Trauma, Memory, and Perception

John Wilks

ABSTRACT

This article explores the significance of sensory experiences in babies and prenates, challenging the assumption that their limited experiences render them incapable of interpreting and contextualizing sensations. It highlights how prenatal exposure to different types of stimuli contributes to the development of the nervous system and shapes future emotional responses. The article argues that even seemingly simple sensory inputs can carry profound meanings, influencing an infant's stress response and relationship to trauma later in life.

The text further examines the complexities of trauma perception, noting that the severity of an experience does not always correlate with observable effects on the infant. Factors like maternal emotional state and infant temperament play crucial roles in shaping responses to prenatal and perinatal trauma. It also introduces the concept of somatic memory, suggesting that some individuals can access detailed recollections from their prenatal stages, challenging traditional views of memory. Overall, the article emphasizes the need for trauma-informed caregiving practices that acknowledge the depth and implications of early sensory experiences in supporting healthy development.

Keywords: trauma, perception, memory, infant

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As adults, our perception of the world is intricately shaped by our previous experiences, which color our present understanding and influence how we integrate new experiences. Each encounter alters our interpretative framework, suggesting that our responses to similar stimuli are unique to our individual histories. Thus, in our daily lives, we often see what we expect to see and feel what we expect to feel, viewing the world through a personal lens that filters and interprets reality.

> ***...the perceived severity of an experience does not always correlate with observable effects on the baby.***

These variations in perception carry significant implications, particularly concerning trauma and particularly when it comes to babies' experiences. This is especially true of neonates, who have a considerably smaller library of prior experiences to draw upon to make sense of any new experience. The subjective nature of our experiences raises critical questions about how we determine what constitutes a traumatic event. Furthermore, the processing of these perceptions within our nervous

systems – along with potential influences from other systems – merits further exploration, especially in relationship to the relative maturity of a baby's nervous system when significant events might have occurred. In this paper, I aim to delve into the intricate relationship between individual experience, perception, and the processing of trauma, highlighting the complexities inherent in understanding our responses to the world around us.

The Relationship Between Experience, Trauma, and Pain Perception

Let us start with pain. Pain is not merely a biological response; rather, it is intricately tied to our previous experiences, context, and the meanings we ascribe to sensations. Pioneers in pain research, David Butler and Lorimer Moseley (Butler & Moseley, 2003), emphasize that the sensation of pain arises from a complex interplay of neurological, psychological, and contextual factors, challenging the simplistic view of a straightforward pain pathway.

Butler and Moseley argue that our perception of pain is heavily influenced by our previous experiences with sensation and interoception, which is our ability to perceive internal bodily states. This perspective suggests that our brain evaluates not just the sensory input but also the context surrounding it. For instance, an individual may interpret a painful sensation differently based on past experiences or emotional states, leading to later variations in how pain might be felt in intensity and duration.

Research indicates that individuals who experience pain early in life are more susceptible to developing chronic pain conditions later on. For example, studies have found that childhood trauma or early physical pain significantly increases the likelihood of persistent pain in adulthood (Sullivan & Neish, 1999). This highlights the long-lasting effects of early experiences on how pain, and possibly trauma, are perceived and processed.

Antonio Damasio's work (2003) elaborates on this connection by examining how emotions and bodily sensations are interlinked. Damasio posits that emotions play a crucial role in shaping our perceptions of bodily states. When individuals develop negative associations with physical sensations due to early pain experiences, this can create a feedback loop in which the brain interprets neutral sensations as threatening, leading to heightened pain perception.

