

BEYOND THE SPECTRUM



Beyond the Spectrum: Discovering the Extraordinary Ways Neurodivergent Children Create Their Own Path to Growth

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Introduction

A child that is neurodivergent is a brilliant child. They are capable of developing a wide array of neural connections in the brain that typical children are not developing. If we support them with intelligence, discipline and a superhuman amount of patience, they will grow into extraordinary adults, capable of navigating many of the most complex challenges facing the world today.

Our work begins with a deep understanding of the innate capacity of the human body to adapt to developmental challenges. With this as a first principle, we can effectively help our children to connect and grow their neural pathways towards the frontal lobe, develop executive functioning skills, and unleash their unique intelligence.

In our research, we have found that framing neurodivergence and autism through the lens of Renormalization Group theory (RG theory) has opened inspiring new pathways of understanding. RG theory, borrowed from physics, provides a framework that helps us comprehend both the neurophysiological challenges many of our children experience and the potential within these different patterns of development. It offers essential insights into how neurological and nervous system capacities can be supported toward integration and flourishing.

The tools and understandings presented in Functional Neurology, coupled with Laser Therapy and Photobiomodulation (PBM,) have proven to be essential practices that can unlock the potential in neurodivergent and autistic children. Further potential is also unlocked with the addition of carefully designed detoxification approaches that support the reduction of neurological inflammation, allowing their minds to function at their highest capacity.

We believe that as a society we find ourselves confronted by a reckoning of existential importance. With millions of neurodivergent children, very few of them receiving the support that they need, we stand at a critical juncture. If we can crack the code of what works, we can open up almost infinite possibilities for these children, their families, and the larger society.

In the following document, we share a holistic and unified approach that, when applied with skill, focus, and compassion, can bring lasting growth for our children. This is not just about addressing challenges – it's about unleashing the unique genius that each neurodivergent child brings to our world.

I. Understanding Neurodivergent Development Through Renormalization Group Theory

To better understand the complexity of neurodivergent development, we can apply Renormalization Group (RG) theory, which offers an exciting framework for understanding how the brain processes and integrates information across different scales. This perspective helps us appreciate the unique ways neurodivergent children process and experience the world.

A. Key Physiological and Neurological Factors

Several interrelated factors contribute to the unique neural processing patterns we observe in neurodivergent and autistic children:

- **Autonomic Nervous System (ANS) Patterns:** Neurodivergent children often experience distinct patterns of autonomic nervous system activity, which can manifest as heightened sympathetic activation (fight-or-flight responses) and different baseline parasympathetic tone. Understanding these patterns helps us support their journey toward comfortable engagement with their environment.
- **Interoception and Sensory Processing:** Many neurodivergent children experience their sensory world uniquely, particularly in how they process and interpret bodily sensations (interoception). This different way of experiencing sensations contributes to their distinctive way of engaging with the world and can influence how they process emotional and physical experiences.
- **Neural Circuit Dynamics:** Neurodivergent children often show unique patterns of activation between the amygdala and the prefrontal cortex (PFC). This distinctive neural pattern creates opportunities for developing specialized strategies that work with their natural processing style rather than against it.

B. The Renormalization Group Perspective on Neurodivergent Development

RG theory provides an illuminating framework for understanding how neurodivergent children process and integrate experiences across different scales of perception and meaning:

- **Microscale:** Moment-to-moment sensory experiences and emotional responses
- **Mesoscale:** Daily interactions and activities
- **Macroscale:** Overall life experiences and sense of self

In neurodivergent children, these scales of experience may be processed and integrated differently than in neurotypical children, leading to unique strengths and opportunities for growth. This understanding helps us appreciate that different integration patterns aren't deficits but rather alternative ways of experiencing and processing the world.

