

Teaching Our Children to Write, Read & Spell: Part I

A Developmental Approach Looking at the Relationship of Children's Foundational Neurological Pathways
to their Higher Capacities for Learning

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INTRODUCTION

In our world today, children are often labeled with disorders like ADHD, various learning challenges and anxiety. My clinical experience, from more than 30 years of evaluating children, has taught me that most of these labels occur when we teach children to write, read, spell, and do written math, too early, before they are neurologically ready. In addition, some children need more time for their neurological, learning pathways to fully develop, especially if they received excessive force on their craniums during the birth process (i.e. cranial compressions), are exceptionally bright, and/or have increased artistic and intuitive capacities. In these instances, the right side of a child's brain would need a longer time to develop or myelinate, before they would be ready to use the left Parietal area of their brain to sound-out words, phonetically. In general, girls may not be ready to start to phonetically read until ages 6 1/2 to 8 years of age, while boys may not be ready to start to phonetically read until ages 7 1/2 to 9 years of age, and sometimes later for both boys and girls (because of the reasons already noted). Sight (i.e. spatial) reading, which occurs in the right side of the brain, can be used to recognize the shape of words as early as ages 3 1/2 or 4 years of age and sometimes even earlier. Yet, this same right area of the brain has a much more important task, which is to create inner-imaginative pictures and scenes related to the words that the child is reading or even listening too.

Children that come to my clinic with the diagnosis of ADHD (because they have difficulties with sustaining attention, following verbal instructions, being easily distracted, being forgetful, fidgeting or squirming when seated in a chair, wiggling while standing, and/or being unable to listen), usually are being asked to do tasks that they are not, yet, neurologically ready to do. Another possibility is that they have unresolved cranial compressions (see my [General Clinic Recommendation](#) article, pages 1 and 2, for more details) that are partially blocking the full development of their proprioceptive pathways. Unresolved cranial compressions also cause

the autonomic nervous system to be in stress mode (i.e. increased sympathetic tone). This creates the other symptoms noted in children with the labels of ADHD and other anxiety, behavioral, and conduct disorders (i.e. such as excessive talking, nervousness, impulsivity, physical reactivity, emotional reactivity, "being always on the go", inappropriate running or climbing, difficulty staying seated, difficulty engaging in quiet activities, difficulty waiting, interrupting others, or intruding on other's space). In addition, children's nutritional status and the health of their intestinal bacteria, as well as the occurrence of gluten-triggered brain inflammation (Please see my [Leaky Gut](#) article) are also key factors that influence learning, behavior, attention, and anxiety, and therefore need to be assessed.

When proprioceptive pathways are not yet fully developed or are partially blocked, then children cannot locate their bodies in space, unless they are actively moving, sitting cross-legged on the floor, or being "squished", externally. These children with undeveloped proprioceptive pathways will have difficulties with peer relationships, will also have difficulties imprinting the correct orientations of numbers and letters, and therefore show reversals when trying to write letters and numbers by memory (i.e. Dyslexia). Teaching children to predominately read by sight memory in preschool and kindergarten, rather than waiting for them to easily sound-out words, phonetically, is what often leads to problems with spelling, punctuation, grammar, capitalization, writing a book report, understanding math word problems, maintaining a long term memory for what was read, and learning, in general. Children that predominately sight read usually don't enjoy reading, both because of the effort involved and because of the lack of internal picturing. This is also why children that predominately read by sight like having lots of pictures in the books they read or only want to read comic books or graphic novels (where there is a new picture every few sentences). This is what the children, including my Son and Brother, have taught me over the past decades of my life. I hope this current article and the follow-up article, [Part II](#) of Teaching Our Children to Write, Read, and Spell, provide you with the information and insight you need to help your own children and the children you work with.

The Development of the Balance and Proprioceptive Systems:

There is a widely held belief that if we start teaching children to write, read, and spell in preschool and kindergarten, they will become better writers, readers, and spellers by the time they reach the first and second grades. This, however, is not what I have seen clinically. The truth is that children should be only taught to write, read, and spell when their neurological pathways for writing, reading, and spelling have fully formed. There are many neuropsychologists, developmental specialists, occupational therapists, and teachers who are concerned that our current trend in this country of pushing "academics" in preschool and kindergarten will result in even greater increases in the number of children, particularly boys, diagnosed with Attention Deficit Disorders, non-verbal learning disabilities, conduct disorders, anxiety disorders, as well as challenges in visual and auditory processing.