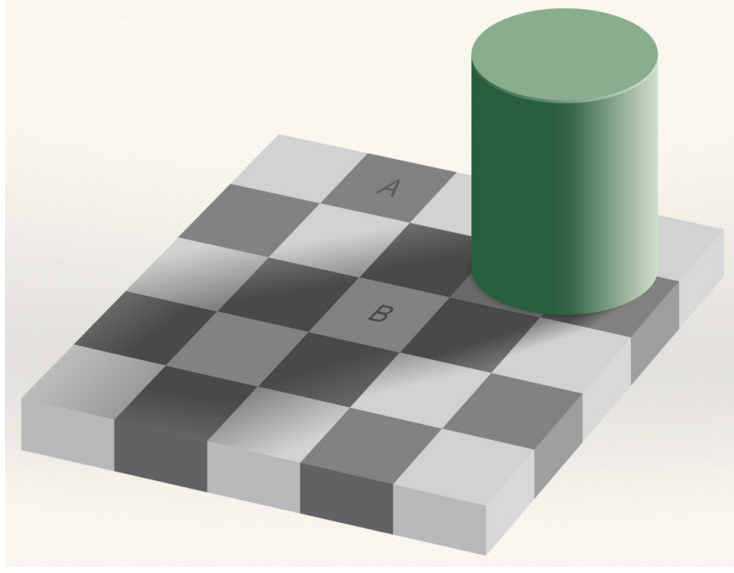
The Role of Visual Perception in Interpretation

Visual perception provides a striking example of how our nervous system interprets stimuli. It often leads us to perceive something that doesn't align with objective reality. As Moseley explains, our sense organs, including our eyes, engage in complex neurological processes to construct our experience of the world.

Consider the example below of the image of three bars. Most observers might perceive the top bar as transitioning from light to dark, the middle bar from dark to light, and the bottom bar as going from light to dark. However, the objective reality is that the middle bar is just one shade of grey. This illusion demonstrates how our brains interpret contextual information, depending on what we expect to see from previous experience.

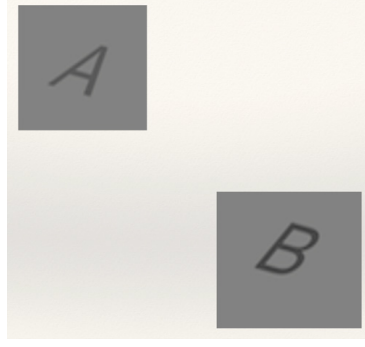
When we perceive visual stimuli or face any stimulus, our nervous systems perform what Moseley describes as "neurological acrobatics." The brain

analyzes contrast, brightness, and surrounding colors to make sense of what we see, especially if something is familiar. For instance, the reticular formation filters sensory information and focuses attention, which can further influence our perception of physical sensation or even an image like this.



A striking example is the illusion created by Edward Adelson involving two shaded squares, A and B, that appear to be different shades of grey. Despite the objective fact that they are identical, our visual system is tricked into seeing them as different due to their contrasting backgrounds.

When viewed in isolation, as shown in accompanying screenshots, it becomes clear that surrounding cues distort our perception, and we see something that is not there. You can have fun unpacking this illusion here: https://www.mantlelabs.com/illusion/



These visual illusions underscore the concept that our perception is not a direct reflection of reality but rather an interpretation influenced by context and prior experiences. This insight is crucial when exploring the nature of trauma, as it suggests that all our sensory experiences, whether visual, tactile, auditory, or olfactory, are subject to similar interpretative processes. Just as our visual system can be deceived, so too can our interpretation of physical sensations, leading to highly individualized responses to stimuli that might be perceived as traumatic. This is as true for babies as it is for adults.

The Role of Context and Meaning in Trauma

As with pain, when examining trauma, it becomes evident that the experience itself is not solely responsible for long-term impact on our psyche; instead, it is the context and meaning attributed to that experience that play crucial roles. This perspective shifts our understanding from viewing trauma as a singular event to recognizing it as an ongoing process of interpretation and integration.

Therapeutic approaches often focus on helping individuals integrate traumatic experiences that they have struggled to process. Integration involves making sense of the trauma within the framework of one's current life, allowing the individual to contextualize the experience and reduce its emotional charge. This process can be essential for healing, as it enables individuals to move from a state of reactivity to one of understanding, and it is a key factor in baby therapy.

