Precise vision: A resource websites for parents and educators

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Precise vision: A resource websites for parents and educators

Abstract
The purpose of this thesis was to provide an easily accessible resource for both parents and educators to help identify learning difficulties related to vision. Access to this resource site will be via the internet system. A great deal of the information on the world wide web pertaining to vision and learning is not designed for easy use by lay people and can be difficult to access. Our intent was to provide useful easy to understand information on this site; internet links are provided to guide visitors who wish to pursue information in more specific areas of vision and learning. Through this medium we hope to be able to keep the information current, as the site can be maintained and updated as well as receive feedback via an nPacific University's programs particularly education and optometry.

Degree Type
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Degree Name
Master of Science in Vision Science

Committee Chair
Paul Kohl

Subject Categories
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Precise Vision
A Resource Website for Parents and Educators

PRESENTED BY:

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In partial fulfillment for the Master of Education
Visual Function in Learning
at Pacific University

May 2000

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ABSTRACT

The purpose of this thesis was to provide an easily accessible resource for both parents and educators to help identify learning difficulties related to vision. Access to this resource site will be via the internet system. A great deal of the information on the world wide web pertaining to vision and learning is not designed for easy use by lay people and can be difficult to access. Our intent was to provide useful easy to understand information on this site; internet links are provided to guide visitors who wish to pursue information in more specific areas of vision and learning. Through this medium we hope to be able to keep the information current, as the site can be maintained and updated as well as receive feedback via an nPacific University’s programs particularly education and optometry.
Visionandlearning.org

The pages contained here are merely the printouts from the website visionandlearning.org. The website is the actual thesis and it is much better appreciated on the internet rather than printed in a binder. Visionandlearning.org is privately maintained by Mary McMains who updates the site as needed. In keeping the site updated some links may appear as “under construction” from time to time while new information is added to the site. There are many links within the website some of which are common to different headings along the menu bar. In instances where links were repetitive the pages were not printed at every link point. In printing out the material from the site, each heading was printed followed by any links to that heading and formatted from left to right in the order of the main toolbar. Please take a look at not only the printed pages contained here, but the actual website as well. The website itself is much more dynamic and allows visitors to learn a great deal; there is an e-mail address available at the website for visitors who wish to submit comments about the site. Happy reading!
Precise Vision: A Resource Website for Parents & Educators

Introduction/ Rationale:

Welcome to precisevision.com. We hope your visit to this website is both informative and fun and that you will gain a better understanding of the sense of "vision." Nearly every moment of everyday we are relying on vision at some level to bring us information from the world around us, a visual system that is not operating in peak condition deprives us of information. Students with poorly performing visual systems often flounder in school and the problems can be difficult to diagnose hence the need to thoroughly evaluate each students visual system.

Precisevision.com inventories skills and behaviors that are associated with smooth functioning and lurching inefficient visual systems. Checklists are provided to help parents and educators easily evaluate their child or student. Links to other resources and reference materials are listed should the teacher or parent have concerns and wish to utilize this site as a point of access.

An overview of components and functions of the visual system are presented as well as a glossary and list of frequently asked questions (FAQ's). Visitors are invited to respond to the website via electronic mail.

Headings covered at this website:
- Home Page
- What is Vision
- OD vs MD
- Learning Disabilities
- ADD/ADHD
- Dyslexia
- MDT's & IEP's
- Developmental Milestones
- Risk Factors
- What is Vision Therapy
- Reasons for Consult
- Developmental Vision Exam
- Finding the Right Doctor
- Testimonials/ Case Studies
- Glossary
- Recommended Reading
- Recommended Links
- FAQ's
- References Used
- About Us
Vision & Learning
---
A Resource for Parents and Educators
This is only the menu for

Vision & Learning --- A Resource for Parents and Educators

To view the entire site, click here.
Does your child or someone you know have difficulty learning?

Perhaps you know a very bright child who never works up to their potential or who you feel may not be applying himself/herself enough. Different methods have been tried, even extra tutoring, but they still fall further behind. Meanwhile, that bright child is becoming more frustrated, losing self-esteem and may already be feeling a sense of failure.

Chances are, they may have a vision related learning problem.

Facts about Vision & Learning

25% of ALL children have a vision problem significant enough to affect their performance in school.

It has been estimated that 1 out of 4 children in the U.S. has some sort of learning problem. This equates to roughly 2-7 million children struggling to achieve in school.

Many visual difficulties have been shown to be related to reading ability.

This is not surprising, since it has been estimated by researchers that 75-90% of learning in a classroom occurs through the visual system.

FACT - As many as 80% of children who are reading disabled, including those considered dyslexic, show a deficiency in one or more basic visual skills.

Vision is almost always overlooked by parents and educators as one of the roadblocks a child may be encountering.

According to the Better Vision Institute, only 14% of children have had a comprehensive vision exam by first grade! Yet, the American Optometric Association recommends that by first grade, all children should have had at least three vision wellness checkups, one at 6 months, one at 3 years and again before beginning school, to ensure that their vision is developing healthy and normal.

