of PTSD.

A holistic perspective of mental health includes an awareness of the power imbalance between those who have experienced traumatic effects, and those who present themselves as mental health experts "inclined to teach and to practice rather than to listen, to learn and to work in partnership" (Wessels, 1999, p.268). Foucault (1990) may be referring to the latter when he states that what is needed is a "tool of analysis, of perception, of decoding - a possibility of defining practice" (p.193). Such practice recognizes the ways that "science also exercises power", and offers a view that is de-pathologizing, and cultivates "the self-management of affective problems in the community" (Foucault, 1999, p.193).

It is increasingly clear that vulnerability to trauma is inseparable from "the causes, locus, and consequences of collective violence (which) are predominantly social" (Kleinman &

Desjarlais, 1995, p.179). Trauma must be examined in the context of the wider world of social, political, economic, and historical forces that have contributed to oppression, be it along the lines of gender, race, ethnicity, sexual orientation, social class, or culture.

When the larger context in which trauma occurs is neglected, PTSD may function as a dominant narrative about "those who possess the authority to legitimize certain narratives while silencing others" (Kleinman & Desjarlais, 1995, p.189). Such is the case when trauma is "used by health professionals to rewrite social experience in medical terms" (Kleinman & Desjarlais, 1995, p.176). PTSD may be seen to medicalize trauma by situating it "as an essential category of human existence, rooted in individual rather than social dynamics, and reflective more of medical pathology" than an event that must be studied within its particular context (Kleinman & Desjarlais, 1995, p.177).

Therapeutic practices that separate trauma from its historical context "overlook the stresses imposed by racism, economic domination, or political oppression" (Wessels, 1999, p. 270). As Kleinman & Desjarlais (1995) state, "Many persons who experience political violence are the victims of intentional and systematic harm that is motivated by issues of power, not pathology" (Kleinman & Desjarlais, 1995, p.182).

The use of diagnostic labels such as PTSD can superimpose yet another oppressive narrative on those who have already experienced trauma as a result of issues related to gender, race, ethnicity, sexual orientation, or culture. When such is the case, diagnoses like PTSD may perpetuate and reinforce internal forms of oppression that stem from socially constructed narratives. Moreover, when survivors of trauma feel they must consent to such diagnoses to access financial or medical resources this may be seen as a misuse of power. Foucault (1990)

refers to this as a "strategy of power" whereby decisions, such as which diagnosis is given, are based not on a response to social suffering but are "rooted in political and economic origins" (p. 104).

Those who suffer from traumatic effects are often among the most vulnerable population, such as those who are traumatized by political violence. Kleinman and Desjarlais (1995) caution that investing them with a moral status of a victim or a patient may be therapeutically counter productive, and what is needed is to collaborate with survivors of trauma to develop their own healing narrative that addresses their unique issues and context. This is often not possible when third-party payers are only willing to pay for the treatment of so-called "organic" disorders such as major depressive disorder, any of the anxiety disorders, or PTSD, and not for issues related to political trauma for which there is often no restitution (Kleinman & Desjarlais, 1995). In this way only "treating disease is authorized for remunerations, whereas responding to distress is not" (Kleinman & Desjarlais, 1995, p.182). This may result in "trauma stories" that become a currency for resources and new status as political refugee (Kleinman & Desjarlais, 1995, p.176).

Alternatively, the focus of research needs to be "the space of social experience in which violence is a way of living (in Wittgenstein's terminology, a form of life)" (Kleinman & Desjarlais, 1995, p.188). This means, for example, that mental health care providers who wish to support the growth of alternative narratives can affirm the therapeutic power of commemorating collective trauma, and remain "aware of the way our language, actions, and professional competencies are caught up in cultural and political forces that contribute to the very problem we seek to remedy" (Kleinman & Desjarlais, 1995, p.189). Therefore, in order to engage survivors of trauma in therapeutic interventions that are free of systemic forms of oppression, mental

health providers must embrace a holistic perspective of mental health that allows for alternate narratives that are well versed in local understandings of trauma and healing.

While it is essential to consider the impact of trauma on an individual and conceptualize sound therapeutic endeavors, it is equally important to consider how trauma may result from "psychosocial realities of a particular time, place, and location in the social and political world" (Brown, 2009, p.166). As Brown (2009) states, "Complex trauma occurs within the psychosocial framework of external cultural realities, and the internal, intrapsychic representations of those realities" (p.166). Recognizing that numerous environmental factors contribute to a person's vulnerability to trauma, as well as their potential to heal, "it is vital to place culture at the center in arranging psychosocial assistance of all kinds" (Wessels, 1999, p. 268).

Wessels (1999) urges Western mental health providers not to assume the universality of Western psychology, and remain cognizant that "concepts of mental health and illness exhibit significant cultural variability...as do practices of healing" (p.268). When people face "chronic, complex emergencies that are rooted in histories of colonialism, oppression, poverty, and environmental degradation", it is incumbent upon Western mental health practitioners to not enter the situation "as experts" but to "learn from the local understandings of mental health, resources, and practices of healing" (Wessels, 1999, p.268).

A post-modern lens with a narrative therapy sensitivity to social context is helpful in eliminating "adverse community practices that contribute to the problems people face such as those that might occur around gender, sexuality, disability and ethnicity" (Percy, 2008, p.363).

Language may be used to both propel or stifle the personal agency of those who have been oppressed by dominant narratives. It is therefore important to "seriously challenge the relations of power that are always at work when it comes to what stories can be spoken, who is authorized to speak them and how they are told" (Percy, 2008, p.364.).

The situation of domestic violence in South Africa demonstrates how dominant narratives may contribute to the perpetuation of traumatic effects. The South African government's emphasis on criminal justice rather than on the creation of a prevention agenda that centers on culture has lead to increased violence against women ((Tremonti & Jewkes, 2013). In South Africa the focus on the victimization of women and criminal retribution for perpetrators of violence is the dominant narrative. The voices of those women are missing, as is support to envision a new status for women with a new narrative that supports empowerment, and the pursuit of a society that values the positive contributions of women.

Civil society researcher, Gushwell Brooks, states that patriarchal ideas of male entitlement, and the subordination of women have resulted in the unprecedented levels of domestic violence which are commonplace in South Africa (Tremonti & Jewkes, 2013). In South Africa, every day three women are killed by an intimate partner, a statistic which is three times higher than in the United States (Tremonti & Jewkes, 2013).

Rachel Jewkes, director of the Gender Health and Research unit of the South African Medical Research Council states that the unparalleled level of brutality which occurs in South African instances of domestic violence is rooted in the legacy of apartheid (Tremonti & Jewkes, 2013). During apartheid high levels of violence were endorsed and institutionalized by state

authority, and it is argued that this legacy continues to influence the culture of violence which exists in South Africa today (Tremonti & Jewkes, 2013).

As a result of apartheid South African children are rarely raised by their biological parents. Such profoundly disrupted family structures make children vulnerable to child abuse and interference by other members of their community which then translates into dysfunctional attachment patterns, and societal problems in subsequent generations (Tremonti & Jewkes, 2013).