As we know from clinical experience, an inability to integrate traumatic experiences can lead to various mental, emo-

tional, and physical health issues. When individuals cannot process and integrate trauma, they may find themselves stuck in a cycle of distress, impacting their overall well-being and daily functioning. This, again, is true for infants as much as it is for adults.

When considering trauma, it is essential to take a nuanced approach to the experiences of newborns and even prenates, who may appear to have limited prior experiences for interpreting sensations and putting them in context. However, their developing nervous systems are not as unformed as we might assume.

From the prenatal stage, infants are exposed to various sensory stimuli that influence their development. They experience tactile sensations through movement in the amniotic fluid and auditory inputs, such as the sounds of their mother's heartbeat, digestive system, and external noises. These experiences help to lay the groundwork for their sensory processing abilities.

While it might seem that a heartbeat is merely a heartbeat and does not require contextual interpretation, it is crucial to recognize that even simple sensations will be interpreted in one way or another. For instance, the sound of the mother's heartbeat might or might not be associated with safety and nurturing in the developing baby's psyche.

Responses to Prenatal and Perinatal Trauma

When examining how infants respond to trauma, particularly prenatal or perinatal trauma, we encounter a paradox: the perceived severity of an experience does not always correlate with observable effects on the baby. As therapists, we may find ourselves surprised by the resilience of some infants who endure significant maternal stress or complications during birth. In contrast, others who experience seemingly idyllic births exhibit signs of profound distress.

This discrepancy challenges our assumptions about what constitutes a traumatic experience for an infant. Trauma is often contextual and subjective, meaning that what one baby perceives as stressful may differ significantly from another's experience. Factors such as maternal emotional state, environmental conditions, heredity, and even the infant's temperament play critical roles in shaping their responses.

These observations lead to fundamental questions about the nature of memory and awareness in infants. Traditional understandings of memory emphasize the role of a fully developed nervous system. Yet, many prenatal and perinatal therapists report instances of clients accessing somatic memories from as early as conception or even earlier. This suggests a form of memory that transcends conventional neurobiological explanations. Various studies and papers have been written about this (Chamberlain, 1998) and the possible effect of past life experiences (Tucker, 2005).

Whether or not a clinician believes in these possibilities, they may well be a lived reality for the adult or baby in our care, thus requiring an open-minded and inclusive approach. Anecdotal evidence from therapeutic practice indicates that some individuals carry detailed recollections of experiences from prenatal stages, including conception and implantation (nidation). These memories may manifest as somatic sensations or emotional responses rather than verbal recollections, highlighting a form of awareness that does not necessarily rely on conventional cognitive memory structures and may manifest later in life as a "felt sense" about something rather than as a cognitive memory.

Non-Local Memory and Consciousness

One parallel worth investigating in the context of non-local memory is the work of cardiologist Pim van Lommel. In his groundbreaking study published in *The Lancet* in 2010, van Lommel examined cases of patients who experienced clinical brain death but reported vivid memories and awareness of their surroundings during that time. His findings challenge conventional understandings of consciousness and memory, suggesting that these phenomena may not solely depend on a fully functioning nervous system (van Lommel, 2010 & 2014).

In his study, van Lommel gathered data from patients who had undergone cardiac arrest and were clinically dead for periods during which they experienced no brain activity. Remarkably, many patients later recounted specific conversations and events in this state, indicating a level of awareness

that defies traditional neuroscientific understanding. These accounts suggest the possibility of consciousness existing independently of the physical brain, raising profound questions about the nature of memory and awareness.

Van Lommel's research opens a dialogue about how we understand memory, particularly in the contexts of trauma and early development. If consciousness can persist outside the bounds of conventional neurological frameworks, it is possible that memories – particularly those related to trauma – may not be constrained by the typical neurological processes we associate with memory formation and recall. This perspective could have significant implications for therapeutic practice, particularly in treating trauma and understanding the experiences of individuals from prenatal stages onward.

