HANDS TO HEART:

Therapeutic Techniques to Anchor Safety and Build Resilience in Children with Chronic Paediatric Medical Trauma

by

Meghan Judith Stewart

A Paper

Presented to the School of Education and Leadership

In Partial Fulfillment of the Requirements

For the Degree of Master of Education

EGC640 School Counselling Project

July 2024

HANDS TO HEART:

Therapeutic Techniques to Anchor Safety and Build Resilience

in Children with Chronic Paediatric Medical Trauma

APPROVED BY Dr. Jill Taggart, Faculty Capstone Supervisor, RCC-ACS #11237

To Those Hearts

This dedication is to those I know and do not know that have carried stories of unprocessed pain and medical trauma in their bodies. Thank you to all that have circled around me to hold me through my own healing and learning. Thank you to those who have been with me on this personal and professional path of writing, researching, and processing. My hope is that this process of researching, creating, and re-storying can be an anchor for those working with children and families on the brave path of opening their stories to listen to the hearts and build their own post traumatic wisdom.

In Gratitude

This paper lies on many stories of bravery before mine.
Thank you to my mother, aunts, and grandmothers.
Thank you to my partner.
Thank you to my four children for being my teachers in the mud, clear water and in between.
Thank you to those that lay in hospital beds before me, beside me and after me.
Your stories are my compass.

My heart work is inspired through the roots of many who observed, read, thought, and wrote before me. As I actively decolonize my learning process, I humbly acknowledge and am grateful for their theories, research, and work. Thank you to those that honour the lineage of polyvagal and attachment theories and the current and ancestral work in play, rhythm, and body healing.

Thank you to my supervisor, Jill Taggart, whose support was like a rudder through seas I did not know I could sail in.

Abstract

Pediatric medical traumatic stress (PMTS) can lead to considerable physical, social, and emotional development impacts in children and their families. Research has identified childhood as a particularly vulnerable developmental phase for medical trauma due to the extensive neurological, physical, and emotional growth occurring in early development. Historical gaps in research and discussion have led to less sensitivity and compassion to the depth of potential medical trauma exposure (McBain et al., 2023). Furthermore, medical trauma has a wide range of risk factors for children which can be misunderstood by a variety of professionals including counsellors (Locatelli, 2020). The aim of this capstone is ito build context for counsellors in and out of school settings to understand the complex trauma response patterns, behaviours, and developmental delays rooted in medical trauma. Bringing a decolonizating and reconciliation lens to this capstone, I hope to honour a wide selection of voices including underrepresented voices and the value of story and to be reflective in my research process. The heart work in this capstone is to resource school and private counsellors with research and resources to support post-traumatic growth for children and their families using play therapy, a developmentally attuned therapeutic approach to childhood trauma (Bratton et al., 2005), and trauma sensitive techniques to support with pre-verbal and somatic memories.

Keywords: Co-regulation, Interoception, Self-Regulation, Trauma, Trauma Wisdom

Table of Contents

HANDS TO HEART:

Therapeutic Techniques to Anchor Safety and Build Resilience in Children with Chronic Pediatric Medical Trauma

Chapter 1: Introduction

> Chronic trauma can lead us to having a narrower window of tolerance and feeling less safe in our bodies, especially when we are exposed to such experiences during childhood. Throughout childhood, prolonged and chronic exposure to stressful and overwhelming events, especially in the absence of our main caregiver, can lead to structural changes within the brain that impact a child's ability to learn and regulate emotions. (Morton, 2024, p. 102)

Introduction

Pediatric Medical Traumatic Stress (PMTS) is an emerging conversation in trauma research that has identified a historical gap in academic discussion on the traumatic experiences of medical procedures and interventions, particularly in the developmentally vulnerable population of young children (de Young et al., 2021). Research on the neurobiological and relational consequences of trauma has identified early childhood as a particularly vulnerable developmental phase due to rapid neurological, physical, and emotional growth with a wide range of traumatic responses (de Young et al., 2011). These findings align with broader trauma research that has identified the significant impacts of early adversity on healthy social, physical, and emotional development (Perry, 2009).

This capstone intends to capture impactful therapeutic techniques that compassionately support the child and their family before, during and after the pain and uncertainty of pediatric medical traumatic stress. I will be reviewing best practices that support post-traumatic growth

and supportive integration practices of pre-verbal and somatic medical experiences embodied in children with chronic PMTS. Trauma can disrupt regulation, perceptions of safety and feelings of trust and integration (Dana, 2018), so this exploration centers on risk and resiliency factors and healing practices that work towards post-traumatic growth using rhythm, relationships, and somatic expression.

Background Information

> Pediatric medical traumatic stress refers to a set of psychological and physiological responses of children and their families to pain, injury, serious illness, medical procedures, and invasive or frightening treatment experiences. Medical trauma may occur as a response to a single or multiple medical events. (NCTSN, 2018)

Medical trauma is distinct compared to other traumatic experiences as it is both psychological and physiological (McBain, 2020; NCTSN, 2018), which requires a continued widening of research on symptoms and implications (Marsac et al., 2014). The term Pediatric medical traumatic stress (PMTS) builds a cross-disciplinary understanding of this unique childhood experience that has a high likelihood of chronic and ongoing psychological, social, and physical implications and delays, particularly for children at early developmental stages (de Young et al., 2021; Rennick et. al, 2014). Many children have an initial stress response symptom to medical experiences and recover, but 25.0-30.0% experience chronic distress that may take the form of PTSD (posttraumatic stress disorder) symptoms like re-experiencing, hyperarousal and avoidance that can impact regulation and healthy functioning (Masalha et al., 2022). There are numerous risk factors that can decrease the child's resilience including the timing and length of procedures and the experience of pain (Masalha et al., 2022).

There is a concern that professionals working in schools or counselling offices may misunderstand unprocessed medical trauma behavioural symptoms when they interpret the behaviours without knowing the medical history (Locatelli, 2020). In therapeutic settings, children display behaviours that reflect their inner feelings and may continue to re-enact scary experiences through behaviours that could be interpreted without understanding the whole story (Dion, 2024). Children with pediatric medical trauma may experience uncomfortable or painful emotions related to their medical conditions or treatments that can be difficult to process (McBain et al, 2023). Considering early childhood trauma like these can evoke deep and long-term trauma response patterns (Perry, 2009; van der Kolk, 2016) it is important to ensure that professionals are conscious of these experiences.

A child's dependence on the welfare, resources and privileges of their families and relationships with them is integral to their social, emotional, and physical healing (Bergeron, 2017). The collective family and individual parents, siblings, aunties, and grandparents are also vulnerable to the stress of the collective experiences of illness and the individual child's experiences (NCTSN, 2018). Parental mental health can be a protective or risk factor in experiencing prolonged symptoms of medical trauma (Brown et al., 2019) and siblings can experience lateral trauma experiences (NCTSN, 2018) that could compound the strain families are experience.

Morton, whose research is well known in medical trauma and a survivor of congenital heart defects, highlights the wide-spanning impacts of the systemic expectations of young patients to be brave patients (2024). Children who carry these narratives alongside the invisibility of physical and emotional medical trauma into their school and community settings are a unique

and specialized population (Rennick et al., 2011) who processes and understands their psychological experiences of medical intervention through on their developmental phase and cognitive capacity (de Young et al., 2011). This paper reveals how this population of children deserves more recognition in research and sensitivity in systems and communities including education, mental health, and the medical system.

Statement of the Problem

> The experience of childhood trauma is unique to each individual child, their personal perception of the exposure to a medical experience and their past experiences of adversity forms their level of resilience. (Children's hospital, 2024).

Pediatric medical trauma is a frequently overlooked and misunderstood condition (McBain, 2022), particularly during the vulnerable phases of early childhood development (de Young et al., 2011). Despite its prevalence, pediatric medical trauma is underrepresented in research and academic discussions and, until recently, continued to be omitted in many studies, including ones focused on trauma and adverse childhood experiences (ACEs) (Young et al., 2021; Morton, 2023). Pediatric Medical Traumatic Stress (PMTS) is an emerging research topic which has driven academic inquiry into uncovering a comprehensive array of significant psychological and physiological impacts on children's neurological, social, and physical development (de Young et al., 2021). The critical demand for further research and discussion on assessment and intervention for children and their family systems, particularly in pediatric exposures to medical trauma, has fueled this relatively new discussion (Kazak et al., 2006; de Young et al., 2011).

The landscape of data indicates that there are profound and potentially long-term effects of medical trauma on children's well-being, including neurobiological changes (de Young et al., 2021; Kazak et al., 2006), maladaptive stress response patterns (Masalha et al., 2022), impaired regulation (de Young et al., 2021; Dion, 2016) and impacted attachments within family systems (Hambrick et al, 2021; McBain et al, 2023). According to the National Child Trauma Stress Network, 80% of children who have uncomfortable procedures or medical interventions experience a significant increase in stress, of which 15% become chronic or extreme (NCTSN, 2018). Although most children, siblings and families are resilient, 20-30% of parents and 15-25% of siblings have persistent experiences that impair functioning and recovery due to lateral exposure to medical trauma (NCTSN, 2018).

Amongst the growing data, results document the unique and widespread experiences of children and their families (Rennick et al., 2014). The severity of illness and injury does not necessarily correlate to the noticeable behavioural, physical, and cognitive symptoms (Haag et al., 2017), and trauma responses may present as behaviour or learning challenges long after or out of context of the initial medical experience (Locatelli, 2009). These underscore the need for continued comprehensive research (Haag et al., 2017) and widespread discussion to build community sensitivity and awareness of this specialized population experiencing physiological and psychological trauma (Morton, 2024).

Despite increased research and discussion in PMTS, the focus often remains within the medical field, leaving teaching and counselling professionals in schools and communities without developmentally sensitive resources and informed practices (Locatelli, 2009). According to McBain, medical trauma is "not openly acknowledged" or "socially validated" in the same

way other traumatic experiences are, even in the research and professional fields (2023, p 3). In British Columbia, efforts include the PATS course at BC Children's Hospital, promoting a trauma-sensitive common language within the medical community (Children's Hospital, n.d.). However, despite progress in implementing trauma-informed practices, specialized resources and information remain limited in other support settings (Perfect et al., 2016). Professionals outside of the medical community may not have the resources accessible to develop and implement specialized care and therapeutic practices that could support the child and their families with the unique challenges of pediatric medical traumatic stress (Brown et al., 2019; de Young et al., 2011; Coyne & Kirwan, 2012).

Purpose of the Paper

The purpose of this capstone is to explore academic literature on pediatric medical traumatic stress, developmental vulnerabilities of early trauma and the neurological, social, and physiological impacts of PMTS and to provide recommendations on impactful and effective therapeutic techniques to support children and their families. The following objectives are included in this capstone process:

- Collect empirical evidence and data on the developmental vulnerabilities of early childhood trauma, particularly in the relatively new field of study of PMTS.
- Identify significant consequences of PMTS on regulation and stress response patterns.
- Study impactful therapeutic techniques that integrate relationship, rhythm, somatic awareness and play that align with research and theoretical wisdom.
- Embody techniques counsellors use to develop secure attachments, broaden windows of tolerance, and build resilience.
- Conceptualize risk and protective factors in children and their families.

- Analyze the impacts on family systems and healthy attachments.
- Study potential neurobiological changes in children with chronic PMTS
- Understand trauma response patterns and facilitating trauma wisdom.

The intent of this capstone process is to provide resources and practices to counsellors and other adults of care who work with children impacted by pediatric medical trauma. It will culminate in a package of presentations that clearly identifies relevant research findings and evidence-based therapeutic techniques, theories, and practices.

Research Question or Thesis Statement

This capstone intends to answer the following question: *What therapeutic practices build resilience capacity and support trauma healing in children who experience chronic pediatric medical traumatic symptoms?* To respond to this capstone question, I will explore how potential protective and risk factors could be used to anchor and guide therapeutic support to this specialized population. I aspire to weave neurobiological and relational research together with somatic practices to inform a professional resource package for professionals working with children and families before, during, and after medical trauma.

Positionality (Re)orientation

This inquiry is deeply personal, as I was a child who endured significant medical trauma, yet I also had protective factors that protected me from some of the risks. I know the pain of Pediatric Medical Traumatic Stress (PMTS) intimately, both personally and professionally. At times, I have opened my heart too widely, and the scars have struggled to contain my trauma responses. My hope is that this research is accessible to those who need it, supporting them in

working with children, families, or themselves to pathways of resilience where they can breathe more deeply into possibilities.

My first professional exposure to medical trauma was when I was volunteering at Children's Hospital as a university student. I chose to work at the hospital because I was intimately familiar with the environment and felt I could support others in a sometimes scary and unpredictable place. I am grateful that many of the children I worked with honoured me with their stories and trust. Many children shared with me that they felt the pressure to act brave for their friends and family. One young child wrote me a beautiful poem on this topic that will always echo in my own heart. This child told me they knew I would understand, and I did. I also spent a lot of my childhood in hospitals, experiencing surgeries or undergoing invasive assessments. What both the child and I already knew is that medical trauma is an invisible experience where people expect you to be brave. It is different from other hard things because it begins inside of yourself, and inner sensations and outer experiences become scary, confusing, and unpredictable for a child.

Throughout my professional career, I have walked alongside children and their families through challenges, sometimes medical. Over these last 27 years, I have noticed that the behaviours we see always have roots that can be challenging to unearth. Their experience of medical trauma for children—such as separation from parents, unfamiliar procedures, and painful interventions—is unique to their developmental stage. There were so many times in school-based team meetings that I would challenge my colleagues to wonder deeper than observing the child having focus challenges or refusing to read. In one case, when I first started teaching a mother had not told us about her son's emergency surgery after birth because she did

not think it was relevant to his behaviour outbursts. It is still not widespread practice in the schools I have worked in to include medical experiences unless there is a psyched assessment.

I come from a lineage of brave and rebellious souls who sought refuge in this tree-lined sanctuary, searching for safety and a sense of belonging. My grandmothers, mother, and aunties stood firm against the constraints of patriarchy, refusing to be silenced. I read the landscape of their lives and realized that education was their key to new horizons. The tension of this origin clings to me as I navigate a place that is not my own, aware of the privilege I hold, though I know I only see pieces of it. For me, research is both an act of justice and an expression of gratitude. Positioning myself is a personal act of demyelination, a journey I undertake with an open heart. Understanding where my own trauma, privilege, and resilience intersect and embodying these insights is something I embrace deeply each time I sit down to work. As I grapple to find my footing in literature, I acknowledge the freedoms I have—freedoms that others do not. My whiteness, cisgender identity, and social positions have granted me opportunities that I did not have to earn through bravery alone. As I write on this computer, I feel a mix of contentment with what I read, witness, and learn, as well as discomfort with the unconscious biases I may overlook.

Theoretical Framework

> …you have to be careful with the stories you tell. And you have to watch out for the stories that you are told. (King, 2011, p. 10)

I begin this section with the quote from King to remind myself and my readers to listen, learn and question and to never settle in too deep to what you know. My relationship to theory is to honour that many voices collected to frame my research and understanding. Research

and theories are intertwined in systems with power, and in my educational experience some voices are not central or easy to find. I am grateful to have learned polyvagal, attachment and systems theory and I feel that they strengthen the spine of this research and stabilize my understanding of the various perspectives metabolized in this research paper.

Polyvagal theory is a framework developed by Stephen Porges, a neuroscientist celebrated for his expansive and cited work on the role of safety, the autonomic system in regulation, stress response and social behaviour (Dana, 2020; Porges, 2011; Porges, 2022). Polyvagal theory contains a robust scientific understanding of nervous system responses, the distinct parts of the brain functions and experiences of safety (Dana, 2023). A widespread amount of trauma research and therapeutic techniques are informed by polyvagal theory (Desautels, 2023). Porges' work identifies the three following states of autonomic regulation: the *ventral vagal complex*, the *sympathetic nervous system*, and the *dorsal vagal complex*. These are all patterns, according to Porges, that are self-protective and growth response patterns that vary on experiences of safety (Porges, 2022). The most well-known response is named by Porges the *sympathetic nervous system* which responds to stress and trauma by mobilization or fighting and escaping (flight). The dorsal vagal complex is a response to threat by shutting down or disconnecting when overwhelmed and according to Dion, (2024a) this is common in children who have experienced medical trauma. Both the sympathetic and dorsal responses can become overactivated through prolonged stress (Porges, 2011) and provide a framework to comprehend developmental and early childhood trauma. Porges' work aligns with the scientific research of Bessel van der Kolk (2014), who also correlated dysregulated states of the autonomic nervous system with symptoms of chronic traumatic responses. van der Kolk identified hyper and hypo

arousal states are intricately connected to the sympathetic and dorsal states that Porges identified Porges, 2011; van der Kolk, 2014). Deb Dana works closely with Stephen Porges and has infused a continuum of therapeutic practices into her writing where she elevates the importance of the human body's somatic ability to sense safety and danger consistently consciously and unconsciously through exteroception and interoception (Dana, 2020). Polyvagal theory lays the groundwork to understand how the vulnerable and unsafe experiences of childhood adversity could evoke behaviour patterns that could negatively impact a wide variety of lifelong experiences (Dana, 2020, Desautels, 2023).

Polyvagal-inspired research and techniques will be wound through the literature review, particularly in contextualizing trauma responses and the qualities of the risk and protective factors that interplay in the resilience of children and their families. Porges' work aligns with the work in chapter 3 of this capstone where the focus turns to therapeutic practices and interventions. The importance of trust, safety, and human connection (Dana, 2020) this theory grounds integrates beautifully with the quest to build resilience. Polyvagal-informed work harmonizes with Dan Siegel's window of tolerance, frequently used as a visual representation of the range or level of emotional and physiological states a person can integrate, respond to or process (Siegel, 2012). This capstone examines protective and risk factors that widen or tighten a child's capacity during, after or before medical trauma with the window in mind. The heart of this paper focuses on understanding attachment styles and scripts and how the qualities of attachment bonds intersect with trauma and resiliency.

