Expected Changes

Behavior, learning, focus, coordination, and social interactions can all improve once primitive reflexes are integrated, lower centers of the brain are fully developed, and vestibular and proprioceptive sensory systems are working well. Learn what changes may happen (and why) when the brain functions as intended.

Academic Changes

- Goes beyond the minimal expectation of an assignment
- Demonstrates higher level of thinking in various areas of the curriculum
- Contributes to class discussions
- Does homework independently in a short amount of time
- Demonstrates understanding of math concepts
- Decodes words; comprehends text; no longer skips over words or lines when reading
- Copies from the board with accuracy and speed
- Writes legibly; spaces words appropriately
- Creates written work that shows both organization and creativity
- Pays attention to details related to punctuation, spelling, and grammar
- Receives higher test scores
- Prioritizes and starts tasks without procrastination

Although many Brain Highways participants were tutored extensively and/or enrolled in school intervention programs before beginning our program, their academic progress was still, at best, minimal.

That's because extra assistance, repetition, and more effort have little to no affect on retained primitive reflexes and underdeveloped early centers of the brain. For example, a retained Palmar reflex may make it extremely difficult to develop the right pencil grip that then results in good, legible handwriting and fine motor skills. Likewise, when the cortex is preoccupied with balance and other functions associated with lower brain development, it's difficult to stay focused or even process what is being taught. Yet, as soon those and other similar variables are no longer interfering with learning, the child beings to progress academically.

Attention/Focus Changes

- Stays on task
- Stays on topic
- Listens to directions
- Completes work without fidgeting
- Sustains eye contact while listening to someone speak

We often think that paying attention is a choice. However, from a Brain Highways perspective, there are physiological reasons that make it difficult to pay attention and stay focused.

For example, both good visual and auditory awareness are not present when the pons is significantly underdeveloped. In such cases, that child's world is pretty much limited to whatever appears directly in front of her.

Likewise, if a child's eyes do not converge to see one image, she may intuitively look away from whoever is speaking to her. That's because making eye contact under such conditions usually results in seeing double or multiple images of the person speaking (which then makes it very difficult to concentrate on the actual words). Similarly, poor eye convergence makes it very difficult to stay focused when reading or writing since the endings of words often "run" into the next word.

Other effects of underdeveloped early centers of the brain and poor sensory processing (e.g. distorted anxiety, preoccupation with balance, lack of sensation of body parts, inability to filter background noises, inability to prioritize, etc.) all additionally interfere with the ability to focus and pay attention. In contrast, without such distractions, it's easy to concentrate.

Compliance Changes

- Replaces meltdowns with dialogue and discussions
- Replaces resistance to try something new with a "give it a whirl" attitude
- Agrees to do what was asked without insisting on doing everything "his way"
- Agrees to try new foods
- Gets dressed without any problem

When primitive reflexes are integrated, the child is no longer in a reactive, fight-or-flight state of mind. Therefore, such children are no longer resisting and fighting everything that their brain perceives as a threat.

Additionally, when children try to function with disorganized brains, they often compensate by insisting on doing everything their way. That ensures they won't do something incorrectly (i.e. if they do it *their* way, it has to be "right"). Sometimes, such children also subconsciously feel so out of control that they seek ways to thwart others' control (i.e. simply refuse to do whatever is asked). However, such compensations are no longer needed once the children's brain organization allows them to respond in ways that others expect.

Last, noncompliance may be directly related to distorted sensory input. For example, when the midbrain is not fully developed, clothing tags, sock seams, and various materials are truly bothersome. These same kids may also dread eating many foods since the texture, rather than the taste, often registers as something repulsive. In such cases, a child's resistance to getting dressed or eating certain foods goes away when the child's brain registers tags, sock seams, clothing, and food like everyone else.