Emotional Capacity in Infants

An intriguing question also arises regarding whether infants can experience and express complex emotions such as guilt, anger, resentment, or even empathy. Many therapists assert that infants are indeed capable of experiencing a range of emotions, often observing these expressions in their therapeutic practices. This perspective contrasts sharply with that of Sigmund Freud, who argued that infants lacked the capacity for significant emotional experiences. (Freud, 1920)

Freud's view has contributed to broader skepticism among health professionals and the public regarding infants' emotional capabilities. His theories suggested that emotional development is contingent upon cognitive maturity, leading to the perception that infants are mainly incapable of meaningful emotional experiences. This skepticism has had dire implications, including the historical practice of performing surgeries on infants without anesthesia based on the misguided belief that they could not feel pain or distress in a significant way (Monell, 2011).

Understanding Pain and Trauma in Infants

Investigating how infants perceive and integrate pain and trauma can lead to a profound shift in our understanding of their emotional and neurological development. The interpretation of experience is key in determining whether an event is perceived as traumatic. For infants, this interpretation is influenced by several factors, including their developmental stage, the emotional states of their caregivers, and the context in which the events occur. A baby may experience significant distress during a medical procedure, but whether this is perceived as traumatic can depend on the surrounding circumstances, including the presence of supportive caregivers and the overall emotional atmosphere.

Making sense of experience is essential for emotional integration in adults and infants. When events are understood and contextualized, individuals can process them more effectively and move forward. For infants, this means that supportive interactions with caregivers can help them interpret distressing experiences. The presence of a nurturing, listening figure can provide a sense of safety and security, facilitating the integration of challenging experiences and reducing the likelihood of long-term trauma.

Consider several neonatal situations where the baby's interpretation is critical:

1. **Surgical Procedures:** Infants undergoing surgery may experience pain and distress. Their ability to process this experience can be influenced by the presence of comforting caregivers and how the procedure is conducted and presented.
2. **NICU Stays:** Babies in neonatal intensive care units often face numerous interventions. The emotional support provided by parents and caregivers can help mitigate feelings of fear and isolation, aiding in interpreting these experiences.
3. **Birth Trauma:** Infants may experience trauma during delivery due to complications. Their understanding of this event can be shaped by the reactions of their caregivers and the care environment.

A Baby's Perspective on Birth

Let's look at how a baby might experience birth – something we all go through. Even with a so-called "normal" birth, there is considerable scope for nuanced experience, and even traumatic imprints, to strongly form at this time. Imagine this scenario from a baby's perspective at birth:

There is a profound sense of coming from somewhere, a gradual awakening to the surroundings. Encased in warmth and fluid, babies begin to experience their bodies by moving limbs and feeling the rhythmic beating of their hearts. The auditory landscape is rich and layered: muffled sounds from the outside world contrast with the intense, familiar sounds of their mother's heartbeat and digestive processes. Babies are also aware of sensations related to nourishment, feeling the "taste" of nutrients arriving through the umbilical cord.

As development progresses, feelings of confinement arise. Babies sense pressure from all sides, leading to a growing anticipation of the impending transition to the outside world. This environment can evoke a mix of comfort and anxiety; curiosity about what lies ahead mingles with concerns about acceptance and love. Babies are keenly attuned to their mother's emotions, sensing her anticipation and potential fears about the birth process.

As contractions begin, babies feel intense pressure on their heads as they contact the cervix. While some pressure is comforting, babies also encounter discomfort as they press against the mother's sacrum. A sense of panic arises with restricted oxygen, reminiscent of feeling trapped in a tight space. Brief moments of relief occur between contractions, allowing babies to "catch their breath."