First, children need to develop a strong sense of balance, both when their bodies are moving and when their bodies are still. Even in utero the fetus is moving and stimulating the three semicircular canals within both inner ears. The semicircular canals are situated so that each one responds to a different direction or plane of movement, such as up/down, forwards/backwards, and left/right. The shell-shaped organ for hearing and the three semicircular canals for balance share the same 8th cranial nerve to the brain. If the brain is not getting correct information from the semicircular canals, it cannot easily maintain the uprightness of the body. In this case, children need to think and concentrate to maintain uprightness, and therefore the movements of their bodies are not yet mind-free. The ability to retain verbal information when sitting or standing depends on the mind being free. This is why a 6 1/2 year old child may be able to remember a sequence of four verbal requests when lying flat on the floor or snuggling in a parent's lap but not when sitting still in a chair, and especially not when standing still. Fluid behind an ear drum also impacts a child's ability to hear as does brain inflammation (resulting from an inflamed intestinal lining known as "The Leaky Gut Syndrome"), but these children have difficulties hearing and understanding language in all positions, whether lying down, sitting in their parent's lap, sitting in a chair, or standing upright.

In order for a child to be able to sit still, pay attention, and visually remember the shapes of letters and numbers, the child first needs to have developed his or her proprioceptive system, a sense of the body in space. From the time the child is born into gravity, movements of the child's trunk and extremities will activate proprioceptive receptor sites within the muscles, joints, tendons, and ligaments. This sensory information then travels to the cerebellum at the base of the cranium as well as to the the parietal lobes, located on each side of the brain, before connecting to all the other brain areas, including the frontal lobes. Movements on the right side of the body are mostly perceived in the left side of the brain, while movements on the left side of the body are mostly perceived in the right side of the brain.

If these proprioceptive pathways have been able to fully develop, by the time children are 7 to 8 years of age (a little younger for girls and sometimes older for boys), their brains will have mapped the location of all the muscles, joints, tendons, and ligaments on both sides of their bodies. Also around this same time period, the right and left sides of their brains will be developing connections with each other, otherwise known as bilateral integration. This will allow children to move the right and left sides of their bodies at the same time. When children can proprioceptively perceive their trunks and extremities and have connected the right and left sides of their brains and therefore their bodies together, they will have developed spatial awareness, a full sense of their bodies in 3-dimensional space (ie. forwards, backwards, up, down, left and right). Their brains and their physical bodies will be now deeply connected. They will be able to locate their trunk, arms, hands, fingers, legs, and feet even when they are sitting still, standing still, or lying in bed with their eyes closed. Their minds will no longer be needed to help keep their bodies upright or judge spatial distances. Their minds will be free to pay attention, focus, and learn, and their minds will also be free to notice the nonverbal social cues given by other children and adults.

In my clinical practice I see children who are being asked to sit still at a desk when they cannot yet maintain uprightness while sitting or standing, and can not yet "feel" or perceive their bodies proprioceptively. These children have to constantly move their muscles and joints and often need to seek external pressure to locate their bodies in space. These children often wiggle in their chairs (sometimes falling out of them), lean on their desks, sit on their legs and feet when in chairs, and/or wrap their feet around the legs of chairs just to help their brains better locate the positions of their trunks and extremities. In addition, when the proprioceptive system has not yet fully developed, children will have difficulties balancing on each foot for 8 to 10 seconds while remaining still when their eyes are closed.

Since these children do not yet perceive their bodies in three-dimensional space (i.e. forwards/backwards, right/left, and up/down), they also will have difficulties copying forms, especially forms containing diagonal lines, such as the triangle or diamond. Usually we expect children to be able to copy a triangle by 5 years of age and to copy the diamond shape by 7 years of age. Children who cannot proprioceptively locate their thumbs or fingers when trying to hold pencils or crayons cannot draw easily and usually show a tense or fist grip. In addition, if a child's brain and mind has not yet started to develop that sense of the body in 3-dimensional space, then diagonal lines will be especially hard for that child to copy. In fact, children will not be able to perceive diagonal lines that are firmly drawn on their backs by a finger, such as in the letters M, W, V, or X or the number 7, until they have fully developed the sense of their bodies in 3-dimensional space. Until that time, diagonal lines drawn on children's backs will feel like vertical, horizontal, or curved lines.

Children, if not coached by a parent or teacher, will draw their brain's proprioceptive connections to their bodies when they are asked to draw a picture of a person. Children less than two years of age usually only scribble when asked to draw a person. Their brains have not yet connected proprioceptively to their bodies. Girls around two years of age and boys around three years of age usually draw a circle for a head with dangling, vertical sticks for legs and horizontal sticks for arms, all extending out from the circle. This means that these children are making proprioceptive connections from their brains to their arms and legs but not yet to their trunks, hands, fingers, or feet. Usually when girls are around three years of age and boys are around four years of age, they will draw full stick-figures with stick-like arms and legs, originating from stick-like or circular trunks. These children may also draw three to five stick fingers on each of the hands, letting us know that they are beginning to perceive their fingers proprioceptively as well.

