

# Welcome

## Calming Fight, Flight, and Freeze with Neurodevelopmental Movements

Presented by  
**Sonia Story**

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## Sonia Story

Neurodevelopmental Movement Educator

- 🌀 Developer of the Brain and Sensory Foundations curriculum
- 🌀 Wrote white paper and Evidence eBook with supporting research, relevance, and rationale
- 🌀 Presenter, Autism One conference, 2018 and 2023
- 🌀 Currently enrolled in Master's Program in Movement Science



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# What are neurodevelopmental movements?

Crucial for maturity of the brain, body, and sensory systems



## *Innate movements of womb and infancy*

- ⦿ Infant reflexes—primitive and postural.  
*Involuntary movements in response to a sensory stimulus*
- ⦿ Developmental movements
- ⦿ Innate rhythmic movements—sucking, crawling, kicking, and many others.



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## Innate Infant Movements Have Jobs

- ⦿ **Brain and Nerves**—develop the brain and nerve networks
- ⦿ **Senses**—provide stimulation necessary for sensory development
- ⦿ **Muscle Tone, Muscle Strength, Stamina, Coordination**
- ⦿ **Emotional and Social Skills**—brain maturity to be able to manage the emotions, control impulses, communicate
- ⦿ **Learning**—develop the brain and sensory foundations for learning
- ⦿ **Balance and Posture**—ability to be upright, aligned, free of tension

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Posture • Core strength • Balance • Muscle development • Sensory development  
Focus • Speech • Social-emotional skills • Impulse control • Leaning • Calm and stillness  
They are all inter-related and all depend on infant movements (Blomberg, 2007)

**Without innate movements, full development cannot take place**—poor focus, sensory discomfort, inability to be still, and anxiety are common.



\*Photos from Kathleen Porter, author of *Healthy Posture for Babies and Children*  
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## Common challenges when innate infant movements are hindered in development, or reactivated with trauma

- ⊙ Anxiety—Fight or flight states
- ⊙ ADD/ADHD
- ⊙ Sensory Processing Disorders
- ⊙ Poor Balance
- ⊙ Freeze states; withdrawal
- ⊙ Muscle aches and tension, fatigue, headaches
- ⊙ Learning delays
- ⊙ Poor core strength & posture
- ⊙ Sleep issues

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## Are deficits in early motor skills connected to anxiety?

Gross motor performance in infancy and early childhood was predictive of the levels of anxious and depressive symptomatology for children between the ages of 6 to 12 years (Piek et al., 2010).



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“The foundations for skills that are needed throughout life are established in early development”  
(Kornhaber et al., 2007, p. 484).

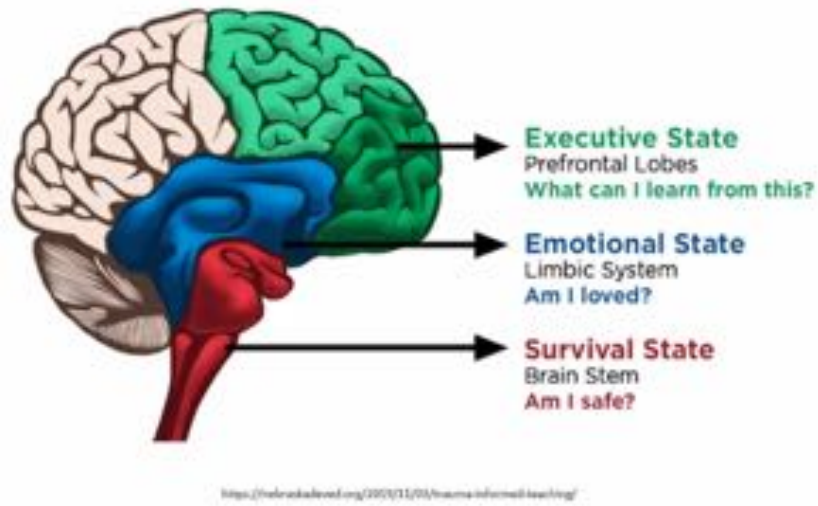
Kornhaber, L., Ridgway, E., & Kathirithamby, R. (2007). Occupational and physical therapy approaches to sensory and motor issues. *Pediatric Annals*, 36(8), 484-493.

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## Primal Brain and Neurological Safety

“For most children with developmental trauma, their neurology is impaired at the level of the primitive brain. Yet most therapeutic interventions target higher brain regions (limbic and cortical).”