Interpersonal violence in South Africa is a "societal problem" which requires a government prevention agenda to address the impact of culture on gender-based violence (Tremonti & Jewkes, 2013). Jewkes (2013) states that culture is highly malleable and can be changed through appropriate, well resourced and multi-sectoral intervention strategies but she notes that such governmental efforts are lacking in South Africa (as cited in Tremonti & Jewkes, 2013). It may be said that this underlying lack of political will to challenge the existing cultural paradigm in South Africa is perpetuating traumatic effects as is evidenced by the rise and level of brutality of interpersonal violence in that country (Tremonti & Jewkes, 2013).

When trauma results from a cultural process which involves human agency, what's required is a "new system of cultural classification" integrated within established power structures, and mediated by "the contingent skills of reflexive social agents" (Alexander, Eyerman, Giesen, Smelzer, & Sztompka, 2004, p.15). In South Africa large-scale forces have altered interpersonal relations (Kleinman & Desjarlais, 1995). The current emphasis on the criminal justice system is reactive, does not address the impact of systemic oppression, and lacks proper preventative action to challenge the impact of culture on violence against women

(Tremonti & Jewkes, 2013). This is important because simply using punitive strategies on the perpetrators of violence does not interrupt the cycle of violence which is rooted in more systemic forms of oppression. The dominant narrative in which women are victims, and offenders are villains crowds out the possibility for a new narrative that empowers women and promotes cultural healing.

As demonstrated, misuses of power at a collective and sociopolitical level can translate into pervasive violence within communities, families, and relationships (Kleinman & Desjarlais, 1995). The issue of the misuse of power may be examined as an implicit process in which certain narratives are legitimized in the social, economic and political worlds to the benefit of some and expense of others. The global market economy is another example of a dominant narrative which is pursued heedlessly even as it incurs substantial human cost, such as the erosion of fundamental human rights in the form of health, and the essentials of life.

In describing our era of development, Todd Gitlin states that, "Growth is wildly uneven, inequality is immense, anxiety is endemic" (as cited in Farmer, 1999, p.1493). "The state, as a result, is continually urged to do more but is deprived of the means to do so." (Farmer, 1999, p. 1493). In addressing the impact of the global market economy on human rights abuses, Farmer (1999) states that:

> We need to make room in the academy for serious scholarly work on the multiple dynamics of health and human rights, on the health effects of war and political-economic disruption, and on the pathogenic effects of social inequalities, including racism, gender inequality, and the growing gap between rich and poor (p.1492).

The increasing dangers and imminent impact of climate change provide a telling example of how the global market economy drives economic imperatives at the expense of human health (Gasper, 2012). In the same way that apartheid generated political power and wealth for some and poverty and oppression for others, it is estimated that climate change may have relatively little impact on economically advantaged persons while the worst affected promise to be low income, and sociopolitically disadvantaged persons (Gasper, 2012). As Gasper (2012) states:

> Massive human rights violations are now in the pipeline as a product of both ongoing anthropogenic climate change, which will destroy many people's livelihoods, and the (non-)treatment and understatement of climate change in mainstream politics and mainstream policy analysis, such as the World Bank's World Development Report 2010, and the Stern Review (Stern 2007; IPCC 2007; Hansen 2011)" (p.984).

The capitalist market economy has "no need for a central authority and no need for goodwill in order to achieve good results" (Gasper, 2012, p.984). It operates within a world of nation states fueled by independent interests and a system of dispersed authority (Gasper, 2012). When the challenge facing humankind is climate change, and not how to expand production, the threat of self destruction is profound (Gasper, 2012). "When dealing with webs of inter-connection that drastically transcend national boundaries, such as the linkages in the earth's climate system," the potential for human harm is great (Gasper, 2012, p. 984).

In so many instances too numerous to cite here, an endemic focus on economic progress continues to force a path of economic domination which tramples the voice of human rights in

our world. What is needed is a new narrative that prioritizes human rights over economic "progress" and charts a very different trajectory of human development, one based on the interconnectedness of nature and human health.

This chapter has offered a discussion of the ways in which language is used to construct dominant narratives which can limit the scope of opportunities for change in therapeutic contexts. PTSD was examined as a dominant narrative which can restrict the focus of treatment on individual symptoms rather than acknowledging the societal forces which engender traumatic effects. It was argued that the larger context of trauma must be expanded to include the impact of social, political, economic, and historical forces that have contributed to oppression, be it along the lines of gender, race, ethnicity, sexual orientation, or culture. When the larger context is included, survivors' local understandings of trauma may be recruited and opportunities for collaborative healing grounded in both professional competencies, as well as cultural beliefs, values and practices, such as commemorating collective trauma, can be integrated.

The next chapter will focus on the therapeutic value of mindfulness in the treatment of trauma. Our understanding of mindfulness is, like trauma, grounded in neurobiological research which demonstrates that prefrontal cortex functioning is strengthened by mindfulness, and undermined by traumatic effects. As will be discussed, when mindfulness can be incorporated in culturally sensitive ways, it can be effective in undermining the tendency toward avoidance of traumatic stimuli which has been identified as a factor in perpetuating traumatic symptoms.

Chapter 4: Mindfulness & Trauma

Mindfulness "originates from Buddhist as well as other contemplative meditation practices" (Frye & Spates, 2012, p.186). It can be defined as "moment-by-moment awareness" (Germer et al., 2005, p. 6) or as "a state of *psychological freedom* that occurs when attention remains quiet and limber, *without attachment* to any particular point of view" (Martin, 1997, italics included in original text, and as cited in Davis & Hayes, 2011, p.198).

Avoidance is described as "chronic, pervasive efforts to avoid thoughts, feelings, and memories related to the traumatic event which produce long term exacerbation of these private events and ensuing functional impairment" (Briere, 2012; Batten et al., 2005, p.242). When it occurs as a result of overwhelming experiences, avoidance may also create vulnerability to comorbid conditions, such as substance use disorders and major depressive disorder, which may present as a broad diversity of disorders (Batten et al., 2005; Thomson et al., 2011).

Avoidance has been conceptualized as being antithetical to mindfulness because while the former has been shown to perpetuate and exacerbate post traumatic symptomatology (Thomson et al., 2011; Courtois, Ford & Cloitre, 2009; Ogden, 2009; Batten, Orsillo, & Walser, 2005; Bernstein, Tanay, & Vujanovic, 2011), the latter can be instrumental in reducing "chronic avoidance of trauma-related stimuli" (Follette et al., 2006, p.52). When integrated in therapeutic work with survivors of trauma, mindfulness has been shown to facilitate safety, enhance self regulation, and increase the success rate of exposure treatments by its ability to "discourage exacerbation of symptoms, resistance to treatment compliance, and the tendency for drop out during the early stages of treatment" (Frye & Spates., 2012, p.185).