Starting around 5 years of age, children should start to experience their bodies in 3-dimensional space (ie forwards/backwards, left/right, and up/down) so their drawings of a person will start to show some dimension. Now their drawings will show clothes (ie. triangular shaped dresses or rectangular-shaped pants and shirts), instead of just stick-like or circular, trunks. There will be tubular or rectangular shaped (rather than stick-like) arms, hands, fingers, legs and feet. The

drawings will become more detailed along with the appearance of a neck around 7 years of age. When children draw these types of dimensional drawings for a person, then their brains and minds are getting ready to read phonetically and simultaneously to create mental pictures and scenes from the words they are reading.

If children's proprioceptive pathways have not yet fully developed or have been partially blocked by unresolved cranial compressions (which can occur during the birth process), their drawings of a person will look like those of younger children, often consisting of scribbles or being stick-like in their forms. It also is important to realize that the social and emotional behaviors of children will parallel the development of their proprioceptive systems. If a child's drawing of a person proprioceptively appears like that of a younger child, the child's social and emotional behaviors will probably be at the age-level of the child's drawing. This is because a child's mind needs to be free in order to note social cues. These children will also tire easily and become easily stressed when they are in new environments or social situations because their minds are doing so much multitasking.

Often children whose proprioceptive pathways have not completely developed are labeled as having Attention Deficit Disorders because they appear fidgety in their movements and have difficulties paying attention and focusing. They often appear stressed and they easily fatigue because of all the multitasking that their minds are doing to help their brains keep their bodies upright and judge spatial distances. This multitasking causes children to live predominately in the "flight or fight", (ie. sympathetic) portion of their autonomic nervous systems. Being in the stressed portion of their autonomic nervous system also causes their pupils (ie. the dark portion of their eyes) to appear large when they are in moderate indoor light. In addition, the movements of these children are often jerky, rather than flowing, and they often seem anxious and/or hyperactive. Their behaviors can be impulsive and even explosive at times. Often these children have challenges with fine motor finger movements, as well, since they may not yet fully perceive proprioceptively the fingers in their hands. Some of these children may still write with the younger, fistlike grip of their pencils or show lots of tension in their fingers and thumbs when holding crayons or pencils. Once again, these children will be seen as having struggles with peer relationships, because their minds are not yet free and available to notice nonverbal social cues.

Children with proprioceptive challenges may also be labeled as having learning challenges in visual processing (for example, dyslexia or other types of nonverbal learning disabilities), because they have difficulties imprinting and remembering the correct spatial orientations of letters and numbers when they are asked to write them by memory. If proprioceptive pathways are fully developed, children can look at the shapes of letters and numbers, use their eyes to track the exact directions of the lines and curves, and then correctly imprint this spatial information in the left parietal area of their brains. When this happens, children's minds can form accurate mental images of the numbers and letters they are seeing. If children's eye tracking, eye convergence, and/or proprioceptive pathways are not yet fully developed or their pathways

are partially blocked, these children will confuse letters such as "b" and "d" or may reverse numbers, like 2, 3, or 7, when writing and reading.

The proprioceptive system can also impact children's lives in other ways. It can affect children's ability to fall asleep at bedtime and/or remain asleep throughout the night. For these children, closing their eyes at night makes their bodies seem like they disappeared because their minds have not yet mapped the internal connections to their muscles, joints, tendons, and ligaments. This is why children may frequently wake up during the night and seek physical contact with their parent(s) in order to fall back asleep. When children's proprioceptive systems are not yet fully developed, they will want to lie next to a parent in order to receive external pressure on their bodies, continually activating the pressure receptors in their skin and the proprioceptive receptors in their muscles, joints, tendons, and ligaments, so they can fully perceive their bodies externally, and therefore relax and fall back to sleep. This is also why children often want a light on when they go to bed. They need to be able to see their bodies because they cannot yet feel or perceive their bodies proprioceptively when the lights are out.

The proprioceptive system is developed and strengthened in children by having them do large and small physical movements, especially movements where they experience pressure, using their fingers, hands, arms, trunks, legs, and feet. Movements like digging with a shovel, pushing a wheelbarrow, carrying groceries, moving rocks, pulling weeds, hanging from the monkey bars, circle games where their hands are clapping and feet are stomping, jumping, hopping, galloping, and skipping are all wonderful activities for developing and strengthening proprioceptive pathways.