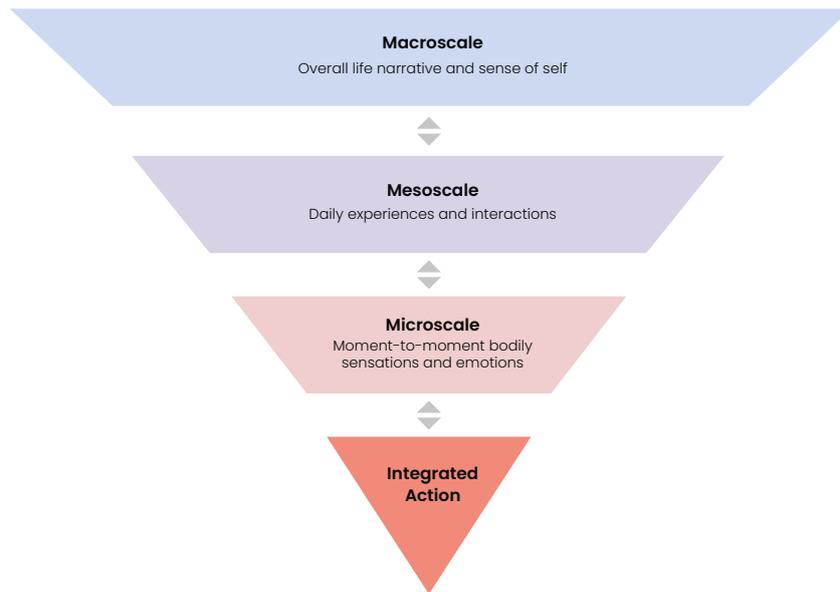


Figure 1: Renormalization Group (RG) Flow Diagram – Multiscale Information Processing in Healthy Individuals. This diagram illustrates bidirectional information flow across three scales: 1. Microscale: Moment-to-moment bodily sensations and emotions, 2. Mesoscale: Daily experiences and interactions, 3. Macroscale: Overall life narrative and sense of self. Arrows represent smooth information exchange between scales, supporting adaptive behavior and psychological well-being.

C. Information Processing and Integration

1. Neurodivergent children often exhibit a fascinating "glocal" processing style—simultaneously processing both local details and global patterns. This unique way of processing information can lead to:

- Exceptional pattern recognition abilities
- Deep focus on areas of interest
- Novel problem-solving approaches
- Unique perspectives on their environment

2. Understanding this processing style helps us:

1. Support their natural learning patterns
2. Create environments that complement their processing style
3. Develop strategies that leverage their unique strengths
4. Foster confidence in their distinctive ways of understanding the world

3. When we appreciate these different processing patterns, we can better support neurodivergent children in developing:

- Strong situational awareness that works with their natural processing style
- Learning approaches that honor their unique perspectives
- A positive sense of self that embraces their distinctive ways of experiencing the world
- Effective decision-making strategies that leverage their natural strengths