Polyvagal-informed academic discussions centralize the protective role of co-regulation and reciprocity in building healthy relationship pathways and patterns Dana and Porges identify

in their writing (Desautels, 2023; Dion, 2024b; Goodyear-Brown, 2024). Both polyvagal and attachment theories anchor in the importance of the connections between people (Bowlby, 1969; Dana, 2020; Porges, 2011). Polyvagal perspectives on the importance of early dyadic relationships align with attachment theory, rooted in Bowlby's assertions that bonds form for security and survival (1969). In early research and writing on attachment, Bowlby identified how the experiences of those relationships create patterned dynamics, including secure, insecure-avoidant, insecure-resistance, and disorganized attachment (Bowlby, 1969). Bowlby recognized that the qualities of early attachment relationships varied from secure and safe to distressing, absent or unpredictable and these initial experiences patterned their lifelong relationship interactions. Considering the importance of attachment patterns in early childhood illuminates the compounding distress a child and a family member could potentially experience during medical trauma where there is frequently a physical or emotional absence of an attachment figure or systemic stress of illness and worry on the family system (Rennick et al., 2014,).

Including attachment theory in this capstone intentionally centralizes how the child's relationships to their family members, medical teams, school personnel and counsellors can be either protective or risk factors in their resilience to medical trauma. Secure attachments support children and youth in managing stress, developing resilience, building autonomy, and learning self-regulation (Neufeld & Maté, 2005). Attachment theory has evolved through time from Bowlby to Neufeld and Maté but consistently features the positive qualities of security and attachment particularly during family system distress (Bowlby, 1969; Neufeld & Maté, 2005). This capstone recognizes relationship as the forefront of the therapeutic relationship and the techniques and interventions offered.

Postmodern systems theories sustain my thinking fluid and disrupt my research when it is going in a straight line. Vikki Reynolds, a local change maker and past counsellor, works, writes, and moves from a place of "solidarity" acknowledging social justice with those who intersect in other places of privilege (Reynolds, 2011, p. 41). I learned from these revolutionary theories to move with humility in my work by looking for connection and collectivism. Even writing this paper alone, these theories orient me towards being open, awkward, and humble. I slowly researched and wrote towards having an what Reynolds calls an "imperfect orientation" to hope towards "transformations for ourselves (and) the people we work alongside..." (2011, p. 40) When I think I understand, these theories remind me that some experiences and stories fit in many places or in none that I know. What I understand of working in solidarity is to listen and privilege those who have been historically and socially marginalized and discriminated against to honour and make this research meaningful and relevant. Dr. Sara King, a black neuroscientist and body-based practitioner, designed a Systems-Based Awareness Map (SBAM) to chart internal and external states of awareness and the interrelationship with collective, ancestral, and individual trauma and resilience (King, 2024). King's work attunes me to the relationship between social justice and well-being and aligns with the pathway of this capstone's recommendations. The work of social justice theorists like Reynolds and King simultaneously invites me to pause and honour the impacts of systemic and historical racism and injustice while I continue this research and advocacy work with more hope in my heart.

Significance of the Study

> Without knowing what medical trauma is and how the symptoms manifest, we can inadvertently miss signs that the child has experienced a medical trauma or jump to conclusions regarding the child's behaviors and play. (BC Play Therapy)

The significance of this capstone is the addition of another voice in this previously under-researched common early childhood experience (McBain, 2022). The scars of medical trauma are not just physical, and there are additional challenges in having these experiences during vulnerable phases of growth and development where cognitive abilities, including language and comprehension, are not fully formed (de Young et al., 2011). The lifelong impacts of unaddressed or ignored PMTS can lead to as many challenges as there are children with these experiences and my inspiration to write this is to become informed myself to work with these children and families.

In my own life, I adapted to having repeated cardiac surgeries and procedures by having a lifelong struggle with feelings of safety that shaped my relationships and experiences, including writing this capstone. The professionals who did support me reinforced my bravery and strength but did not see the internal struggles to regulate and face the day-to-day challenges of day-to-day challenges like having scars on my body, feeling like I always had to be strong, working harder than I have to and not trusting any adults in power. I learned to cover up and disconnect to overachieve and be seen as someone who seemed how I thought people saw me-strong. To the little version of me, this research could have supported my family and me with resources and knowledge to build resilience and post-traumatic awareness and strength I am learning alongside this project fifty years later.

Professionally, I have observed and experienced the complexity of interwoven medical trauma and trauma response patterns in the schools and hospitals where I have worked. Although I had inner somatic wisdom guiding me as a teacher and counsellor, this research has grounded me with a foundational understanding. The data, observations, and theories I have unsurfaced are now integral to my practice as a counsellor who works with families and children before, during and (sometimes years) after medical experiences. As Maté writes, true research is in the stories, and although this is an academic paper, the stories I embody and hold for others have guided this heart work (Maté, 2011). This project empowered me to hold on tighter with a compassionate understanding of the unsettling impacts of trauma on healthy development and connections with others and ourselves. The presentation I developed will be shared, altered, and built upon as my learning continues evolving. I look forward to integrating this wisdom into my work as a counsellor, writer, and speaker for my private practice, Hands to Heart.

Definition of Terms

Co-regulation*:* to support and hold space for another person to build the capacity and resilience to regulate or calm their nervous system (Porges, 2021).

Interoception*:* the awareness of and relationship to inner body sensations such as heart rate, breathing and pain. These experiences of sensations play a role in how we comprehend, process, and respond to emotional states and a sense of safety (Dana, 2020; Goodyear-Brown, 2024)

Self-regulation*:* the capacity of the nervous system to balance emotional state and response to stressful and adverse experiences (Porges, 2011). Somatic awareness, mindfulness and self-compassion play an integral role in building healthy and adaptive regulatory responses (Schwartz, 2021).

Trauma*:* an adverse experience that can be interpreted and experienced by a human as distressing, painful, unsafe, or overwhelming (Maté, 2011). Trauma can disrupt the brain function and nervous system, which impacts the ability to regulate and cope and can lead to significant maladaptive coping patterns (Schwartz, 2021; van der Kolk, 2014). *Ex*posure to repeated, consistent or extreme adversity or traumatic experiences during early childhood development which impacts an individual's emotions, cognition, physical and social development (van der Kolk, 2005)

Trauma Wisdom*:* the concept of wisdom in trauma elevates the strengths, insights, and inner beauty that humans can embody as gifts of their adverse past experiences. (Schwartz, 2020a). Trauma wisdom honours the experience of resilience, or the ability to restore, resource and recover from trauma by building capacity for regulation of emotions (Schwartz, 2021). This can be supported through healthy interpersonal connections, an awareness of their personal story and understanding personal vulnerabilities, strengths, and relationships (Maté, 2011). Outline of the

Remainder of the Paper

Chapter 2 is a comprehensive review of literature honouring research, theory, and Indigenous wisdom on the unique impacts of pediatric medical traumatic stress (PMTS) on children early in their early development. There are identified gaps in literature, particularly targeting the impacts of PMTS on early development and articulating the complexities of risk and protective factors. The neurobiology of trauma and the critical impact of healthy attachment systems guide literature analysis through many considerations.

Informed by the research and analysis in the literature review, the concluding chapter is a foundational presentation on critical research indicating pediatric developmental vulnerabilities,

risk and protective factors and inner nervous system and outer family system trauma responses informed through the lens of polyvagal and attachment theories. This second component of the workshop is therapeutic offerings for counsellors in and out of the school system that centers on developing an interoceptive sense of safety and research-informed play therapy techniques to support and rebalance regulatory, emotional, and somatic trauma responses. The focus of chapter 3 is to use the heart as a guide to the hopeful experience of traumatic wisdom.

Chapter 2: Literature Review

Introduction

This literature review curates and honours research, theory, and ancestral wisdom in the unique impacts of pediatric medical traumatic stress (PMTS) on children early in their early development. In Chapter 1, I identified the significant potential impacts of medical trauma on children and how their trauma might be missed or misunderstood in various systems, including hospitals, schools, homes, and other community spaces. I asked the question: *What therapeutic practices build resilience, capacity and support trauma healing in children who experience chronic pediatric medical traumatic symptoms?* In this chapter, I continue to shed light on the experiences of PMTS by examining the prevalence and potentially ongoing symptoms that disrupt development and impact many aspects of healthy childhood development. Through this research process, it became evident that the uniqueness of each child's story is rooted in their individual risk and protective factors that disrupt or support their physical, emotional, and functional healing and restoration after medical experiences. In the last section of this chapter, I find intersections connecting various therapeutic techniques that provide a hopeful beam of resources to develop a suggested integrative model of healing for counsellors.

The theoretical frameworks of attachment, system, and polyvagal theory I grounded on in Chapter 1 will be braided into the ideas that surface from the literature. They will be elaborated on through the research lens to provide a deeper context and understanding.

Developmental Vulnerabilities of Early Childhood Adversity and Trauma

> Early development sets the ground-whether strong or shaky- for all learning, behavior, and health (or lack of it) that will come later. (Maté, 2018 p. 125)

This section provides a developmental lens to understand the medical trauma experience of children through their early phases of life. Early childhood has elevated risks and vulnerability for the implications of trauma exposure due to the "rapid neurobiological development, attachment relationships, cognitive and linguistic capacities, and emotional regulation" (de Young et al., 2011, p. 739). Early traumatic exposure during this fast pace of development could impact and impair children socially, physically, emotionally, and cognitively (Kazak et al., 2006; Marsac et al., 2014). According to Perry, the first three years of life are "disproportionately powerful in shaping how the brain organizes" emphasizing the significance of beginning the literature review with a lens on the sensitivity of early development (Perry et al., 2021, p. 31).

It is now widely recognized that trauma during early development has wide-spanning lifelong impacts (Perry et al., 2021). In 1998, Felitti and his group of researchers began a worldwide conversation on the serious implications of adverse childhood experiences (ACEs) (Felitti et al. 1998). Felitti published their epidemiological study on 9000 adults with results pointing to the correlation between adversity and lifelong physical and psychological wellness and resilience. This research acknowledged the widespread experience of trauma and a strong correlation between adverse experiences and negative long-term outcomes. Felitti's work included insight into how a cumulative number of adversities, such as living with an addicted parent or experiencing sexual abuse, correlated to an increase in risk in future trauma. As more recent research adds to the dialogue, stress, trauma, and adversity in early childhood have been

associated with impacted brain structures and disruptions in relationships and social, emotional, and physical development (American Academy of Pediatrics, 2012).

Early adversity research did not include medical trauma (Morton, 2022), but an expansive amount of longitudinal data has reinforced the importance to continue studies and widen the understanding of adverse experiences to include more populations, settings, and details about experiences (Perfect et al, 2016). Felitti et al.'s (1998) original research was a narrow data sample with a lens focused on a white population, but through time and awareness of social justice, there has been a swell of data with a more inclusive lens (Buqué, 2024). For example, in BC, at the summit of ACE studies in 2019, physicians reviewed their professional standards and potential actions they could engage in to enhance policies and move trauma-sensitive practices beyond the hospital to homes and schools (Burkley, 2020).

Each phase of development from infancy to early childhood impacts how a child comprehends, responds, and copes with medical trauma (de Young et al., 2011). Early in brain development, when language is still emerging, neurobiological research indicates the architecture of the developing nervous and relational systems in children under the age of 1 are highly vulnerable and dependent on basic survival, safety, regulation, and needs (de Young et al., 2021). Communicating needs are limited to crying and motioning as the brain is still in the process of wiring language and higher cognition which further exacerbates confusion, pain or other distressing experiences and can interfere with the process of being soothed (de Young et al., 2011). If traumatic experiences occur during this vulnerable developmental phase, pre-lexical memories are encoded somatically, emotionally, and physically without the infrastructure of language which makes remembering or contextualizing past experiences difficult later in development (van der Kolk, 2014). Recent research has found that trauma-based symptoms of

infants and young children are consistent with symptoms of older children and adults with heightened cognitive, physical, and emotional vulnerabilities of early development (Perry, 2021).

Toddlers and Preschoolers continue to be developmentally vulnerable and at risk (de Young et al., 2011; Neufeld & Maté, 2005). Toddlers between 1 and 2 are becoming more conscious of their actions in their environment but remain dependent, reliant, and vulnerable particularly in unfamiliar settings (de Young et al., 2011). Their perceptions of threatening experiences are different than what an adult would perceive, which accentuates the importance of trauma sensitivity at this developmental phase (Dion, 2024). In children ages 3 to 5, some developmental resiliency becomes accessible through more cognitive processing capabilities, basic communication, and memory encoding (de Young et al., 2011) but still limited to a more concrete understanding, particularly of new, unpredictable, or salient experiences (Salmon et al., 2002).

Throughout research, children do not have the same developmental power as adults to cope during medically traumatic experiences (de Young et al., 2011). As Maté (2018) writes in the beginning quote, our experiences in early phases of childhood become the ground for our "… learning, behavior, and health…" (p 125) so understanding the risk factors in how developmental limitations may limit the processing and interpretation of traumatic experiences (de Young et al., 2011) is critical to consider in this capstone on medical trauma.

Contextualizing Pediatric Medical Traumatic Stress

> Pediatric medical traumatic stress refers to a set of psychological and physiological responses of children and their families to pain, injury, serious illness, medical procedures, and invasive or frightening treatment experiences.

> Medical trauma may occur as a response to a single or multiple medical events. (NCTSN, 2018)

Children who have experienced medical procedures, illness and accidents are susceptible to developing chronic symptoms of Pediatric Medical Traumatic Stress (PMTS), which can have psychological, social, and physical short and long-term impacts (de Young, 2021; NCTSN, 2018). Kazak describes PMTS as "continuum of key symptoms . . . which may be present without meeting criteria for a full diagnosis of PTSD . . ." (Kazak et al., 2006, p. 344) which clarifies that it is not a disorder itself, but a framework to build protocols, supports and screening tools. Building a collective understanding of PMTS was motivated by research on the traumatic impacts of medical procedures, painful experiences, diagnoses, treatments and surgical procedures on children and their families Masalha et al., 2022). The indicators of PMTS are the persistence and extremity of symptoms, which can be an individual or collective trauma experience potentially impacting the individual child and the family system (Rennick et al., 2014; Škorjanc et al., 2021).

Most children who experience a posttraumatic response from medical adversity have an adaptive recovery in a brief time span, but 25- 30% will develop a chronic response impacting physical recuperation and normative developmental milestones (National Child Traumatic Stress Network, 2018; Masalha et al., 2022). A significant concern identified throughout the research is that 3%-10% of these children meet the diagnostic criteria for severe posttraumatic stress disorder (PTSD) symptoms (Masalha et al., 2022). A considerable proportion (15- 20%) of children with chronic symptoms experience notable impairments and disruptions in numerous developmental areas, including behavioural, physical, cognitive, and emotional (DeYoung, 2021;

Masalha et al., 2022). These numbers are considered extremely concerning and have driven a recent surge in research, particularly in identifying variables that point to long-term and extensive difficulties and challenges (Price et al., 2016; Rennick et al., 2014).

The unique experience of medical trauma demands extensive treatment considerations as it has distinct differences from other trauma experiences and can lead to chronic psychological and physical impairments (McBain, 2022). Traumas are experienced somatically (van der Kolk, 2014), but what is unique about medical trauma is that the trauma can begin in the soma or body, so inner sensations and consistent fears or pain can consistently cue the person of their ongoing or past experiences and continue a cycle of retraumatization (McBain, 2022). As identified in the first section of this literature review, pediatric medical traumatic stress is even more distinctive because of the developmental capabilities and vulnerability of children (de Young et al., 2021; Kazak, 2006).

Due to the complex developmental phases and unique variables to each experience, presenting problems related to PMTS can be unnoticed or overlooked by healthcare professionals and educators as childhood traumatic responses may be long after or out of context of the medical experience (Locatelli, 2009). Children who suffer posttraumatic symptoms of PMTS may present with immediate or delayed responses, which can lead to either a brief or chronic disruption in healthy physical, social, and emotional development (DeYoung, 2021; Masalha et al., 2022). It is common in developmental trauma for a delayed lateral sensation or trigger to activate a trauma response at a different time (Kazak et al., 2006; Levine, 1997), which can frequently lead to a professional misunderstanding of the cause of the behaviour (Dion, 2024 a). How pediatric health providers respond and interact with toddlers can be experienced as frightening (Rennick et al., 2014), particularly when the attachment figures who have provided

safety cues and intimate levels of support for food and security are absent (de Young et al., 2021). Medical procedures, hospital stays and painful experiences are potentially distressing for children when detached from safe attachments and potential systems of safety and comfort particularly when the child does not have the capabilities to communicate or process their distress leaving them vulnerable and potentially not able to seek the support they require (de Young et al., 2021).

Early medical trauma is complex to screen, assess and provide support (de Young et al., 2021). Understanding the extensive range of normative reactions to childhood trauma and the symptomology and complexity of early pediatric development is an essential discussion in all systems of support around the child and their family (Masalha et al., 2022; Rennick et al., 2014). Depending on the development and cognition of a child, they are unlike adults in perceiving and understanding their prognosis and the risks of their medical experience (de Young et al., 2011) and they may not understand how their safety or lives could be impacted (de Young et al., 2021). In PMTS research, it is well-documented that trauma responses can seem to be minimal, acute, chronic, or delayed in their onset, but due to the complex developmental phases and unique variables to each experience, presenting problems related to PMTS may be unnoticed or overlooked by professionals (Kazak et al., 2016; Locatelli, 2009).