Learning to Write, Read, and Spell:

Our current educational system is teaching children to read in a way that does not make sense developmentally. Children in preschools and kindergartens are expected to read words when only the right side of their brains have developed. From around three to seven years of age, children are myelinating the right sides of their brains, so they only have access to this right hemisphere of their brains for reading. The right brain can only read individual words by sight recognition or sight memory. So preschool and kindergarten-aged children have to use this developing, right frontal area of their brains to guess at words. Yet the right frontal area of the brain has a much more important task than trying to figure out words by sight. Children need the frontal area of their right brains (and eventually the frontal area of their left brains) to create and analyze mental pictures when they are listening to stories or reading books for themselves. If children have to use the frontal area of their right brains to recognize words by sight, this area of the brain is not free to create inner mental pictures and scenes associated with the words they are hearing or reading. Furthermore, it is the myelination of the left side of their brains, usually around 6 1/2 to 7 1/2 or 8 years of age for girls and at least another year or two later for boys,

that enables children to hear the separate sounds within a given word, (ie. phonemic awareness) and string the individual sounds together to sound-out words phonetically.

True reading happens when children can form and create mental pictures in the frontal areas of their right brains, while simultaneously sounding-out phonetically the corresponding words using the left side of their brains. It is the formation of these mental pictures while reading that gives children a deep comprehension and enjoyment for what they are reading. It is this forming of mental pictures while reading that enables children later to make sense of math word problems, algebra, biology, chemistry, and physics and deeply to understand literature, poetry, and history. Mental picturing while reading allows children to verbally express and write down their thoughts and ideas, using their own words, and helps them remember what they have read (ie. pictured) for their entire lives. In addition, when children read phonetically, by sounding-out the words using the left side of their brains, they will have a much easier time with spelling.

In the past, children were taught to recognize only a few hundred words by right brain, sight recognition. These words were usually very short (ie. is, a, and, at, the, are) and did not carry any associated mental pictures. If children cannot create or form mental pictures while reading, they are forced to memorize the words they see. When these right brain, sight readers are then asked to write a report, they can only parrot back the words or sentences they have memorized. These are the children who plagiarize or copy something verbatim from a book word for word when they are asked to write reports. This is because they can only recall the exact words that they read and memorized by sight, and they cannot refer to mental pictures. It is mental picturing that enables children to summarize, condense, and more deeply comprehend what they are reading. This is how and why our current educational curriculum, which pushes reading in preschools and kindergartens, is creating problems with attention and nonverbal learning disabilities in our children.

I have noticed that when children use their right brain, sight memory, to guess at a word's identity, they mostly focus on the first and last letters of a word, the word's overall shape, and its length. This means that the children are often oblivious to the sequence of letters within the middle of the words. Usually the children that have been pushed to read since preschool and/or kindergarten have memorized thousands of words by right brain, sight memory. Therefore, these children do not usually notice any differences when shown the sentences, "GAOTS LKIE GARSS" versus "GOATS LIKE GRASS", "CTAS HVAE TIALS" versus "CATS HAVE TAILS", or "BAERS LVOE HNOEY" versus "BEARS LOVE HONEY". Children can look individually at each letter and compare the spelling of each word, if asked, but they do not see the differences right away when reading. On the other hand, a child that is reading phonetically, because he or she is sounding-out the words, immediately notices all the misspelled words and even tries to phonetically sound-out the nonsense words.

I have noticed in children that phonetic-based reading, using the left hemisphere of the brain, usually starts to develop around the same time as the bilateral integration pathways (ie. the pathways that connect the right and left sides of their brains, and therefore their bodies, together). A physical sign that children have developed their bilateral integration pathways is shown by their abilities to perform the cross-lateral skipping pattern (ie. opposite leg to arm, extending) without having to think or concentrate. This is because moving the extremities on the right side of the body is connected to the frontal motor area in the left side of the brain. Conversely, moving the extremities on the left side of the body is connected to the frontal motor area in the right side of the brain. If children can move their opposite arms and legs at the same time, the right and left hemispheres of their brains are "talking with" or connected to each other. If children can only skip using their feet or only skip extending the same arm with the same leg (ie. the homolateral skip), they are not yet ready to read, since they cannot access both sides of their brain simultaneously. Jumping rope by themselves in a flowing double jump pattern for every single swing of the rope, both forwards and backwards, also means that bilateral integration pathways are forming.

Doing lots of cross-lateral movement activities, in general, helps to strengthen children's bilateral integration pathways. Movements like jumping rope by themselves, noncompetitive swimming lessons, rock wall climbing, hiking with poles, snow shoeing with poles, cross country skiing with poles, Bal-a-vis-x.com (bouncing a ball from one hand to the other while on a balance board), contra or square dancing, ballroom dancing (in middle school or high school), certain EXTRA lesson movements, and of course Therapeutic Eurythmy (which in my opinion is one of the most powerful movement therapies for strengthening bilateral integration) are all great. Circle time in kindergarten through the 4th grade at Waldorf and Waldorf-Method schools often includes cross-lateral movements. Doing Spatial Dynamic movements in the older grades is also helpful.