In the previous chapter, trauma was discussed in the context of social, political, economic, and historical forces that have contributed to different forms of oppression including

gender, race, ethnicity, sexual orientation, and culture. Professional competencies in isolation of cultural beliefs, values and practices often contribute to misuses of power within therapeutic settings. When those who have experienced various forms of systemic trauma are able to discover their voice, local understandings of trauma and collaborative healing are enhanced.

This chapter will define mindfulness, and describe its influence on neurobiology, and self and affect regulation. A discussion on the relationship between trauma and avoidance, and the function of mindfulness to disrupt avoidance and dissociative mechanisms, will be provided. A brief review of current approaches which integrate mindfulness in trauma-informed therapeutic work will also be developed. Mindfulness can facilitate trauma therapy by supporting the client to develop self regulation skills. Mindfulness can also help the therapist to track the client's location within their window of tolerance which positively impacts the therapeutic relationship, and the overall effectiveness of treatment. A clinical case scenario will be provided in an effort to demonstrate how mindfulness may be incorporated into therapeutic work with survivors of trauma. To conclude, limitations of mindfulness in therapeutic work with traumatized individuals, as well as recommendations for future research will be described.

What is Mindfulness?

Mindfulness is described as "the capacity to sustain moment-by-moment focused awareness of, and openness to, one's internal experience and immediate environment, without judgment and with acceptance" (Briere, 2012, p.267). Metacognitive awareness is thought to be cultivated through mindfulness, and consists of "the growing ability to observe and reflect upon

one's thoughts and feelings" (Briere, 2012, p.275). This ability to recognize that thoughts and feelings result from interpretations, and are not evidence about the true state of reality, can help clients to become more mindful, and experience less distress as a result of unchallenged internal processes (Briere, 2012).

Mindfulness may be experienced as a spontaneous and fleeting "state", or alternatively it can endure in which case it is considered a "trait" (Treadway & Lazar, 2009). Treadway and Lazar (2009) explain that:

> "understanding state effects (helps to) elucidate why mindfulness may be useful within a therapy session when dealing with painful memories or sudden bursts of emotion. Conversely, understanding the long term (trait-like) effects (helps to) identify why mindfulness is useful for treating chronic conditions such as depression and general anxiety" (p.46).

Within historical, philosophical, and psychological discourse there is general agreement that mindfulness is "rooted in the fundamental capacities of consciousness, namely attention and meta-awareness" (Brown & Cordon, 2009, p.60). Our orientation may be described as a "natural attitude", or default mode of processing, in which what comes into awareness is categorized almost immediately based on our cognitive or emotional reactions (Brown & Cordon, 2009). As described by Donn Welton in the introduction of *The Essential Edward Husserl*, Husserl is recognized as the founder of phenomenology, a branch of philosophy which explores the linkages between "language and experience, meaning and reference, and subject and object" (Welton, 1999, p.ix).

As conceptualized by the Husserlian school, our focus on ourselves, others, and the world

leads to very rapid presumptions about the truth (Brown & Cordon, 2009). In this discursive state of mind, cognitive commitments are made that say, in effect, "I know what this is" or "I know what's going on" without careful observation" (Brown & Cordon, 2009, p.61).

This "natural attitude" is adaptive because we can accomplish more in less time but it also means that our perceptions of reality are predetermined by previous experiences. Our experience, rather than being open to what is as it appears in the moment, is more evaluative and mediated through cognitive filters "that are frequently of a habitual, conditioned nature" (Brown & Cordon, 2009, p.61). We are prone to "superficial, incomplete, or distorted views of reality" that may be vulnerable to preconceived emotional colourings (Brown & Cordon, 2009, p.61).

Mindfulness supports the development of a phenomenological attitude in which "our attention is turned toward reality simply as it appears or is given to us...as a flow of phenomena or appearances" (Brown & Cordon, 2009, p.61). The benefit of this mindful orientation is the suspension of both judgments and assumptions about ourselves, others and the world. When we are able to be curious and develop more of an observer perspective we may experience freedom from a conceptualized sense of self that limits our ability to make choices about how we wish to interpret our experience (Batten, Orsillo, & Walser, 2005).

Mindfulness has been shown to decouple two distinct forms of self-reflection: 1) self-awareness focused on present experience, and 2) extended self-reference in terms of enduring characteristics (Treadway & Lazar, 2009, p.52). An example of a present moment self-awareness might be noticing another person has an unpleasant facial expression, and noticing an emotional response to it, while extended self-reference might be noticing a person has an unpleasant facial expression and drawing a conclusion, such as "that person is judging me. This is more evidence

that there's something wrong with me, and the world is a nasty and unfriendly place. I am better off avoiding people."

When a trauma survivor is able to "discern the transient nature of even very compelling cognitive and emotional processes", they are able to "discover that emotional reactions, intrusive experiences, and cognitions or beliefs are not necessarily *real*" (Briere, 2012, p.275). The ability to notice emotional responses without reacting to them may allow a person to gain a new sense of personal agency based on having the choice to separate what belongs to the present moment from judgments and assumptions that are rooted in the past. The ability to distinguish between symptoms which may be "more relevant to the past than the present" may allow a person to resist being recruited into emotional reactivity and conditioned behavior, leading to a new level of choice regarding conclusions and corresponding behavior (Briere, 2012, p.275).

The Practice & Effects of Mindfulness

Thomson, Arnkoff & Glass (2011) explain that "Mindfulness is typically cultivated through meditation exercises that emphasize moment to moment awareness of bodily sensations, emotions, or activities, while intently observing and letting go of any distracting thoughts that enter into awareness" (p.221). Mindfulness meditation is a practice well recognized for instilling acceptance, a quality which fosters "commitment, awareness, willingness to experience emotional distress, and attention to the present moment...in both pleasant and unpleasant circumstances" (Folette, Palm & Pearson, 2006, p.47).

The benefits of mindfulness have been demonstrated in neurobiological research where data supports the possibility that meditation may promote short and long term changes in neural

functioning (Lutz, Greischar, Rawlings, Ricard & Davidson, 2004 as cited in Treadway & Lazar, 2009, p.50). The dorsolateral prefrontal cortex (DLPFC), an area associated with executive decision-making and attention, was consistently shown to be activated by mindfulness (Treadway & Lazar, 2009).

As mentioned in part one of this research, it is often repeated in the neurobiological research on trauma that DLPFC function is undermined in cases of PTSD (B. van der Kolk, personal communication, April 15, 2013; Lyoo et al., 2011). During the task of affect labeling, which is practiced during mindfulness, the amygdala has been shown to decrease in activity. Neurobiological research demonstrates that mindfulness induces prefrontal regulation of limbic responses, a fact that may explain why "mindfulness is a useful component of therapy" (Treadway & Lazar, 2009, p.52).