Teri Gelgood, LMFT



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We can transform fight-flight-freeze states  
by using the principles of healthy  
development and neuroplasticity.

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## Infant Rhythmic Movements (IRM) Excellent first movements to help with anxiety



- ⦿ All healthy babies do a large variety of innate rhythmic movements in early infancy
- ⦿ Calm and mature the brain, body, and sensory systems
- ⦿ Key for developing resilience & sensory integration
- ⦿ Key for healing trauma

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## Rhythmic Movements for Calming and Brainstem Regulation— Excellent for healing trauma and anxiety



Bruce D. Perry, MD

The only way to move from high anxiety states, to calmer more cognitive states, is **rhythm**—*patterned, repetitive, rhythmic somatosensory activity.*

Photo and paraphrase of interview excerpts with Bruce D. Perry, MD from <https://attachmentdisorderhealing.com/developmental-trauma-3/>  
Accessed, 10-18-2018 (Emphasis Added)

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## Challenges associated with atypical rhythm



- ⦿ Speech and language disorders
- ⦿ Developmental coordination disorder
- ⦿ ADHD symptoms
- ⦿ Dyslexia

These are all associated with atypical rhythm, or “rhythmic impairment”

Ladányi E.; Persici V.; Fiveash A.; Tillmann B.; Gordon R.L. (2020). Is atypical rhythm a risk factor for developmental speech and language disorders? WIREs Cogn Sci. 2020;11:e1528. <https://doi.org/10.1002/wcs.1528>

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## Help for Severe Behavior—Child in Fight-or-Flight Calms with IRM

### OT is amazed at changes in 6 weeks

I had one of my patients begin doing the rhythmic movements [from the Online Brain and Sensory Foundations course] 6 weeks ago. This child is 8 years old and attends a special school for emotionally and behaviorally challenged children that can't attend regular public education. When he gets frustrated at school, it typically results in a major melt down with hitting, throwing desks and chairs, and yelling. He has had 4-5 adults holding him down on the floor at times. **This boy has not had hardly any behavior or emotional outbursts like I described since he has started doing the rhythmic movements at home or at school.**

He has already made **great gains with balance, coordination, sensory processing, impulse control, and frustration tolerance and it has only been 6 weeks. Amazing!!**



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## From Reactive Attachment to Cuddling with Mom

"I have been practicing OT for almost 25 years, of which at least 20 of those years have been in pediatrics. I have attended many conferences / courses over the years. This course by far has been the most beneficial. It is the only course I have attended that some part can be applied to every student / client on my caseload."

Jennifer Everett, OTR

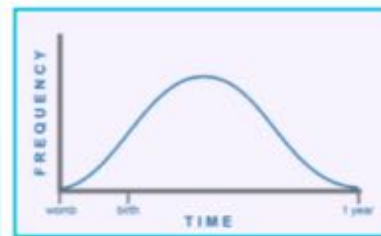
Extreme fear of going into public bathrooms without noise-cancelling headphones	Doesn't need to wear noise-cancelling headphones
Frequent gagging due to smell	Smells are no longer an issue
Would frequently not respond to name being called, despite having been tested by audiologist with normal results	Significant improvement to answer name when called (still needs work)
Only had a 1- to 2-minute attention span for play dough, trucks, helping with chores, or even helping mixing treats	Increased attention for playdough, cutting, chores, table-top activities
Tense in public situations, often "on-guard," anxious about school	No longer on-guard all the time; loves school
At school, was ggressive, would shove and bite, and would not "calm down"	Teachers have not noticed any behavior issues



## Life Cycle of a Primitive Reflex

© Primitive infant reflexes are designed to

- Emerge
- Repeat until integrated (jobs are complete)
- Become dormant—inhibited by higher brain centers



Innate infant reflexes have long been used in infant assessment for determining the health or dysfunction of the central nervous system (CNS) Fiorentino, 1973 .





## Common Challenges Linked with Retained Primitive reflexes



- ⊙ Anxiety
- ⊙ ADHD
- ⊙ Sensory disorders
- ⊙ Learning challenges
- ⊙ Poor Balance, poor posture
- ⊙ Speech & language challenges
- ⊙ Emotional and behavior difficulties
- ⊙ Schizophrenia

These conditions are all associated with retained primitive reflexes in research literature.