The intensity increases, and feelings of dread emerge as babies struggle to navigate through the constricting passage. Exhaustion sets in, yet adrenaline fuels the effort to position themselves for birth. As they finally emerge, they are dazzled by bright lights, and confronted by unfamiliar faces and sounds.

Relief accompanies the realization of being alive, but this is quickly overshadowed by a new panic as the oxygen supply shifts. Babies' reliance on their mother's oxygen is abruptly severed, triggering the instinct to breathe independently. As strangers handle the baby, the sensation of something abrasive against their skin provokes a cry, an instinctual response to overwhelming stimuli.

Implications for Understanding Trauma

This narrative illustrates how potentially complex and nuanced a newborn's birth experience can be. It emphasizes that babies are deeply affected by the sensory and emotional context of their entry into the world. Interpreting these experiences is critical; whether they are perceived as traumatic can significantly impact children's emotional development and ability to integrate these experiences later on.

Recognizing the depth of these experiences encourages caregivers and practitioners to approach the birthing process with sensitivity, ensuring that the emotional needs of mother and baby are met. This understanding can inform practices that promote a supportive and nurturing environment during and after birth.

Interventions

Now, imagine from a baby's perspective this scenario of a pharmacologically-assisted birth, where the mother might have been induced and given pain relief:

Initially, the baby feels comfortable in the warm internal environment, preparing mentally and physically for the upcoming transition. There is a mix of anticipation and excitement about what lies "beyond the doorway." However, this calm is suddenly disrupted by feelings of grogginess, triggering alarm as a baby instinctively knows the need to remain alert for the journey ahead.

Without warning, the door bursts open, and unfamiliar figures enter. The suddenness of the event feels invasive as the baby is placed in a painful hold, and whisked away without negotiation or explanation. The transition from the familiar to the unknown is jarring.

Blurry vision and a pounding headache compound the confusion. As the newborn gasps for air, panic sets in with the sudden loss of oxygen. Despite the apparent joy of those around them – laughter and smiling faces – newborns feel isolated in their distress and struggle to understand their new reality.

As they are further separated from warmth and comfort, invasive medical procedures ensue. The sharp pain in their heels is unlike anything they have ever experienced, and the sensation feels threatening. The newborns' cry echoes loudly, a visceral expression of confusion and fear. The burning sensation in their eyes adds to their disorientation, leaving them unable to focus on their new surroundings.

When placed upon the breast, these newborns struggle to latch and suck, feeling foggy and tired. The confusion intensifies as they try to make sense of this new world, feeling overwhelmed by the rapid changes and unfamiliar sensations.

Over the following hours, caregivers express love and relief at the baby's arrival, reassuring them of their safety and health. For the baby, however, the experience remains chaotic and fraught with discomfort. Their desperate need for connection and understanding is paramount.

This narrative underscores the complex emotional landscape newborns face during their entry into the world. It illustrates how overwhelming sensations, sudden changes, and a lack of agency can contribute to a traumatic experience. By understanding the newborn's experience, we can foster approaches that prioritize emotional well-being, ensuring that transitions into the world are as gentle and supportive as possible. This understanding can help mitigate the long-term effects of trauma and promote healthy emotional development.

Societal Impacts on Trauma

Let's look now at how very specific and challenging events might be interpreted by a newborn. Because circumcision is such a common practice all over the world and in many differing cultures, it has been extensively studied in terms of its potential long-term effects (Gollaher, 2000). In relation to what has been said before, understanding the context in which procedures like circumcision occur is vital for assessing their potential impact on infants.

Circumcision might be performed in hospitals, where approximately 55% to 65% of American boys are circumcised every year with varying levels of parental involvement. As of 2012, the American Academy of Pediatrics was still recommending circumcision (American Academy of Pediatrics, 2012) despite the potential for significant harm. Additionally, cultural and religious rituals often accompany the procedure, adding layers of significance and expectation that may further impact the infant's experience (Glick, 2000).

