



Why Can't *Eye* Learn?

12 Factors That Interfere With Learning.

The first time I discovered a critical link between vision and learning I was in optometry school. It was fascinating to examine someone who could see the letters on the eye chart, yet struggle with visual tasks up close (such as reading). Although I was well trained in treating vision based learning problems, it quickly became clear other issues continued to cloud the learning challenges faced by 20-30% of our population. These are the children (and adults) who are diagnosed as being Learning Disabled, ADD/ADHD, dyslexic, lazy, unmotivated, etc. I was so impressed with this visual connection to learning that while a professor at the Southern California College of Optometry, I returned to graduate school and received a Master's in Education.



Many skills are required for a child to be ready and able to learn. These are oftentimes referred to as *Reading Readiness skills*. Vision is but one of the many neuro-developmental links to a child's ability to read and learn. We are born with the sensory skills of touch, movement, balance, smell, taste, vision, and hearing. However, we must learn to develop and integrate these skills so as to derive meaning from our world. Failing to develop these skills properly and in a timely manner often results in a child having difficulty with learning. As these children haven't yet developed *Reading Readiness skills*, they begin to struggle early in school, even as early as kindergarten. Even though these problems begin early, they aren't usually identified until 3rd - 4th grade. This happens for several reasons:

- 1) Parents have been reassured that "little Johnny or Suzie will outgrow the problem" so early diagnosis and intervention is not sought even though the parents feel something's not right. Go with your intuition.
- 2) The academic load increases in 3rd and 4th grade and marginal compensatory skills are now pushed beyond their limit. It is said that K-2nd grade is when the child learns to read and 3rd grade and beyond the child reads to learn.
- 3) Many schools won't test for learning problems until 4th grade, even though reasonable assessments can be made in the pre-school years. When the school finally does test, it usually is for the label of "learning disability".

These children learn to hate school and tend to develop stress and anxiety disorders. They also develop ulcers, stomach pains, depression, and frequent headaches. They often don't want to go to school because they have been singled out as being different. And that hurts....socially, emotionally, physically, and psychologically. Fortunately there is hope.

When I evaluate a child to determine why there is difficulty with learning, I test a number of different factors. **Outlined briefly below are the twelve main areas which are readily identifiable and treated.** Please understand this is designed to be a

brief overview. If you would like a more in-depth explanation of any of these items, please let me know.

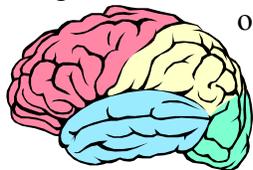
1. **Eyesight**- The ability to read the letters on the standard eye chart. Some students are far-sighted, near-sighted, or have astigmatism and simply need



eyeglasses to help them see better. Although measuring this is always our starting point, one can "see 20/20" and still have vision-based learning problems.

2. **Visual Efficiency Skills (VES)**- In addition to being able to see the letters on the eye chart, there are many other visual skills that are critical to reading and learning, such as: eye focusing (image clarity), eye teaming (how they eyes work together), and eye tracking (following a moving object or moving the eyes such as in reading). These visual skills relate to how much attention and effort must be spent in order to achieve a single clear image. Unfortunately, most eye doctors don't evaluate these critical visual-based learning skills.

Roughly 50% of the human brain is allocated to the processing of visual information. Our brains don't like to see blurry or double. If the visual efficiency skills are poor one must spend so much "attention" simply to achieve a single clear image that little attention remains for higher



order thinking, such as the development of reading and math skills. Higher order thinking typically involves the use of abstract visual symbols to represent something else, such as speech sounds (reading) or time, space, volume,

mass, velocity (math). This higher order thinking will NOT come easily or NOT come at all if ones' neuro-developmental foundations are weak.