The school-Aged Experience of PMTS

Compared to infants, school-aged children have been the subject of more studies on Pediatric Medical Traumatic Stress (PMTS) (de Young et al., 2021), however, there is still a need in the research community to expand understanding and develop integrative support for school-aged children (de Young et al., 2021; Kazak et al., 2006). A study of 88 children ranging in age from 6-13 who were hospitalized for a prolonged amount of time healing from surgery, found

that 26.4% displayed PMTS symptoms (Ben Ari et al., 2019). This aligns with other research that has identified a wide span of impacts of medical trauma on memory, attention span, confidence, and cognitive abilities (Rennick et al., 2014), which can present as learning problems, impulsivity, disconnection, and friendship difficulties in school settings (Perfect et al., 2016). In a systematic review of research spanning 1990- 2015, it was noted that 39 % of children who reported considerable amounts of past trauma also had significant challenges keeping up with their academic workload and scored lower in IQ assessments (Perfect et al., 2016). This study also noted that working memory and language capacity were seriously delayed in comparison with children with a reduced number of trauma exposures (Perfect et al., 2016).

Data focused on identifying the critical impacts of medical trauma on school-aged children is needed to highlight the low awareness in wider communities outside of the medical field (Ben Ari et al., 2019). DeMaso et al. (2014) identified an elevated diagnosis rate of ADHD (35%) and social struggles (60%) in a group of patients coping with chronic illnesses. A staggering point of this research was that some of the patient group had experienced surgery up to 16 years previously, when they were infants with many of the children not having active memories of the event. This points again to the high vulnerabilities of early childhood development mentioned in the first section and identified by numerous papers including the work of de Young et al (2011). This wide range of challenges experienced by youth with chronic PMTS can be misunderstood or pathologized in school and medical systems without an understanding of the significance of traumatic exposure (Ben Ari et al., 2019).

The Uniqueness of Each Child

The scope of diversity is too broad for this literature review however, it is essential to highlight the strong emergence of research honouring diversity and trauma sensitivity for varied

youth (Coyne et al., 2012; Edwards-Leeper, 2016; Fuld, 2018; Ramos, 2021; Rennick et al., 2014). Research indicates that considering individual qualities unique to each child, such as identity, past experiences, neurodiversity, and temperament, are critical factors in predicting the level of traumatic response (Rennick et al., 2014). Pre-existing variables, particularly in mental wellness and the accumulation of adverse experiences, disable the child's capacity to cope with distress and trauma (Stanzel et al.2022; Salmon et al., 2002). Neurodiverse children have increased risks when processing and experiencing adversity (Fuld, 2018). In their research, Fuld highlights the importance of being sensitive to the neurodiverse experience and aware of the potentially elevated trauma responses, particularly hyperarousal which would heighten the vulnerabilities of this population to medical trauma (Fuld, 2018). LGBTQ+ children are also potentially vulnerable to medical trauma due to possible misidentification or identity misunderstandings across systems of care (Ramos, 2021). Experiences of system-induced trauma of marginalization and stigma increase the risk of trauma responses, and queer-affirming practices, particularly for young children, are not consistent in systems of care (Edwards-Leeper, 2016). The importance of this wide range of considerations is a reminder of how unique and sensitive each experience of medical trauma experiences could be for each child and their intersectioning experiences.

Coyne et al.(2012) researched children's perspectives of environmental factors to identify commonalities of experiences that are more probable to evoke prolonged and chronic trauma responses. This research took interview data from 55 children aged 7-18 with a range of acute (27) and chronic (28) illnesses and experiences. Coyne et al's interviews were intended to give voice to children and examine the correlations between the qualities of experiences and the risk of trauma. Coyne et al's work points to the importance of listening to children's stories to

centralize their perspectives in academic dialogue. Some poignant findings were that experiences of unfamiliarity, misinterpretation of messages from medical professionals and feeling misunderstood were more correlated to chronic and prolonged distress. The timing, level of pain and severity of procedures were also identified as predetermining factors to long term stress symptoms. Coyne's et al. methodologies balance clear scientific methodologies with the importance of inclusion of child's voices.

Oversights in Pediatric Research

In the last 30 years, an increased academic focus has centered on PMTS (Masalha et al., 2022; Rennick et al., 2014), but in comparison to the extensive literature on pediatric diseases, congenital conditions, and emergency injuries, there remains a disparity (Stanzel et al., 2022). For example, there is a lack of research focusing on children aged 0-6 and their symptoms and developmentally unique experiences of potentially traumatic exposures from medical experiences. Examples are prolonged childhood cancer, congenital diseases, and childhood illnesses, particularly in children aged 0-6, who are developmentally vulnerable (de Young et al., 2021). Medical trauma research frequently focuses on children with higher language and cognition levels or relies on parental or caregiver perspectives, so there remains less research on younger children (Stanzel et al., 2022). These research gaps have resulted in insufficient knowledge about the immediate or delayed impacts of medical events on children, inadequate screening methods, and low rates of ongoing psychological support for children and their families (Masalha et al., 2022). According to Marsac (2014), due to the significant historical gaps in focus on the pediatric experience, there remains a systemic need to build supportive

frameworks to mitigate childhood mental health by building supports during potentially traumatic medical experiences.

Recent studies offer hopeful evidence and an increased dialogue on the vulnerabilities and impactful practices and interventions to support children and their families (de Young et al., 2021; & Livecchi 2024). There is an acknowledgement of the critical need to use developmentally sensitive screening tools to guide support systems wider than immediate medical support, especially in children under six (de Young et al., 2021) and an awareness of the impacts of early childhood trauma (Rennick et al., 2014). Current papers more recently published recommend developing an integrative framework including multiple fields of experts, larger sample sizes and more longitudinal research (McBain, 2023).

The Experience of Trauma

Trauma is a word used to describe the body and brain's reaction to a stressful event or situation. What the brain and body consider stressful is unique for everyone and causes different reactions in each person. Because of this, trauma can be hard to define and recognize — something that's traumatic for one person might not be traumatic for another. (Kids Help Line, 2023)

There is a voluminous amount of research and discussion on trauma, which has informed trauma-sensitive policies, practices, and mindsets in a variety of fields. Trauma healing has been a growing conversation seen through extensive research, studies, academic literature, and social media. The exploration of trauma has crossed disciplines, including psychology, neuroscience, and education, each contributing an array of perspectives, observations, and conclusions with contributors like Bessel van der Kolk, Peter Levine, Stephen Porges, Gabor Maté, Christine

Caldwell, Albert Wong, and Arielle Schwartz and many others. The word trauma is challenging to conceptualize clearly in a literary review as the term is used in a wide variety of contexts and meanings. The definition from Kids Helpline will be the anchor throughout the document to provide a consistent understanding: trauma is a response to a stressful experience unique to the individual's worldview and perspective (Kids Help Line, 2023). This aligns with contemporary rhetoric that describes trauma as an experience of discomfort that impairs, stresses, or overwhelms a person's capacity to integrate and process the stressor(s) and weakens or hinders their social and cognitive functioning and wellness (Malkemus & Smith, 2021). Maté, one of Vancouver's leading trauma experts, describes the trauma experience as the "root of our deepest wounds," and he writes and speaks extensively on the topic of learned patterns of trauma response and its influence on wellness and addiction (Maté, 2018, p. 10). Maté's description seems to come from the Greek word (τραυμα) trauma which is translated as injury or wound (Kolaitiset al, 2017).

Trauma is a pervasive and multifaceted experience that impacts all populations of humans psychologically, physiologically, and socially (Maté, 2018). In an assessment of WHO World Mental Health surveys, it was found that over 70 percent of those surveyed identified at least one event that caused them a trauma response with an average of 3.2 lifetime events (Kessler et al., 2017). In this data, trauma exposures related to the impacts of medical experiences were being present during a death or serious accident (23.7%), a shocking death (31.4%) and experiencing an accident (14%). Kessler et al. identified these experiences as traumatic validates the inclusion of the family members potentially experiencing PMTS by experiencing lateral trauma of being near or with someone else experiencing medical distress. This survey also aligned with the early ACEs studies mentioned earlier in the paper that

identified that early exposures to trauma increased the risk of more adversities throughout a lifetime (Felitti et al. 1998; Kessler et al., 2017).

Van der Kolk (2014) notably wrote *The Body Keeps The Score* on how trauma is experienced, processed, and stored (van der Kolk, 2014). van der Kolk's extensive career in researching trauma began with war veterans where he began to identify that trauma is embodied physically. His work is cited by many suggests that trauma is fragments of stored sensations or implicit memories that can become stuck, or with the support of effective therapeutic techniques, can be integrated and processed (van der Kolk, 2014). As a response to this experience illustrated in van der Kolk's work, the brain and body develop response patterns identified clearly in Porges' polyvagal theory as mobilized into fight, flight or fawn or shut down in freeze and collapse experienced as tension and dysregulation (Porges, 2011). This complex synergy of psychological, emotional, and physiological responses to an experience perceived by the individual as painful or harmful is a common human experience (Schwartz, 2020b).

Beginning at conception, the developing brain begins to process and remember cues from the outer world that build each human's unique systems of regulation and survival (Perry et al., 2021). A historical assumption of children in early development was that they were too young to process or remember experiences, but current data notes the capacity of a young child to absorb and sense their environment, relationships, and experiences (de Young et al., 2021; Perry et al., 2021). In Bruce Perry's research (2006, 2009), he identifies children's sensitivity at initial stages of development to process and embed memories of emotional safety and danger as well as images, patterns, and sensations to build their sense of the world (Perry 2006, 2009). If a child experiences an early trauma, they are likely to store sensation-focused memories, like the sound of a voice or a smell, with a complex array of emotions (Goodyear-Brown & Yasenik, 2024). An

"evocative cue" can bring an experience back to a child without the capacity of language or higher-level thinking to regulate a stress response (Perry et al., 2021., p 37). In conclusion, it is important to identify the numerous vulnerabilities of children in potentially traumatic environments and experiences, particularly the unique experience of pediatrist medical trauma as highlighted in the research by de Young, Perry, and Goodyear-Brown & Yasenik mentioned above. The next section will contextualize this importance further by highlighting a neurobiological understanding of the trauma experience.

The integration and understanding of our traumatic experiences can be impaired by the encoding process of trauma memories (Schwartz, 2020a; van der Kolk, 2014). According to Schwartz, trauma memories are primarily non-verbal and often, early childhood traumatic memories are encoded through the senses (Schwartz, 2020b). In early development, these childhood implicit memories of stress, pain or unregulated emotions can become a part of the child's neurological infrastructure and understanding of their world as they continue to grow (Wizansky & Sadeh, 2021). According to Wizansky and Sadeh, memories are encoded, stored, and connected to past experiences and can be understood through the implicit memories of adaptive responses to past and present distress. This working hypothesis informs therapeutic practices by articulating how stress interferes with the memory system and how traumatic experiences can become frozen or stuck in unprocessed clips without the structure of language Wizansky and Sadeh also found when there are cues or reminders of these experiences or sensations in the present, these memories can impact emotional regulation, cognitive understanding, and regulation patterns. They suggest that therapeutic practices of using precise images, sensations and somatic cues could potentially access what language cannot Wizansky and Sadeh's work suggests the practices of building safety cues and attuning to the other possible

sensations that clients might be responding to might be effective practices to integrate these trauma memories, findings similar to those published by Dana, 2023; Goodyear-Brown and Yasenik, 2024 and Schwartz, 2020b).

Adaptive Growth and Protective Patterns

The DSM5(2013) and NCTSN (2018) both identify three common trauma responses, including re-experiencing, avoidance, and hyperarousal (American Psychiatric Association, 2013; NCTSN, 2018). These responses are commonly recognized as symptoms in chronic cases of PMTS (de Young et al., 2021; Kazak, 2006; Rennick, 2014). These three responses can be explained through polyvagal theory as regulatory states or emotional patterns responding to distress to stay safe (Dana, 2020) and a corresponding model of progressive fear responses explained later in this paper (Schauer & Elbert, 2010). Depending on the development and unique cognitive and neurological qualities and abilities of the child, their family system, and their systems of support these responses can become overactive, prolonged, or even extremely delayed and not easily connected to the medical stress (Rennick et al., 2014).

Re-experiencing is a repeated activation of memories, or a trauma story and it can trigger sensations and emotions that, overactivated can impact mental wellness and the daily life experiences of a child (Kazak, 2006). After being scared or in pain, a child might worry that something similar could occur even when they are not in the location or with the same people (Goodyear-Brown, 2024; Dana, 2020). Marsac (2014) has identified common forms reexperiencing can take in children with traumatic disorders including nightmares, repeated violent play on the same topic, a sensitive startle response or physiological experiences like shaking hands or rapid heart rate after experiencing a cued memory. This is the most commonly

observable trauma response which can be identified in children's writing, play and conversations with trusted attachment figures (Marsac, 2014).

Hyperarousal is when the normal and healthy reaction of fight and flight response does not disarm after exposure to adversity or trauma experiences (NCTSN, 2018, van der Kolk, 2014). This uncomfortable state is common in chronic medical trauma responses and that presents in children as impaired sleep, hypervigilance, overreactive responses and focus or obsession on potential danger (de Young et al. 2011). According to de Young et al, the unpredictable and frightening nature of these stress responses can lead to generalized fear which can impair their perceptions of safety and influence their interactions in various environments.

According to Kazak et al (2006), avoiding and disconnecting is the most common adaptive response to pediatric medical trauma. Kazak scanned research to find that numerous studies identified behaviours like avoiding the doctor and looking away to triggering medical cues like needles or pills (Kazak, 2006). These behaviour patterns in children can range from extreme to vague responses to reminders of an adverse or traumatic experience (de Young et al. 2011). Depending on the child's understanding of their experience, other avoidant behaviours such as social withdrawal and disconnection to previously enjoyed activities (Dion, 2024a, 2024b). Authentically assessing and scaling avoidant behaviours proves to be difficult with young children, particularly when they have limited language and developing cognitive understandings (de Young et al, 2011). The concern with children who develop this behaviour pattern is that they generalize the adaptation to other experiences, like school (Desautels, 2023) or other community experiences (Dion, 2024a).

A Neurobiological Understanding of Trauma

Examining theories and empirical evidence on the nervous system infuses a scientific understanding of how the brain and body heal through resilience (Desautels, 2023). It is widely acknowledged in science that trauma and prolonged stress impact the development and function of the brain and nervous system (National Scientific Council on the Developing Child (NSCDC), 2014). A comprehensive neurobiological perspective of the brain and nervous system's function in trauma builds an empirical interpretation of stress responses, emotional (dys)regulation and biological vulnerabilities and risks in children (Desautels, 2023; Dion, 2016; Goodyear-Brown, 2024), particularly with the additional unique complexities of pediatric medical experiences and the evidence that early stress impacts the brain and nervous system structures (de Young et al., 2021). How children experience, integrate, and embody adversity and distress can be clarified through the wide landscape of research on neurobiological growth, adaptation, and function (Perry, 2009, Porges 2011, van der Kolk, 2014). This section presents three frameworks infused with current theory and a scientific understanding of how the brain and body heal, build resilience, and adapt to trauma with the hope to plant more seeds of practices and tools that could support the nervous systems of young children with PMTS. The work of Dana (2020), de Young et al., (2021) Perry, (2006, 2009), Porges (2011), Schauer & Elbert, (2010) highlighted in this paper use scientific findings on the architecture and development of various functions and systems of the brain and nervous system.

The Neurosequential Model of Therapeutics

The Neurosequential Model of Therapeutics (NMT) by Perry (2006) is a widely cited explanation of the hierarchical structure and functioning of the four main parts of the brain: the brainstem, midbrain, limbic system, and cortex (Perry, 2006). Perry's scientific papers explain that the brain develops from the brainstem, which is the most simple and primal, to the cortex,

which is responsible for higher-level cognitive skills. Although all the parts of the brain work together, each part has a different role. Perry's model is often referenced with the saying "bottom-up," which describes the sequence of development and identifies the more primitive parts of the brain as having a significant role in experiencing and processing trauma. Each part of the brain structure forms through development, with the brainstem developing in utero. Perry's extensive scientific understanding of the developing brain highlights the significance of the claims highlighted in other sections of this paper by de Young's (2011) on the vulnerability of PMTS during periods of childhood when the brain is still wiring and developing neural pathways (Perry, 2006; Perry, 2009).

There are the four parts of the neural sequence model organized by developmental stages proposed by Perry (2006, p 241-242):

> *Brainstem*: The brainstem regulates the main survival impulses of the cardiovascular and respiratory systems responsible for survival. Mobilization of trauma responses (fight, flight, and fawn) comes from this part of the brain
>
> *Midbrain*: The mid brain's primary functions are movement and some emotion
>
> *Limbic System*: The limbic system is commonly identified as the site where feelings and impulses to sensations or cues are generated
>
> *Cortex*: The cortex is the large area of the brain where complex cognition like reasoning is centered

The most critical point of Perry's model for guiding decisions in therapeutic techniques is that stress and trauma impact the lower brain functions of regulation and arousal, and stress reactions surpass the higher-level cognitive abilities (2006). Research on therapeutic methodologies supporting NMT's indications of the significance of brainstem regulation has

been ongoing, including a recent longitudinal (7 year) analysis on 677 children who had had early childhood trauma (Cox et at., 2021). Cox identified relationships' role in regulation and connection as having the largest effect compared to more clinical and cognitive-based therapeutic techniques. In more recent research, Perry (2021) has identified regulation through play and movement as techniques that work with the targeted brain functions and parts and to build resilience and capacity.

Subheading

Polyvagal theory was introduced earlier in this paper as an identified theoretical framework guiding this research. In this section, Porges' explanation of the nervous system's functioning responses will provide a scientific lens into patterned trauma responses (Porges, 2011). Congruent with Perry, Porges identifies varying response patterns with different nervous system components and presents compelling evidence that there is a hierarchy in trauma response patterns. Porges identifies the main components of the vagus nerve are the dorsal and ventral vagal as an integral part of the parasympathetic nervous stem, which senses and responds to functions and sensations.