It is through "nonjudgmental observation and description of internal experience" that a client may learn about their procedural tendencies rather than be carried away in enacting them (Ogden, 2009, p.222). As Ogden (2009) explains, "Since emotions and procedural tendencies are the purview of the right hemisphere (Schore, 2003a), whereas language is the purview of the left hemisphere, mindfulness may serve to promote communication between the two hemispheres" (Neborsky, 2006; Siegel, 2007, both cited in Ogden, 2009, p.222). The fact that mindfulness has been shown to improve prefrontal functioning may provide survivors of trauma with hope that the application of mindfulness may ameliorate their ability to focus, make executive decisions, and decrease the impact of fear conditioned responses on their quality of life.

Mindfulness & Self Regulation

Self regulation may be defined as coping skills which allow a person to modulate the intensity and duration of "biologically primitive affects such as shame, rage, excitement, elation, disgust, panic-terror, and hopeless despair" (Schore, 2002, p.462). Courtois, Ford & Cloitre (2009) state that "the capacity not just to tolerate but to actively modulate emotional distress" is an important therapeutic focus for achieving the central goals of trauma therapy (p.90).

Mindfulness is a useful tool for developing self regulation skills, and has been reported as the most significant factor related to lower traumatic stress symptoms such as intrusion, avoidance, and hyperarousal (Follette et al., 2006; Vujanovic, Youngworth, Johnson, and Zvolensky, 2009; Chopko & Schwartz, 2013). Chambers, Gullone and Allen (2009) state that, "Emotion regulation has such strong empirical support as a benefit of mindfulness meditation that recently the term "mindful emotion regulation" was coined to refer to "the capacity to remain mindfully aware at all times, irrespective of the apparent valence or magnitude of any emotion that is experienced" (as cited in Davis & Hayes, 2011, p.200). As will be developed in this chapter, mindfulness "encourages acceptance rather than rigid avoidance of one's experience" (Follette et al., 2006, p.53).

Mindfulness, Therapist Attunement & Meditation

In the presence of mindfulness, the therapist can be "exposed to considerable pain and suffering without being disarmed, distracted, or personally activated" (Briere, 2012, p.272). Mindfulness is thought to help therapists develop a "felt sense of clients' inner experience" as well as the ability to maintain equanimity in the face of clients' suffering while assisting clients to to be more present with body sensations and feelings (Davis & Hayes, 2011).

The practice of meditation refers to various self-regulation practices that involve training attention and awareness to establish greater voluntary control for the purpose of enhanced mental well being (Davis & Hayes, 2011). Findings suggest that long-term mindfulness meditation practice is an effective means for supporting therapists' ability to distinguish their own experiences from their clients', as well as gain more clarity and self-insight regarding their clinical work (Davis & Hayes, 2011). Empathy, as well as compassion, are two other therapist characteristics that have been linked to meditation (Davis & Hayes, 2011).

Through mindfulness the therapist is able to offer unconditional caring, acceptance, mindful awareness, and attunement which may be the "antithesis if not the antidote to the client's initial traumatization" (Briere, 2012, p.270). Attunement within the therapeutic relationship may have the power to influence changes in the survivors perception and response systems, and is thought to be facilitated by the clinician's own practice of meditation which allows the clinician to "pay attention with less internal distraction and less interference from his or her own history" (Briere, 2012, p.275).

Mindfulness & Avoidance

Avoidance has been identified numerous times in the literature on PTSD as critical in the development and perpetuation of post traumatic symptoms, and resolving avoidance is considered a "benchmark for successful treatment" of traumatic stress disorders (Courtois, Ford & Cloitre, 2009, p. 91; Batten et. al, 2005; Briere, 2012; Thomson, Arnkoff & Glass, 2011; Follette, Palm & Pearson, 2006; Frye & Spates, 2012; Chopko & Schwartz, 2013; Bernstein, Tanay & Vujanovic, 2011). Courtois, Ford & Cloitre (2009) state that:

> Reversing avoidance and developing ways of actively engaging with both positive and negative experiences and memories requires growth in the form of a shift from automaticity and reactivity to conscious approach and self regulation (p.92).

Avoidance may contribute to the development of trauma-related tendencies that stem from overwhelming experiences that cannot be integrated (Ogden, 2009). Dissociation, "which is one of the strongest predictors of PTSD in the psychological literature", may be seen as analogous to avoidance in the sense that both have been linked to the development and maintenance of PTSD (Thomson et al., 2011, p.228). "Dissociation, constituting disturbances in consciousness, perception, memory, or identity (APA, 2000) may be conceptualized as the clinical antithesis of mindful attention to the present moment" (Thomson et al., 2011, p.228). Dissociation is initially an adaptive response to a situation which cannot be processed because it is completely emotionally, physically and/or psychologically overwhelming. Dissociation can occur, for example, during a rape when a woman's parasympathetic nervous system is triggered

into extreme hypoarousal which causes her conscious attention to flee the situation in an effort to manage the overwhelming experience of violation.

In the treatment of PTSD it is important to help the client become aware of both subtle and overt forms of avoidance (Courtois et al, 2009). In the presence of mindful, accepting attitudes and behavior the risk of PTSD diminishes, and psychological adjustment is enhanced in the aftermath of a traumatic event (Thomson et al., 2011). Thomson et al. (2011) affirm that because experiential avoidance and non-mindful behavior are suspected in the etiology of PTSD, "mindful, accepting attitudes and behavior may improve psychological adjustment and reduce the risk of PTSD after a potentially traumatic event" (p.221).

Mindfulness & Treatment of PTSD

Exposure therapy and cognitive-behavior therapies (CBT) that "focus on building skills for managing anxiety and/or challenging dysfunctional ways of thinking following a traumatic event", as well as EMDR, are the most empirically supported PTSD treatment approaches (Batten et al., 2005, p.242). Other treatments which do not emphasize the recall of traumatic memories, instead focus on "enhancing clients' capacities for self-regulation in their current lives (e.g. McDonagh-Coyle et al., 2005, present-centered therapy), or on strengthening clients' abilities to examine reflectively the full range of past and recent memories without focusing on traumatic experiences per se (e.g., Courtois, 1999; Ford & Russo, 2006; Pearlman & Caringi, Chapter 10, and Follette, Iverson, & Ford, Chapter 13 this volume)" (Courtois et al., 2009, p.92).

Whether trauma therapy emphasizes recall of traumatic memories or not, mindfulness can help clients develop the ability to be present with previously avoided mental, emotional, physical

or sensory input, which may increase the efficacy of treatments. By all accounts mindfulness appears to cut across diagnostic categories, and can address presenting problems based on functional dimensions with high levels of psychiatric co-morbidity (Batten et al., 2005).

Exposure therapy is a "behavioral intervention in which the client is repeatedly presented with imaginal or in vivo cues associated with the traumatic event" (Batten et al., 2005, p.243). "The objective of exposure therapy is to engage fear and anxiety that arise upon remembering the trauma, and to maintain contact with those emotions without avoidance, until habituation of emotionally responding occurs" (Batten et al., 2005, p.243). Prolonged exposure (PE) is said to be "effective in reducing symptoms of PTSD...and in maintaining the reduction of symptoms months later after treatment" (Frye & Spates, 2012, p.185).

