Neural Pathways to Peace and Flourishing

A Calm Clarity Concept Paper

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November 1, 2024*

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Around 9 am on a beautiful Saturday morning in the spring of 2022, while the world was slowly easing out of lockdown, I was sitting in the passenger side of my father's minivan to help him pick up gardening supplies. Suddenly, we became aware of the driver behind us wanting to pass, so my father pulled over to the side to let him go forward. As he passed, the driver slowed down to shout profanities at us and threatened that if he had a gun, he'd shoot my elderly father and me. Then, to my relief, he sped away.

My father did not even flinch. He just laughed about the situation. This reminded me of the degree to which my family has become desensitized to seeing people lash out in this manner since resettling in inner-city Philadelphia after fleeing Vietnam over forty years ago. My father has even been held up at gunpoint and at knifepoint, yet by some miracle, he has escaped without physical injury.

Frightening experiences like this where people become so escalated that they threaten violence or act violently peppered my childhood. When I was in middle school, a young man was shot in the head leaving the take-out restaurant that my family ran and lived above. The ambulance carried him away but left the cleanup to us. The image of the ground covered in blood and bits of brain became forever seared into my brain.

These experiences instilled in me a desire to learn how repeated exposure to violence and the threat of violence impacted the development and functioning of my brain—as well as the brains of other people who grow up and live in these conditions.

Lessons from Neuroscience

A key insight I learned from mining neuroscience for answers is that the human brain is continuously adapting to experience by strengthening the neural pathways that a person uses the most and pruning the neural pathways that they do not use. This means that a person's capacity to live peacefully and peacefully resolve tensions and conflicts depends on whether they actively cultivate and strengthen the neural pathways to peace. Conversely, it also means that not developing and strengthening these same neural pathways could result in people having a higher propensity to escalate conflict and use force and violence to get what they want.

Studies on how the human brain changes as people practice mindfulness now provide insights into the neural pathways for inner peace. According to Daniel Goleman and Richard Davidson, consistent mindfulness practices enhance four important neural systems: **the attention system, the resilience system, the meta-awareness system, and the connection system**. (Goleman and Davidson 2017) Mindfulness practices transform us because they boost our capacity to use and apply these key neural systems in our daily lives. The **attention system**

helps us focus on what matters most, guiding our thoughts and energy toward meaningful action. The **resilience system** anchors us in moments of challenge, allowing us to regenerate and remain grounded through adversity. The **meta-awareness system** provides us with the clarity to observe our inner narratives and shed limiting patterns. The **connection system** deepens our sense of inner and outer connectedness, allowing us to experience ourselves and others as part of a shared whole.

Tragically, the development and functioning of these four critical systems are especially vulnerable to trauma. I know from personal experience that people who have suffered trauma often live with chronic hypervigilance, a state of being continuously on high alert to defend against threats. Hypervigilance makes people more likely to perceive other people's actions as threatening and react in ways that escalate conflict. Hypervigilance also makes people more likely to otherize and dehumanize the person or people they see as a threat. By threatening and traumatizing the other party, that second party then reacts in a similar pattern, co-creating a cycle of escalation. I have learned the hard way that hypervigilance tends to increase conflict and insecurity and undermines our ability to resolve disputes and create real security. This is why addressing trauma and building the neural pathways for inner peace are essential to making genuine peace possible.

Rewiring the brain to heal the effects of childhood trauma is also something I can speak about from personal experience. Throughout my childhood, I often felt overwhelmed and helpless as poverty, gun violence, and addiction ravaged my community, one that was already burdened by historical and ancestral trauma. The families in my community had no resources for understanding and addressing the impact of this complex form of accumulated trauma on brain development. I learned to do what the people around me did: I ignored and suppressed negative emotions and experiences. Then as one of the few first-generation college students from an inner-city community in my class at Harvard University, I struggled with hypervigilance, complex PTSD, depression, and panic attacks. When I finally sought help, the psychiatrist I saw made me aware that the traumatic events I had experienced since infancy had impacted my brain and explained the difficulties that I was having regulating my stress levels, focusing my attention, and forming social connections.

That conversation inspired me to turn to neuroscience as an empowering tool for understanding myself, healing the effects of trauma, and making sense of fragmented aspects of my childhood. I used what I learned to create a "user manual" to proactively steer my own brain development to build the physiological capacity to experience greater physical, emotional, mental, and spiritual well-being, alignment, and integration. I have now spent decades applying this user manual to my own life, and I can say without a doubt that my life and my brain have changed. I am no longer the temperamental, depressed, and anxious control freak I used to be. I can experience anger without taking it out on the people around

me. I can experience sadness without falling into despair. I can experience moments of self-doubt and insecurity without getting swallowed up by fear and paralysis. I can experience uncertainty and ambiguity without spiraling into anxiety and panic attacks. Instead of reflexively suppressing, rejecting, or escaping negative experiences, I can now greet these aspects of life with presence, curiosity, and compassion. These four neural systems provide me with an anchor to ground myself through the challenges that life throws my way.