The healthy state of connection and curiosity called ventral vagal state can be interrupted when the sympathetic (fight, flight, fawn) or dorsal (disconnect and freeze) responses are not activated (Dana, 2020; Porges, 2011). This resourceful state of social connection supports healthy and global growth, so varied research and discussions have focused on the interplay between regulation and the science of safety (Dion, 2008; Morton, 2021). Further inquiry has deepened the understanding of how the flexibility to move between ventral vagal and other states (vagal tone) is an indicator of the level of functionality for emotional processing, regulation, and adaptations to distress (Cattaneo, 2021). Cattaneo’s work identifies the significant advantage

there is to have the adaptive strength to respond, process and integrate adversity which is key in building resilience and widening the window of tolerance. The work of Desautels (2023) shares the neuroscience behind polyvagal- based practices internationally to a diverse audience of teachers and counsellors to expand trauma-sensitive and regulatory practices in community and school settings. Desaultes speaks extensively and hopefully on the importance of protecting the nervous systems of children to support them in regulation and growth.

Defensive and Protective Response Patterns

Defensive and protective response patterns are a central experience of chronic trauma (Maté, 2018) and a focus in therapeutic work (Dana, 2018, 2023; Schwartz, 2020b; Schauer & Elbert, 2010). For example, Schauer and Elbert (2010) identify 6 Fs to develop common indicators and language of the fear response experience. Their noted 6 F escalation of responses aligns with Siegel's (2012) work on tolerance and resilience being impacted by states of fear, which will be articulated later in the paper. In Schauer and Elbert's framework, the first response to a distressing event is to freeze to focus on the surprise or threatening sensation or cue. They explain that all senses are attuned to the sounds or sights of the event. The next two stages identified by Schauer and Elbert, are the commonly discussed sympathetic responses of fight and flight, which enact a mobilized escape or battle also described by Porges, 2011. What is clarified in this work by Schauer and Elbert is that the fight response is triggered because there is no escape.

Fright is then the next experience if there is no sense of safety and it is felt as being numb or panicked. If this stage is prolonged, it can become symptomatic through feelings of needing to be vigilant and re-experiencing the scary idea or memory. This connects to the early discussion in this paper on the work by de Young et al (2021), Kazak (2006), Rennick (2014) on adaptive

growth and protective patterns. Flag is the next stage, which is like Porges' dorsal response of immobilization where there is a disconnect to the surroundings (Porges, 2011; Schauer & Elbert, 2010). Schauer & Elbert identify a final response of faint when the body becomes protective and serves as a survival response. According to Schwartz (2020b), understanding this progression of adaptive body-brain patterns is useful in therapeutic practice for identifying the levels and experiences of trauma responses.

The Window of Tolerance: Protective and Risk Factors

Inspired by the research of Marsac et al (2014) in clarifying the need to build a model identifying social, relational, and biological that could buffer and resource children before, during, and after their medical experiences this section explores inner (interoception and neuroplasticity) and outer (attachment) systems protective and risk qualities. The window of tolerance is a therapeutic framework designed by Dan Siegel (2012) to imagine a space that can expand and close based on a person's ease, tolerance, and resilience. Siegel using the imagery of a widening window acknowledges and honours the potential for trauma healing and thriving after experiences of adversity, while acknowledging the negative impacts of past trauma. Siegel uses the window concept to encourage growth of resilience and validate the need for protection and support. This literature review section integrates this concept with risk and protective factors to highlight evidence-based resources for children and their families experiencing PMTS (Morton, 2021; Rennick et al., 2014). This section begins by looking at the inner nervous system and its vulnerabilities and functioning then widens the lens to the unique experiences that impede or build resilience in family systems.

Interoception: Listening to our Hearts

The nervous system processes and understands sensations of protection, safety, vulnerability, and danger through interoception, exteroception and neuroception (Dana, 2023; Porges, 2011). The interplay between the act of scanning, regulatory states and the perceived cues from the inner and outer world is central to Porges' work (Dana, 2023). These unconscious processes are internal scanning systems that can be useful windows into each individual's story of their world (Dion, 2016; Goodyear-Brown, 2024) and common experience for children who have had trauma is to develop a pattern of heightened sensitivity or vigilance to signs of danger (Dion, 2024a). According to polyvagal theory, the brain is wired to search for safety and as McBain (2023) identifies in her research, the root of medical trauma is often inside of the very body that experiences the pain or distress. Listening to our hearts is a barometer to what is going on, but as McBain writes, this is complicated in the experience of medical trauma.

Interoceptive signals are inner perceptions of changes or responses in our bodies, and deficiencies in these sensations can indicate a role of childhood trauma (Dana, 2018). The role of this inner connection is intertwined with regulation of emotions, physical reactions, and responses (Porges, 2011). According to Sara King (2022), interoceptive awareness is the capacity to listen and trust the wisdom of our bodies, which can be a freeing experience that is difficult to find when disrupted by trauma. This inner senses of hunger, respiration, heartbeats, digestion, and other states are interpreters of our experiences of emotions and responses to traumatic exposure (King, 2022). To build a healthy interoceptive relationship with inner somatic cues for clients who have experienced stress and trauma, Porges (2011) and Dana (2018) suggest that the client must be in ventral vagal or a regulated neurological state. (Dana, 2023; Porges, 2011).

The interrelationship of interoceptive processes and emotional responses, such as disconnecting or overreacting to bodily sensations, is essential for counsellors working in trauma

healing to understand and honour. (Dana, 2018; Schwartz, 2020a). As identified earlier in this section, medical exposure has the distinctive characteristic of the potential of trauma triggered by pain or other inner-body sensations due to the unique nature of the sometimes invasive and painful procedures and medical experiences (McBain, 2023; Morton, 2022). Distressing trauma-related experiences may impair interoceptive processing, and response patterns may become over- or under-sensitive, leading to various mental health risks (King, 2022). Threat arousal reactions, like an increased heart rate or feeling dizzy, can be associated with a fixated scan on interoception cues, which can, in turn, interrupt feelings of safety (Dana, 2023). A common experience for children who have had medical trauma is to have a challenging time experiencing interoceptive safety (de Young et al., 2021; Morton, 2022). Goodyear-Brown (2024) utilizes sensory integrative practices that slow the child down and work on integrating blocking and attuning to inner sensations as a method to build resilience in children with trauma through building a safe sense of interoceptive inner experiences.

Neuroplasticity and Trauma Healing

> We carry our trauma stories in the pathways of our nervous systems
>
> (Porges, 2011. p 145)

Research in neuroplasticity, the change and adaptation of neural pathways, provides hope for trauma healing and building resilience (Desaultes, 2023). The NSCDC states the developing child's brain is both sensitive and strong with a rapid growth phase of neural connections which, in the first few years from conception to the age of two, develops over one million connections every second (NSCDC, 2014). The hope of this neuroplasticity or flexibility of the child's nervous system is commonly intertwined into neuroscience-informed therapeutic practices (Desautels, 2023) and will be honoured through this section as an understanding of potential

biological resilience. The adaptability of neurons and brain structures not only explains why adversity has such a powerful impact, but also reinforces how positive experiences can foster healthy growth and development towards building resilience (Peckham, 2023). According to Peckham's research, the transformative potential of neuroplasticity is that neurons and brains adapt and change to our negative and positive experiences (Peckham, 2023). This further illuminates the research on the cumulative and deep impacts of trauma written about earlier in this literature review. It is important to consider that neuroplastic functioning does not distinguish between the varying qualities of experiences; it simply encodes experiences and develops patterns (Peckham, 2023). Dana (2018, 2020) documents her observations of the changing therapeutic relationship with a client when trust builds and a client can identify sensations and experiences of safety in the experience. This relational change reflects the client using their neural networks in a different pattern and encoding new experiences (Doidge, 2012). Consequently, the vulnerable child relies on supportive systems and protective forces to ensure that their neural pathways are immersed in and responding to kindness, love, comfort, and safety (Dana, 2018, 2020; Dion, 2016).

A common saying with counsellor's is 'what fires together wires together' (Hebb, 1949) which alludes to the formation of patterns and associations that strengthen through our lives. Doidge (2012) has been instrumental in aligning research in neuroscience with therapeutic practices with a focus on neuroplasticity. Doidge's research began with a focus on learning disabilities which lead him to the story of Barbara Aerosmith who transformed her own life through the repetitive practice of capacities. Doidge writes and speaks extensively about the academic literature and studies he has been involved in, with a central theme being that connections in the brain circuity can be strengthened. Doidge's book "The Brain That Changes

Itself" includes an overview of success stories of people through time that have changed their abilities, habits, and health through a neuroscientific and therapeutic lens. Doidge's current research in hypnotherapy aligns with a previous topic in this paper where Perry's model identifies brainstem work as integral to impactful in early trauma (Doidge, 2015). Doidge's writing on neuroplasticity provides hope for positive changes and adaptations.

The process of traumatic growth from PMTS can be supported through the hopeful lens of possibility for nervous system plasticity and fluidity. With widening of the window of tolerance and building resilience being a goal, the stories of change, positive growth and trauma wisdom held in the science of neuroplasticity can deepen therapeutic effectiveness.

Attachments as Safety and Hope

> It's easiest to support children and youth through trauma if their caregivers are also well supported." (BC Children's Hospital, n.d)

This component of the literature review highlights the potential for protection in relationships to stress the importance of collective and community support for families and children during medical experiences. According to Perry (2021), a healthy response to stress is to flock to a circle of trusted humans which emphasizes the importance of strong attachments, belonging and collective healing in trauma work. A child's resilience can be nurtured by healthy coping reactions by family members and secure attachment systems (Lieberman et al. 2007). Relationships are the "tectonic plates" that "shape the ground" for children to form lifelong attachments (Maté, 2011, p. 125). Young children rely on their families to interpret and navigate their surroundings and receive care and protection (Perry et al., 2021). A body of empirical evidence identifies the protective role a family can play during medical adversity if members feel

supported and healthy themselves (Hambrick et al., 2021; Rennick et al., 2014). When a child is securely attached, they sense empathy, care, and comfort from the attached figure (Neufeld & Maté, 2005). Attachment theory builds a deeper understanding of the biological and social protective and risk factors in levels of security in relationships (Bergeron, 2017).

The unique collective experience of PMTS acknowledges that any member of the family system including aunties, parents, grandparents, siblings, cousins, and other children can be impacted by vicarious medical trauma which then in turn reduces the support network for the child (Bergeron, 2017; Hearps, 2014; Rennick et al., 2014). Many families cope with medical traumas in a healthy normative range of initial stress (NCTSN, 2018) as they are resourced enough to access support and restore physical and psychological wounds, but some families would benefit from additional support (Rennick et al., 2014). The literature on the parent-child distress cycle in PMTS is extensive (Christofferson et al., 2020) and research identifies numerous risk factors in the family system and their impacts on the individual child and adverse medical experiences can negatively impact the quality of the family member-child relationship (Bergeron, 2017), which can make the dyadic relationships more susceptible to the risks of parental trauma during medical situations (Wizansky & Sadeh, 2021). During the stressful experience of having a child in the hospital, the caregiver's capacity to co-regulate, understand threats, and cope with their own emotions directly influences the extent of the individual child's experience of distress (Rennick et al., 2014). The unavailability and separation of a parent can alter attachment or further entrench insecurity patterns (Lieberman et al. 2011) which is noted in de Young's research (2011) as a common determining risk factors in chronic PMTS in children

who misunderstand the parent's absence from procedures or sleepovers as a betrayal or parental distress as avoidance.

Healthy relationships and positive attachments can enhance resilience and mitigate pain, challenges, and difficulties (Hambrick et al., 2021), which makes the family a potentially protective space for traumatic growth and healing of short-term and chronic PMTS (Rennick et al., 2014). Children with secure attachment patterns are more likely to have the intrinsic trust to seek safety when they perceive or experience danger or threat (Bergeron, 2017). In contrast, insecure attachment patterns—such as anxious, disorganized, and avoidant—are linked to less favourable outcomes in mental wellness and resilience (Lim, 2020). In an empirical analysis of 138 studies, Lim (2020) confirmed these conclusions identifying a strong link between insecure attachment and slow or reduced trauma recovery. Lim's paper focused on the vulnerabilities of family systems in times of crisis such as the lack of protective healthy attachments in early childhood and the impact of trauma on the bonding process, particularly in chronic cases. These results connect to other recommendations prioritizing research in preserving the protective factors of secure and healthy attachments (Hambrick et al., 2021) and building policies and procedures in systems of support that center on providing parents with emotional and therapeutic support to scaffold themselves and their child (Bergeron, 2017).

Families are a central system in a child's life that shapes their relationship health, and they can also perform a critical role in the level of trust and feelings of safety in other relationships (Hambrick et al., 2021). It is important to acknowledge Bronfenbrenner's Ecological Systems work (1979), which provides a framework for understanding how different systems of relationships like schools, places of cultural practice and medical communities also

have a noteworthy influence on children's development. The different relationships a child can have (i.e., teacher, extended family member, coach, friend, religious or spiritual connection) can also be bilaterally impacted by medical trauma exposure, which can compound a child's experience (Kazak, 2006). Behaviours and symptoms found in frequent or chronic experiences of medical trauma can lead to discomfort in others, which can invoke ableism or unsupportive reactions (Perfect et al., 2016; Rennick et al., 2014).

Culture and Diversity Considerations

Health equity is widely discussed in the literature as the risk factors in family experiences become more acknowledged, particularly the roles of human rights, culture, diversity, and intersecting levels of privilege (Christofferson, 2020). Understanding the pediatric medical experience through multiple contexts—from broader systems of cultural ideologies and worldviews to the unique family systems—promotes sensitivity and support systems that directly enhance the mental wellness of children in pediatric care, (Kazak et al., 2006; Masalha et al., 2022). In an extensive literature review on PMTS, Kazak (2006) found that among psychological, preexisting conditions and developmental implications, the social orientation of the family plays an influential role in healthy adaptations. Kazak recommends further research on evidence supported interventions to support the collective family system (Kazak et al., 2006). Many Indigenous cultures value community and collective healing, reflecting the inherent value of providing group therapeutic opportunities (Findlay, 2021). By broadening the scope of therapy and widening the circle of healing to include the family in the therapeutic process, attachments can be strengthened, and the whole family can share in the healing (Rennick et al., 2014). Kazak (2006) identified that interactive family-centered approaches to preventing and supporting PMTS

were more impactful, particularly when the family was scaffolded with psychoeducational information and emotional support. Qualitative data from play therapy sessions with children consistently established the need for safe and caring attachment figures during adverse experiences (Nabors, 2013). These findings point to the need to resource and support parental and family resilience (Kazak, 2006; Nabors, 2013).

In a study by Price et al (2016), findings shared were that the potential for immediate traumatic responses to the family system was within a normal range right after experiencing a stressful event and with therapeutic support there were less long-term impacts. What was notable is that Price's data revealed that when one family member had an ongoing trauma stress response, the whole family was impacted. When this was a parent, the effects were potentially more traumatic to all children, but particularly the child who experienced the procedure, event, or treatment. The main recommendation of this paper was to build in more trauma-informed care and screeners to mitigate the family system impacts of pediatric medical trauma.

Parental and family stress and systemic barriers can make coping with pediatric medical traumatic stress (PMTS) challenging, and data indicates that the recovery process may be interrupted, blocked, or complicated (Bergeron, 2017). Systems of power, including hospitals (Dupuis-Rossi, 2021) and schools (Desaultes, 2023) embed stories and beliefs that have created barriers against cultural healing wisdom (Findlay, 2023). This expanding field of human rights-aligned research creates space for meaningful dialogue on collective trauma and healing by recognizing the significant role of each individual's cultural, ancestral, and family experiences in resilience and trauma (Dupuis-Rossi, 2021; King, 2022). Something to consider is that the child and their family may have a predisposition to trauma responses linked to transgenerational

trauma or their past traumas (Buqué, 2024) or experiences of racism (King, 2022). These additional social vulnerabilities and privileges could significantly impact a child and their family's experience of medical trauma (Masalha, 2022). Marginalized and at-risk families with histories of neglect or racism may lack healthy coping systems (Buqué, 2024) or positive relational health to seek support or advocate for themselves (Findlay, 2023).

Identifying key barriers and resources in PMTS is a growing academic discussion. Parents or caregivers may face challenges interpreting a diagnosis, dealing with ableism from professionals, or experiencing racism or discrimination (McBain,2023; Masalha, 2022). In a study, Hearps (2014) noted that the education level of parents correlated with the trauma experience of both the child and parent after open-heart surgery. Building strengths in all families is a complex goal due to many compounding risk factors, but a resilience-promoting focus on supporting family systems is a starting point (Findlay, 2023; Hearps, 2014).

Somatic Therapeutic Practices: Hands to Heart

> The story of our sympathetic autonomic states is one of searching for our home.
>
> (Desaultes, 2023, p 66)

The intention of this literature review is to collect a wide array of contemporary and ancient trauma healing practices based in research and ancestral wisdom that would support, protect, and honour children and their families who have experienced chronic PMTS. The wider lineage of trauma healing using contemporary therapeutic techniques reflects an integrative approach that acknowledges the work of many minds (Dupuis-Rossi, 2021). The knowledge keepers heart work all intersects in understanding that post traumatic growth is a complex journey (Findlay, 2023). This research could never fully embrace and hold the expansiveness of

this topic, please honour the limitations of this review, and understand that I respect the expansiveness of the work in bringing children home to their own hearts.