Despite the well demonstrated efficacy of exposure therapy, several concerns have been highlighted in the literature, such as "exacerbation of symptoms during exposure (Kilpatrick & Best, 1984; Pitman, Alman, Greenwald & Longpre, 1991), resistance to treatment compliance (Burstein, 1986; Scott & Stradling, 1997; Tarrier et al., 1999; Van Minnen et al., 2002), and the tendency for dropout to occur during the early stages of treatment (Burstein, 1986; Van Minen et al., 2002)" (Frye & Spates, 2012, p.185).

Becker & Zayfent (2001) report that many clinicians prefer not to use exposure based treatments for PTSD because of complications that may arise during implementation, inappropriateness of exposure for clients who lack self regulation and distress tolerance skills, and the tendency for some clients to become hyperaroused or dissociative (as cited in Frye et al., 2012).

Follette et al. (2006) state that "the use of mindfulness and acceptance techniques in PTSD interventions may address problems with exposure treatments", and suggest that "including skills training in emotion regulation and interpersonal effectiveness before conducting exposure may lead to better outcomes" (p.54, 56). Frye et al (2012) concur that "PE augmented with mindfulness and emotion regulation may reduce anxiety sensitivity and aid clients to remain in treatment" (p.187). For example, when mindfulness is incorporated in a progressive manner, such as when it is practiced in one sensory modality at a time before shifting to more personal and potentially painful experiences, it can be very beneficial for PTSD clients (Batten et al., 2005).

Mindfulness is a central component of Mindfulness Based Stress Reduction (MBSR), Dialectical Behavior Therapy, and Acceptance and Commitment Therapy (ACT) (Davis & Hayes, 2011). While a full review of these approaches is not possible here, a brief discussion on these and sensorimotor psychotherapy (SP) will be offered.

MBSR is a mindfulness-based therapy where clients are taught skills through the application of mindfulness practices, while ACT incorporates Buddhist psychology and mindfulness theory to clinical work (Germer et al., 2005 as cited in Davis & Hayes, 2011). Mindfulness can also be integrated into psychotherapy by means of therapist mindfulness which is facilitated through therapists own practice of meditation to be more "mindful" and present with clients" (Davis & Hayes, 2011, p.204).

Mindfulness in Therapeutic Practice

The rationale for using mindfulness-based psychotherapy, or for using mindfulness as an adjunct to other trauma focused therapies such as exposure, is to establish increased physical and psychological safety and stability, and the capacity not just to tolerate but to actively modulate emotional distress (Courtois et al., 2009). In the first phase of trauma treatment mindfulness training may be conducted to support the development of safety and stabilization which are critical to the process, and must be a continual focus throughout (Courtois et al., 2009; D.Shewchuk, personal communication, April 14, 2012; B.van der Kolk, April 13, 2013). Processing of traumatic memories may take place in phase two of treatment when "safe self-reflective disclosure of traumatic memories and associated reactions in the form of progressively elaborated and coherent autobiographical narrative is the primary task" (Courtois et al., 2009, p. 93).

An important component of mindfulness-based treatments, "tracking" requires that we "place into awareness the moment-to-moment unfolding of our changing internal states" (Siegel, 2010, p.150). During the process of tracking "we join our clients in their unfolding journey to heal...which allows new combinations of neural firing to be created" (Siegel, 2010, p.150). Tracking emerges from empathic listening and attunement both of which involve the prefrontal region (Siegel, 2010, p.140). Through tracking a therapist can create resonance with a client, "help move the dyadic system toward integration, and ultimately shift the internal elements of the client to liberate the natural drive toward a self-regulation and integrative flow" (Siegel, 2010, p.142).

Tracking is also an effective tool for assessing whether a client is managing challenges to self regulation, and is within their window of tolerance (Siegel, 2010). As mentioned in Chapter 1, the window of tolerance is the location where a client can manage potentially upsetting triggers, and can process traumatic material without falling into either hypo/hyperarousal, or dissociation.

Sensorimotor psychotherapy (SP) is an approach which is gaining recognition for its treatment of trauma despite the fact that it has only limited empirical validation. The value of SP is to engage "bottom up sensory experience" through mindfulness, and other body focused interventions (Siegel, 2010, p. 143). This is especially useful when cortical function has been disabled by real or perceived threats to safety and/or survival (Ogden, 2009). When subcortical responses not mediated by the cortex override a person's ability to be present, the use of mindfulness can be helpful in reactivating prefrontal function, and deactivating the "subcortical mammalian, or animal defenses", such as hyperarousal of the amygdala (Ogden, 2009, p.207).

The value of working somatically is "increasingly recognized as being essential in the treatment of trauma (Eckberg, 2000; Levine, 1997; Ogden, Minton, & Pain, 2006; Pesso, 1973; Rothschild, 2000; van der Kolk, 2006)" (Langmuir, Kirsh & Classen, 2012, p.214). SP's use of directed mindfulness is intended to bring procedurally learned physical tendencies into awareness so that thoughtful interruption can be initiated which teaches "patients to use their own movement, posture, and sensation to regulate arousal and expand their own affect-regulating capacity" (Ogden, 2009, p.231). When clients can make use of the observer perspective inculcated by mindfulness they may benefit from a holistic approach to healing which integrates cognitive, emotional, and somatic elements (Langmuir, Kirsh & Classen, 2012).

Clinical Scenario[2]

The following clinical scenario recounts a session with "Sharon", the fictional client who was described in chapter two. In this session, her sixth, mindfulness and sensorimotor psychotherapy principles are incorporated in an effort to establish safety, increase self regulation, and diminish Sharon's state of hyperarousal.

Sharon arrived for this session wearing heavy make-up, a very short dress, wide brim hat, and sunglasses. Her shoulders were clenched up, chest collapsed, and her head was thrust forward. She had dark circles under her eyes which were cast downward, and she appeared exhausted. She was limping on her right foot which appeared to be swollen. When asked what happened to her foot Sharon began to cry as she described how the girlfriend of a man who lives in her building tried to push her down the stairs because of her suspicion that Sharon was sleeping with him. This is the third time that Sharon has had difficulty with neighbors that escalated into conflict. Sharon has had to move twice in the last six months.

As Sharon described her altercation with the girlfriend her tears ceased and she shifted into a visibly angry state. Sharon described the altercation in minute detail, and as she did her anger intensified the closer she got to description of the woman trying to push her down the stairs, which is how she injured her foot. Sharon stated "And I told that f-ing c--t that if she ever tries to so much as touch me again I will rip her head off with my bear hands!"

Sharon was breathing hard at this point and was just about to launch into another story when the therapist, "Mary", said "Sharon I notice that you're breathing quite hard right now. Did you notice that?" Mary is leaning slightly forward in her chair, her body is relaxed, and her gaze

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[2] As mentioned, this case study first introduced in chapter two is the invention of the author and was not taken from an actual clinical example.

is gentle but present. Sharon replied that she didn't notice, and stated that she rarely notices what's happening in her body.