3. **Visual Perceptual Skills, also known as visual information processing skills**-

These skills, learned from prior experiences, help add meaning to what is being analyzed visually. Processing of visual sequences, color, shape, orientation, texture, and patterning are all examples of these types of



skills. Visual imaging helps with "seeing" spelling words in the mind's eye so one doesn't fall into the trap of spelling words based upon how they sound (laff = laugh). Visual imaging even helps with spoken language processing and reading comprehension. Trouble with visual information processing skills will cause difficulty with handwriting, math development, map reading, visual awareness of ones body in visual space, understanding of left and right and other related visual spatial terms, persistent letter reversals, physical clumsiness, learning to tie shoelaces, button buttons, or even to ride a bike, etc.

4. **Language Comprehension**- to understand spoken language not only do you have to remember the words that are spoken and the order in which they



were spoken, but you also have to know the meaning of the spoken words. Trouble here results in difficulty with

both listening and reading comprehension. For example, even though you can read the following words, most people will have trouble understanding the sentences' meaning: *The most caudal structures in the CANS are the cochlear nuclei. They are located on the posterolateral surface of*

the pontomedullary juncture, which is known as the cerebellopontine angle. This sentence is taken directly from a text on central auditory processing disorders.

5. **Working Memory** - this is similar to the RAM (Random Access Memory) and CPU (Central Processing Unit) of a computer, in that you can't run current software on an older computer because it doesn't have enough memory. This relates to one's ability to process large vs. small chunks of information, mental processing speed, and multi-tasking ability. Trouble with working memory often means that one will struggle when under the pressure of time, such as having to answer questions in class on the fly, when doing a math speed drill or changing math functions in mid-stream, taking timed tests as in class, or having to read words on a page and think of their meaning simultaneously.



There are specific diagnostic tests which can be performed to determine if this is a contributing factor to the child's difficulty with learning. *I find that working memory deficits are often the overriding factor in learning difficulties.*

6. **Rapid Naming Speed (RNS)**- is a skill which involves visual processing speed and word retrieval or naming ability. Trouble here may result in trouble with reading speed, fluency, and spelling. Additionally, RNS deficits will likely affect sight word reading development and word retrieval skills for both spoken and written language.

This may be implicated, along with visual memory, when a child has to sound out a word they have "seen a thousand times". RNS is almost always overlooked in most evaluations of reading difficulties today.

7. **Phonological Processing Skills**

(PPS)- skills here relate to the oral language abilities of blending (the sounds /c/, /i/, /r/, /l/, /u/, /s/ = circus), segmenting (there are 5 sounds in magic - /m/, /a/, /g/, /i/, /c/), and sound manipulation (flame without the / f / sound = lame). Although these skills are a necessary skill for beginning reading, they do not insure that one will become a good reader. These skills are usually not taught in beginning reading instruction. Phonics programs already assume that one has these skills, rather than systematically teaching them. For the past 20 years reading research in the USA have been focused on PPS rather than vision based learning problems. Just because you can recognize the sounds in spoken words doesn't mean you have the visual skills required to develop the automaticity in visual memory to connect how the visual symbols map onto those sounds. Even the most current research on dyslexia (Drs. Shaywitz and Shaywitz from Yale University) using functional MRI's confirm this difficulty with visual-verbal integration skills.



8. **Auditory Processing** – the ability to identify, sort, process, and make sense of what is heard. Trouble here may result in a child not "hearing" oral language instructions in class, i.e.- "Children, please pull out your science book, turn to chapter 3, read efficiently as the rest of us. They pages 68-82, and answer questions 7-15 in the back of the chapter." Tasks like these are overwhelming and defeating to a child with auditory sequential memory problems. Kids may often ask "What", or Huh?", or "Could you repeat that?", or "I didn't hear you?" These children are often accused of



being lazy, crazy, or just not paying attention. When in fact, they cannot process sounds as quickly. Because of this slow processing speed they are constantly trying to catch up with what they hear. Because this is so frustrating these children eventually just tune out. Trying to maintain this much cognitive effort is simply too much work. The best example of what this is like is when you listen to someone speaking with a heavy accent. It's so much work to simply separate out the words that you often can't keep track of what is being said.

9. **Motor Planning and Sequencing or Temporal Processing**- aka rhythm and timing patterns.