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### RESEARCH: Emotional and Behavioral Difficulties Linked to Motor Skills Deficits and Retained Primitive Reflexes



British Journal of Educational Psychology (2020), 90, 719-735  
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[www.wileyonlinelibrary.com](http://www.wileyonlinelibrary.com)

#### Motor problems in children with severe emotional and behavioural difficulties

Bronagh Taylor<sup>1</sup>, Donncha Hanna<sup>1</sup> and Martin McPhillips<sup>2\*</sup>

<sup>1</sup>Queen's University, Belfast, UK

<sup>2</sup>Edge Hill University, Lancashire, UK

For more information about innate movements, sign up for our free monthly newsletter at <https://moveplaythrive.activehosted.com/f/17>

Children with emotional and behavioral difficulties (EBD) also tend to have motor skills deficits and retained primitive reflexes compared to children with no EBD.

Motor issues and retained primitive reflexes were each statistically significant predictors of EBD.

"Specific approaches aimed at improving different aspects of motor function in school children with EBD should be incorporated into classroom practice as a matter of urgency, with a particular emphasis on early intervention" (Taylor et al., 2020).

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## Moro reflex—Key to a felt sense of safety and calm



- ⦿ Can be stimulated by multiple sensory inputs—arms and legs extend and move outward in a startled pattern, then arms return inward with a clinging motion.
- ⦿ The motion is often accompanied by a gasp and/or a cry
- ⦿ Adrenaline and cortisol are produced during the Moro response
- ⦿ Unintegrated Moro reflex is associated with constant fight-or-flight states and increased sensitivity.

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## Fight-or-flight states are linked with retained Moro reflex



- ⦿ Physiological responses of Moro reflex—increased heart rate, increased breathing rate, sweating, secretion of adrenaline and cortisol
- ⦿ Retained Moro = same as CNS states of anxiety
  - Feeling keyed up, on edge
  - Irritability
  - Muscle tension
  - Easily fatigued
  - Elevated stress hormones
- ⦿ Retained (active) Moro reflex could result in inattention, anxiety, hyperactivity, and sensory challenges

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## Mother and OT See Great Accomplishments for Boy with Severe Trauma

Submitted by Lisa Van Heukelom, OTR/L



From RAD to Playing with Siblings

Before	After
Multiple outbursts per day	Outbursts reduced to a couple of times a week
Outbursts were often directed toward siblings	Less aggressive toward siblings
Difficulty with transitions	Improvements at home with self-regulation and ability to transition
Did not tolerate schedule changes very well	Tolerating changes to schedule a little better and does not always feel the need to be in control

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No more headaches for adopted daughter

"I am pleased with her progress and think that she notices as she is very compliant with the activities."  
N.K., mother

Before	After
Complained of headaches	Fewer headaches
Would experience neck pain when working at the tabletop	Now able to flex her neck to work on tabletop tasks without having neck pain
Strong startle reaction	Less noticeable startle reaction
Would have strong emotional reactions if she said something funny and people laughed suddenly	Less reactive to people laughing, and is even beginning to laugh at herself
Would go into sullen moods over what seemed to be minor issues	More stable moods
Had difficulty with urinary incontinence during the day and at night	Urinary problems have resolved
Demonstrated very low frustration tolerance; would give up before even trying challenging tasks	More apt to persevere with difficult tasks

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## Retained Primitive Reflexes Linked to Mental Health Challenges



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### The role of neurological-developmental delay in childhood psychopathology.

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Friedlander, S., Pothier, P., Morrison, D., & Herman, L. (1982). The role of neurological-developmental delay in childhood psychopathology. *American Journal of Orthopsychiatry*, 52(1), 102-108. <https://doi.org/10.1111/j.1939-0025.1982.tb02669.x>

Employing a scale with demonstrated reliability, this study compared the relative frequency of primitive reflexes and abnormal postural adjustments among normal, neurologically handicapped, and emotionally disturbed children. Results demonstrated the greater frequency of these developmental signs in the two groups manifesting developmental abnormality, and are interpreted as supporting the presence of developmental delay in childhood psychopathology. (PsycInfo Database Record (c) 2022 APA, all rights reserved)

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### Prevalence of retained primitive reflexes in patients with anxiety disorders

View/Open

ForrestDS\_2002redux.pdf (17.87Mb)

Date  
2002

Author  
Forrest, Diane Sutherland

Metadata  
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Anxiety is not only one of the mental health disorders most commonly referred to clinicians, but is also a research interest, producing subsequent modification in treatment approaches. However, there are suggestions in the literature that the effectiveness of some psychological treatments have not been systematically evaluated (Department of Health, 2001), or that treatment studies have employed methods unrepresentative of everyday clinical practice (World Health Organization, 2000). Furthermore, from analysis of outcome studies, psychological therapies have been reported as effective for only half of those treated (Fisher & Durham, 1999). These findings suggest that there are individuals with anxiety who fail to respond to available therapies, and that alternative approaches for this group are not well studied.

