



## *Wired For Learning?*

### The Hidden Role of Primitive Reflexes

Written by a  
Neuroplastician

ANNEMARIE SMELLIE

# *AnneMarie Smellie*



I am a Neuroplastician and founder of  
Quester Therapies, working with  
neurodiverse children and adults,  
helping them build stronger  
foundations through:

Retained primitive reflex work  
Auditory profiling  
Nutritional and toxicity assessments  
Mindset and emotional regulation

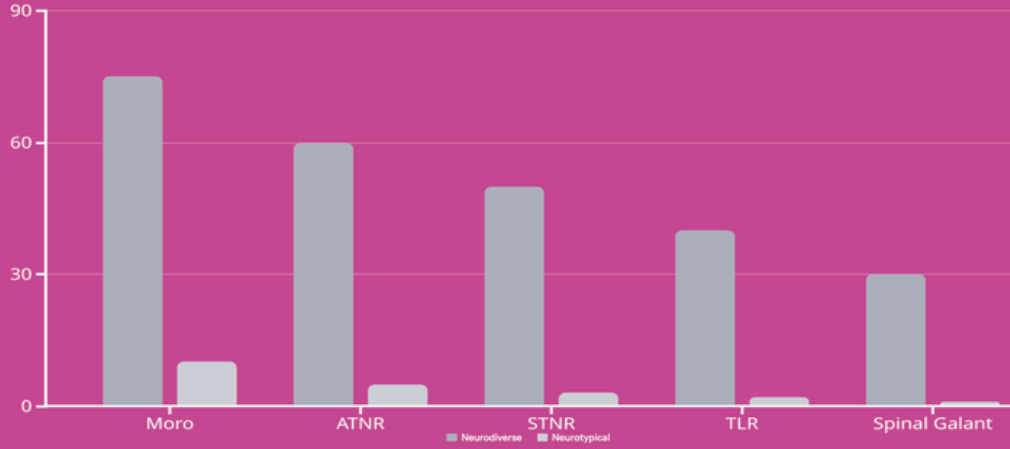
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## Introduction

As parents, we often wonder why certain things seem so much harder for our children, whether it's sitting still, concentrating in class, or coping with big emotions. What many of us don't realise (and I certainly didn't when my children were young) is that some of the answers lie in something very natural: the primitive reflexes we are all born with.



# Prevalence of Retained Primitive Reflexes in Neurodiverse Individuals







This chart illustrates the prevalence of retained primitive reflexes among neurodiverse individuals. The data is based on a meta-analysis of multiple studies published in the Journal of Developmental and Behavioral Pediatrics. The Moro reflex is the most commonly retained, followed by ATNR and STNR. These reflexes can impact various aspects of development and function.

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As you will see in the above chart, the Neurodiverse Individuals have more retained primitive reflexes than those who are 'Neurotypical'

## Why Reflexes May Be Retained

-  **Pregnancy Stress**  
Hormonal influences can affect reflex development.
-  **Birth Complications**  
Traumatic births or C-sections may interrupt natural progression.
-  **Early Environment**  
Poor neonatal conditions affect neurological integration.
-  **Childhood Stress**  
Emotional factors can inhibit reflex maturation.



# *Primitive Reflexes*

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Primitive reflexes start in the womb, they are all about the development of our body and mind, creating a two-way connection between them (neural pathway), they enable us to act upon signals before they reach the brain e.g. moving a hand quickly away from a hot fire.

Life may have evolved but the way that babies evolve into mature human beings hasn't - they still need the same stimulus as in centuries before. This involves time to develop and proper communication with parents.

From conception, a baby is as one with its mother, experiencing every movement, sound, food/drink and emotions that the mother does.

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Movement is the way that these primitive reflexes develop. Just like in nature each animal/plant has a set way of growing and learning about itself - so do we. Even in the womb the baby needs the stimulus of movement from it's mother to develop.

There is a developmental pathway of movement, once a reflex has had the correct stimulation it is integrated into the central nervous system, then allowing the next one in the sequence to show itself.



Maternal contractions provide possibly the deepest massage we will ever experience in our lives, helping to rid the lungs of fluid in preparation for breathing, priming the kidneys for effective urination after birth and awakening the sensors of the skin and proprioceptors located in the muscles, tendons and joints for control of movement in a gravity based environment.



The birth process itself provides stimulation to the reflexes, which in turn help the baby move in particular ways in order to go through the birth canal. Vaginal delivery also enables the baby to 'prime' the immune system as the baby is exposed to bacteria normally present in the maternal vaginal and anal tracts. This helps to confer natural resistance to exposure to life.