Ga'nigoi:yah: Decolonizing Trauma Healing

> Systems change for me really is about opening those pieces up, those things are all there, and connecting to that knowledge because that's knowledge that has carried our ancestors… It is all about peace, it's about love, it's about compassion, it's about all those things that come out of the Ga'nigoi:yah (the Good Mind), that's what the Good Mind is. So, it's bringing back the Good Mind.
>
> (Longboat, as cited in Goodchild, 202, p 88)

> Mainstream therapists, mental health workers, and health care providers are encouraged to honour our wisdom, our forms of resistance, and our strength and to act in solidarity with Indigenous Peoples by engaging in a process of decolonizing their therapeutic practices … (Dupuis-Rossi, 2021, p 115)

Working on the ancestral and unceded territories brings a professional responsibility to research and practice with cultural humility and a strong perspective (Fellner, 2020; Reynolds, 2023). Academics who align social justice with their professional lives seek to challenge the Eurocentric roots of research and therapeutic practices (Mullan, 2023). Disrupting the colonial-infused academic traditions and white-focused perspectives on mental health has inspired a conversation in unlearning and centralizing many forms of voice previously marginalized or erased (King, 2022; Reynolds, 2023). Academia and dominant colonial culture lost what Longboat (2021) means by the Ga'nigoi:yah (the Good Mind) without recognizing how systemic

oppression, even in medical and therapeutic systems, both create(d) and obstruct(ed) trauma healing in Indigenous and marginalized populations (Dupuis-Rossi, 2021). For these academics, healing is a social justice issue and "enacting our ethics" works towards client safety and looks at our balanced and unbalanced power dynamics of colonial hierarchies like education level and role (Reynolds, 2023, p. 43). A mainstream professional conversation has been pushed forward in British Columbia by the Truth and Reconciliation government, which centralizes an awareness of colonial violence, racism and the erasure of cultural identities and healing wisdom (Fellner, 2020). The acknowledgement of colonial violence in research and therapeutic and healing practices ignites the possibility of shifting the field into an active form of decolonization, including understanding the centralized voices in academic writing, honouring Indigenous approaches to healing and care, and honouring traditional knowledge (Fellner, 2020). The importance of circles in healing (Roberts, 2022) and integrating Indigenous values and practices into therapy (Fellner, 2020) is honoured in this component of the literature review with the conscious understanding of how uncomfortable, essential, and meaningful this understanding is in this research.

Globally and through history, Indigenous cultures have developed healing traditions that align with their worldviews, spiritual beliefs, and landscape (Fellner, 2020). Denise Findlay, a Sḵwx̱wú7mesh Úxwumixw practitioner, collaboratively developed a knowledge framework, "Gathering our Medicine," grounded in Indigenous ways of knowing and a calling for decolonizing approaches for mental wellness support in British Columbia and beyond (Findlay, 2023 p 356). This meaningful framework inspires the next component of this literature review and Chapter 3. Ignited by a calling, Findlay shifts the role of a traditional expert to an integrative

and collective support for families and their children. Findlay's work values the ecology of each family and community system, including a roadmap of government and legal publications, including the Government of British Columbia's *Mental Health Roadmap* (Province of British Columbia, 2019), *The Aboriginal Policy and Practices Framework* in British Columbia (Ministry for Child and Family Development, 2013) balanced with Elders voices, collected stories and Indigenous wisdom and knowledge (Findlay, 2023). Including this framework in a literature review is an act of decolonization to align with the deepest intention of Findlay's work to disrupt the traditional power of experts and recenter and honour ancient ways of knowing and healing. "Being and Becoming" is central to the framework with an intentional focus on healing in circles, with professionals creating "affirming spaces" for "safe intersubjective relating" and "lateral kindness" (Findlay, 2023, p 358-359). Findlay's work intentionally shifts away from what Dupuis-Rossi identifies as a traditional approach of pathologizing (2021) and centers on the unique wisdom of the child and the family.

An expanding range of research and conversations is beginning to conceptualize the diverse cultural perspectives and understandings of what a healing space and practice can be (Fellner, 2020; Reynolds, 2023). Bruce Perry, whose research on trauma integrates neurobiology and attachment, acknowledges how many shared Indigenous healing practices honour the embodied experience of trauma and integrate sensory movement, rhythm, song, and art in his most recent publication (Perry, 2021). There is a growth in academic literature supporting practices that were marginalized or discredited in the past, including somatic and sensory-based practices (Dana, 2023, 2018; King, 2022; Schwartz, 2017). Contemporary understandings of trauma healing integrate therapeutic techniques that are interwoven with ancestral wisdom that

value and center creative art (Malchiodi, 2023), play (Dion, 2024a; Goodyear-Brown & Yasenik, 2024), dance (Bernstein, 2019), rhythm (Barry, 2021) and being in collective healing (Bergeron, 2017). With this beautiful collection of mind body modalities, embodied experiences and encoded trauma responses can be accessed beyond the traditional therapeutic use of language and cognition (van der Kolk, 2014). Aligning these techniques with the hopeful scientific knowledge of neuroplasticity and the possibility of change, the approach of the school counsellors, teachers, and other healing practitioners can “buffer and protect” children during times of adversity by slowing down and responding to their trauma stories (Desautels, 2016, p. 6.).

In this important section, research on impactful practices is highlighted, with the hope that support systems—including the education, medical, and community sectors—can use this information to attune, respond, accommodate, and honour trauma growth and healing in children and their families experiencing medical trauma.

Cultivating Trust and Presence: Relationship

> Therapy is always a combination of head and heart, science and art."
>
> (Schwartz, 2021, p. 12)

The foundational role of the therapeutic relationship is the most significant predictor of transformational change in individuals with chronic traumatic stress responses (Dana, 2018; Desautels, 2023; Pearlman. al, 1995). Counsellors are uniquely positioned to focus on building trust and safety in one-on-one settings and the feelings of safety are recognized are a central protective variable throughout data on mental wellness and post traumatic growth (Morton et al, 2022). Over 40 years ago, Rogers began a conversation that continues today about the value of a

person-centered approach to therapy (Rogers, 1980). He promoted a model grounded in empathy, congruence, unconditional positive regard, and presence to build a supportive and healthy therapeutic relationship honouring each unique individual's story and challenges (Weinraub, 2018).

Research on the neurobiology of safety centralizes the importance of building a trusting and stable relationship (Dana, 2018; Porges, 2011), particularly for young children experiencing chronic trauma responses to experiences that they might not have the language or cognitive processing to understand (Dion, 2024b). Children who have experienced medical trauma may have ruptured experiences of safety and attachment (Dion, 2024a; Ramos, 2021; Wizansky & Sadeh). A safe and secure relationship, coupled with active co-regulation, nurtures healthy ways of regulating and coping with change and stress (Lieberman, 2007) and builds healthy cognitive processing and trust in social relationships (Dion, 2024a). Dana (2023), using a polyvagal-informed framework, accentuates the importance of understanding that safety is more than words; it is our nervous systems relating beyond language through cues of sensation, including tone of voice and how actions are perceived in interactions. Cues could include a smell, sound, or a person's appearance (Goodyear-Brown, 2024). A counsellor's own regulated nervous system can serve as an anchor (Dana, 2018), and they can model healthy coping responses through actions, like taking a breath or placing their hands on their heart (Dion, 2024a.). Face-to-face reciprocity, where the counsellor witnesses, nurtures, and holds space for the child, establishes the beginning of a therapeutic bond (Porges, 2011).

There is an expanse of literature documenting the importance of the therapeutic alliance, which is grounded in compassion (Maté, 2018), trust (Schwartz, 2020a), presence (Rogers,

1980), and safe connection (Dana, 2018). There has been a historical power imbalance between mental health professionals and the individuals they support (Dupuis-Rossi, 2021; Price et al., 2016). This inequality in power is especially critical to consider when supporting developmentally vulnerable children who have confusion and unpleasant experiences associated with adults in the helping role compounded with potentially struggling with chronic illness and PMTS (de Young, 2021). A model where the therapeutic experience is co-constructed, and the counsellor is attuning to the client challenges the potential traditional client-professional hierarchy and moves towards a relationship of respect, honour and healing (Reynolds, 2023).

According to the National Child Traumatic Stress Network, a child's responses to medical trauma are often more related to their subjective experience of the medical event rather than its objective severity (2017), so the unique child's story and perspective is something to be held and honoured. In therapy, difficult emotions and painful memories can resurface, making it essential for counsellors to be attuned to, honour, and respect an individual's window of tolerance (Dana, 2018; Dion, 2023; Siegel, 2012). It was important to land in this section on the simple importance of the relationship as a point to begin to inquire into building resilience.

Expressive Play

> "Play therapy techniques complement discoveries in neuroscience for the power of relationships to influence neuronal growth" (Wheeler et al, 2016, p. 32)

Since the year 2000, there has been a surge of neuroscience and attachment driven research guiding therapeutic methods of play therapy (Dion, 2008; Hudspeth, 2016). Data collected has identified that the experience of play increases trust and engaged curiousity which (Wheeler et al, 2016). Play therapy models use the imagination and without requiring the burden

of language, which honours that 60% of communication is nonverbal (Dion, 2024a). Play can be a tool for children to reenact their scary experiences or repeat actions that are unprocessed or implicit and inaccessible with language supported by a safe adult who is listening, and engaging with their stories (Dion, 2016). Play can provide counsellors and families with the children's and siblings' perspectives of medical experiences to guide developmentally and trauma-sensitive information and support (Nabors, 2013).

Children of all developmental phases often chooses to play or enact out their unintegrated trauma with toys, and their play feels like what they need to process (Dion, 2024a; Nabors, 2013) which can provide the counsellor with some insight into their inner feelings and experiences (Goodyear-Brown, 2024). According to Nabors (2013), using play and imagination allows children the space and freedom to express their emotions, reactions and understanding of adverse experiences. The interplay of relationships and imagination can also be a means of expression for children to enact traumatic experiences in their lives with a sense of control (Nabors, 2013), with play as a form of non-verbal communication (Dion, 2008).

Nabors (2013) studied the effectiveness of play therapy with medical trauma and found numerous positive results. An interesting finding in the study was that although the play of children and their siblings who have experienced medical trauma were drawn to playing with medical toys, the control group did not tend to use the specific toys. This research has found that during the play and expression process, there was often a clear lens into concerns and misconceptions of medical experiences (Nabors, 2013). Nabors concluded that with the support of a trained counsellor with a playroom and toys, a child can play out their medical trauma and express their feelings as well as building safety by having a non-judgmental container.

In a meta-analysis of research on play therapy, Bratton (2005) examined 93 studies exploring play as a methodology for children with challenges both emotionally and behaviorally. Relevant to this capstone the Bratton's study found that the use of play with children demonstrated behavioural improvements with an increase in time and an approach that was guided by the child. They state that the quality of being "…uniquely responsive to children's developmental needs…" increases the effectiveness, particularly with younger children (p 385). An unintended result of this wide spanning assessment was the increase in measured changes when attached adults were included in the sessions (Bratton et al., 2005). This finding is in congruence with the section of this paper on the vital role of attachment in building regulatory and emotional resilience.

Rhythm and Integration

> Feelings come and go like clouds in a windy sky. Conscious breathing is my anchor.
>
> (Thich Nhat Hanh, 2008)

In trauma recovery, rhythmic and repetitive experiences can regulate stress responses (Levine, 1997; Perry, 2009). Movement, breathing, and drumming can integrate children's neurological regulation into the present moment through repetition that does not rely on higher cognitive skills (Perry, 2009). Practitioners use ancient breath work practices, such as pranayama and controlled breathing, and have noted the impacts on many clients (Schwartz, 2021). Research data supports the positive effects of supported breathwork as found in two recent clinical studies by Meuret (2020) and Fincham (2023). In Mueret's study, the documented reduction of symptoms of panic, a mobilized trauma response, ranged from 15%-27% in their

population, which is significant. In a cross-country scoping meta-analysis completed by Fincham (2023), the results were more vague, but the scope included a wide range of studies with many variables to code. Fincham's research pointed to slow, diaphragmatic breathing as the most impactful in regulating the nervous system, decreasing the heart rate, and reducing stress responses, which may be particularly beneficial for the physiological and psychological stress of medical trauma (de Young, 2021). According to Schwartz (2021), breath work activates the parasympathetic nervous system and balances stress responses, particularly when experiencing fight, flight, or fear responses. Intentional and deep breathing promotes a calmer and relaxed physical and mental state that widens the tolerance to feeling and potentially processing past and present discomfort and pain (Siegel, 2012).

A regular routine of attuned personal breath work completed by a counsellor models self-regulation and can lead to authentic co-regulation during sessions that could be particularly meaningful to anchor a child or their family who have experienced both the complex and developmental trauma (Desautels, 2023; Schwartz, 2021). Embodied trauma responses of the client and counsellor are frequently expressed in session and can laterally affect the counsellor's own nervous system (Dana, 2018; Dion 2024). Counsellors tuning into their own breath and somatic sensations can further regulate the therapeutic experience by attuning to the present moment and the relationship and experience of the client (Schwartz, 2020a).

Levine (1997), is frequently cited on the value of somatic or body-based movement in integrating embodied trauma. Levine's story he frequently shares of the woman in session running to move through her past trauma was the beginning of his practice of somatic experiencing. Levine uses movement, touch and releasing rhythm to support and integrate

trauma stored in the body. Two qualities of Levine's practice of "somatic experiencing" are pendulation and titration, and together, these work to build the capacity for movement into more painful embodied memories and sensations. *Pendulation* is modelled after the movement of a healthy nervous system that expands and contracts. The practice is to rhythmically move between difficulty and ease using the integration of a calmer state to feel uncomfortable sensations and memories. *Titration* is a slow and responsive technique used to support experiencing tiny amounts of somatic distress while building in breath, movement and sounds to support a release of the held memory. Titration works by pausing and noticing sensations in the body, which Levine suggests will move protective responses that were stopped or frozen in the past. Levine's techniques respect the intricate balance between safe and gradual integration and the discomfort of memories while supporting their client through transformation.

Quantitative research into rhythmic somatic work is increasing, but studies like the one completed by Kuhfuß (2021) articulate the need for more expansive data. Kuhfuß's study identifies some positive impacts of movement and rhythm used to support trauma integration but notes that it is difficult to remove bias when analyzing therapeutic techniques thoroughly. Stuckey (2010) explored data on the modern-day effectiveness of multicultural ancient uses of dance, rhythm, and drumming. Stuckley found that although a vast amount of the literature was theoretical and lacked systematic practices, their more controlled analysis noted positive relationships between dancing, drumming, and singing and mental wellness. Acknowledged by a somatic practitioner and embodied movement writer Rae Johnson (2014), there are challenging incongruities between the field of rhythmic body work and the collection and analysis research. Johnson challenges this barrier and resistance that many somatic practitioners have to engage in

the collection of data and engaging in research by beginning to build a framework to encourage more research to advance and inspire body-based practices.

Collective Healing

> Trauma has the potential to negatively impact a child and caregiver not only individually but also relationally. That is, the relationship or attachment between a caregiver and child could be affected as a consequence of PMTS. Therefore, attachment theory and its concepts provide another useful framework for both conceptualizing and treating PMTS. (Bergeron, 2017, p 123)

Parent-Child Psychotherapy

Aligning with the importance of supporting the child's primary attachments, Bergeron (2017) produced a conceptual analysis of Child-Parent psychotherapy (CPP) as a therapeutic model for impacted parent-child dyads experiencing PMTS. Bergeron's research focused on interventions with families who have high-risk factors that are previously mentioned in this paper, specifically experiences of marginalization, previous trauma, and lack of resources. Developmentally sensitive play is integrated into the CPP model as children and their families work with the guidance of a therapist. Bergeron notes that these integrative techniques and the inclusion of the family system "... bodes well for focusing on the unique struggles that families could encounter with medical trauma." (p 124). Bergeron's work identified the varied protective and growth factors each family has that could be evolved in the therapeutic setting.

Cycling Back

In this chapter, I have consolidated the academic literature to contextualize the multifaceted experiences rooted in pediatric medical trauma, the protective and risk factors and

impactful therapeutic practices for the children and their families. Understanding the complexity of pediatric medical traumatic stress responses is meaningful for counsellors in communities and schools to provide meaningful support and avoid misinterpretations of the trauma response patterns (Desaultes, 2023; Dion, 2024a). The unique experience of medical trauma is that the stressors may come from inside or outside their body (McBain, 2023) so having a deep comprehension of this experience and ongoing interoception and exteroception of safety in sensations and experiences is fundamental for professionals working towards trauma sensitivity (Morton et al, 2022). Integrative approaches and practices informed by the neurobiology of development (de Young, 2011), attachment and safety (Dana, 2020; Goodyear-Brown & Yasenik, 2024) with a focus on the unique story, culture and wisdom of the child and their family (Findlay, 2023) move towards the potential for building resilience and walking alongside children to find their trauma wisdom and healing. Infusing somatic techniques into counselling sessions supports children in making healthy connections with their inner sensations and a deeper sense of safety and awareness (Dana, 2020; Levine, 1997; Perry, 2021).

Chapter 3: Summary, Recommendations and Conclusions

Summary

The intention of this Capstone was to resource and inform counsellors working with children who have or are about to have potential traumatic exposure to medical events or procedures. From the literature review, I propose ***Hands to Heart***, a collection of resources and practices for counsellors working in a variety of settings who may work with children who have experience with medical trauma or are preparing to have a procedure or treatment.

Somatic practices of integrative breath work, rhythm, play, and movement come from ancestral lineages carried forward with story (Dion, 2024b; Findlay, 2023). Ancestral ways of knowing and healing are beginning to be documented and shared instead of destroyed and erased as the decolonization of therapeutic techniques becomes a louder and more respected (again) collective of stories (Dupuis-Rossi, 2021; Mullan, 2023). Polyvagal theory and somatic trauma research have centralized new language and frameworks that align with these lineages and validate them through scientific research and colonial methodologies (Dana, 2023; Johnson, 2022; Perry et al, 2021). The neuroscience of trauma healing is a commonly researched topic aligned with impactful counselling practices that support metabolizing, processing, and embodying their stories of trauma and resilience (Dion, 2024a; Perry, 2006, 2009). This wisdom is rooted in building safety to come home to our bodies, schools, and experiences (Desautels, 2023).

When we inform our practice with polyvagal theory and the neuroscience of trauma and resilience, we can work with children with a focus on interoceptive and exteroceptive safety, social connection, and co-regulation (Dana, 2021; Porges, 2022; Porges 2011: van der Kolk,

2015). Creating therapeutic space and relationships with children that have had medical experiences potentially leading to somatic danger and interoceptive cues of risk is foundational (Morton, 2021). Focusing on trust and integrating sensitometer experiences, play and feelings of safety can regulate their nervous systems (Perry, 2010) and build trust (Dion, 2024a). The resources and practices I provide in ***Hands to Heart*** can support children with chronic PMTS patterns to move from hypo and hyper (or fight/flight/fawn/freeze) aroused states by attuning to the supportive therapeutic techniques inspired by polyvagal informed play therapists Dion and Goodyear-Brown.