Social Interaction Changes

- Makes new friends
- Sustains friendships
- Plays with cousins at family gatherings
- Attends birthday parties with no problems
- Spends the night at someone else's house
- Hangs out with peers in the neighborhood or during recess

A child with poor coordination (i.e. can't dribble the soccer ball) and/or distorted anxiety may find it difficult to join his classmates at recess. Pulling a hat off another child's head, screaming when something doesn't go his way, and playing too roughly are additional examples of behaviors related to underdeveloped early centers of the brain that interfere with having friends. It's difficult to be friends with someone whose behavior is unpredictable and often seems distorted and disproportionate to the present situation.

Note that teens with disorganized brains (who also have raging hormones to add to the confusion) are often referred to as drama queens or as people who require "high maintenance"—both references inferring that it's difficult to be around such adolescents.

On the other hand, it becomes easy to make and sustain relationships once the brain is no longer acting on distorted and poor sensory information. In fact, parents of our program participants often note that their children are now friends with the very kids who were unkind or ignored their sons and daughters the previous year.

Speech and Language Changes

- Communicates with words (if the child was previously nonverbal)
- Articulates sounds clearly
- Increases the amount of daily communication
- Initiates conversation
- Elaborates on ideas
- Stays on the topic
- Uses more complex sentence structures
- Expresses critical and creative thinking

From a Brain Highways perspective, speech and language are often compromised when the lower centers of the brain are not fully developed. A child who does not speak or speaks only minimally may be missing key networks (i.e. their speech is similar to young babies and toddlers who also have not completed such development).

Likewise, a child who is in constant survival mode, which is the case if certain primitive reflexes are retained and lower centers of the brain are not fully developed, may be too preoccupied with his primary existence to develop language or engage in conversation. Yet, when the brain functions as intended, the cortex is free to develop and/or access speech and language.

Flexibility/Transition Changes

- Goes with the flow, even if plans suddenly change
- Ends one task and immediately begins the next one
- Follows new routines without a problem
- Moves on to the next thought
- Stops one activity and moves to the next with ease
- Forgives others quickly when something happens

An underdeveloped midbrain makes it difficult to transition—whether the shift is to a new activity or a new thought. Likewise, interrupting daily routines (e.g. to go on vacation) creates additional stress to children whose lives rely so much on compensations. The new environment makes the challenge to compensate more difficult, which in turn results in negative behavior when such efforts are not successful.

However, with a well-organized brain, new routines and transitioning no longer tax the brain. Consequently, such children are flexible, at ease in new environments, and quickly "move on" as needed.

Self-initiated Behavior Changes

- Politely asks another child who has invaded his space to please move over (rather than wallop him)
- Snuggles next to her mother while sitting on the couch
- Chooses to read a book for fun
- Patiently waits her turn to speak or use something
- Plays with siblings without tackling and rough housing
- Shows compassion and offers to help someone else
- Expresses feelings
- Responds positively to feedback

One of our biggest markers of change is when the child does something *naturally* within his regular day. The above kinds of changes are easily explained in terms of brain development. For example, when primitive reflexes are no longer causing a child to react without thought, he'll opt to solve problems or express emotions with words. When proprioceptive processing improves, a child automatically knows the right amount of pressure to use when playing with others. When vestibular processing improves and words quit moving around a page, reading becomes pleasurable.

The list goes on; however, the self-initiated behaviors are always directly linked to new neurological connections that now make such changes possible.

Coordination Changes

- Rides a bike
- Hits a baseball
- Throws and catches a ball
- Swims using various strokes
- Skips
- Ties shoelaces
- Demonstrates motor planning
- Stays seated on a chair
- Handles objects without breaking them
- Moves through space without tripping or bumping into things

Retained primitive reflexes make it very difficult to do certain physical movements. For example, kids with a retained asymmetrical tonic neck reflex (ATNR) may throw balls with a straight, side-arm approach—which actually makes sense: As soon as the head turns with a retained ATNR, the arm on that side of the body wants to automatically straighten (instead of bend, which is required to throw the ball correctly).