Cesarean births do not give the stimulation that the baby requires and in some instances this leads to retention of primitive reflexes. However, these reflexes may be retained due to many other factors e.g. too quick a labour/ forceps... There is no definitive answer.

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These primitive reflexes have a timeline and should be integrated into the central nervous system by the time the baby is approximately one year old. If they are 'retained' beyond this time the child/adult may display certain symptoms such as clumsiness, motor difficulties, restlessness. They can also lead to anxiety and difficulties with eye functioning e.g. horizontal eye tracking and processing skills.



Primitive reflexes also have an impact on our senses. The clue is in the word 'primitive' - it's all about our most basic reactions, needing to be on 'high alert' in case of trouble. Our senses provide information about our environment, this information is provided by our vision, hearing, touch, taste, sound, smell, balance (vestibular system) and proprioception (the body's ability to sense its location). There is also a lesser known sense called interoception, this helps us to understand what is going on inside our bodies e.g. whether we are hungry, thirsty, hot, cold etc.

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Children/adults who have a lack of interoceptive senses can also have trouble 'feeling' their emotions. They are not tuned into their bodies and unable to interpret their body sensations, making it difficult to clearly identify their emotions. A child/adult may retain their primitive reflexes for a number of reasons.



Babies who skip developmental milestones such as walking without first crawling (or not crawling enough before walking) may be more likely to retain these reflexes. There are significant studies which show that many children/adults who have learning difficulties including dyslexia, dyspraxia, dyscalculia, ADHD/ADD etc. have clusters of retained primitive reflexes and under-developed postural reflexes (which keep the body upright and aligned).

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# *The Main Reflexes*

## Fear Paralysis



Fear paralysis is our deepest emotional response, it is like being a rabbit in headlights - completely frozen and unable to move. This reflex is associated with attachment issues, about being secure in social situations and understanding the world around us. Reactions at this level are often subconscious - it's as though our central nervous system is trying to keep us in a safe place.

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## **Fear Paralysis**

A retained fear paralysis reflex may lead to the following:

- Fear of trying something new
  - Compulsive traits
  - Irrational fears
  - Anxiety
  - Disturbed sleep
  - Over / under attachment to adults and peers
  - Fear of social environments
  - Difficulty interacting
  - Emotional irregularity
  - Difficulty settling
  - Exaggerated need for routines
  - Dislikes of change in routines
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## The Moro Reflex

The moro reflex is involved from the very first moment the baby takes its initial breath independently from its mother. The sudden noise, light and sounds at birth, initiates it. It is also seen as an emotional alarm call from the baby to its parents to indicate when they sense a sudden change in their internal and external environment that they are upset by.

If their concerns are met and they feel safe, the central nervous system will start to trust that they will be supported and the baby relaxes and starts to explore their environment through their senses - vision, hearing and body movements. These all provide vital sensory information which enters the central nervous system and activates the brainstem and delivers direct stimulation to the newer parts of the brain - leading to arousal and attention.



The Moro reflex also has a biochemical effect due to over-production of the stress hormones, cortisol and adrenaline - which increase sensitivity and reactivity. This creates an over-reaction to stimuli. It also lowers the efficacy of the immune system responses, leading to allergies and sensitivities. With some people it increases the glucose metabolism, which can mean an onset of fatigue and mood swings.

A retained Moro reflex may lead to the following:

- Over-reactivity/hypersensitivity
- Vestibular problems
- Motion sickness
- Balance problems
- Visual perceptual difficulties
- Problems with ocular-motor functioning (eye movements)
- Immature eye movements (which make it hard to screen out background visual information, leading to distractibility)
- Difficulty catching a ball or processing rapidly approaching visual stimulus

And More...

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- Delayed pupillary constriction to bright light resulting in photosensitivity
  - Auditory confusion/overload/hypersensitivity to loud noises (again, this can lead to distractibility)
  - Poor impulse control
  - Problems with attention/being easily distracted
  - Angst
  - Dislike of change
  - Need to control events (OCD, phobias, anorexia)
  - Panic attacks
  - Emotional immaturity
  - Mood swings
  - Body armouring (dislike being touched)
  - Hard to accept criticism
  - Hyperactive and then fatigued
  - Reactive hypoglycemia (sugar lows)
  - Difficulty making decisions
  - Weak ego/low self esteem/insecurity
  - Physical timidity
  - Tendency to allergies/sickness (because the body is in a perpetual state of stress)
  - Hypersensitive to certain medicines
  - Shallow breathing (poor carbon dioxide reflex)
  - Adrenal fatigue
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## Tonic Labyrinthine Reflex (TLR)



The Tonic Labyrinthine Reflex (TLR) is one of the earliest reflexes to develop in a baby, starting in the womb. It's closely connected to how your child experiences balance, posture, and even their sense of space in the world.