When children are in the older grades, they can do a circus skills camp some summer (e.g. learn how to ride a unicycle while juggling) or learn how to paddle while upright on a flat surf board in still water (a popular sport in Hawaii right now). Even kayaking, canoeing, and rowing are rhythmic, cross-lateral activities because the trunk and lower extremities hold tension while the arms are paddling. All of these activities will strengthen bilateral integration and proprioceptive pathways. Practicing form drawing (also done in Waldorf and Waldorf-Method schools) and writing in cursive, in a flowing manner without pausing between each letter, will also strengthen bilateral integration pathways. Printing just requires the left hemisphere of the brain while cursive writing requires the right and left sides of the brain working together. Older children who have not yet fully developed their bilateral integration pathways will find cursive writing very challenging and will prefer to print.

As an aside, we also ask children to hold a pencil and write before they are developmentally ready. I see very young children in preschool and kindergarten being asked to write with one of

their hands while they still have overflow movements occurring in the fingers of their opposite hands. Before six or seven years of age, the vertical midline of the child usually is not fully integrated. Therefore, when a child moves the fingers of one hand, the fingers on the other hand will also move, often without the child's conscious awareness. Children should not be made to write until this vertical midline is integrated. Children's vertical midline is usually integrated after they have developed bilateral integration pathways between the right and left sides of their brain. When this happens, children can cross over the middle of their bodies (ie. cross their midline) with their dominant hands to pick up objects placed on the other side of their bodies. Also if we force children to hold a pencil or pen and write, before they have integrated their vertical midlines and before they have located their thumbs and fingers proprioceptively, they will show tense pencil grips, cramped handwriting, and spatially compromised and jerky penmanship.

My greatest concern is that I am seeing more and more fourth through eighth graders from public and private schools who are still reading mostly by right brain, sight memory and therefore cannot picture and deeply comprehend what they are reading. For example, when I give these children the following sentences to read; "Six byos wnet on a vaccaiton tohgeter. Tehy wnet fsihing in a bule baot. One boy cuahgt a big fsih. The ohtres did not ctach a tihng. Tehy dediced to go hmoe", they often do not notice any of the misspelled words. Furthermore, when I have these same children read the same sentences with the words correctly spelled, they often tell me that both sentences are exactly the same or maybe only note one or two words, such as "Hmoe or Fsih", that are misspelled and then tell me that the rest of the words are spelled correctly. Once again, these children are reading both the misspelled sentences and the correctly spelled sentences by sight memory, using only the right side of their brains.

I worry that these children were pushed to read too early, when only their right brains were developed enough for reading. They compensated by learning to read everything using sight word recognition. When the left side of their brains finally developed (or myelinated) for phonetic-based reading, they did not easily switch sides and still now read mostly by sight memory. It was only when these children were given new words, words they had never seen before or when they became stuck in their reading, that they would slowly attempt to sound out the words phonetically. Some children had a strong visual memory for the sequences of letters in words, and they noted misspelled words easily, though they still were reading words by sight recognition rather than sounding them out. This was easy to tell by asking these children to read the words; TRAMS, STOP, and WARTS, backwards. If the children were reading phonetically then it was easy for them to sound-out the words backwards and quickly respond; SMART, POTS, and STRAW. If children were only reading the words by sight recognition, they struggled trying to read these words phonetically backwards.

Most importantly, none of the children that were predominately reading by right brain, sight memory could easily make mental pictures or create scenes while reading words. Some of

these children told me that they never formed pictures in their minds when they read, and they only made pictures in their minds when someone else read to them or if they listened to books on tape. Some children, who were reading mostly by sight memory, told me they saw a few isolated pictures in their minds when reading but not whole scenes, they did not always fully understand what they were reading, and therefore, they did not like to read. Other children told me that they could create pictures in their minds as long as they read words very slowly. In this way they could first memorize the words in a sentence, and then they could silently repeat back the sentence to themselves and therefore form mental pictures as a second step.

For children 4th grade and older who are predominately reading by right brain, sight memory, I often recommend a phonetic-based reading program to switch their reading pathways to their left side, as long as their sensory processing pathways of balance in stillness, eye tracking, eye convergence, proprioception and bilateral integration are fully developed. If children are showing any signs of sensory processing/integration challenges with touch, balance, proprioception, bilateral integration and especially with their eye movements, then I first recommended Biodynamic Cranial Osteopathic treatments or cranial treatments by a specialized Chiropractor, board certified both in Atlas Orthogonist and Functional Neurology, to help gently, and often non-manipulatively, resolve the cranial compressions. I then recommend that the child do specific movement therapies such as Therapeutic Eurythmy, Extra Lesson, Parelli horseback riding lessons (especially bareback), Bal-A-Vis-X, Brain Gym, HANDLE, or sensory integration therapy with an occupational therapist that specializes in working with children. These movements need to be noncompetitive, and the therapists need to avoid over stimulating the children and activating their fight and flight "stress" responses. Therefore, these therapists need to live in the present movement, be in their relaxed autonomic nervous systems, love their work, and enjoy the children. Neurological pathways do not form well when children are experiencing external stressors in their environments and internally stressed in their autonomic nervous systems.