Likewise, kids with poor vestibular and proprioceptive processing are often viewed as uncoordinated, clumsy, and careless when they fall off chairs, trip, bump into furniture, and break objects.

In contrast, when primitive reflexes are integrated and sensory processing improves, such kids are able to coordinate their body, engage in movements that require motor planning, and use the correct amount of force for whatever they are handling.

Spatial Awareness Changes

- Stays within spatial boundaries of others (e.g. no longer leans on them, steps on their toes)
- Keeps arms and hands at sides when passing by (versus touching everything)

An underdeveloped midbrain, as well as poor proprioceptive processing, makes it difficult for kids to respect others' spatial boundaries. Since such children do not have good awareness of their body parts and what such parts are doing, they have difficulty maneuvering through space without bothering others. Moreover, these children often touch everything they pass since doing so gives them a reference as to where they are in relation to whatever they are passing . . . similar to how a person with impaired sight might put out her hand to establish the distance between herself and a wall. Yet when these kids develop an innate sense of their body parts, they are able to respect spatial boundaries and move through environments without touching everything.

Physical Changes

- Shows more muscle tone
- Walks with a cross-lateral pattern
- Keeps head centered (versus tilted or down)
- Makes eye contact
- Walks on soles of feet (versus on toes)
- Sits in chair without fidgeting and slouching
- Wakes up "dry" in the morning
- Is aware that he needs to go to the bathroom
- Smiles—a lot—throughout the day

After vestibular and proprioceptive processing improves, a child will look stronger, sit upright, and stay still on a chair. Good proprioceptive feedback also makes it possible to toilet train a child—something that may have been previously difficult (or impossible) when poor proprioceptive processing prevented the child from automatically "sensing" that he needed to go to the bathroom.

Likewise, the combination of integrated primitive reflexes and well-functioning vestibular and proprioceptive systems gives us something called gravitational security, which is basically the knowledge and confidence that we can move without falling. Without such security, a child typically feels fear and anxiety over what others perceive as basic movement. Not surprisingly, when such distress is gone, we see a difference in how that child now moves through his environment (and we see a lot of smiles).

Self-confidence Changes

- Tries new experiences
- Sleeps alone in her own bed
- Views mistakes as part of the learning process
- Expresses personal viewpoints
- Assumes leadership roles
- Initiates play dates

A whole new world opens up when a child's life is no longer governed by fears, distorted anxiety, gravitational insecurity, and primitive reflexes. Moreover, as the child begins to experience success whenever she attempts to do this or that, her confidence grows. In turn, she takes on challenges with a new self-assurance.

Why IQ Scores Can Change

After some participants complete the neurological reorganization, their IQ score increases, with testing showing as much as a twenty point gain. Such improvement is documented by the school districts that retest these children as part of a tri-annual review.

From a Brain Highways perspective, we don't view the higher IQ score as meaning the whole brain organization actually improved a child's intelligence. Rather, we conclude that the first score—when the child was being tested with retained primitive reflexes and underdeveloped lower centers of the brain—was inaccurate because the child did not have full access to his cortex. In contrast, with the retesting, the child was now able to show her true abilities, but *only because the early brain development was completed.*

Why Maturation Is Not a Variable for Change

Regardless of age (our participants have ranged in age from 3 to 70), everyone starts experiencing the same kinds of changes at the exact same time in the program. That supports that the idea that the brain work, rather than simply aging, is the catalyst for change.

One of our 50-year-old participants summed it up best. After sharing positive changes that she was experiencing for the first time in her life, she was quick to add: "And I'm pretty sure I haven't matured in the last two months."

In fact, in our experience, problems actually worsen with age for the following reasons: 1) More demands on the cortex make it increasingly difficult to compensate; 2) Parts of the body used to compensate become less helpful as those parts also age; 3) People become less tolerant of negative behaviors when we are older.