When a baby tilts their head forward or backward, the TLR helps their body respond automatically. For example:

When the head tilts forward, the body naturally curls in.

When the head tilts back, the body tends to arch and stiffen.

This reflex is meant to integrate (or “switch off”) by around 3½ years of age. Once it does, a child can more easily separate head movement from body movement, an essential skill for sitting upright in a chair, coordinating their hands and eyes for writing, and feeling secure in space.

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If the TLR doesn't integrate properly, children may experience:

- Poor posture or slumping at a desk
  - Difficulty with balance, coordination, or sports
  - Motion sickness or dizziness
  - Challenges with spatial awareness (bumping into things, struggling to judge distance)
  - Fatigue from trying to stay upright
  - Problems with concentration, as the body is working overtime to compensate
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## Asymmetrical Tonic Neck Reflex (ATNR)



The ATNR is known as the 'fencing pose' - due to the movement of the body when the head is rotated. It is also considered to be the 'learning reflex' due to its connection with people with dyslexia. The ATNR is a complex reflex that has effects on vision, movement and the auditory system. All these areas need to be balanced to allow effective learning integration.

The movement of the arms and legs differentiate one side of the body from the other, teaching the brain where the centre of the body is located. This then helps with balance skills and spatial awareness.

Once the ATNR has been integrated into the central nervous system it helps to create neurological connections between both sides of the brain - essential for processing and interpretation of the sounds and images a child hears and sees. This neurological maturity is essential for sports, reading, writing and many other areas.

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Retention of this reflex can make it difficult for a child/adult to put their ideas down onto paper, as they cannot use visual and hearing information together. It affects the ability of the eyes to track horizontally, affects balance, and is sometimes a factor in the mismatch between a child/adult's verbal ability and what they are able to write down.

Because nothing happens automatically, there is much additional cognitive effort required to read/write. This makes it hard to also have to think about the content of what is being written/read or any questions being asked at the same time.



A retained ATNR may lead to the following:

- Poor coordination (difficulty integrating both sides of the body)  
Lack of fluidity and rhythm in movement
  - Some difficulty with eye hand coordination
  - Mixed laterality (uses different hands for different activities)
  - Delay in establishing a dominant hand (after the age of 4)
  - Difficulty using two hands in a coordinated manner (affects use of cutlery, cutting and writing skills)
  - Poor balance
  - Sitting awkwardly at a table when writing (may turn the body to the side)
  - Difficulty sustaining attention
  - Fatigue
  - Difficulty using their two eyes together and when eye-tracking left to right (may lose their place when reading which will affect reading comprehension)
  - Difficulty writing down what they are capable of saying (discrepancy between verbal ability and academic performance)
  - Difficulty reaching their academic potential
  - Neck stiffness, awkwardness in turning the head from left to right
  - Appears to not hear or miss hear verbal information and instructions
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## Symmetrical Tonic Neck Reflex (STNR)



The STNR teaches the brain about the upper and lower parts of the body so that instead of the whole body being in either extension or flexion, the baby is able to move either the upper or lower part of the body independently. It plays an important role in postural tone, establishing the near/far accommodation of the eyes and vertical eye tracking.

The STNR is important in helping to inhibit the TLR (whole body response to gravity). It helps the infant pull up from sitting to standing. It also allows the baby to rock backwards and forwards, building its muscles in preparation for crawling.

Young children with a retained STNR will often sit in a 'W' leg position, or with their legs wrapped around the chair and arms fully extended out, making writing difficult. Alternatively, if they flex their arms to write, they may need to extend their legs fully under the table. This can, in turn, affect concentration, as they are not able to sit comfortably.

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A retained STNR may lead to the following:

- A tendency to slump over the desk when writing
  - Messy eating
  - Difficulty mastering co-ordination when swimming
  - Curved posture when walking (with shoulders forward and a slight lean)
  - Reduced eye hand coordination
  - Failure or being late to crawl as an infant
  - Appearing disorganised, forgetful and needs help for planning skills
  - Getting tired easily when reading or copying text
  - Difficulty with spatial planning in movement as well as when writing and drawing
  - Difficulty standing on one leg when the eyes are closed
  - Stiffness or reduced movement noticeable in the lower back
  - Disconnection between what they think and their ability to express their understanding in schoolwork or speech
  - Heavy when running and difficulty picking up speed
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## Spinal Galant Reflex



The spinal galant reflex is a spinal reflex rather than a primitive reflex. When the side of the spine is stroked with a brush the hip on that side reacts by moving outwards like a flick.