Imagine a newborn's experience of circumcision where the familial, societal, and religious elements might be intertwined in a baby's consciousness with a very physical experience:

In the days following birth, baby's world is filled with new sensations: voices, smells, light, and the comforting contact of skin. They begin to develop a rhythm with day and night, feeding, and the feeling of clothes on their skin. Familiar voices from the womb gradually become comforting anchors in this new environment.

On a particular day, excitement fills the air. Dressed in unfamiliar clothing, the baby is taken outside for the first time, experiencing the first bracing breaths of fresh air. They enter a building, and the atmosphere shifts as they are brought to the front of the room. Strange rituals and unfamiliar language swirl around them. The baby's clothes are removed partially, and they sense an underlying current of expectation from the smiling faces surrounding them.

Suddenly, a searing pain pierces through the euphoria of the celebration. This pain surpasses any discomfort experienced during birth, creating a sense of alarm. The baby's nervous system reacts instinctively, sending them into a state of heightened alert. Heart racing, feeling hot and panicked, they struggle to comprehend the sudden shift from joy to agony.

In this moment of intense distress, confusion reigns. The baby attempts to reconcile their experience with the happiness of those around them. Why are others celebrating when they are in such pain? The juxtaposition of external joy and internal suffering creates a profound sense of isolation.

The celebration continues; people are dancing and singing, yet the baby's cries go unanswered. The incongruity of the situation leads to a painful realization: the baby internalizes the experience, interpreting it through a lens of confusion. Perhaps they have done something wrong. Perhaps their suffering signifies a personal failing. This interpretation can have long-lasting implications for emotional development, shaping how they perceive themselves and their place in the world.

Implications for Understanding Trauma

This narrative illustrates the complexity of a newborn's emotional experience during a significant event like circumcision, but could equally be applied to a difficult birth or a confusing entry into this world. The pain and confusion experienced in

such contexts can profoundly affect the baby's developing sense of self and ability to process emotions. Recognizing that infants can internalize traumatic experiences, especially when there is a disconnect between their experience and everyone else's, highlights the importance of approaching how we treat babies with sensitivity and awareness.

The Interconnection of Autonomic Responses and Self-Perception

In situations like those described above, a newborn's autonomic nervous system responds with a powerful survival instinct. This response, characterized by heightened heart rate, increased respiration, and a state of alertness, or conversely, a dorsal vagal shutdown, happens very fast, and initially serves to protect the infant from perceived threats. In the baby, this might play out as an exaggerated Moro reflex. However, it is particularly striking how these immediate survival responses can intertwine with beliefs the infant forms about themselves and their surroundings in response to those autonomic responses. This means that later in life, when an external or internal stimulus triggers autonomic responses, they get coupled with certain strong beliefs about belonging, safety, or "goodness," which can be very difficult to disentangle. The shock of experiences like circumcision can lead to profound internalizations. Amid joy and celebration, the infant is left to grapple with confusion and pain, which can shape their understanding of themselves and the world around them.

Perhaps because there is little prior experience to draw upon to put an event like this into context, a baby might interiorize the experience and tend to believe that the only explanation is that something is wrong–wrong with self, the environment, or the people in it.

For example, in the aftermath of such a traumatic event, babies might begin to develop distrust toward the people who are supposed to provide comfort and safety. The cognitive dissonance between the caregivers' happiness and a baby's distress can lead to a skewed perception of relationships, where the infant may come to believe that expressions of joy can coexist with personal suffering.

These early experiences can have long-lasting implications for emotional and psychological development. As babies grow, they may carry forward feelings of distrust, leading to unhealthy attitudes toward intimacy and sexuality. For instance, the pain associated with a significant life event may become conflated with the experience of closeness, resulting in a complex relationship with physical touch and affection.