There are many causes for having unresolved cranial compressions, which often occur over the cerebellum and brain stem areas at the back of the head and base of the skull. These cranial compressions usually occur at birth, since the cranium consists of plates that can overlap and are very moldable. Often children who have experienced a C-section birth, prolonged labor (more than 12 hours), a very fast delivery, pitocin induced labor, or the use of vacuum suction forceps at delivery are at risk for still having unresolved cranial compressions. In addition, these children need a lot of strengthening of their vestibular-balance, eye tracking, eye convergence, proprioceptive, and bilateral integration pathways once these pathways have more fully opened.

Once these pathways and connections are formed and strengthened, many of these older grade children will still need tutoring to strengthen their phonetic-based reading skills since their right brain's, sight recognition of words became so strong. Phonetic-based tutoring is usually only needed for 1 hour, twice a week. First, children's phonemic awareness is strengthened (ie. their

ability to hear the separate sounds within a given word). Next children need to gain a thorough understanding for word families (e.g. sat, mat, cat, etc.) and the different sounds that vowels can make within words. Finally, these children will need to learn the spelling rules that determine which sounds particular vowels make within a given word. All of these activities will strengthen children's left brains for phonetic-based reading. Even if these older grade children were taught word families and phonetics in the first and second grades, they may need to revisit these reading skills, since the left side of their brains was probably not developed enough to learn these skills when they were in the earlier grades. If the tutoring does not stick in children's minds from week to week, then I know that their sensory processing pathways are not yet fully opened and/or developed, so tutoring is slowed or stopped until children have more cranial and/or movement therapies to completely open their pathways.

In summary, reading should be taught in schools only after children have developed the left side of their brains for phonetic-based reading and also developed bilateral integration pathways (connecting the right and left side of their brains together). This will enable children to read phonetically, using the left side of their brains, while simultaneously creating internal mental pictures in the frontal area of the right side of their brains (and augmenting or analyzing these pictures by processing language in the frontal area of the left side of their brains, as well). Children who can simultaneously sound-out words phonetically, using the left side of their brains while creating mental pictures in the frontal area of the right side of their brains, will be able to read easily, and simultaneously create visual images and pictures in their minds related to the content of what they are reading. They will be able to discuss or write about what they have read, using their own words, because they can replay the mental pictures and scenes that they generated in their minds while reading.

Prevention of Learning Disabilities:

Overall, schools and parents can support a child's learning by serving healthy foods rich in protein, good quality fats (especially omega 3 fatty acids and coconut oil), fresh fruits, and vegetables, while eliminating foods that are highly processed, full of sugar, and contain partially-hydrogenated oils and trans fats that occur when cooking or frying foods in vegetable oils (ie. corn oil). Adequate sleep will increase the percentage of rapid eye movement or REM sleep. A lack of sleep leads to less REM sleep, and therefore, less consolidation of short term visual memories into long term visual memories from the previous day's lessons. Extremely limiting screen time (television, videos, and computer games) and eliminating it altogether on school nights, will keep children's minds free to do their own picturing. Also, their minds will not be stressed by trying to comprehend and process the often violent images shown on screens, and the visual memories that children form while learning at school will not have to compete with or be diluted by the rapidly flashing visual images on screens. Regular rhythms and routines in eating and sleeping, as well as physical activity will promote a more relaxed and integrated nervous system for learning.

In addition, children cannot learn and neurological pathways cannot form as easily when children's nervous systems are experiencing stress. Forcing young children to write, read, and spell and requiring them to take standardized tests especially on computers, in the early grades, before they are even developmentally ready to read and write, will further stress their autonomic nervous systems and therefore slow development of their brains, bodies, and minds. In addition, children who are pushed to read and write before they are neurologically ready, will dislike reading and writing and will not enjoy learning or even going to school. If we insist on pushing writing, reading, and spelling before children's minds are neurologically fully developed, we will continue to create an epidemic of behavior, attention, and learning challenges in all our children and especially in our boys.

First grade is the time to introduce lots of form drawing and learn the shapes of capital letters by relating them to pictures. Because the reading center (frontal lobe area) in the right brain can visualize individual letters as pictures, it makes sense to first teach children the shape of a letter and its corresponding sound by relating the shape of the letter to actual pictures that children can understand and draw. For example, the letter "M" can be represented by two mountain peaks, covered by a layer of snow, with a valley in between. As teachers we can tell children that the sound "M" is the first sound one hears when saying the word "mountains". Other examples might include drawing a king out of the letter "K", a bunny or gentle bear out of the letter "B" or waves out of a "W". What does not make developmental sense is expecting children to just memorize the abstract shapes of the letter "F" or memorize phrases like "F" as in the word FOX, "B" as in the word BOY, or "C" as in the word CROCODILE. These words do not make any visual sense to the reading center in the right brain. The letter "F" doesn't look like a FOX, the letter "B" doesn't look like a BOY, and the letter "C" does not look like a CROCODILE. A number can be first taught by relating the number to the actual number of objects that the number represents (e.g. using counting stones or pictures of objects that the children actively count).