In previous sessions Mary introduced mindfulness as a practice that helps a person to become grounded in the present moment, and cultivate a non-judgmental and compassionate relationship with difficult emotions. Sharon has already experienced progressive relaxation and mindfulness meditation directed at specific emotions and somatic experiences in earlier sessions but in the last few sessions there was less discussion or practice of mindfulness and more focus on interpersonal issues in Sharon's life.

Sharon wept quietly as she confided that she is afraid to even pay attention to her body because it's a scary place. "Are you feeling scared right now?" Mary asked, maintaining eye contact with Sharon (who was looking down and away from Mary). "No", Sharon replied, "I feel ashamed." Mary asked, "What's that about, Sharon?" Sharon replied, "I feel ashamed that you're seeing me so weak and vulnerable."

Mary began to inquire about the beliefs that underlie Sharon's feelings of shame. Mary was conscious of using both verbal and non-verbal communication to convey that she was present, and attuned with Sharon. Mary worked on the assumption that "the client is not pathological or broken, and that she already has the capacity to live a vital and meaningful life" (Batten, 2005, p.261).

Mary reflected openly on what she had been noticing in Sharon's facial expression, posture, and body language, as well as the shifts she observed throughout their conversation. Mary said, "I noticed that when we first started our session today you seemed more withdrawn. Your eyes were looking elsewhere, and it looked like the weight of what happened to you was pulling you down. The more you told the story of what happened, the more it seemed like the

anger was like a gust of wind which began to buoy you up. Is that how it feels to you?". Sharon's body language and facial expression shifted which told Mary that Sharon was in a more self-reflective and introspective place; it was as if the amygdala was now being mediated by some prefrontal activity.

Sharon said, "Yes, I do notice that anger keeps me going. I guess without it I might collapse." Mary says, "Mmmhmm, I get that." Mary was quiet for awhile and then asked Sharon, "If you were looking for that anger inside your body right now, where might you find it?" Sharon looked away and said, "I'm not sure..."

Mary explained that emotions like anger can be stored in the body and bringing mindful awareness to them can begin to reveal unconscious patterns that may be rooted in past experiences, such as trauma. The patterns, Mary says, sometimes trigger and are triggered by emotional states.

Sharon seemed distracted, like she was not able to absorb what Mary said. Sharon said, "Why is this happening to me? Why am I such a loser? What is the point of even living when my whole life is such a curse! I wish I had never been born!" Sharon's weeping intensified. Mary focused on her own breathing and noticed she wanted to help Sharon to feel better (different) but felt stuck so she remained quiet and watchful for what else might arise.

Mary asked Sharon if there's anything she could do for her right now. Sharon shook her head. Mary didn't say anything for what felt like ten minutes at which point she said, "What's it like being here right now, Sharon?" Sharon replied that she doubted things could get any worse for her. Mary then used non-verbal responses to communicate that she was listening with an open heart.

"Sharon," Mary says "Is it different to be feeling this way with me here with you?" Sharon's facial expression slowly shifted as if she became aware of a larger perspective. Then Sharon said quietly "It's better to have you here with me".

Mary reflected back to Sharon that it seemed like she was feeling both overwhelmed with painful emotions but also comforted by Mary's presence. This lead them into a conversation about perspective, and how it's possible to see our situation, or even ourselves, from more than one perspective. Mary used the point as a segue to highlight the value of mindfulness as a means of shifting a person's relationship with their emotions.

Using local nomenclature, Mary normalized the issue of self regulation as being one that many people struggle with. She then elaborated that many clients find that when they approach their emotions with mindfulness they are able to regain a sense of personal control even in the midst of much chaos and hardship.

"Sharon," Mary said "Remember that safe place you told me about a few sessions ago? Your grandmother's house in the country where you felt so connected with nature, and felt so much love from all the animals there? Would it be ok with you if we took some time to find that feeling of safety inside you?" The look on Sharon's face was a mixture of relief and some trepidation as she nodded her head."

Mary proceeded to use mindfulness to help Sharon focus on the breath and become aware of the stable and supportive atmosphere in the room. Sharon's body began to slowly release tension as was evidenced by how she began to lean back into the chair, and by the change in her facial muscles. Ogden (2009) states that "gestures, facial expressions, and posture are not only reflections of emotion but actively participate in the *subjective* (my emphasis added) experience of emotion, and in our interpretation of our experiences" (p. 214).

Mary asked Sharon to notice what happens when she allows herself to reflect on the feeling of shame she shared with Mary earlier in the session. She asked Sharon if noticing shame as if from the inside of her body brings up any sensations anywhere. Sharon winced slightly and seemed to pull into her belly region. Mary noticed the change and asked Sharon to continue to focus on the breath and notice what was happening in her body.

Sharon's hands began to shake a bit. Mary said, "I notice that your hands are shaking. Do you notice that?" Sharon nodded her head. "I'm wondering what would happen if you took over that movement from your hands? Would it be ok if you exaggerated that shaking movement in your hands?" Sharon consented and began to exaggerate the movement. Mary inquired about any emotional response to the now intentional shaking. Sharon said, "It feels weird, like I'm taking control of something that I've always wanted to go away."

Mary replied "Sharon, what do your hands want to do?" Sharon said that her hands wanted to let go, and she wanted to kick her feet. Mary encouraged Sharon to kick her feet, and she began to do so as if there was an invisible assailant in the room with them. The kicking seemed to energize Sharon until she became tired and stopped after which she began to cry in a way that seemed to surface out of a sense of relief, something Mary had never seen in her before. Mary came over and sat next to Sharon and said, "It's going to be ok, Sharon. It's not your fault." Later Sharon explained that when her step father had sexually molested her when she was eight years old, she had always wanted to kick him away but had always been too scared, and Sharon admitted that she'd blamed and despised herself for letting him get away with it.

Ogden (2009) states that:

> When patients first turn to the body, they typically become aware of disempowering, immobilizing defenses rather than triumphant actions. But as they

> learn to extend and refine their mindfulness of the body, they nearly always discover the impulses to fight or flee that were inhibited for the sake of survival, during the original traumatic events but remain concealed within the body" (p. 227).

Directed-mindfulness to what was happening in her body was helpful in getting Sharon to access her "sensation vocabulary" from which together Sharon and Mary could track the continual changes (Ogden, 2009, p.226). Throughout this process Sharon was able to use mindfulness to engage in emotional processing through the "experience, articulation, expression, and integration of sensations and physical actions" (Ogden, 2009, p.223). Together Mary and Sharon were able to help Sharon navigate through difficult emotions while she remained within her window of tolerance.

Mary left this session feeling hopeful that her work with Sharon might continue to deepen into "a deep, transformational form of collaboration" (Siegel, 2010, p.149). Mary hoped that Sharon could eventually begin to recognize that she is a being who is part of a larger whole, and that her drive to wholeness is inherent in her makeup" (Siegel, 2010).