Furthermore, if infants internalize the belief that they somehow contributed to their suffering, it may foster feelings of inadequacy or shame. This cycle of negative self-belief can perpetuate a pattern of emotional distress, impacting future relationships and the ability to engage with the world in a healthy, trusting manner.

A Baby's Experience of Surrogacy

To take a completely different example, in the context of surrogacy, a newborn's experience is often overshadowed by adult concerns and rights. Imagine a baby born in a hospital after a long and exhausting process. As they finally encounter skin contact with their birth mother, a moment of relief washes over them. Yet, this calm is short-lived. Soon, unfamiliar voices fill the room – excited, joyful, and perhaps overwhelming. The baby is passed around among strangers, and a sense of confusion sets in.

Despite the adults' jubilant celebration, the baby feels disconnected and unsure of their place. The juxtaposition of adult happiness and the baby's confusion can lead to feelings of anger and frustration, yet these emotions often go unacknowledged. The well-meaning reassurances from adults – that everything will be wonderful, and that the baby will have all they desire – fail to resonate with the little one's experience. This dissonance might create a profound internal struggle, prompting infants to question their worth, or perhaps even to be very angry with the world.

The Complexity of IVF and Donor Experiences

The complexities deepen with IVF and techniques like intracytoplasmic sperm injection (ICSI), where traditional notions of consciousness may further complicate our understanding. If consciousness is present in these early stages around conception, whether assisted or not, can a developing prenate

interpret experiences or attach meaning to them? These questions venture into philosophical territory where current science may not provide clear answers.

However, clinical experience raises some interesting considerations. For instance, a colleague shared a moving case of a young girl conceived through IVF who repeatedly drew an image of a tree surrounded by several graves. Even though the girl was not consciously aware of it, this imagery poignantly reflected her mother's decision to discard the exact same number of remaining frozen embryos after her birth, suggesting a deep-seated emotional connection to loss and abandonment that the child may not consciously understand.

Similarly, another client born from a frozen embryo via ICSI developed a fixation on the diameter of gun barrels – a curious parallel to the different needle sizes used in the ICSI process – and an insatiable desire to visit frozen landscapes. In ICSI, different diameter needles are used to optimize the procedure for oocyte aspiration and sperm injection. Thinner needles can reduce damage to the oocyte and improve precision during injection, while thicker needles may be employed for better sperm handling. The choice of needle diameter can impact fertilization efficiency and embryo development.

These clinical observations, strange as they are, raise questions about whether certain experiences and their meanings can imprint on individuals at an unconscious level, even prior to the existence of a fully mature nervous system, influencing their interests and emotional landscapes throughout their lives.

Understanding these complexities, or at least having an open mind about them, can enrich therapeutic practice, enabling professionals to approach babies and adults with greater sensitivity to their unique histories and emotional narratives. By exploring the intersections of early experiences and their lasting impacts, we can better support individuals on their journeys toward healing and self-acceptance.

This framework encourages a holistic view of early life experiences, emphasizing the importance of addressing the conscious and unconscious narratives that shape our identities. It is essential to recognize that beyond the immediate experiences – whether perceived as positive or negative – an in-depth exploration of the historical and emotional context surrounding potentially traumatic events is crucial. This understanding is vital for grasping the long-term impacts these experiences may have on individuals and how we can foster healing and integration.

John Wilks *has practiced and taught Biodynamic Craniosacral Therapy and the Bowen Technique for the past 30 years. He has lectured globally, specifically supporting practitioners who work with mothers and babies. He is the author of six books, including* Choices in Pregnancy and Childbirth *(2015) and* An Integrative Approach to Treating Babies and Children *(2017). He co-founded the Breath of Life Conferences in London and speaks at conferences worldwide about the long-term effects of our development in the womb, the birth process, and our entry into this world. He runs two large internet-based teaching programs, one of which specializes in delivering high-quality webinars and courses for individuals working with families:* www.ourbirthjourney.com

Email: john@ehealthlearning.tv

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