Non-Activated Brain & Nervous System

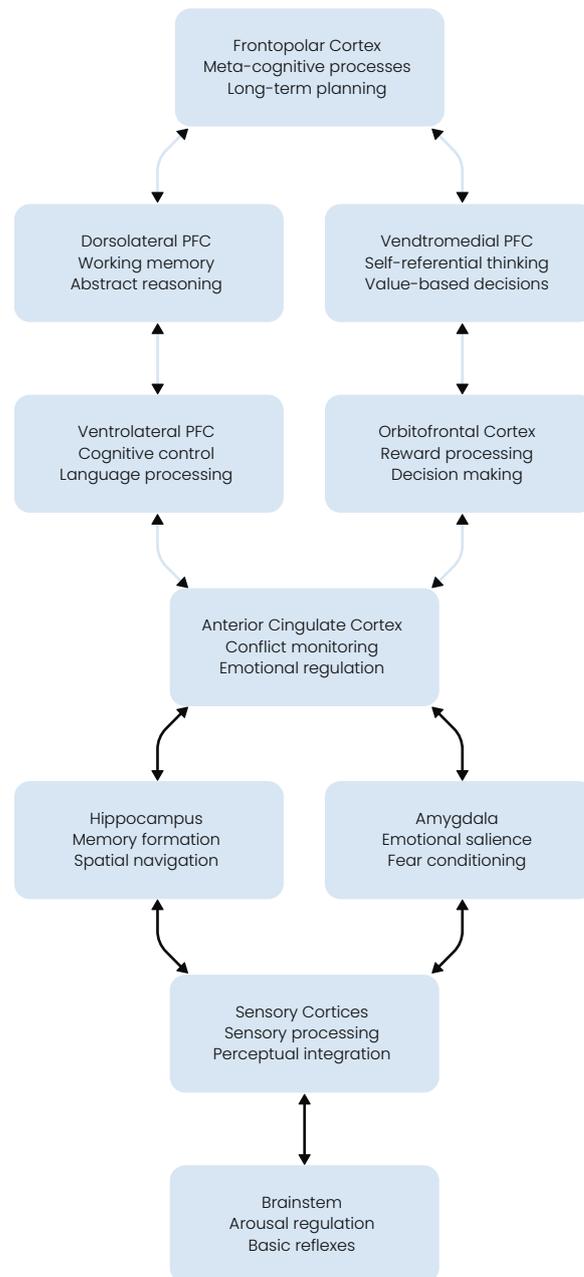


Figure 2a: This figure depicts a brain that is not in a heightened state of activation. Solid lines represent normal connectivity throughout the brain, with consistent light blue coloring indicating balanced activity across all regions. This illustrates healthy Renormalization Group (RG) flow, where information and awareness can smoothly transition between immediate, local contexts and broader, global perspectives. In RG flow terms, the non-activated brain demonstrates smooth scale transitions, allowing for adaptive integration of information from immediate, concrete experiences to abstract, global awareness. This enables flexible navigation between specific sensory inputs, emotional responses, and broader conceptual understanding of the world and self.

Activated brain and nervous system that is in a heightened state

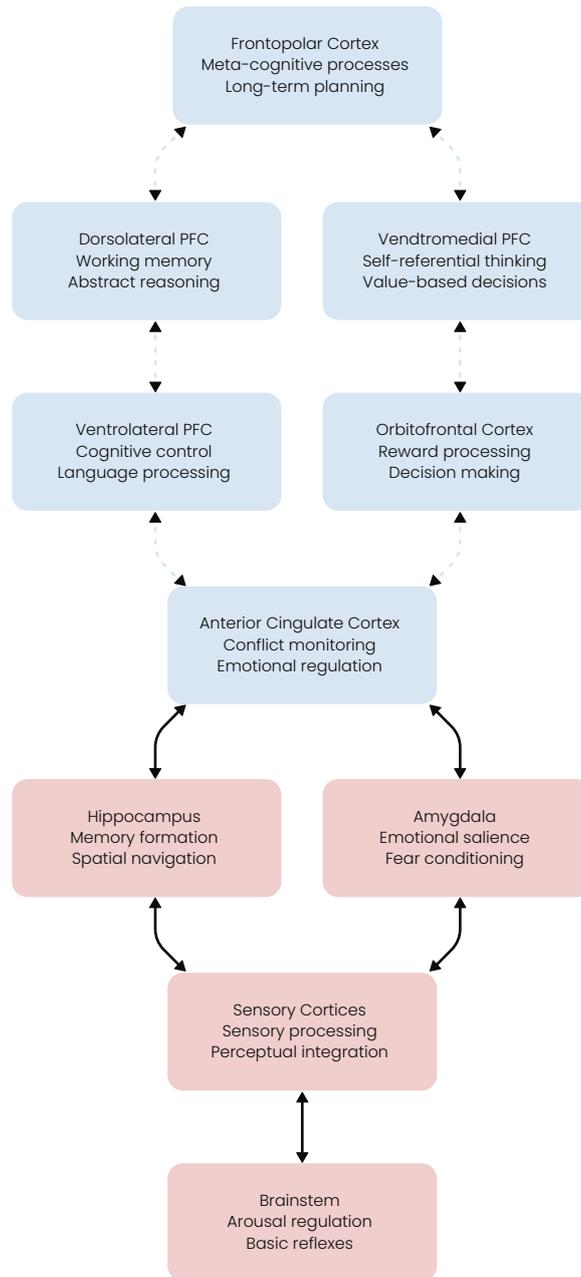


Figure 2b: This figure shows a brain in a heightened state of activation . Dotted lines in the upper part of the brain represent reduced connectivity between higher-level brain regions, visualizing the impaired communication in prefrontal areas. This can lead to difficulties in executive function, emotional regulation, and complex cognitive tasks, corresponding to decreased top-down control and regulation. Light red coloring in the lower regions (Hippocampus, Amygdala, Sensory Cortices, and Brainstem) represents enhanced activity in emotional, memory, and sensory processing areas. This can contribute to symptoms like hypervigilance, poor focus, short term memory challenges and heightened emotional responses. Solid lines between lower regions suggest maintained or enhanced connectivity in these areas.