My User Manual for Steering Brain Development

In 2013, I decided it was time to fulfill a childhood promise I made to one day return to inner-city Philadelphia to make a difference. I started Calm Clarity as a social venture to turn my user manual into a neuroscience-based leadership and life skills program. As part of the training, I show people how to use meditation exercises to work-out and strengthen these four key neural systems.

Whenever I walk people through my user manual, I usually start by sharing that the human brain contains what scientists call the default mode network (DMN for short) as part of our autopilot. According to Matthew Lieberman, scientists gave the DMN this name because it appears to self-activate whenever our attention is not focused on any specific task, and this led scientists to theorize that whatever its function is, it must be so important that our brains evolved to do this as its default state. The function of the DMN is to continuously weave our experiences together to construct a mental model of our social world, and to help us navigate this social world by making predictions to help determine what actions we should or should not take. (Liberman 2013)

DMN activity is often experienced as an inner narrator providing a stream-of-consciousness commentary about what a person is experiencing. According to Rick Hanson, the DMN has a negativity bias because it evolved to maximize survival by amplifying the attention we give to negative events and experiences. This bias increases the probability of preventing or avoiding perceived threats and dangers. (Hanson and Mendius 2009) This is why people often spend their downtime worrying about things that have gone wrong or could go wrong. This is also why so many of us experience our DMN as an inner critic that beats us down and unleashes shame and blame on others.

I learned from examining my own DMN that it has three distinct gears that correspond to different patterns of brain activation, which I named based on the sequence by which the underlying structures develop. “Brain 1.0,” which is fully developed when we are born, corresponds to when the DMN is hypervigilant and keeps us in a state of self-preservation and elevated stress. “Brain 2.0,” which fully develops in adolescence, corresponds to the dopamine system taking over the DMN, prompting us to chase rewards that feel good. In many ways,

Brain 1.0 and Brain 2.0 are two sides of the same coin. Whenever Brain 1.0 is triggered, our aversion to the negative feelings that arise trigger us to chase a dopamine fix in Brain 2.0 that allows us to temporarily make those feelings go away without resolving the situation. As the opioid epidemic demonstrates, so many people cope with whatever is activating Brain 1.0 by relying on Brain 2.0 to escape, numb, or push away the negative feelings and sensations that arise. This could take the form of immediate gratification through drugs and alcohol, as well as food, retail therapy, video games, and gambling. This could also take the form of seeking external validation through people pleasing, achievement, wealth, and status, or establishing a sense of control by gaining power over situations and people.

"Brain 3.0," which fully develops after our mid-twenties, corresponds to a state of self-mastery and well-being that comes from using these four neural systems to calm Brain 1.0 and Brain 2.0 so we can make conscious choices to mindfully respond rather than mindlessly react to whatever challenges arise. In contrast to what my inner narrator sounds like in Brain 1.0 and Brain 2.0, my inner narrator in Brain 3.0 is calm, curious, open, and creative. I nickname it my "Inner Sage" because it guides me to see a bigger picture, take a long-term view, and feel compassion for the human experience. My Inner Sage coaches me to attune to the present moment and connect with other people to allow their perspectives to enrich and expand my mental model of the world rather than force my point-of-view on others.

I think of the four neural systems for attention, resilience, meta-awareness, and connection as the pillars of Brain 3.0 that enable us to embody our Inner Sage to co-create peace and flourishing and mitigate the suffering and havoc that our DMNs in Brain 1.0 or Brain 2.0 can wreak on our lives and the world around us. Before I share more about the functions of these four neural systems, I want to clarify that these systems do not work in isolation. They enhance and reinforce each other because they share common neural networks. In fact, the attention system serves as an essential component of the other three systems. Therefore, the sequence in which I share more about these systems below reflects my view on how the four systems build into each other.