About the process of trauma therapy, Crenshaw (2006) emphasizes that:

> Perhaps no other therapeutic intervention is so dependent on timing, sensitivity, empathy, and skill than the therapeutic response that honors the depths of the person's suffering while at the same time introducing the possibility of hope and change (p.36).

Limitations & Recommendations for Future Research

While psychotherapy for adults with trauma symptoms is widely practiced, psychotherapy for adults with complex traumatic stress disorders is "still in the early phases of scientific and clinical validation" (Courtois et al., 2009, p.101). Because complex stress disorder lacks a concrete clinical diagnosis in the Diagnostic Statistical Manual V (DSM), guidelines and modules for treatment of clients who've survived traumatic experiences that were long term, originated during childhood and/or in the context of intimate relationships, have not been thoroughly researched and investigated. Subsequently treatments that were developed for clients with PTSD need to be verified in clinical trials with survivors of complex trauma before they can be assumed to be fully effective (Courtois et al., 2009).

One limitation of the present research is its treatment of "trauma" which has for all intensive purposes, subsumed PTSD as well as complex (developmental) stress disorder, two types of trauma which are very different. As mentioned in chapter two of this research, complex trauma refers to trauma that "occurs repeatedly and cumulatively, usually over a period of time and within specific relationships and contexts" (Courtois, 2008, p.86). Future research should focus on constructing two distinct mindfulness-based trauma-informed theoretical models of therapy, one for a PTSD and a second for complex stress disorder.

This research has mainly focused on the use of mindfulness to establish safety in an effort to facilitate the overall objectives of trauma therapy. Because PTSD and complex trauma develop from distinct etiologies, a thorough understanding of the differences between them, and how mindfulness can facilitate safety in each case, is a prerequisite for establishing a mindfulness based trauma-informed theoretical model of therapy.

In order to fully understand how to effectively integrate mindfulness into trauma treatment it is necessary to outline contraindications for the use of mindfulness with survivors of trauma. Establishing safety may be seen as the fulcrum around which clinical decisions regarding the use of mindfulness can be made. What remains unclear, and needs to be developed through clinical research, is the construction of guidelines for the use of mindfulness in the presence of concurrent disorders for which medication may have been prescribed.

Specific guidelines are also necessary for the use of mindfulness in phases two and three of trauma treatment, the processing of traumatic memories, and reintegration respectively (Courtois et al., 2009). As Courtois et al. (2009) affirm, "the range of symptoms and comorbidities involved may require a number of treatment goals and a variety of theoretical perspectives and clinical modalities in an integrative rather than a unimodal or fragmented manner" (p.96). The authors emphasize the importance of individualizing and modifying treatment to the needs and capacities of the client (Courtois et al., 2009).

The definition of mindfulness is quite broad despite the fact that mindfulness may be reflective of distinct interventions and practices. There are various constructs associated with the benefits of mindfulness which include, but are not limited to, non-judgmental acceptance, metacognitive awareness, increases in attentional capacity and ability to modulate distress, as well as mindfulness on the part of the therapist.

Chopko and Schwartz (2013) point out that "additional research is needed to determine whether the beneficial aspects of mindfulness-based constructs are...population specific, trauma specific, or dependent on nonjudgmental acceptance" (p.7). In cases where beneficial aspects are population specific, "Learning how to select the right form of meditation (or mindfulness)

practice to best match an individual patient is a critical next step in the clinical application of mindfulness-based treatment", and this may inform future research on trauma" (Treadway & Lazar, 2009, p.54).

The influence of mindfulness on the therapeutic relationship is another area which may become a promising focus of future research. Davis and Hayes (2011) suggest that "future research could profitably address how therapists' mindfulness contributes to critical relationship factors such as the formation and sustenance of the working alliance, countertransference management, and the provision of unconditional regard with difficult clients" (p.204). Currently "the psychological and physical health benefits of mindfulness meditation are strongly supported by research (but) the ways in which therapists' mindfulness meditation practice and therapists' mindfulness translate to measurable outcomes in psychotherapy remain unclear" (Davis & Hayes, 2011, p.204).

A research study could be designed to analyze the role that therapist mindfulness plays in therapeutic outcomes with trauma survivors. Such a study would need to identify the level of therapist mindfulness prior to tracking therapeutic outcomes. Two large samples, one of therapists with previous mindfulness experience, and a control group without any prior mindfulness experience, could take part in the study. Both groups could be assessed initially using two assessment instruments: the Kentucky Inventory of Mindfulness Skills (Baer, Smith & Allen, 2004 as cited in Chopko & Schwartz, 2013), and the Mindful Attention Awareness Scale (MAAS), which includes a measure of dispositional mindfulness, and which assesses openness and receptivity to the present moment across multiple domains including cognitive, emotional, physical, and interpersonal (Creswell, Way, Eisenberger & Lieberman, 2007).

A large sample of randomized trauma survivors could be divided into a sample, and a control group. Both groups could be assessed prior to treatment to identify the frequency and severity of individuals' post traumatic effects, as well as participants' perceived level of coping skills prior to commencement of the study. These measures could be repeated prior to six therapy sessions and again after completion of six sessions to assess any changes in frequency and severity of traumatic symptoms, as well as changes in participants' perceived level of coping skills. An additional measure could also assess clients' perceptions of therapist empathy, attunement, and unconditional positive regard.

The role of neuroplasticity in supporting changes in neural functioning in work with survivors of trauma may also be a focus of future research. Siegel (2007b, 2009) has proposed "a neurological basis for the connection between mindfulness and insight" which may indicate that neuroplasticity underlies the ability of mindfulness to strengthen prefrontal cortical functioning, and lessen hyperarousal of the amygdala, both of which are symptomatic in survivors of trauma (Davis & Hayes, 2011, p.199). The precise relationship between mindfulness and neuroplasticity, and interventions that may support work with survivors of PTSD and complex stress respectively, require further investigation, as does "the study of mindfulness which can help to inform about the nature of consciousness, its fundamental role of in human functioning, and how its processes can be refined to enhance that functioning" (Treadway & Lazar, 2009, p.59). Along the same lines, future research may explore the relationship between earned-security and neuroplasticity in terms of how the former may stimulate rebuilding of neural pathways that were compromised by insecure attachment.

Recently EMDR (Eye Movement Desensitization and Reprocessing) therapy has been cited as an effective treatment for trauma (Knipe, 2008). A full review of this approach was beyond the scope of this writing but would be a compelling focus for future research aimed at a more holistic and integrated approach to trauma therapy. Along the same line of inquiry, van der Kolk (2013) has endorsed interventions which emphasize movement and engagement, such as yoga, martial arts, theatre, and self-defense training (personal communication, April 16, 2013). The influence of skills training that emphasize body awareness, personal agency and/or self protection is a hitherto unexplored area of research currently possessing only anecdotal support but future research may provide new insight into the ways in which these modalities may hold therapeutic power for survivors of trauma.