II. Functional Neurology Approaches to Treating Neurological Imbalances and Activating Executive Functioning

Functional neurology is a vital component of the healing process that focuses on optimizing brain function by identifying and treating neurological imbalances. Functional neurology clinics (like [Infinity Functional Neurology](#) in Iowa) help children and young adults move through locked-in primitive reflex patterns while supporting the activation of executive brain functioning.

Unlike traditional neurology, which primarily focuses on diagnosing and treating disease, functional neurology aims to improve brain performance through non-invasive, therapeutic interventions. A central concept in functional neurology is neuroplasticity, which reflects the brain's remarkable ability to adapt and reorganize itself by forming new neural connections in response to injury, disease, or behavioral changes.

For neurodivergent children, neuroplasticity is the key that opens the door to enhanced cognitive function and increased ability to effectively navigate the challenges of daily life. By applying techniques that promote brain adaptation, functional neurologists can help these individuals develop compensatory strategies, leading to improved social interactions, learning abilities, and sensory processing.

Functional neurology stacks development in stages that involve primitive reflexes, vestibular, ocular, and then cognitive development. For children, we need to carefully consider the auditory process and language areas of the brain. These elements stack between vestibular and ocular development, helping the child, parents, and caregivers to recognize the incredible work their child is doing in developing their mid-brain and moving towards their frontal cortex or executive functioning.

A. 3 Phases & Development

PHASE 1:

- Joint Mobilization
- Primitive Reflexes and Postural Stability

PHASE 2:

- Vestibular Stability (Balance and Coordination)
- Head Stability

PHASE 3:

- Complex Movement
- Eye Tracking
- Optimal Adaptability

B. Key Tools and Approaches:

There are several key tools used in each phase to stimulate and support the child in their integration, development, and progression:

- **Joint mobilization:** The body in fight, flight, and freeze will adapt and learn to hold its joints and limbs in ways that "cut off" communication to the brain, creating a blind spot for the brain/body neural connection. We see this in children with various developmental differences.
- **Primitive reflex integration:** These consist of core reflexes we are all born with that assist us in our early stages of development. If these reflexes are not integrated during the first two years of life, the brain does not develop accordingly. Supporting the child in integrating retained reflexes helps them progress toward greater capabilities.
- **Vestibular development:** Strengthening the child's core and vestibular awareness is key to helping them experience themselves safely in the world.
- **Auditory processing:** Working with motor timing and sensory integration in relationship to auditory stimuli using established principles.
- **Complex movement:** Supporting the child in distinguishing between limbs and moving them accordingly as they send signals, including cross-brain and cross-body movements along with motor timing.
- **Eye tracking and strengthening:** Helping to enhance the child's visual processing through exercises that coordinate eye tracking and processing.
- **Cognitive development** becomes our framework for increasing these processes as needed, combining areas that need strengthening to create programs that target key aptitudes while supporting areas of growth.

C. Therapeutic Tools and Technologies

While progressing through these phases, as determined by each child's individual evaluation, various tools can be deployed to support integration and development:

- **Neurosage:** Uses sensory feedback (visual and auditory) to activate different brain areas, including visual and vestibular systems. Sound, color, vibration, balance, eye tracking activities, and lasers can be added or adjusted to increase inputs to specific brain areas that show less activity than others. This helps wire together brain regions to improve balance, coordination, focus, memory, attention, reaction times, involuntary movements, and mood.