The Attention System enables us to direct and focus our attention and sustain our concentration. Based on studies by Norm Farb, Wendy Hasenkamp, and Amishi Jha, mindfulness meditations strengthen our ability to manage the see-saw relationship between the focused attention network (FAN) and DMN. The DMN self-activates and diverts our attention whenever the FAN is not focusing on a task or is tired and needs to rest. A strong attention system enables us to become aware when our attention gets diverted by the DMN and to consciously redirect our attention to the task at hand. It also enables us to zoom our attention in to focus on details and to zoom our attention out to become aware of the bigger picture, and to agilely shift our focus to a new topic or subject as needed. (Farb, Segal and Anderson 2007) (Hasenkamp, et al. 2012) (Jha 2021)

This ability to be aware of our attention and to guide and focus it is a critical pathway to peace because it enables us to observe and counteract the DMN's tendency towards hypervigilance in Brain 1.0. By being able to step back and observe our DMN, we can become aware of how tension and conflict trigger Brain 1.0, hyper-focusing our attention on potential threats and amplifying the impact of the threat(s) on us—while ignoring the impact of our actions and words on others. We can also be aware of how the DMN shifts into Brain 2.0 trying to control, mitigate, or even deny threats through short-term actions that may undermine our long-term security and well-being. Once we have developed the ability to direct and guide our attention, we can make a conscious choice to activate the resilience system so that we can shift further into Brain 3.0 and regain our ability to see a bigger picture. This ability to take our attention back from a hypervigilant DMN is a prerequisite for opening our awareness to possible options for addressing and resolving conflicts.

The Resilience System involves two components. The first is the capacity to use our attention system to notice and attune to signals from our body that indicate when the sympathetic nervous system (SNS) is setting off a fight-or-flight response. This triggers a biochemical cascade that directs blood flow away from the prefrontal cortices of the brain (where the four neural systems are housed) to our arms and legs, which temporarily impairs the functioning of the prefrontal cortices. The signals from our body could be sensations such as tightness in particular areas where we tend to hold stress, such as a clenching of the jaws, hands, shoulders, or back. Other signals could include butterflies in the belly, faster heart rate and pulse, restlessness, fidgeting, a headache, or brain fog.

Once we notice the signals, the second component of the resilience system is the ability to stimulate the parasympathetic nervous system, also known as the rest-and-digest system, to restore blood flow to the prefrontal cortices to regain access to the important capacities they give us. A simple technique for doing this is to proactively take a few slow, deep breaths. Inhale slowly until you fully inflate your lungs. Pause for 2 to 3 seconds. Then exhale slowly until you fully deflate your lungs. Again, pause for 2 to 3 seconds before you inhale again. Doing this at least 3 times tells your body to transition out of sympathetic arousal.

These two components of the resilience system give us the capacity to regulate our sympathetic nervous system and reduce the harmful effects of chronic stress on the body (such as inflammation, insomnia, and various autoimmune disorders). Together the attention system and resilience system enable us to maintain calm and composure in times of crises by preventing Brain 1.0 from hijacking our attention in ways that further arouse the sympathetic nervous system and by restoring blood flow to our prefrontal cortices so we can think clearly and make constructive decisions when the stakes are highest.

The Meta-Awareness System gets stronger as we use our attention system to notice, observe, and become more aware of the stories and messages that our DMN brings to our

attention without getting swept up into Brain 1.0 and/or Brain 2.0. Meta-awareness also builds upon the resilience system and enables us to discern and recognize patterns for how the DMN in Brain 1.0/Brain 2.0 keeps the sympathetic nervous system aroused and amplifies hypervigilance, anxiety, rumination, despair, or conflict escalation. Meta-awareness enables us to discern when an autopilot pattern is causing self-imposed suffering and make a conscious choice to replace it with a new pattern that fosters well-being and other outcomes that we genuinely want.

The stronger our meta-awareness system, the greater our ability to detach from our DMN and discern whether it is speaking in Brain 1.0, Brain 2.0, or Brain 3.0. This capacity develops by intentionally taking a pause to consider the outcomes of acting on urges in Brain 1.0 or Brain 2.0. This pause gives us the capacity to consciously choose not to behave in ways that dehumanize each other and increase the risk of escalation and violence. Over many years, the meta-awareness system enables us to rewire our DMN such that Brain 3.0 becomes a larger aspect of our autopilot. As this happens, we reflexively think, act, and interact in greater and greater alignment with our conscious values, aspirations, and intentions, and naturally experience a more stable sense of inner peace and harmony.

The Connection System enables us to form emotional connections, see other people's perspectives, and give and receive social support. According to research by Dr. Barbara Frederickson, activating the connection system makes us feel a sense of inner connectedness and interconnectedness with the world around us, and enhances well-being and positivity. (Frederickson 2013) During times of high stress, people with a strong connection system will tend and befriend rather than flee or fight. Among groups and communities where the connection system is strong, people naturally connect during times of adversity and crisis to build social support and rally resources to recover and rebuild in the aftermath of loss and calamity.