Temporal processing refers to the time-organization system within our brains which is related to and has influence over (yet is independent of) our sensory processing (touch, vision, hearing, etc.) Children here may be affected in several ways:

1. *General motor clumsiness*- unable to do jumping jacks or hopscotch, trouble learning to ride a bike,

slams car doors and cabinets shut because they can't control the speed or force



with which they close them, runs into kids in line at school because they can't control movement of body parts

2. *Receptive speech*- unable to process sequentially what is heard

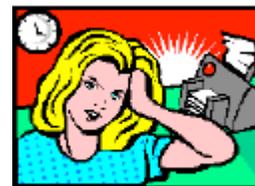
3. *Expressive speech*- stumbles over word retrieval, occasionally mumbles or stutters, uses simple sentence structure, and describes activities such as "Can you hand me that stuff or thingamajig?" because accurate use of words is too difficult.

4. *Organizational thought*- these kids tend to be unorganized, i.e. – messy rooms and desks, maybe a disheveled appearance, and difficulty with written assignments.



These kids often hate writing because of the tremendous memory load placed on word sequencing, letter formation, capitalization, grammar, spelling, and punctuation. *And all these skills are supposed to happen seamlessly and effortlessly.*

10. **Stress/Anxiety** – Recent research has shown that struggling with learning and standing out from ones peer group increases cortisol production in the brain. Cortisol is a stress hormone. This in turn has effects on memory development, which in turn again increases stress/anxiety, etc., etc.. I think it amazing and a reflection of how resilient we are that more children with learning problems don't exhibit severe adaptation disorders.....or maybe they do and we aren't paying attention. Or we are paying attention and as a first line of treatment prescribe Ritalin and all of its derivatives. Too often the underlying neuro-developmental deficits are simply being covered up. These drugs, which are related to "speed", do have a place in treatment and controlling behavior. But even when prescribed with due diligence, we should continue to explore the other factors outlined in this paper.



These foundational neuro-developmental skills are frequently the underpinnings of WHY these children develop attentional disorders. And yes, treatment is available for these neuro-developmental skills.

ii. **Genetic predisposition-** Although these types of problems may "run" in the family, it is clear from the neurosciences that many/most of these problems may be helped when diagnosed and treated early. It's more challenging to treat these problems in older students as they come to truly believe they are too stupid to learn and will never get it. As these students have tried many other ineffective treatments which likely have missed the underlying neuro-developmental dysfunctions, the students themselves come to believe that there is something wrong with them. These children are so tired of having their hopes raised only to fail again that they often are simply unwilling to try anymore. This *learned helplessness* even begins to spill over into these children's lives where they have previously been successful. These children seem to be addicted to having someone else complete their work.

12. **Nutrition-** Although I won't profess to be an expert here, nutrition and especially the consumption of essential fatty acids is critical to the correct functioning of every cell membrane in our bodies, including the cell membranes which transmit messages throughout our central nervous system. We should all become more knowledgeable about how



best to feed our children and ourselves. Nutritional deficiencies can and do play a significant role in our children's ability to pay attention, read and learn.

In summary, here are twelve easily identifiable factors which profoundly affect our neuro-developmental abilities to process information. These sensory processing skills affect everything that we do including the learning of reading and math. *These skills are not only testable, they are trainable or treatable.*

Rather than labeling these children as being learning disabled, dyslexic, or having attention disorders and lowering our expectations of what these children can do, I suggest we have these children comprehensively evaluated to find out which of the above factors are playing a role in their difficulties and then treating the deficiencies to the best of our abilities.

The educational system is designed to make modifications and accommodations in the school curriculum in order to compensate for or work around these problems. It is not the school's responsibility to FIX/TREAT any of these medical diagnoses, except as allowed by Special Education regulations and law. These children are destined to continue struggling and require special accommodations UNTIL the neuro-developmental dysfunctions are recognized and treated.

As a parent or teacher, I am sure you have questions. If we are scheduled to meet again, please make a list of your questions and we will discuss them at your next appointment. If we are not currently scheduled to speak again, please call and let my staff know you have questions and they will arrange a time for us to discuss this.

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