D. Additional Support Tools:

- Balance balls
- Balance beam
- Vibration plate (for core balance, strengthening, and increasing neural connections)
- Rezzimax (for calming and integration)
- Photobiomodulation laser therapy ([Avant Wellness](#))
- Condensed oxygen/EWOT (helping children who are under-oxygenating)
- Oxygen chambers
- Binovi Eye Kit (pattern training)
- Blaze Pods
- Stim Pod (attaches to the ear and sends a current to soothe the vestibular nerve, promoting safety and calm)
- Metronome

III. Medical Lasers and Photobiomodulation as a Potent Catalyst for the Enhancement of Neuroplasticity and Healing

Photobiomodulation (PBM) and medical laser applications have emerged as significant therapeutic tools in addressing neurodevelopmental conditions through their direct influence on both mitochondrial function and neuroplasticity. The effectiveness of this approach is rooted in the fundamental role of mitochondrial energy production in brain development and synaptic function. When this energy production is compromised, it creates a cascade of developmental challenges, manifesting as cognitive difficulties, speech delays, and attention deficits – patterns commonly observed across various neurodevelopmental conditions.

PBM operates through the application of low-level light therapy (LLLT) to stimulate cellular repair mechanisms, reduce neuroinflammation, and promote neurological healing. This therapeutic approach has demonstrated particular efficacy in neurodivergent children, showing measurable improvements in cognitive function, memory, and mood regulation through enhanced mitochondrial activity and optimized cellular energy production.

The mechanism of PBM's effectiveness lies in its ability to enhance synaptic plasticity, facilitating the formation of new neural connections. This process is especially crucial for children with developmental differences, as it supports the brain's capacity to reorganize and integrate new motor, sensory, and cognitive functions. Clinical applications of PBM in children with autism have shown promising results in improving speech capabilities, attention span, and emotional regulation.

Furthermore, PBM addresses the critical issue of neuroinflammation, a characteristic feature of many neurodevelopmental conditions. By reducing oxidative stress and supporting

mitochondrial health in neurons, PBM helps create a more stable neurological environment conducive to healing and development. This reduction in neuroinflammation correlates with improved cognitive function and decreased behavioral challenges.

IV. Detoxification Diet

The relationship between brain inflammation and neurological function plays a central role in children's development. Dietary modifications that support the removal of heavy metals, environmental toxins, and pathogens, while addressing allergies and infections, can significantly reduce neurological inflammation. As inflammatory responses decrease and immune system function improves, neurodivergent children often demonstrate significantly increased access to cognitive and behavioral capacities previously limited by inflammatory processes.

V. A Word on Safety and Patience.

For a child with challenging forms of neurodivergence,, the need for safety pathways is very strong, and the triggers can be sensitive. Our goal during all treatment is to help them gain confidence in their abilities to strengthen their neural connections away from a fight, flight, and freeze reactivity cycle. In this way, no matter how incremental, we support them to develop the skills and mastery that they are innately trying to achieve.

VI. Conclusion

We are guided by the understanding that every child embodies their own unique pattern of growth and learning, often following paths we might not expect or immediately recognize. Rather than viewing developmental differences as deviations that need correction, we can appreciate them as expressions of neurological diversity that open doors to unexpected discoveries and transformations.

At the core of this approach is the understanding that movement isn't just about physical action – it exists in many forms and patterns, sometimes flowing, sometimes staccato, sometimes seemingly random. These movement patterns are intimately connected to how children, particularly neurodivergent children, process information, experience emotions, communicate, and make sense of their world.

This journey is rarely smooth or straightforward. Parents and children alike often face intense challenges – from overwhelming sensory experiences to emotional meltdowns and moments of deep frustration. What appears as a tantrum may actually be a child's desperate attempt to communicate their needs or process overwhelming sensations. Finding the right tools and approaches can feel like navigating a maze, especially when traditional methods don't align with a child's unique way of being.

When working with all children, and especially neurodivergent and autistic children, learning happens most powerfully through gentle exploration and discovery, never through force. While neurotypical brains often seek predictable patterns of organization, neurodivergent children's brains and nervous systems frequently create unique, seemingly chaotic patterns of processing and learning.

This process isn't about reaching predetermined milestones but about recognizing and nurturing each child's distinct form of intelligence and potential, particularly when their path may appear unconventional. When we embrace these diverse ways of processing and learning – including the challenging moments that often accompany growth – we often witness unexpected and remarkable transformations as children discover their own authentic ways of moving, learning, and engaging with their world – ways that might challenge our traditional understanding of "efficiency" but are perfectly suited to their neurological makeup.



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