The problem is that when people who have experienced trauma do not have a strong social support system, their sympathetic nervous system is more likely to trigger fight-or-flight reflexes and bring their DMN into Brain 1.0. This "deactivates" the connection system, such that they instinctively withdraw and put up walls, leaving people feeling even more disconnected, isolated, and alone. When the connection system is weak, families, communities, and regions languish as they interact in Brain 1.0, allowing differences, tensions, and conflicts to tear them further apart. This is why strengthening the connection system requires that we use the attention, resilience, and meta-awareness systems to mindfully observe but not act on impulses in Brain 1.0 to disconnect and withdraw.

To help people "work-out" their connection system, I often guide people through a compassion meditation exercise that I designed to "turn on" the tend-and-befriend response and set off a biochemical cascade that enables us to feel a stronger sense of connectedness

within ourselves and with the wider community. The first part involves visualizing sending positive wishes from your heart to a younger version of you who needed support, then to your loved ones, then to your community, and finally to all human beings. The next part involves giving yourself permission to receive the positive wishes that people of goodwill across the world are sending back to you. Anyone interested in trying it can find it on the Calm Clarity website here: https://www.calmclarity.org/resources.

The Impact of Rewiring our Brains

Over ten years of sharing my user manual with diverse audiences, I have seen repeatedly how the ability to use these neural systems to shift from Brain 1.0 / Brain 2.0 into Brain 3.0 can impact people's lives. Once, after I presented at a lunch-and-learn for a large bank, I was surprised when the regional head of the bank interrupted a conversation that I was having with a manager to speak with him and give him a hug. Afterwards, the manager returned and explained that during an earlier meeting that morning, the executive had told the manager that he needed a personality transplant. By attending my talk, the executive realized he was in Brain 1.0 and apologized for taking it out on the manager. He took back what he said, communicated that the manager did not deserve to be spoken to that way, and repaired their connection.

Another story I will never forget was shared by a mother in a training I ran for a workforce development program. She was outside shoveling snow when her five-year-old son inadvertently locked them out of the house by coming out to join her. Normally, she would have reacted in Brain 1.0 by yelling at him and punishing him for locking them out. Instead, she took several slow, deep breaths to restore blood flow to Brain 3.0. Then she remembered that she had given a neighbor a spare key and that there was no need to punish her son, who was too young to understand that he locked them out. She could then use Brain 3.0 to play in the snow with him and form a heart-warming mother-son memory they would both treasure.

One of the most dramatic group transformations I saw was when I facilitated a Calm Clarity training during a summer bridge program for students from different high schools in West Philadelphia. When the program began, it felt like a powder keg where tempers could easily flare, trigger the students to vent their anger on each other, and escalate into a fight. Over the course of the program, the students realized that they are not the Brain 1.0 version of themselves and wanted to discover and experience the Brain 3.0 version of them. As they experienced this transformation, they made conscious decisions to show each other more compassion and to support each other to apply for college and pursue their long-term goals and aspirations.

During the pandemic, I gave a brief virtual presentation on the impact of trauma on brain development to a group of law enforcement professionals in New Jersey. During the group discussion afterwards, a school resource officer shared how it opened his eyes to the need to be mindful of the impact of his own state of mind on the students with whom he interacts. If school resource officers interacted with the students in Brain 1.0 and Brain 2.0, they would reinforce and strengthen Brain 1.0 and Brain 2.0 in the students. If they interacted with the students in Brain 3.0, they could support the students to activate and build Brain 3.0. This prompted the group to wonder: how would the children in their community experience and build Brain 3.0 if they primarily interacted with adults in Brain 1.0 or Brain 2.0?

I want to close by asking important questions that we, as a society, need to discuss and consider. How do we co-create the conditions that support us to interact with each other in Brain 3.0 rather than Brain 1.0 and Brain 2.0? How do we strengthen these four neural systems in ourselves so that we can see, hear, and collaborate with each other as human beings in Brain 3.0 rather than otherize, dehumanize, and hurt each other in Brain 1.0 and Brain 2.0? How do we stop giving authority and power to leaders who manipulate and use Brain 1.0 and Brain 2.0 to blame, shame, and divide us so that they can wield power over us? How do we cultivate and elevate leaders who activate and strengthen Brain 3.0 to unite us to co-create peace and prosperity?

My life experiences and my work over the past decade have taught me to see conflict and violence as alerts that we need to invest attention and resources to healing trauma and building the four key neural systems that serve as the neural pathways to peace and flourishing. The longer we wait to do this, the longer we prolong our suffering.

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