Also in first grade, we can have children practice drawing cursive forms, like drawing small case letters in a repetitive row (e.g. drawing the cursive form of "c", over and over to represent the crest of the waves in an ocean or drawing cursive "w's" in a row that look like waves). Children can also copy printed letters and numbers from the board and draw letters using their fingers (for example the letter M as represented by two mountains) on each other's back or in the sand. However, do not expect them to easily write numbers or letters by memory, since they will still show reversals if their proprioceptive systems are not fully developed. I have learned that it is harder for children to learn to write cursive words in a flowing manner during first grade, since their bilateral integration pathways are still developing. However, children can have fun drawing these cursive forms in form drawing exercises, and later they will later be surprised and delighted, when they see these same forms again as they are learning to write words in cursive and not just print them.

Starting in the second and third grades, many of the children will have developed their proprioceptive systems and connected the right and left sides of their brain together, and therefore can be more formally taught to write in cursive, to read phonetically, and to spell without developing attention problems and learning challenges. This assumes that children do not start first grade until they

Therefore, it is time to remove the desks from kindergartens and preschools. Our preschools and kindergartens need to fill their curricula with play consisting of lots of sensory integration activities that will strengthen fine motor movements, visual motor abilities, listening skills, balance, muscle tone, proprioception, as well as strengthen children's social and emotional skills and most importantly, strengthen their imaginative and picture making capacities by promoting play, using puppets and marionettes to visually act out stories for the children to see, and by telling children lots of stories and reading them lots of books (initially with pictures representing the moral qualities of goodness, truth, and beauty). Activities like climbing, running, jumping, hopping, skipping, walking the balance beam, playing circle games, singing, playing catch, doing meaningful chores, painting, coloring, playing hand clapping games, doing string games, cutting with scissors, and finger knitting will all strengthen children's minds for learning. Children need these healthy, harmonious, rhythmic, and noncompetitive movements to develop the connections between their brains and their bodies, which will later free their minds for learning, problem solving, and creative thinking. For it is the movements of our bodies and our love for learning that create strong foundational, neurological pathways that free the mind for reading, writing, spelling, mathematics, problem solving, and most importantly, creative and imaginative thinking.

Teaching our Children to Write, Read & Spell: Part II

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Question #1: If I am understanding what you wrote in Part I, children that are pre-school age or in kindergarten should not be pushed to write, read or spell because it might create learning disabilities in the future?

Answer: Yes, this is true. Most young children, less than 7 years of age, have not finished developing their neurological pathways for writing, reading and spelling. First, children need to have fully developed their proprioceptive system so they can visualize and imprint in their memory the exact shapes of the letters and numbers they see.

Next, in order to read with comprehension and spell, children need to have developed their right brain for visual recognition of small words (ex. if, the, is, are, were, at etc.) and their left brain for phonetics, the ability to match a letter or letters to particular sounds. In addition, these children also need to have developed their bridge pathway or corpus callosum for simultaneous communication between the right and left sides or hemispheres of their brain. When all of these pathways for reading are developed, a children will be able to instantaneously recognize small words by sight using their right brain, sound out larger words phonetically using their left brain and create imaginative pictures for the words they are sounding out, another activity of the right brain. When these reading pathways are fully developed, these children will be able to read fluently, make imaginative pictures from the words and sentences they are reading, comprehend what they are reading, and have a visual memory that enables them to spell more easily.

Now if young children especially 4, 5 and 6 years of age are pushed to read or spell, they can only do this activity by using their right brain since the left brain and bilateral integration of their cerebral hemispheres have not fully developed. These children will try to read all words by sight memory. They will look at the first and last letters of a word and make a guess. A word like stop could be read as stamp, stump, or step. The right brain is working so hard trying to visually figure out the shape of each word, both large and small, that it is no longer available for creating internal pictures of the words.

These children still may read fluently, but they won't be able to sound out words, spell or have lasting comprehension. The right brain reading pathway becomes over-worked and the children will end up being just sight readers with poor spelling and poor comprehension. Later on, these children often get labelled as having non-verbal learning disabilities since they have bright minds but aren't performing in reading, spelling, and also math (especially word problems that rely on children's internal picture-making capacities to solve the problem).