Recommendations

The presentation ***Hands to Heart (***see Appendix A) begins with honouring unseeded territories, acknowledging lineages and setting the intention of honouring voices of research and practice that intersect and center on the importance of healthy and strong attachment relationship systems to support inner nervous system resilience and regulation in your children who have experienced medical adversity. It is then broken down into two sections. The first section contextualizes and provides a brief history of the unique experiences, risks, and trauma response patterns of pediatric medical trauma and the second section offers some therapeutic practices.

Section one orients the audience to the recent acknowledgment of the building academic focus in research and discussion on pediatric medical trauma and the roots of research through a framework of key developmental vulnerabilities and significant concerns. A wide range of potential trauma exposures are provided to highlight the point made by the National Child Traumatic Stress Network (2018) and echoed throughout research that traumatic response patterns are unique to the child's perspective and narrative in comparison to what an adult may

consider as a traumatic experience. An example of this is that an adult may be concerned about the life-threatening surgery, but the child may re-experience the pain or unfamiliarity of a seemingly benign experience like feeling hungry after surgery or being bumped accidentally by a nurse. This component also raises the importance of developmental phases and cognitive capacities in processing and integrating traumatic experiences. Developing language and cognitive skills are important barriers for counsellors to consider.

The central slides are important to pause on as they integrate the various risk and protective factors that can either broaden or narrow a child's window of tolerance and align it with developmental trauma research. Although this is not comprehensive, it acknowledges the child's unique neurobiology and extends outward to include their attachment security, family system patterns and the influences of culture, privilege, and diversity on their experience of trauma and resilience. Some influential trauma researchers and play therapists are named highlighting their critical points of research to identify the sensitive and important work of counsellors working with medical trauma.

The second half of the presentation lands on four key somatic offerings informed by the work of polyvagal and attachment informed counsellors Lisa Dion, Paris Goodyear-Brown and Deb Dana and family therapist M. Bergeron. The first component begins with anchoring the nervous system with co-regulation and relationship. Next, was the concept of interoception with a sensory integrative technique for young children used a guide to listening to their own heart and body sensations. Following this, was the simple concept of using a child's play as the compass to conceptualize the case pathway. Lastly, the therapeutic lens widens to the outer

systems of support with a suggestion of inviting families into session for modelling and scaffolding.

Limitations to this Capstone

Although there has been a rise in literature on PMTS, hurdles during the research process for this capstone were the limited focus on early developmental trauma and lack of cohesive research using common language. A gap in research on early pediatric experiences is a historic challenge identified by de Young et al. (2021). As recognized in this paper, research on children with less language and cognitive abilities remains sparse (Stanzel et al., 2022), even though according to numerous trauma researchers including Perry (2021), early trauma can be significantly more of a lifelong challenge. I found it challenging to find peer reviewed literature that connected the delayed impacts on pediatric medical events with impactful techniques for children and their families and acknowledge the limitations of this in my capstone. In reading McBain's (2023) paper, aptly titled "Breaking Silos to Address Medical Trauma: The Need for Integration of Trauma and Health Psychology Training", this academic tension I felt was validated. This is a topic of research with many centers and this capstone is an attempt to collect and integrate ideas from a spectrum of fields.

I hope to see a continued momentum of research on developmental vulnerabilities and symptoms being targeted with effective and trauma- sensitive therapeutic techniques that provide meaningful resources outside of the medical field. My recommendation is that a wider field of discussion is generated bringing the medical and mental health fields of practices together. Play

therapy is a meaningful place to begin as the foundation is built on a child-centered developmentally sensitive set of practices. In her recent podcast, Dion (2024) invites play therapists to consider the impacts of medical trauma on their clients and introduces some of the key symptoms unique to this experience. Research aligning with these current conversations are slowly emerging to focus on this specific population with these unique symptoms of trauma. As discussed earlier in this capstone, the wide array of variables makes therapeutic data collection challenging, but longitudinal data like the early work of ACEs could drive future research and practices that parallel the rapid medical advances in childhood illnesses and diseases. An integrative framework including larger sample sizes, cultural and diversity considerations and developmentally sensitive screening and data collection is beginning across multiple fields, and it is my hope that common threads are integrated together to further guide our practices.

Conclusions

Within this capstone, I have created a fluid source of information and resources called ***Hands to Heart*** to be shared across modalities as a video, individual slides, a component of my professional website and audio for my upcoming podcast. My heartfelt hope is that this piece of work provides a resource of insights and informative offerings for counsellors to inform and deepen their own practice in working with this specialized population of youth in schools and the community. As the presentation identifies each child's varying gender identities, worldviews, and experiences of protective and risk facts indicate to how important it is to inform our practice by the gentle art of listening and walking alongside each child honouring their path. Our own hearts are where we can begin to support children on the hopeful journey of finding their own trauma wisdom. My dream is to inspire others in finding their potential to use their own nervous systems

to co-regulate and support the widening of children's unique windows of tolerance. In children who have patterns of protection built up through medical trauma, the trust and safety in their relationships with inner sensations and external experiences is the latch to the window. This is where they can begin to embody their own healing, wire new patterns, share their stories, and understand and sit with their own nervous system patterns.

References

Aboriginal Policy and Practice Framework in British Columbia (2013), www2.gov.bc.ca/assets/gov/family-and-social-supports/indigenous-cfd/abframework.pdf. Accessed 27 July 2024.

American Academy of Pediatrics. (2012).“Early childhood adversity, toxic stress, and the role of the pediatrician: Translating developmental science into lifelong health.” *Pediatrics*, vol. 129, no. 1, 1 Jan. 2012, https://doi.org/10.1542/peds.2011-2662.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing

BC Children's Hospital. (n.d.). *Trauma*. BC Children's Hospital. Retrieved August 12, 2024, from http://www.bcchildrens.ca/health-professionals/learning-development/resources/trauma

Ben Ari, A., Margalit, D., Udassin, R., & Benarroch, F. (2019). Traumatic Stress among School-Aged Pediatric Surgery Patients and Their Parents. *European journal of pediatric surgery : official journal of Austrian Association of Pediatric Surgery ... [et al] = Zeitschrift fur Kinderchirurgie*, *29*(5), 437–442. *https://doi.org/10.1055/s-0038-1660449*

Bergeron, M. A. Y. (2017). Factors that Support the Use of Child–Parent Psychotherapy as an Intervention for Child–Parent Dyads Exposed to Pediatric Medical Traumatic Stress. Clinical Social Work Journal, 45(1). https://doi.org/10.1007/s10615-016-0585-2

Bernstein, B. (2019). Empowerment-Focused Dance/Movement Therapy for Trauma Recovery. *American Journal of Dance Therapy*, *41*(2), 193–213. https://doi.org/10.1007/S10465-019-09310-W

Bombay, A., M.Sc, Matheson, K., PhD., & Anisman, H., PhD. (2009/11//). Intergenerational Trauma: Convergence of Multiple Processes among First Nations peoples in Canada. Journal of Aboriginal Health, 5(3), 6-47. https://www.proquest.com/scholarly-journals/intergenerational-trauma-convergence-multiple/docview/1138545041/se-2

Bowlby, J. 1969/1982. *Attachment and loss volume 1: Attachment.* New York: Basic Books.

Bowlby, J. 1973. *Attachment and loss volume 2: Separation: Anxiety and anger.* New York: Basic

Bratton, S. C., Ray, D., Rhine, T., & Jones, L. (2005). The Efficacy of Play Therapy With Children: A Meta-Analytic Review of Treatment Outcomes. *Professional Psychology: Research and Practice, 36*(4), 376-390. https://doi.org/10.1037/0735-7028.36.4.376

Bronfenbrenner, U. (1979). The ecology of human development: Experiments by nature and design. *Cambridge, MA: Harvard University Press.*

Brown, E. A., De Young, A., Kimble, R., & Kenardy, J. (2019). Impact of Parental Acute Psychological Distress on Young Child Pain-Related Behavior Through Differences in Parenting Behavior During Pediatric Burn Wound Care. *Journal of Clinical Psychology in Medical Settings, 26*(4), 516-529. https://doi.org/10.1007/s10880-018-9596-1

Buqué, M. (2024). *Break the cycle: A Guide to Healing Intergenerational Trauma.* Random House.

Burke, C. A. (2010). Mindfulness-Based Approaches with Children and Adolescents: A Preliminary Review of Current Research in an Emergent Field. *Journal of Child and Family Studies, 19*(2), 133-144. https://doi.org/10.1007/s10826-009-9282-x

Burkley, M., & Ali, T. (2020). Addressing Adverse Childhood Experiences (ACEs) in BC: Practical Approaches | British Columbia Medical Journal. *BC Medical Journal*. Retrieved July 28, 2024, from https://bcmj.org/articles/addressing-adverse-childhood-experiences-aces-bc-practical-approaches

Caldwell, C., & Fuchs, T. (2013). *Body, Movement and Dance in Psychotherapy On body memory and embodied therapy*. https://doi.org/10.1080/17432979.2013.775968

Cattaneo, L., (2021) Is Low Heart Rate Variability Associated With Emotional Dysregulation Sep; 11(9): 872. Published online 2021 Aug 31. https://doi.org/10.3390%2Fjpm11090872

Christofferson, J. L., Okonak, K., Kazak, A. E., Pierce, J., Kelly, C., Schifano, E., Sciolla, J., Deatrick, J. A., & Alderfer, M. A. (2020). Family consequences of potentially traumatic pediatric medical events: Implications for trauma-informed care. *Journal of Family Psychology, 34*(2), 237-246. https://doi.org/10.1037/fam0000597

Cox, A., Perry, B. D., & Frederico, M. (2021). Resourcing the System and Enhancing Relationships: Pathways to Positive Outcomes for Children Impacted by Abuse and Neglect. *Child Welfare, Suppl.Special Issue: Global Perspectives on Child Protection and Neglect, 98*(6), 177-202. https://www.proquest.com/scholarly-journals/resourcing-system-enhancing-relationships/docview/2509380973/se-2

Coyne, I., & Kirwan, L. (2012). Ascertaining children's wishes and feelings about hospital life. *Journal of Child Health Care*, *16*(3), 293–304. https://doi.org/10.1177/1367493512443905

Dana, D. (2018). *The polyvagal theory in therapy: Engaging the rhythm of regulation*. W. W. Norton & Company.

Dana, D. (2020). *Polyvagal flip chart: Understanding the Science of Safety.* W. W. Norton & Company.

Dana, D. (2023). *Anchored: How to connect with yourself and others in a chaotic world.* North Atlantic Books.

DeMaso, D. R., Labella, M. H., Taylor, G. A., Forbes, P. W., Stopp, C., Bellinger, D. C., Rivkin, M. J., Wypij, D., & Newburger, J. W. (2014). Psychiatric Disorders and Function in Adolescents with d-Transposition of the Great Arteries. *The Journal of Pediatrics*, *165*(4), 760–766. https://doi.org/10.1016/j.jpeds.2014.06.029

Desautels, L. L. (2023). *Intentional Neuroplasticity*. Wyatt-MacKenzie Publishing.

de Young, A. C., Kenardy, J. A., & Cobham, V. E. (2011). Trauma in Early Childhood: A Neglected Population. *Clinical Child and Family Psychology Review*, *14*(3), 231–250. https://doi.org/10.1007/S10567-011-0094-3

de Young, A. C., Paterson, R. S., Brown, E. A., Egberts, M. R., le Brocque, R. M., Kenardy, J. A., Landolt, M. A., Marsac, M. L., Alisic, E., & Haag, A. C. (2021). Topical Review: Medical Trauma during Early Childhood. In Journal of Pediatric Psychology (Vol. 46, Issue 7, pp. 739–746). Oxford University Press. https://doi.org/10.1093/jpepsy/jsab045

Dion, L. (2008). *What is synergetic play therapy®?*. Synergetic Play Therapy Institute. https://synergeticplaytherapy.com/what-synergetic-play-therapy/

Dion, L. (2016). How a tragedy inspired a new play therapy model. *Synergetic Play Therapy Institute*. Retrieved from http://synergeticplaytherapy.com

Dion, L., (2024 a). *Medical Trauma: Special Episode*. Lessons from the playroom [Audio podcast]. Play Therapy Community. Apple Podcasts. https://podcasts.apple.com/al/podcast/lessons-from-the-playroom/id1208265163

Dion, L. (2024 b). Exploring neurobiological links between Synergetic Play Therapy & Art psychotherapy. Synergetic Play Therapy Institute. https://synergeticplaytherapy.com/exploring-neurobiological-links-between-synergetic-play-therapy-and-art-psychotherapy/

Doidge, Norman. (2010). The brain that changes itself : stories of personal triumph from the frontiers of brain science. Carlton North, Vic. :Scribe Publications,

Doidge, Norman. (2012) The Brain that Changes Itself: Neuroplasticity in Clinical Practice. [Video/DVD] Psychotherapy Networker. https://video.alexanderstreet.com/watch/the-brain-that-changes-itself-neuroplasticity-in-clinical-practice

Doidge, Norman. (2015). Hypnosis, Neuroplasticity, and the Plastic Paradox. *American Journal of Clinical Hypnosis*, *57*(3), 349–354. https://doi.org/10.1080/00029157.2015.985572

Dupuis-Rossi, R. (2021). The Violence of Colonization and the Importance of Decolonizing Therapeutic Relationship: The Role of Helper in Centring Indigenous Wisdom. *International Journal of Indigenous Health*, *16*(1). https://doi.org/10.32799/IJIH.V16I1.33223

Edwards-Leeper, Laura. (2016) *Affirmative Care of TGNC Children and Adolescents*. American Psychological Association

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The adverse childhood experiences (ACE) study. *American Journal of Preventive Medicine*, *14*(4), 245-258. https://doi.org/10.1016/S0749-3797(98)00017-8

Fellner, K. D., Ansloos, J., Ouellette, N. L., & Villebrun, G. D. (2020). Reconciling Relations: Shifting Counselling Psychology to Address Truth and Reconciliation. *Canadian Journal of Counselling and Psychotherapy*, *54*(4), 638–660. https://doi.org/10.47634/cjcp.v54i4.70661

Fincham, G. W., Strauss, C., Montero-Marin, J., & Cavanagh, K. (2023). Effect of Breathwork on Stress and Mental health: a meta-analysis of randomised-controlled Trials. *Scientific Reports*, *13*(1). https://doi.org/10.1038/s41598-022-27247-y

Findlay, D. (2023). Gathering our medicine: strengthening and healing kinship and community. *AlterNative*, *19*(2), 356–365. https://doi.org/10.1177/11771801231168178

Fuld, S. (2018). Autism Spectrum Disorder: The Impact of Stressful and Traumatic Life Events and Implications for Clinical Practice. *Clinical Social Work Journal*, *46*, 210–219. https://doi.org/10.1007/s10615-018-0649-6

Goodchild, Melanie. "Relational Systems thinking." *Journal of Awareness-Based Systems Change*, vol. 1, no. 1, 25 Feb. 2021, pp. 75–103, https://doi.org/10.47061/jabsc.v1i1.577

Goodyear-Brown, P., & Yasenik, L. (2024). *Polyvagal power in the playroom: A guide for play therapists*. Routledge/Taylor & Francis Group

Goodyear-Brown, P. (2024). Trauma and play therapy: Helping children heal. Retrieved from https://www.parisgoodyearbrown.com/store/p/trauma-and-play-therapy-helping-children-heal:citation[oaicite:0]{index=0}&#8203

Government Of British Columbia. (2019). *A Pathway to Hope*. Government of British Columbia. https://www2.gov.bc.ca/assets/gov/british-columbians-our-governments/initiatives-plans-strategies/mental-health-and-addictions-strategy/bcmentalhealthroadmap_2019web-5.pdf

Haag, Ann-Christin, and Markus A. Landolt. "Young Children's Acute Stress After a Burn Injury: Disentangling the Role of Injury Severity and Parental Acute Stress." *Journal of Pediatric Psychology*, vol. 42, no. 8, 2017, pp. 861–870, https://doi.org/10.1093/jpepsy/jsx059.

Hambrick, E. P., Seedat, S., & Perry, B. D. (2021). Editorial: How the Timing, Nature, and Duration of Relationally Positive Experiences Influence Outcomes in Children With Adverse Childhood Experiences. In *Frontiers in Behavioral Neuroscience* (Vol. 15). Frontiers Media S.A. https://doi.org/10.3389/fnbeh.2021.755959

Hanh, T. N. (2008). *Peace is every breath: A practice for our busy lives.* HarperOne.

Hanna, T. (1970). *Bodies in revolt: A primer in somatic thinking.* Holt, Rinehart and Winston

Healing Medical Trauma in Play Therapy - BC Play Therapy Association. (2022, October 18). BC Play Therapy Association. https://www.bcplaytherapy.ca/events/healing-medical-trauma-in-play-therapy-playing-perfectly-a-play-therapists-guide-for-working-with-ocd-in-play-therapy/

HealthLink BC. (n.d.). *Understanding How Adverse Childhood Experiences (ACEs) Can Affect Children | HealthLink BC*. Www.healthlinkbc.ca. https://www.healthlinkbc.ca/health-topics/understanding-how-adverse-childhood-experiences-aces-can-affect-children

Hearps, S. J., McCarthy, M. C., Muscara, F., Hearps, S. J. C., Burke, K., Jones, B., & Anderson, V. A. (2014). Psychosocial risk in families of infants undergoing surgery for a serious congenital heart disease. *Cardiology in the Young*, *24*(4), 632–639. https://doi.org/10.1017/S1047951113000760

Hebb, D. O. (1949). *The organization of behavior: A neuropsychological theory*. New York: Wiley. ISBN: 0-8058-4300-0

Hudspeth, E. F. (2016). Play therapy applications with diverse cultures.*International Journal of Play Therapy, 25*(3), 113. https://doi.org/10.1037/pla0000030

Johnson, R. (2014). Somatic psychotherapy and research: Walking the common ground. *Body, Movement and Dance in Psychotherapy*, *9*(2), 82–92. https://doi.org/10.1080/17432979.2014.893449

Johnson, R. (2022). *Somatic integration: Embodied social justice.* North Atlantic Books

Kazak, A. E., Kassam-Adams, N., Schneider, S., Zelikovsky, N., Alderfer, M. A., & Rourke, M. (2006). An integrative model of pediatric medical traumatic stress. *Journal of Pediatric Psychology*, *31*(4), 343–355. https://doi.org/10.1093/jpepsy/jsj054

King, S. (2022). The "Science of Social Justice": An Interdisciplinary Theoretical Framework Grounded in Neuroscience, Education, and Anthropology towards Healing Intergenerational Trauma. In *Journal of Contemplative Inquiry* (Vol. 9, Issue 1). https://digscholarship.unco.edu/jociAvailableat:https://digscholarship.unco.edu/joci/vol9/iss1/14

King, T. (2011). *The truth about stories: A native narrative.* House of Anansi Press.

