

The Vision Connection

by Editor

Many parents and teachers struggle looking for answers for children on the autism spectrum.

Because children with autism have a wide array of symptoms, the vision system is often overlooked. As a result, caretakers are surprised to find out that vision is much more than sight. Vision problems are typically syndromes affecting how we think, speak, listen, and move. The *Mislabeled Child* by B. Eide MD, MA, and F. Eide, MD, discusses the need to include the vision system when getting to the source of learning challenges. They note, “Visual problems are very hard to diagnose in children. One reason is that children with visual problems seldom complain of—or even recognize—their difficulties. That’s because they don’t know what it’s like to see any other way. Often the children we see recognize their problem only after it’s been corrected.”

(2006) It is often obvious when someone has crooked teeth and requires braces. Poor eye contact, on the other hand, is frequently misdiagnosed as an emotional problem, and its root cause may not be addressed.

In *Seeing Through New Eyes*, author Melvin Kaplan writes, “...vision involves the brain as well as the eyes, and many disabled children suffer from neurological problems that prevent them from correctly perceiving what the eyes see. These perceptual deficits can translate into impaired social skills, poor language skills, motor problems, and a host of other severe symptoms—even in children with 20/20 eyesight.” (2006)

Harry, an 8-year-old boy, was diagnosed with autism and a learning disorder. Fortunately, his grandmother had read an article about how “hidden” vision problems are detrimental to academic success. So, she encouraged her daughter to have a behavioral vision evaluation for her grandson. At our first meeting, Harry appeared shy, had little or no eye contact, and reached out with his hands to explore his environment. He showed no interest in me during the exam and continued to investigate my office through looking, followed by touching.



Harry's mother had made the following observations of his behavior: problems interacting with his peers; problems with printing and written expression; hated to read aloud; difficulty sticking with a task without squirming; clumsy and jerky body movement; difficulty copying from the board; invading other people's personal space; unable to place his hand on a body part when requested; when playing soccer has no idea where other players were, or what to do with the ball; difficulty following directions; and playing with other children caused high levels of anxiety.

Initial testing indicated Harry's eye health and sight were fine for far and near activities. Sight is just a measure of how clearly we see. While 20/20 visual acuity is the standard, 20/20 vision or perfect vision is a misnomer. Unfortunately, having 20/20 visual acuity or sight provides no information about how someone is using his or her vision to take in information, organize information and compare it with previously stored input, and finally to decide what to do with that information. Vision is an ongoing act of perceiving, processing, and performing. Our vision system answers the questions: **Where am I? Where is it? What is it? What do I do with it?**

We have to be able to match what we see to what we know and feel to have an identity match. A 2-year-old enters a room and sees a vase. He will touch this vase, feel it, and taste it to know what it is. An older, competent visual child, without touching and feeling, can simply look and know what something is. When driving, do we look at the gas pedal? Do we look at the brake pedal when we step on it? Do we look at the steering wheel when we turn it? No, we perform these acts while keeping our eyes pointed at the road.

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Processing of visual information starts at the back of the eye. The back of the eye houses essential brain tissue, and visual information is sent from each eye to other areas of the brain. These areas either govern or have a major impact on **cognition, posture, balance, movement, speech, auditory processing, and emotions and feelings**. The vision system is the main operating system of the brain. It tells us when and where to do something. A competent vision system is the difference between reading fluently versus reading in a fragmented, halting manner, or copying in phrases versus one word at a time. In addition, the vision system tells us when and where to put our hands to hit or catch a ball. The same underlying process occurs when we are writing. It is the vision system that directs the hand to appropriately space letters and keep the letters uniform in size and on the line.

When vision is not supplying the appropriate information, we have mismatches in space. A mismatch is a disparity between where we see an object and where it is in space. Space is really another word for vision; that is, our vision determines our understanding of space. Part of seeing includes making accurate spatial judgments like kicking a soccer ball, drawing geometric shapes, spacing letters and words appropriately, gracefully moving through space without bumping into things, or staying in the lane when driving a car.

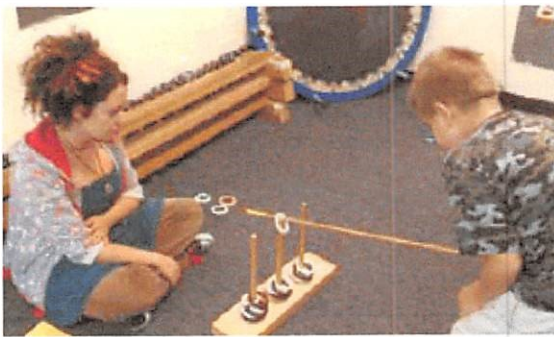
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At the start of Harry's visual examination, the quality of Harry's eye movements was evaluated. Harry had little or no control of his eye movements, but he could follow a moving target by touching it. In other words, Harry needed the reinforcement or feedback from touch to know where to look.

Eye movements allow us to explore our environment, quickly assess our surroundings, and select an area for attention. When a child or adult lacks control of their eye movements, behavior is markedly compromised. Eye movements maintain a good correlation of the mental age versus the chronological age of an individual. The poorer the eye movements, the younger the mental age of the person. An infant will follow a moving target briefly, a 3-year-old will follow a moving target with his head, and a 6-year-old will follow a moving target fairly smoothly without any head movement. Harry's eye movement performance and his inability to sustain any contact with the moving target would be typical of a 2.5-year-old. A 2.5-year-old's behavior is characterized by the 3 D's: disorganization, disorientation, and distractibility. Through touching

and feeling, Harry was able to make some sense out of his environment. But obviously, Harry was unable to feel the letters on the page. Thus the symbolic or abstract world of reading and writing, along with thinking in general, was a challenge for Harry.