This reflex helps the foetus move around in its mother's womb and seems to be a primitive conductor of sound (through vibrations).

It helps with the flexibility of the baby to move down through the birth canal and subsequently assists in a later amphibian reflex and the ability to commando crawl (on the stomach). It is also thought to initiate the kidney's process of urination.

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A retained spinal galant reflex may lead to the following:

- Continued bed-wetting past 5 years of age
  - Clumsiness and reduced coordination of the upper and lower body
  - Fidgeting (difficulty sitting still)
  - Over sensitivity in the lower back area
  - Sensory sensitivity to labels and tight clothing, especially trousers
  - Difficulty with attention and concentration
  - Difficulty in crowds
  - Uncomfortable in social situations
  - Poor attention and concentration
  - Problems with auditory processing
  - Nasal congestion/mouth breathing/snoring
  - If the spinal galant is on one side only and left untreated, it can result in scoliosis
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## Palmar Reflex



The palmar reflex is an involuntary reaction to when something is put in a baby's hand, it automatically grasps it. This then develops into being able to independently move each finger which provides the ability to be able to hold things such as cutlery or a pencil.

A retained palmar reflex may lead to the following:

- Weakness in hand strength
  - Immature use of the two hands together
  - Difficulty isolating each finger
  - Reduced hand eye co-ordination
  - Delay in establishing early pen and paper skills
  - Little or no interest in colouring, drawing or cutting
  - Immature pencil grip affecting handwriting
  - Difficulty with spelling and writing finger which provides the ability to be able to hold things such as cutlery or a pencil.
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## The Plantar/Babinski Reflex



Just like the palmar reflex, this reflex is initiated through touch - the toes will curl down and grasp an object. It is important for this reflex to be released to enable the toes to act separately and lie in a flat position in order to support the body and allow stability for walking. The babinski reflex helps to define the foot arch and helps to create sensory awareness from both sides of the foot.

Retained plantar and babinski reflexes may lead to the following:

- Difficulty / delay in learning to walk
  - Poor balance
  - Immature foot arches and ankle stability
  - Tip toe walking
  - Lower back pain when walking and standing
  - Reduced eye foot coordination
  - Difficulty wearing shoes (e.g. if toes curl up)
  - Reduced stability in the feet in standing (especially noticeable in the dark when vision cannot help)
  - Reduced speed when running
  - Laboured coordination and speed for sport
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Primitive reflexes are a natural part of every child's early development. They're automatic movements, built into our nervous system from before birth, that help babies survive, grow, and begin exploring the world.

Reflexes like the Moro, TLR, and ATNR guide everything from the first breath and suckling reflex, to rolling, crawling, and eventually walking. In those early months and years, they serve an essential purpose, giving the body and brain the practice they need to build more complex skills.

As children grow, these reflexes should gradually integrate — which means they switch off as the brain matures and higher-level control takes over. Integration is what allows a child to sit upright without slumping, write smoothly across a page, balance confidently on a bike, or focus on schoolwork without constant fidgeting. In other words, the integration of primitive reflexes creates the foundations for learning, movement, and emotional regulation.


When reflexes don't integrate fully, however, it can leave a child working harder than they should. Their body may still be “stuck” in those automatic patterns, pulling them off balance, tiring them out, or disrupting their focus. For neurodiverse children especially, unintegrated reflexes can add another layer of challenge.

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A child with ADHD may struggle even more to sit still or pay attention if their body is constantly triggered by the TLR. A child on the autism spectrum may already be sensitive to sensory input, and an active Moro reflex can make them feel constantly on edge. Dyslexia and coordination difficulties, too, can often be linked to reflexes that are still interfering with eye tracking or body awareness.

The good news is that reflexes are not fixed. With the right support, movement activities, and gentle repetition, it's possible to help the nervous system "catch up" and integrate those lingering reflexes. By doing so, we give children stronger foundations, making everyday tasks feel easier, and allowing their natural abilities and confidence to shine through.

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So if your child is struggling, please know it's not a sign of weakness or inability - it may simply mean their foundations need a little extra support.

And the beautiful thing is, with the right tools, you can help strengthen those foundations and watch your child's confidence grow.

If you are interested in knowing how to help your child - then do get in touch:

[info@questertherapies.com](mailto:info@questertherapies.com)  
07803 0270707

*AnneMarie Smellie*

Quester Therapies