In order to clarify the effect of mindfulness-based interventions on trauma treatment there is a need for clinical research using large samples, control groups, and study designs that may identify whether changes are due to treatment, the assessment process, somatic awareness, the passage of time, group support (in the case of group design), individual differences in subjects due to variables such as age, culture, income, education, or some other environmental or genetic variables (Langmuir et al., 2012). Previous exposure to mindfulness may also increase the potential for placebo or expectancy effect and this must be taken into account (Langmuir et al., 2012). Future research must also address the challenge of manualizing the process of mindfulness in order to support the veracity of conclusions drawn from clinical research (Langmuir et al., 2012).

Integral Theory & Conceptualizing Trauma

The proverbial metaphor of the six blind men and the elephant is a good analogy for our understanding of trauma. Each blind man feels a different part of the elephant and then hypothesizes its nature, but each can only grasp a limited impression of the elephant based on his incomplete view (Saxe, 1936). Similarly, our understanding of trauma is deepened when placed within a framework that consolidates multiple perspectives on trauma. Integral theory facilitates the interpretation of traumatic phenomena in a way that is multidisciplinary, multicultural, and epistemologically inclusive (Johnson, 2012).

Wilber (2000) elaborated integral theory which includes the philosophical concepts of the good, the true, and the beautiful, as well as a fourth quadrant which represents subtle reductionism of conventional systems theory (as cited in Johnson, 2012). With the benefit of the four quadrant system (represented below) one may achieve a greater sense of qualitative and quantitative inclusiveness which is helpful in comprehending the full context and complexity of trauma (Johnson, 2012).

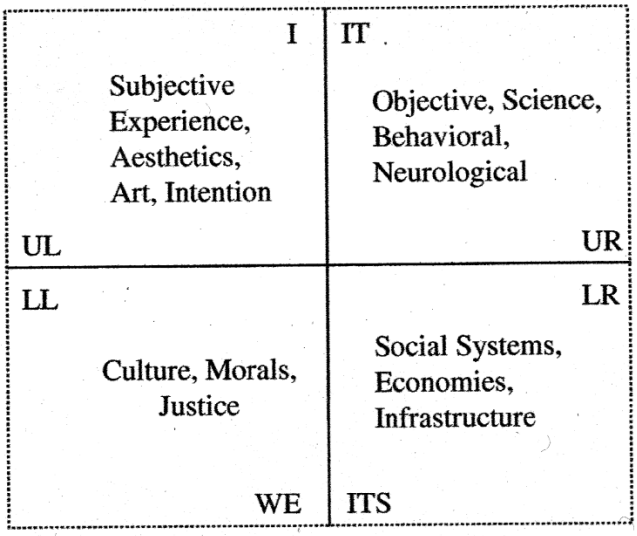

FIGURE 1 The four quadrant system.

(*Figure 3*, The four quandrant system (reproduced from Johnson, 2012, p.51)

The good corresponds to morals and is signified by the pronoun "we" (the realm of community, cultural norms, ideas of justice, and ways of interacting with one another); it is found in the lower left quadrant, and is referred to as "LL" (Johnson, 2012). The true represents science and is signified by the pronoun "it", found in the upper right quadrant, "UR" (the measurable objective materials and our processes to comprehend them) (Johnson, 2012). The beautiful is equated with art, is signified by the pronoun "I", and is found in the upper left, UL (aesthetic realms such as personal experience, subjective meaning, and emotions) (Johnson, 2012). The final quadrant, "its", refers to "the institutional structures that make up societal interlocking orders within a community, city, state, nation, world, and so on", found in the lower right, LR (Johnson, 2012, p.50).

Given that they exist within the realm of science, neurobiology and attachment theory may fit into the UR quadrant. To whatever degree the sociopolitical view of trauma is recognized and used as a springboard for cultivating local understandings of trauma and non-pathologizing therapeutic practices, this trauma perspective may be found in the LL quadrant. The realm of the subjective I, UL, may be seen to correspond with therapeutic approaches for trauma, such as mindfulness-based psychotherapy. The last quadrant, LR, may provide residence for facets of the sociopolitical meaning of trauma that reveal how the intersections between community, city, state, nation, world influence manifestations of trauma. Because it is important to truly understand the full scope of a client's context, this four quadrant theory may provide a structure with which it is possible to comprehend an individual's unique constellation of traumatic experience. This structure may be used as a point of departure for establishing optimal levels of safety and positive therapeutic engagement (Johnson, 2012).

Conclusion

This thesis has provided several independent and interrelated perspectives on trauma including neurobiology, attachment, the sociopolitical meaning of trauma, and the therapeutic power of mindfulness in the treatment of trauma.

In studying the impact of trauma on various brain structures, Chapter 1 provided insight into the neurobiological basis for assertions that verbal therapies are often insufficient to resolve the effects of trauma. As was discussed, trauma is encoded in the brain and influences the way memories are processed which has implications for working within a person's window of tolerance. The culmination of this research contributes to the foundation of clinical knowledge which can be applied to trauma-informed therapeutic work.

In Chapter 2, the reciprocal connections between attachment, brain development, and traumatic effects were elucidated providing evidence for an emerging *regulation theory of therapy* in trauma-informed approaches. Clearly our understanding of the mirror neuron system, attachment communications, and the physiology of secure and insecure attachment have been critical in the development of trauma-informed treatment approaches, especially in the area of complex trauma.

A third perspective on trauma was provided in Chapter 3, and included an analysis of the social, political, economic, and historical forces which have contributed to oppression along the lines of gender, race, ethnicity, sexual orientation, or culture. The category of PTSD can sometimes be used to superimpose dominant narratives upon survivors of trauma which can then obscure the possibility of developing local understandings of their particular traumatic experience. This chapter provided reflections on the importance of being curious about local

understandings of trauma, and the value of collaborative interventions that support healing narratives by addressing the unique issues and context of trauma.

In Chapter 4 a discussion on mindfulness and its influence on neurobiology, and self and affect regulation was developed. It is evident that a mutually reinforcing relationship exists between avoidance and post traumatic symptoms while mindfulness contributes to the disruption of avoidance and dissociative mechanisms. Current approaches which integrate mindfulness in trauma-informed therapeutic work were discussed briefly, as well as the ways in which mindfulness can help the therapist to track the client's location within their window of tolerance.

A clinical case scenario was introduced in Chapter 2, and was further developed in Chapter 4 to demonstrate how mindfulness may be incorporated into therapeutic work with survivors of trauma. A review on the limitations of mindfulness in therapeutic work with traumatized individuals, as well as recommendations for future research were also advanced.

Each of the perspectives developed in this thesis expands our clinical understanding of trauma. The four quadrant theory was described to provide a multidisciplinary, multicultural, and epistemologically inclusive framework that can encompass all of the trauma perspectives offered here, including neurobiology, attachment theory, sociopolitical conditions, local and non-pathologizing narratives, as well as mindfulness and holistic therapeutic practices. Together these perspectives provide an integrated understanding of trauma which can illumine a person's unique narrative and journey, as well as enhance collaborative and trauma-informed therapeutic processes.

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