Kolaitis, G. , & Olff, M. (2017). Psychotraumatology in Greece. *European Journal of Psychotraumatology, 8*(Suppl. 4), Article 135175. https://doi.org/10.1080/20008198.2017.1351757

Kuhfuß, M., Maldei, T., Hetmanek, A., & Baumann, N. (2021). Somatic experiencing – effectiveness and key factors of a body-oriented trauma therapy: a scoping literature review. *European Journal of Psychotraumatology*, *12*(1). https://doi.org/10.1080/20008198.2021.1929023

Levine, P. A. (2015). *Waking the tiger: Healing trauma (25th anniversary ed.)*. North Atlantic Books.

Lieberman, A. F., & Harris, W. W. (2007). Still Searching for the Best Interests of the Child. *The Psychoanalytic Study of the Child*, *62*(1), 211–238. https://doi.org/10.1080/00797308.2007.11800790

Lim, B. H., Hodges, M. A., & Lilly, M. M. (2020). The Differential Effects of Insecure Attachment on Post-Traumatic Stress: A Systematic Review of Extant Findings and Explanatory Mechanisms. *Trauma, Violence, & Abuse*, *21*(5), 1044-1060. https://doi.org/10.1177/1524838018815136

Liu, H., Petukhova, M. V., Sampson, N. A., Aguilar-Gaxiola, S., Alonso, J., Andrade, L. H., Bromet, E. J., de Girolamo, G., Haro, J. M., Hinkov, H., Kawakami, N., Koenen, K. C., Kovess-Mora, V., Navarro-Mateu, F., O'Neill, S., Piazza, M., Posada-Villa, J., Scott, K. M., Shahly, V., Stein, D. J., … Kessler, R. C. (2017). Association of DSM-IV posttraumatic stress disorder with traumatic experience type and history in the World

Health Organization World Mental Health Surveys. JAMA Psychiatry, 74(3), 270-281. https://doi.org/10.1001/jamapsychiatry.2016.3783

Locatelli, M. G. (2019, August 22). Play Therapy Treatment of Pediatric Medical Trauma: A Retrospective Case Study of a Preschool Child. *International Journal of Play Therapy*. Advance online publication. http://dx.doi.org/10.1037/pla0000109

Malchiodi, Cathy A. *Handbook of Expressive Arts Therapy*. The Guilford Press, 2023.

Malkemus, S. A., & Smith, J. F. (2021). Sexual Disembodiment: Sexual Energy, Trauma, and the Body. Journal of Humanistic Psychology, 61(1), 1–26. https://doi.org/10.1177/0022167821996144

Marsac, M. L., Kassam-Adams, N., Delahanty, D. L., Widaman, K., & Barakat, L. P. (2014). Posttraumatic Stress Following Acute Medical Trauma in Children: A Proposed Model of Bio-Psycho-Social Processes During the Peri-Trauma Period. *Clinical Child and Family Psychology Review*, *17*(4), 399–411. https://doi.org/10.1007/s10567-014-0174-2

Masalha, B., Ben-David, S., Benarroch, F., & Ben-Ari, A. (2022). Intercultural Differences in the Development of Pediatric Medical Traumatic Stress (PMTS) in Children Following Surgical Hospitalisation. *Children*, *9*(4). https://doi.org/10.3390/children9040526

Maté, D. G. (2018). *In the realm of hungry ghosts.* Vermilion.

McBain, S. (2022, Sep). Recognizing Medical Trauma: HOW THERAPISTS CAN INTERVENE. *Psychotherapy Networker, 46*, 15-17. https://www.proquest.com/magazines/recognizing-medical-trauma-how-therapists-can/docview/2712896365/se-2

McBain, S. A., Stoycos, S., & Doenges, T. (2023). Breaking Silos to Address Medical Trauma: The Need for Integration of Trauma and Health Psychology Training. *Journal of Clinical*

Psychology in Medical Settings, *30*(2), 380–386. https://doi.org/10.1007/s10880-022-09897-2

Meuret, A. E., Rosenfield, D., & Schneider, R. (2020). The impact of breath training on emotional regulation in children: A randomized controlled trial. *Journal of Clinical Child & Adolescent Psychology*, 49(5), 718-732. https://doi.org/10.1080/15374416.2020.1795187

Morton, L., & Livecchi, T. (2024). *Healing Hearts and Minds A holistic approach to coping well with congenital heart disease.* Oxford University Press. https://doi.org/10.1093/oso/9780196572870.001.0001

Morton, L., Cogan, N., Kolacz, J., Calderwood, C., Nikolic, M., Bacon, T., Pathe, E., Williams, D., & Porges, S. W. (2022). A New Measure of Feeling Safe: Developing Psychometric Properties of the Neuroception of Psychological Safety Scale (NPSS). *Psychological Trauma: Theory, Research, Practice, and Policy*, *16*(4), 701–708. https://doi.org/10.1037/TRA0001313

Morton, L. (2023). *"I was born with a deadly heart condition, but it was medical trauma that left the deepest scars."* Stylist.co.uk. https://www.stylist.co.uk/health/mental-health/liza-morton-heart-condition-medical-trauma/755302

Mullan, J. (2023). *Decolonizing therapy: oppression, historical trauma, and politicizing your practice.* W. W. Norton & Company.

Nabors, L., Bartz, J., Kichler, J., Sievers, R., Elkins, R., & Pangallo, J. (2013). Play as a mechanism of working through medical trauma for children with medical illnesses and

their siblings. *Issues in Comprehensive Pediatric Nursing*, *36*(3), 212–224. https://doi.org/10.3109/01460862.2013.812692

Neufeld, G., & Maté, G. (2005). *Hold On to Your Kids: Why Parents Need to Matter More Than Peers.* Ballantine Books.

Ogden, P. (2018). The role of the body in fostering resilience: a Sensorimotor Psychotherapy perspective. *Body, Movement and Dance in Psychotherapy*, *13*(4), 225–233. https://doi.org/10.1080/17432979.2018.1467344P

Pearlman, L. A., & mac Ian, P. S. (1995). Vicarious Traumatization: An Empirical Study of the Effects of Trauma Work on Trauma Therapists. *Professional Psychology: Research and Practice*, *26*(6), 558–565. https://doi.org/10.1037/0735-7028.26.6.558

Peckham, H. (2023). Introducing the Neuroplastic Narrative: a non-pathologizing biological foundation for trauma-informed and adverse childhood experience aware approaches. *Frontiers in Psychiatry*, *14*. https://doi.org/10.3389/fpsyt.2023.1103718

Perfect, M. M., Turley, M. R., Carlson, J. S., Yohanna, J., Pfenninger, M., & Gilles, S. (2016.). School-Related Outcomes of Traumatic Event Exposure and Traumatic Stress Symptoms in Students: A Systematic Review of Research from 1990 to 2015. *School Mental Health*, *8*. https://doi.org/10.1007/s12310-016-9175-2

Perry, B. D. (2006). The neurosequential model of therapeutics: Applying principles of neuroscience to clinical work with traumatized and maltreated children . In N. Boyd Webb (Ed.), *Working with traumatized youth in child welfare* (pp. 27–52). New York. Guilford Press.

Perry, B. D. (2009). Examining Child Maltreatment Through a Neurodevelopmental Lens: Clinical Applications of the Neurosequential Model of Therapeutics. *Journal of Loss and Trauma*, *14*(4), 240–255. https://doi.org/10.1080/15325020903004350

Perry, B. D., & Winfrey, O. (2021). *What happened to you?: Conversations on trauma, resilience, and healing*. Flatiron Books.

Peterson, S. (2018, March 19). *Effects.* The National Child Traumatic Stress Network. https://www.nctsn.org/what-is-child-trauma/trauma-types/medical-trauma/effects

Peterson, S. (2018b, May 25). *Medical trauma*. The National Child Traumatic Stress Network. https://www.nctsn.org/what-is-child-trauma/trauma-types/medical-trauma

Petzschner, F. (2022) Interoception. Scholarpedia, 17(5):55569.

Porges, S. W. (2001). The polyvagal theory: Phylogenetic substrates of a social nervous system. *International Journal of Psychophysiology*, 42(2), 123-146. https://doi.org/10.1016/S0167-8760(01)00162-3

Porges, S. W. (2011). *The polyvagal theory: Neurophysiological foundations of emotions, attachment, communication, and self-regulation*. Norton. https://www.proquest.com/trade-journals/polyvagal-theory-neurophysiological-foundations/docview/869985636/se-2

Porges S. W. (2022) Polyvagal Theory: A Science of Safety. *Front Integrated Neuroscience* 16:871227. doi: 10.3389/fnint.2022.871227

Price, J., Kassam-Adams, N., Alderfer, M. A., Christofferson, J., & Kazak, A. E. (2016). Systematic Review: A Reevaluation and Update of the Integrative (Trajectory) Model of

Pediatric Medical Traumatic Stress. *Journal of pediatric psychology*, *41*(1), 86–97. https://doi.org/10.1093/jpepsy/jsv074

Ramos, N. (2021). Medical trauma in LGBTQIA youth: Adapting trauma-informed affirming clinical practices. *Pediatric Annals*, *50*(9), e379–e383. https://doi.org/10.3928/19382359-20210818-02

Rennick, J. E., Dougherty, G., Chambers, C., Stremler, R., Childerhose, J. E., Stack, D. M., Harrison, D., Campbell-Yeo, M., Dryden-Palmer, K., Zhang, X., & Hutchison, J. (2014). Children's psychological and behavioral responses following pediatric intensive care unit hospitalization: the caring intensively study. *BMC Pediatrics*, *14*(1), 1–11. https://doi.org/10.1186/1471-2431-14-276

Reynolds, V. (2023). An Ethical Stance for Justice-Doing in Community Work and Therapy. *Journal of Systemic Therapies*, *42*(1), 40–55. https://doi.org/10.1521/JSYT.2023.42.1.40

Rogers, C. R. (1980). *A Way of Being*. Houghton Mifflin.

Roberts, C. (2022, August 10). *Circle work: Being together as a relation.* Carolyn Roberts. https://www.carolynroberts.net/single-post/copy-of-circle-work-being-together-as-a-relation

Salmon, K., & Bryant, R. A. (2002). Posttraumatic stress dis-order in children: The influence of developmental factors. *Clinical Psychology Review,* 22(2), 163–188. 10.1016/S0272-7358(01)00086-1

Sameroff, A. (2010). *A Unified Theory of Development: A Dialectic Integration of Nature and Nurture*.

Schauer, M., & Elbert, T. (2010). Dissociation following traumatic stress: Etiology and treatment. *Zeitschrift Für Psychologie/Journal of Psychology, 218*(2), 109-127. https://doi.org/10.1027/0044-3409/a000018

Schwartz, A. (n.d.). Treating Complex PTSD and Dissociation with Integrated EMDR Therapy: A Resilience Informed Approach. In *Dr. Arielle Schwartz*. Retrieved August 13, 2024, from https://drarielleschwartz.com/wp-content/uploads/2014/08/Complex-PTSD-and-Resilience-2017.pdf

Schwartz, A. (2020a). *The post-traumatic growth guidebook: Practical mind-body to heal trauma, Foster Resilience and awaken your potential*. PESI Publishing & Media.

Schwartz, A. (2020b). *A practical guide to complex PTSD: Compassionate strategies to begin healing from childhood trauma*. Rockridge Press.

Schwartz, Arielle. (2021). *The Complex PTSD Treatment Manual : An Integrative, Mind-Body Approach to Trauma Recovery.* Pesi.

Siegel, D. J. (2012). *The developing mind: How relationships and the brain interact to shape who we are (2nd ed.)*. Guilford Press.

Škorjanc, J., Hausmeister, I. K., & Klašnja, S. (2021). Pediatric medical stress and trauma. *Psihološka Obzorja*, *30*, 162–170. https://doi.org/10.20419/2021.30.542

Stanzel, A., & Sierau, S. (2022). Pediatric Medical Traumatic Stress (PMTS) following Surgery in Childhood and Adolescence: a Systematic Review. *Journal of Child and Adolescent Trauma*, *15*(3), 795–809. https://doi.org/10.1007/s40653-021-00391-9

Stuckey, H. L., & Nobel, J. (2010). The Connection Between Art, Healing, and Public Health: A Review of Current Literature. *American Journal of Public Health*, *100*(2), 254–263. https://doi.org/10.2105/ajph.2008.156497

van der Kolk, B. A. (2014). *The body keeps the score: Brain, mind, and body in the healing of trauma.* Viking.

Watson, P., & Kassam-Adams, N. (2009). The impact of trauma on children and families. In A. S. Friedman (Ed.), *Handbook of Pediatric Psychology in School Settings* (pp. 403-420). Springer.

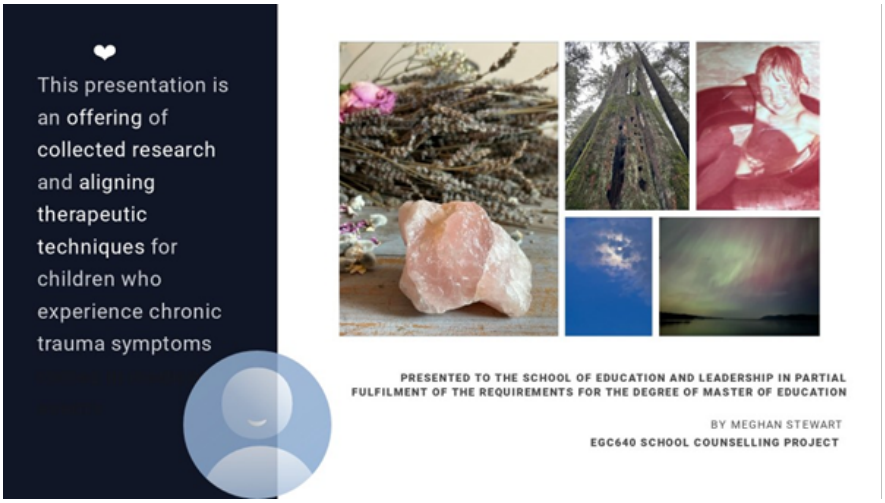
Weinraub, S. (2018). [Presence]. In M. Bazzano (Ed.), *Re-Visioning Person-Centred Therapy: Theory and Practice of a Radical Paradigm* (1st ed). Routledge. https://doi.org/10.4324/9781351186797

Wheeler, N. (2016) 'Integrating Interpersonal Neurobiology With Play Therapy', *International Journal of Play Therapy*, 25(2), pp. 24–35. doi:10.1037/1555-6824.16.2.176.

Wizansky, B., & Sadeh, E. B. (2021). *Dyadic EMDR: A Clinical Model for the Treatment of Preverbal Medical Trauma*. https://doi.org/10.1080/15289168.2021.1940661

Appendix A


I respectfully and gratefully honour the traditional and unceded territories of the Sḵwx̱wú7mesh (Squamish) and səl̓ilwətaɬ (Tsleil-Waututh) Nations. I am committed to listening to and learning alongside those who hold ancestral stories of healing through play and relationship congruent with this inquiry
♥

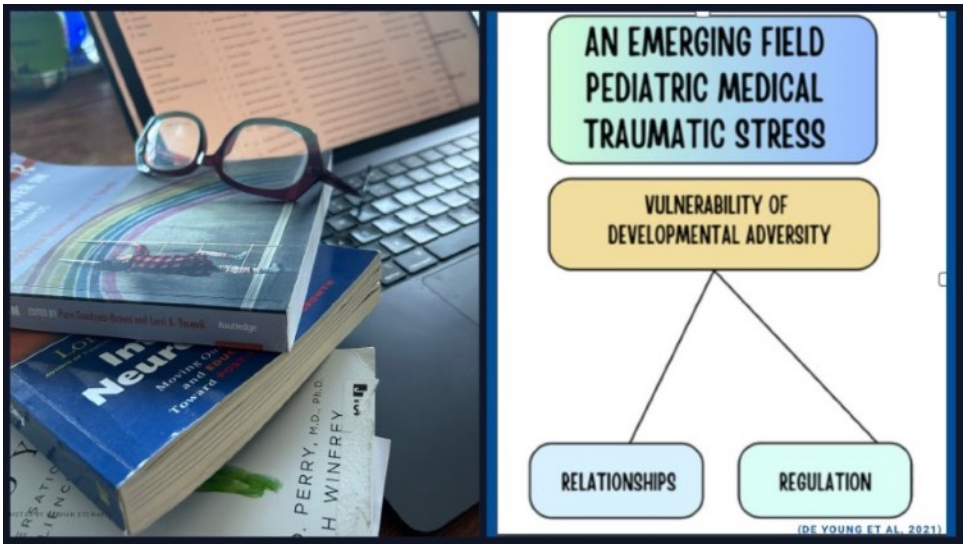

❤
This presentation is an offering of collected research and aligning therapeutic techniques for children who experience chronic trauma symptoms
PRESENTED TO THE SCHOOL OF EDUCATION AND LEADERSHIP IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION
BY MEGHAN STEWART
EGC640 SCHOOL COUNSELLING PROJECT

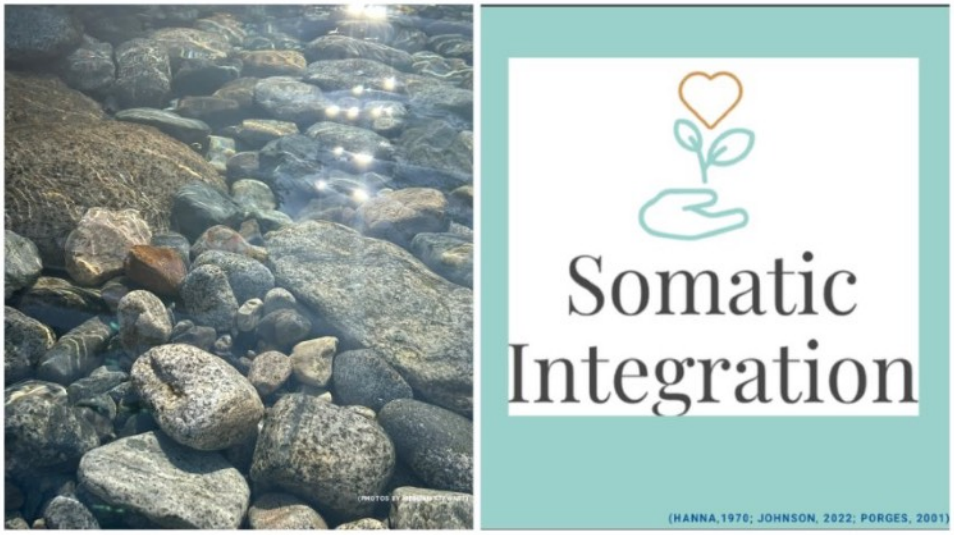
Acknowledging Lineage

My heart work is inspired through the roots of many who observed, read, thought and wrote before me. As **I actively decolonize my learning process, I humbly acknowledge** and **am grateful for** their theories, research and work. Thank you to those that honour the lineage of Polyvagal and Attachment theories and the current and ancestral work in play, rhythm and body healing.