Our visual system plays a major role in figure/ground discrimination, organization, orientation, and attention span. Organization requires us not only to select an area for attention, which is the figure, but simultaneously to maintain awareness of the big picture or background. To see the background, we have to be able to take in a large amount of information at once, while centering on the figure. Harry was tunneling. When we tunnel, we lock into the subject or the selected area for attention and ignore all other sensory information. For example, we have to be called several times when watching TV, working on the computer, or reading. Tunneling also causes difficulty in following multiple directions. We lock in on part of the information and forget the rest.



Visual skills are often built on one another. These include eye movements and location skills, binocular visual skills, visualization, and visually directed movement. Attempts at working with eye movements only is like learning a splinter skill, which fails to integrate with other skills and places an artificial ceiling on the child's overall development.

The underlying problem for Harry was due to tunneling: his inability to see a large amount of information at once. Once his functional vision field can be enlarged, he has a framework for selecting an area for attention and learning to follow a moving target easily. Tunneling was an adaptation Harry made because he was overwhelmed with information, and it allowed Harry to have some success at learning. However, tunneling has a lot of drawbacks. When we tunnel, we lack awareness of what is happening around us, and it limits our ability to see all of our options. It is as if we are stuck and challenged to make transitions. It is limiting in team sports where we have to see the ball, teammates, and opponents, and predict where the ball is going. When we tunnel, we do not take in the whole field simultaneously; thus, we can be slow to respond to new stimuli.

Harry was also weak in his ability to coordinate the information from each eye, thereby complicating his cognition, posture, balance, movement, and speech and auditory processing.

Problems ensuing from inadequate coordination of the input from each eye make reading and writing activities stressful. These problems also lead to skipping words or lines, messy writing, problems copying from the board, poor eye contact, and poor listening skills. Finally, group activities, especially sports, can be very confusing.

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Unfortunately, children are often misdiagnosed with central auditory processing problems while the underlying vision problem is left untreated. The child makes progress, but reads slowly, often has to go back to reread, and never enjoys the actual act of reading. In addition, there are still gaps in the child’s listening abilities.

Harry also had difficulty with visualizing. Visualizing is the ability to picture something previously seen, picture something from a different orientation, or picture an action sequence. Visualizing is fundamental for organization or planning ahead. It provides orientation—knowing where you are in space and following multiple directions, so if we can picture it, we have a much better chance of remembering it. It provides directionality—knowing where we are in relation to our surroundings. Finally, it provides creativity—requiring that we see things from different perspectives. In other words, visualization is built on the foundation of the other visual skills.

Cognitive intelligence can be divided into three components. The first is genetic/ nature. It is what we get from our parents, and that is why some children are gifted in certain areas while struggling in others. The next component is nurture. It is how we surround a child, e.g., conversation, books, museums, and music. Last is the child’s involvement in the world. This last part requires a competent, learned vision system to negotiate the world and to master reading, math, relationships, and sports. When vision is not working properly, a person makes many maladaptations, including self-stimulating behaviors, avoiding eye contact, turning the head to view the world, and avoiding group play. Vision is the bridge from the concrete world to the abstract world of reading and writing.

Harry never learned to trust what he was seeing. Because Harry did not trust what he was seeing, the only way he felt confident in what he saw was by touching and feeling for confirmation. A child who develops without any complications usually learns to trust what he sees.



Fortunately for Harry, performance lenses and a program of Visual Training helped him get back on track. Performance lenses are low power or reduced power glasses that make it easier to coordinate the information received from each eye. When Harry put on the performance lenses during our evaluation, his voice became louder, he was able to sit still, and his reading became more fluent. Before the lenses, Harry's walking was characterized by small steps and jerkiness; with the performance lenses, he took bigger steps, and his walking was altogether smoother. After the evaluation, I prescribed performance lenses and a Visual Training program for Harry. Visual Training teaches people how to use lenses, prisms, and movement activities to develop adequate visual skills.

At his first progress report, conducted after the start of Visual Training, Harry's mother relayed the following changes in his behavior: "He can now look at or inspect his surroundings without turning his head. Harry can also make and maintain eye contact with people other than his close family. Soccer is now an activity that Harry enjoys. In the past he stayed in the background of the game, fearful that he would bump into other players. Harry is also talking in more complete sentences. Overall, his ease in the world and his surroundings as well as his trust of his own vision system has greatly increased." Harry continues to do well in the Visual Training program and feels more comfortable being in the world.

"Hidden visual problems" affect many children and adults and compromise their behavior and abilities. Performance lenses and Visual Training are powerful tools for children and adults on the autism spectrum. Patients with autism spectrum disorders may not have all of the above symptoms when a vision problem is contributing to their difficulties; in fact, it is important to note that any of the above symptoms could signal a vision problem. Vision problems can make it even more difficult for people with an autism spectrum disorder to think and move. These

individuals tend to see the world in small chunks; thus, it takes them longer to organize a lot of information and deal with busy or dynamic environments. With the help of performance lenses and Visual Training, individuals can become more aware of their bodies, their environment, and overall can be more at ease with the world.

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