One biologically-based explanation for variable responses to treatment cites the possibility of anxiety as resulting from failed development of primitive and postural reflexes, necessary for processing sensory information and maintaining gravitational security. This theory is central to the work of the Institute for Neuro-Physiological Psychology (I.N.P.P.), recently applied to research which identified infantile reflexes, and failed transformation to adult responses, in a population of adults with differing subtypes of anxiety (Blythe, 1999).

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## An exploration of the relationship between unintegrated primitive reflexes and symptoms of anxiety in children between 10-13 years in the Western Cape Province of South Africa

Carter, Tamara-Lyn

URI: <http://hdl.handle.net/10500/27506>

Date: 2020-02

Type: Dissertation

### Abstract:

Anxiety Disorder is one of the most common disorders experienced by children and, if not managed, can extend into adulthood. Research has established a link between unintegrated primitive reflexes (UPR) and Learning Disorders. Learning Disorders are often co-morbid with symptoms of anxiety, however, the relationship between symptoms of anxiety and UPR have not been studied. This study aims to explore the relationship between the UPR and symptoms of anxiety in children between 10 – 13 years of age. No correlation was found between the total primitive reflex score and total symptoms of anxiety score; however, a significant relationship was found between symptoms of anxiety and the Moro, Plantar and Spinal Galant reflex. These UPR play an important role in balance. Research on balance dysfunction indicates a relationship with symptoms of anxiety. Prenatal maternal stress, common childhood illness and comorbidity with ADHD were also found to be factors in symptoms of anxiety in children.

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## Better balance lowers anxiety, increases self-esteem



Research in Developmental Disabilities

Volume 30, Issue 3, May–June 2009, Pages 486–495



### Balance treatment ameliorates anxiety and increases self-esteem in children with comorbid anxiety and balance disorder

Orit Bart<sup>a</sup>, Yair Bar-Haim<sup>b</sup>, Einat Weizman<sup>a</sup>, Moran Levin<sup>a</sup>, Avi Sadeh<sup>b</sup>, Matti Mintz<sup>c</sup>

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<sup>c</sup> Psychobiology Research Unit, Department of Psychology, Tel-Aviv University, Israel

Bart, Orit; Yair Bar-Haim; Einat Weizman; Moran Levin; Avi Sadeh; Matti Mintz

*Research in Developmental Disabilities*, 30, 486–495, 2009

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## Highly Anxious 7-Year-Old Separates from Mother, Gains Balance, and Develops Nice Handwriting

Submitted by Anonymous parent



"It's Like Watching a Different Kid"

"In the beginning, my child would not leave my side. Everywhere I went, he went. At night, he would not sleep alone. . . within about 2-3 sessions, he was letting me leave the room at night and sleeping alone. I had to leave the door open, leave the hallway light on, and talk to him from my bedroom, but still that was a huge difference. I was shocked. . . within a month or two, he progressed to being able to play separately in a different room. . ."

Before	After
Would not leave mother's side	Able to play separately in a different room
Would not sleep alone	Allows mother to leave the room at night and sleeps alone
Complained that the bus, cafeteria, and gym were too loud	Not as sensitive to noise
Had a hard time standing on one leg	Improved balance; steadier and not falling over constantly
Fatigued when writing	Hands do not get as tired anymore when writing
Poor penmanship	Teacher says he has nice handwriting!

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## A Sensory-Motor Approach Innate Rhythmic Movements and Primitive Reflex Integration



Teri Gelgood, LMFT

"I have been more than thrilled with the results I have been seeing in the short time I have been using neuro-sensory-motor interventions with clients. Some examples include a toddler no longer having separation anxiety when her adoptive mother has to go somewhere without her, and a 9-yr old boy having fewer dissociative, aggressive episodes at home."

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## Key Points



- ⦿ Retained primitive reflexes often play a role in sensory disorders and anxiety and fight-flight-freeze states.
- ⦿ When balance skills are poor, anxiety is common. Conversely, improving balance in children lowers anxiety, increases self-esteem, improves focus.
- ⦿ Innate neuro-movements appear to transform anxiety disorders by calming and developing the brain and sensory systems