Another area of difficulty is writing. Often children's hands do not functionally separate from each other until after ages 6 or 7. Prior to this age, the movements made by fingers in one hand are mirrored by movements of the same fingers on the opposite hand. This makes writing very difficult for young children. In addition, printing is an activity involving the left brain while cursive writing, that is flowing and not mechanical, requires both the development of the right and left brain as well as bilateral integration, the connection between the two hemispheres.

Question #2: What about older children in 2nd, 3rd, 4th, 5th and 6th grades who still seem to be reading mostly by sight memory, can't sound out words easily, have difficulty spelling, and have trouble imagining in their mind the story they are reading? What is going on with these children?

Answer: First I would check to see if bilateral integration of the right and left sides of the brain has developed. If children can do the cross-lateral skip with opposite arm and leg extending at the same time and their skipping motion is flowing and not mechanical, then bilateral integration

has developed. If this pathway has not developed, then Biodynamic Cranial Osteopathy treatments followed by Therapeutic Eurythmy movement therapy, Parelli horseback riding lessons, Extra Lesson work, or sensory integration movement therapies (like HANDLE, Brain Gym, or Bal-a-vis-x) will be needed to help this pathway fully form. Often the development of the proprioceptive system (sense of the body in space), vestibular system (muscle tone, balance, speech articulation, eye tracking, and convergence) as well as bilateral integration of the right and left cerebral hemispheres are compromised or blocked when children experience a c-section birth, suction forceps delivery, pitocin to stimulate labor, prolonged labor, or a very fast delivery.

Once these neurological pathways are “opened” and developed, children in 1st, 2nd and 3rd grades may spontaneously start to read phonetically, notice how words are spelled, and create imaginative pictures in their minds from the words they are reading in a story or book. Once children can do the cross lateral skip with opposite arm and leg, cursive writing will become much easier and more flowing. Incidentally, form drawing and practicing cursive writing help develop bilateral integration of the cerebral hemispheres, and therefore serve to strengthen the reading pathways.

Question #3: What about children in 4th, 5th, 6th and even children in the older grades who are still reading mostly by sight? They usually figure out a word by guessing and can only slowly sound out some words phonetically? They still may have difficulty with spelling and do not have much comprehension or internal picture making capacities when reading stories? What is going on in this situation?

Answer: Sometimes when children are asked to read and spell at an early age or their pathways for reading are blocked, the right brain was the only hemisphere available for reading. Therefore, these children learn to read every word by sight memory. Later on (several years later) their left brain finally may have developed for reading, but they still don't use the left brain as their primary method for reading. Instead, these children still look at words using their right brain and try to recognize the words by the overall shape of the word and the first and last letters of each word. If they can't figure out what the word is by sight, they switch over to using their left brain and try to sound out the word phonetically. As long as children mostly are using their right brain to recognize words by sight memory, their right brain is not free for internal picture making. In addition, these children will have tremendous problems with spelling since their right brain doesn't pay attention to the arrangement of letters within a word. Remember in “true reading”, the right brain is used to recognize only about 500 small words by sight, while all the other thousands of words are decoded by the left brain using phonetics (sounding out words by matching sounds to letters) therefore freeing the right brain to simultaneously provide an imaginative picture of the word that the left brain has sounded out.

In these older children whose proprioceptive and bilateral integration pathways have finally developed but are not being used, I will recommend tutoring that emphasizes phonetics, matching sounds to letters and sounding out words. It is most beneficial if this tutoring is accompanied by movement games such as playing catch or spelling words forwards and backwards while walking on a balance beam. Teaching children the long and short sounds of all the vowels and the rules of spelling now makes sense and stimulates the reading area in the left hemisphere of the brain. For example, one rule of spelling that stimulates the left brain would be to have children look at words containing two vowels in a sequence and teach them that the first vowel is the one that says its name while the other vowel is silent (ex. oa in boat, ea in meat, or the ea in bead). Another spelling rule that exercises the left brain would be to have children note the single vowel in the middle of a word and teach them that vowels use their long sound in words that end with "e" such as in the words plane, time, or stone. If children are pushed to learn phonetics before bilateral integration and the left brain has fully developed, they will still struggle with reading and spelling. In this case parents will spend thousands and thousands of dollars for intensive hours of tutoring every day for years that won't be very effective. Children will become very frustrated and learn to hate reading. When bilateral integration has developed, then tutoring is fun and easy and only requires 1 to 2 hours/ week for the next 1 to 2 years as children learn the sounds of all the letters, the rules of spelling, and start picturing words.

Question #4: How does one know what movement therapy or tutor would be the best for a particular child?

Answer: The most important thing to look for is a movement therapist, and/or tutor who is fully present when working with your child. The child needs to love the therapist or tutor, and the therapist or tutor needs to love their job and love your child. This is not a sentimental love, but an unconditional love.