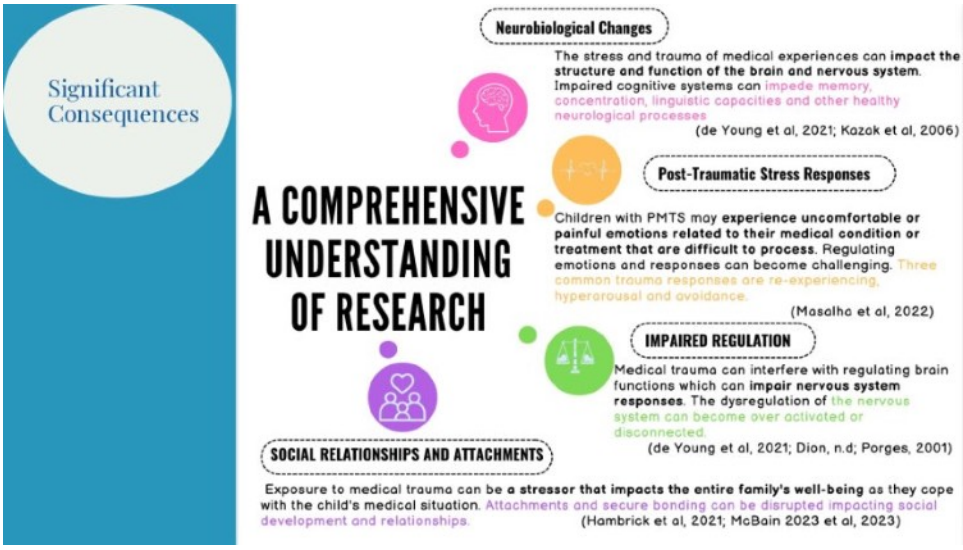
I INTEND TO HONOUR NUMEROUS VOICES OF RESEARCH AND PRACTICE THAT INTERSECT AND CENTER ON THE IMPORTANCE OF HEALTHY AND STRONG ATTACHMENT RELATIONSHIP SYSTEMS TO *SUPPORT INNER NERVOUS SYSTEM RESILIENCY AND REGULATION* IN YOUNG CHILDREN WHO HAVE EXPERIENCED MEDICAL ADVERSITY


Orientation
1 | ROOTING RESEARCH: PEDIATRIC MEDICAL TRAUMA STRESS
2 | VULNERABILITIES OF MEDICAL TRAUMA IN EARLY DEVELOPMENT
3 | THE NEUROPHYSIOLOGY OF TRAUMA
4 | SECURE AND INSECURE ATTACHMENT
5 | PRIVILEGE, CULTURE AND DIVERSITY
6 | THERAPEUTIC PRACTICES-ANCHORING THE NERVOUS SYSTEMS
7 | THERAPEUTIC PRACTICES-LISTENING TO OUR HEARTS AND BODIES
8 | CHILD'S PLAY AS A COMPASS
9 | A WIDE CIRCLE: COLLECTIVE HEALING

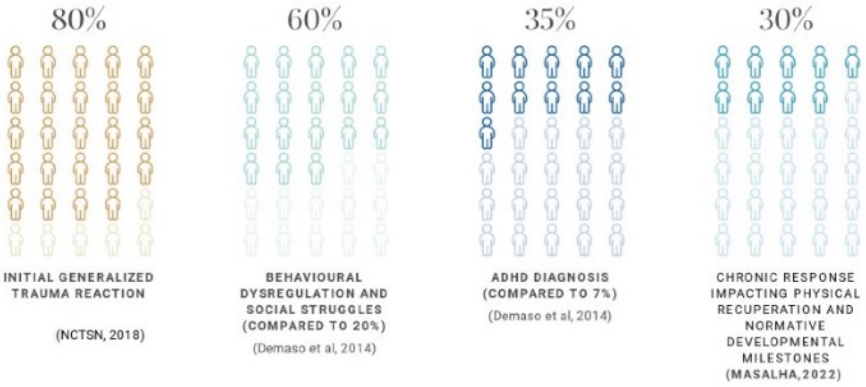

AN EMERGING FIELD
PEDIATRIC MEDICAL
TRAUMATIC STRESS
VULNERABILITY OF
DEVELOPMENTAL ADVERSITY
RELATIONSHIPS
REGULATION
(DE YOUNG ET AL. 2021)

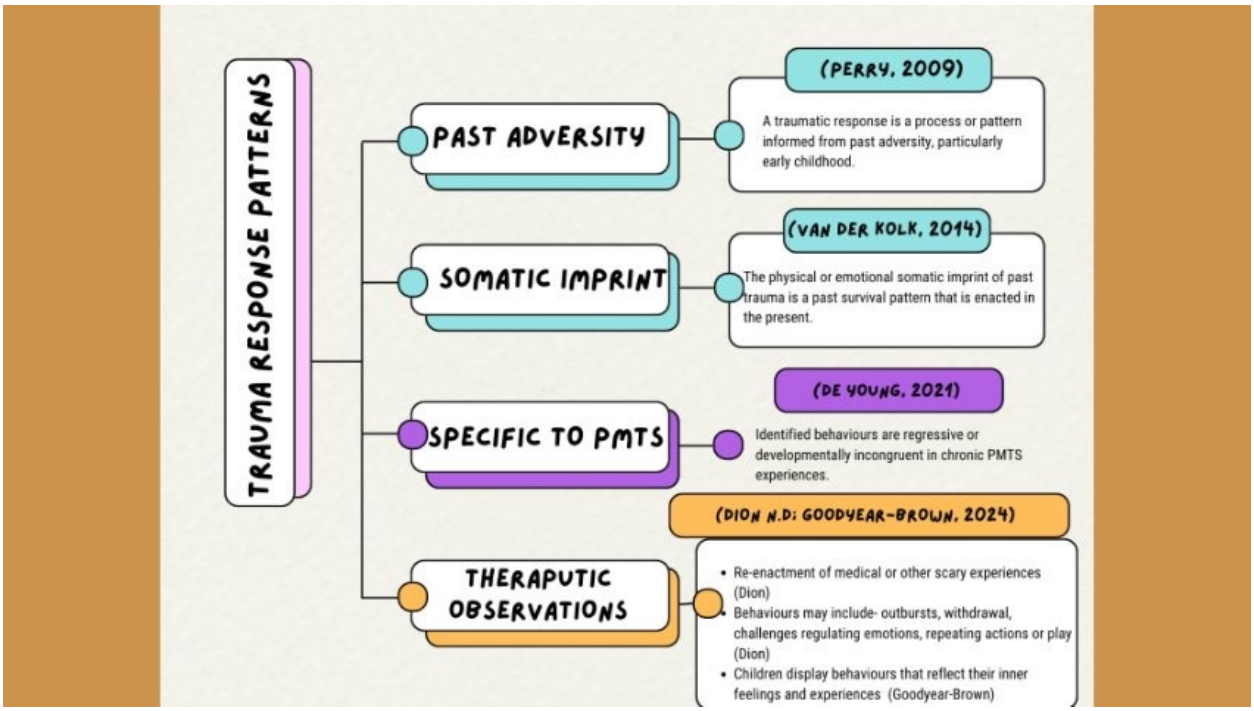

Somatic
Integration
(HANNA,1970; JOHNSON, 2022; PORGES, 2001)

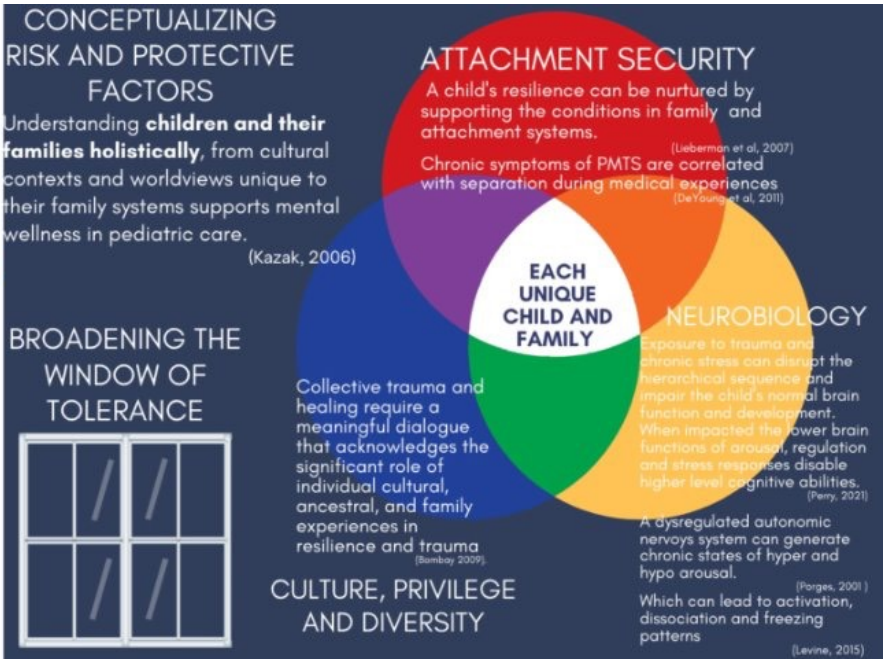

Roots of Research:
Building a Framework of Understanding
DEVELOPMENTAL VULNERABILITIES
Early childhood has elevated risks and vulnerability for trauma exposure during medical experiences due to the ongoing formation of neurological, physical, emotional and social systems
(Perry et al, 2021; de Young et al, 2021)
SIGNIFICANT CONSEQUENCES
NEUROBIOLOGICAL CHANGES (DE YOUNG ET AL, 2021; KAZAK ET AL, 2006)
STRESS RESPONSE PATTERNS (MASALHA ET AL, 2022)
IMPAIRED REGULATION (DE YOUNG ET AL, 2021; DION, N.D)
IMPACTED FAMILY SYSTEMS AND ATTACHMENTS (HAMBRICK ET AL, 2021; MCBAIN 2023 ET AL, 2023)


Significant Consequences
A COMPREHENSIVE UNDERSTANDING OF RESEARCH
Neurobiological Changes
The stress and trauma of medical experiences can impact the structure and function of the brain and nervous system. Impaired cognitive systems can impede memory, concentration, linguistic capacities and other healthy neurological processes
(de Young et al, 2021; Kazak et al, 2006)
Post-Traumatic Stress Responses
Children with PMTS may experience uncomfortable or painful emotions related to their medical condition or treatment that are difficult to process. Regulating emotions and responses can become challenging. Three common trauma responses are re-experiencing, hyperarousal and avoidance.
(Masalha et al, 2022)
IMPAIRED REGULATION
Medical trauma can interfere with regulating brain functions which can impair nervous system responses. The dysregulation of the nervous system can become over activated or disconnected.
(de Young et al, 2021; Dion, n.d; Porges, 2001)
SOCIAL RELATIONSHIPS AND ATTACHMENTS
Exposure to medical trauma can be a stressor that impacts the entire family's well-being as they cope with the child's medical situation. Attachments and secure bonding can be disrupted impacting social development and relationships.
(Hambrick et al, 2021; McBain 2023 et al, 2023)

Impact of Medical Trauma on Young Children




TRAUMA RESPONSE PATTERNS
PAST ADVERSITY
(PERRY, 2009)
A traumatic response is a process or pattern informed from past adversity, particularly early childhood.
SOMATIC IMPRINT
(VAN DER KOLK, 2014)
The physical or emotional somatic imprint of past trauma is a past survival pattern that is enacted in the present.
SPECIFIC TO PMTS
(DE YOUNG, 2021)
Identified behaviours are regressive or developmentally incongruent in chronic PMTS experiences.
THERAPUTIC OBSERVATIONS
(DION N.D; GOODYEAR-BROWN, 2024)
• Re-enactment of medical or other scary experiences (Dion)
• Behaviours may include- outbursts, withdrawal, challenges regulating emotions, repeating actions or play (Dion)
• Children display behaviours that reflect their inner feelings and experiences (Goodyear-Brown)


CONCEPTUALIZING RISK AND PROTECTIVE FACTORS
Understanding children and their families holistically, from cultural contexts and worldviews unique to their family systems supports mental wellness in pediatric care.
(Kazak, 2006)
ATTACHMENT SECURITY
A child's resilience can be nurtured by supporting the conditions in family and attachment systems.
(Lieberman et al, 2007)
Chronic symptoms of PMTS are correlated with separation during medical experiences
(DeYoung et al, 2011)
EACH UNIQUE CHILD AND FAMILY
NEUROBIOLOGY
Exposure to trauma and chronic stress can disrupt the hierarchical sequence and impair the child's normal brain function and development. When impacted the lower brain functions of arousal, regulation and stress responses disable higher level cognitive abilities.
(Perry, 2021)
A dysregulated autonomic nervoys system can generate chronic states of hyper and hypo arousal.
(Porges, 2001)
Which can lead to activation, dissociation and freezing patterns
(Levine, 2015)
BROADENING THE WINDOW OF TOLERANCE
Collective trauma and healing require a meaningful dialogue that acknowledges the significant role of individual cultural, ancestral, and family experiences in resilience and trauma
(Bombay 2009).
CULTURE, PRIVILEGE AND DIVERSITY

Bringing it all Together

- ANCHORING THE NERVOUS SYSTEM WITH CO-REGULATON AND RELATIONSHIP
- INTEROCEPTION: LISTENING TO OUR HEARTS AND BODIES
- CHILD'S PLAY AS THE COMPASS
- WIDENING THE CIRCLE TO OUTER SYSTEMS OF SUPPORT

Interoception- Listening to Hearts and Bodies

SENSORY EXPERIENCING THROUGH PLAY THERAPY

Inspired by Paris Goodyear-Brown

Stuffed socks or toys for **sensory blocking** can be an interactive tool to engage in sessions. This technique supports inner connection and building a healthy connection and interoceptive trust.

- TRAUMA RESPONSES IN CHILDREN ARE OFTEN PROCESSED THROUGH ONE SENSORY PATHWAY
- USING A RANGE OF SENSORY EXPERIENCES SUPPORTS AN EMBODIED INTEGRATION OF EARLY TRAUMA
- EXPERIMENTING WITH BLOCKING AND EXPERIENCING SENSORY INPUT-TOUCH, SIGHT, SMELL EMPOWERS CHILDREN TO BUILD A NEUROCEPTION OF SAFETY

(GOODYEAR-BROWN, 2024)

The Offering in the Playroom

THE CHILD'S PLAY IS THE COMPASS

The child often chooses to play out their unintegrated trauma with toys. When attuning to your client consider the story they are enacting. **Their play will feel like what they need to process.**

(Dion, 2024)

A Wide Circle

OF COLLECTIVE HEALING ❤

" Trauma has the **potential to negatively impact a child and caregiver not only individually but also relationally**. That is, the relationship or attachment between a caregiver and child could be affected as a consequence of PMTS. **Attachment theory and its concepts therefore provide another useful framework for both conceptualizing and treating PMTS**."

(Bergeron, 2017, p. 123)


Bringing it all Together
GROUNDING IN ATTACHMENT AND POLYVAGAL THEORY
ATTUNING TO VULNERABILITIES OF EARLY DEVELOPMENT
INTEGRATING PLAY, MOVEMENT AND RHYTHM
TECHNIQUES THAT SUPPORT GROWTH AND HEALTHY NEUROBIOLOGICAL RESPONSES
SUPPORTING FAMILY SYSTEM CAPACITY
Somatic Integration
ANCHORING THE NERVOUS SYSTEM WITH CO-REGULATON AND RELATIONSHIP
INTEROCEPTION: LISTENING TO OUR HEARTS AND BODIES
CHILD'S PLAY AS THE COMPASS
WIDENING THE CIRCLE TO OUTER SYSTEMS OF SUPPORT


THANK YOU FOR ATTENDING
❤
movement
connection
Ancestral
Trauma
restory
dealing
rhythm
family
drumming
breathe
system
Wisdom
safety
Trust
play
Post
Grow
attachment
presence
imagination
Somatic
nervous
Indigenous