20/20 "Vision" is Not Enough

Most people believe that good vision only means having 20/20 acuity, or seeing clearly in the distance. Schools that do vision screenings are usually only checking eyesight when they have kids read letters on a chart (usually a Snellen eyechart) across the room. This only detects 20-30% of vision problems in children and most do not even check acuity up close.

Most kids are actually farsighted and not nearsighted in elementary school. This means they have more difficulties seeing up close than they do far away. It also means that most kids will pass a school screening but still have trouble focusing up close, sustaining that focus over a short period of time and/or have difficulties changing their focus quickly from far to near. Obviously these skills are essential in activities such as reading efficiently, reading comprehension and copying from the board. However, these skills are only the tip of the vision iceberg!
There is more to vision than seeing clearly. 

So WHAT IS VISION?

Helpful tips for navigating around this site

The menu at the top is designed to be user friendly. You may follow the links in the order provided, or skip around in the order you prefer. Our only STRONG suggestion is to read the What is Vision page before you skip around.

To use the menu, simply click on any of the seven main tabs in the menu above. This will scroll down and allow you to choose from several sub menus. To view a page, click on one of the sub menus. The main tab you choose will stay highlighted so you do not lose your place.

If you follow a link that leads you outside of this site, a new browser window will automatically open up so you do not get lost in an endless web of links. If you close only that window, you will not lose this site. This will allow you the ability to toggle back and forth between windows if needed or to easily follow other links on our pages that you find interesting.

We hope you find this site informative. If you have time, please send us your comments and feedback, or email us if you have any questions. Thanks for visiting!

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DISCLAIMER-This website is for your information only. Its purpose is to increase your level of awareness about vision and learning. The educational content on these pages is not intended to take the place of medical advice from a licensed health care professional. If you feel you or someone you know may have a vision problem, please make an appointment to see a licensed optometrist. The creator of this site assumes no responsibility for any service provided by any optometrist found via this site.
What is Vision?

Vision is an important part of classroom learning

Vision is so complicated it involves 20 visual abilities and more than 65% of all pathways to the brain. The visual system is a significant part of how we process information and a key factor in how we learn. It is far more than just seeing objects clearly, but also involves processes such as how we move our eyes together, how we focus, how we achieve depth perception, how we perceive the world around us, how we process, store and recall information, to name just a few!

85% of classroom learning comes through the visual system. Poor visual skills can lead to difficulties with reading, learning, overall school performance and even sports. This happens when a good foundation of vision is not developed properly and stress causes the unstable system to break down under too much load. Fortunately, problems with visual skills can be fixed with proper vision training. A person can learn how to use their visual system more efficiently, so they will be better equipped to handle heavier loads on their visual system.

Vision is a great deal more than having 20/20 eyesight!

Vision is a dynamic, always changing process of organizing, interpreting and understanding what is seen. It is a process that integrates sensory and motor information generated by the brain and body to derive meaning and direct movement.

Vision is actually developed like walking and talking. It is learned over time from birth on up by our experiences and how we react and solve problems. It differs from eyesight because eyesight is our ability to see, a sense that most of us are born with, and vision is actually a LEARNED process. The visual skills we learn early on provide the foundation for later visual complexities. Any weak link in the visual process can affect the outcome, especially if the visual system is under stress.

Think of having the right machine, such as a car, but not knowing how to use it. In order to make the car more useful, you have to figure out how to coordinate all the levers, knobs and pedals. Vision is the same way. You may have two eyes, but learning how to coordinate them together and interpret the information coming in takes skill and practice.

Basically, we use vision to guide motor behavior, like catch a ball; interpret space and time, like when we give directions and say "it will take 10 minutes if we turn left at the light coming up in two blocks"; and integrate information from our other senses (hearing, touch, taste and smell), so we may think, understand and react to the world around us.

Vision allows us to take what we see and process this light information so we can -

- Identify what we see by where it is, how far away it is, how big it is, how fast it is moving, what texture it has, etc.
- Store this current information for future retrieval.
- Integrate the sight information with all our other senses - touch, hearing, taste and smell.
- Compare this information to previously stored information in order to confirm prior experience or reconstruct a prior experience if necessary.
- Derive meaning from both the new information and past information.
- Decide the relationship between where we are and where it is, or find out where we are in space.
- Act on this new meaning.
- Use this new perception to direct movement or thought.

Sound complicated?
Vision is there every step of the way when you learn and process information.

80% of what you perceive, comprehend and remember depends on the visual system. Our visual system helps us get the information in, perceive and derive meaning from it, then get the information out again so it is useful. Notice this is also how intelligence is often measured. Getman, a renowned behavioral optometrist, stated, “Vision is the dominant mode in the development of intelligence.” The more efficient a person is, the higher their score on many intelligence tests. This is why IQ scores can change.

The visual process is constantly active and evolving as you integrate and utilize the information you gather, learn from it and modify this information by experience. This is the process known as VISION.

Visual skills are important in reading and learning.

Getting to the point where we gain the ability to understand and interpret what we see correctly and efficiently involves many visual skills. If one or more of these skills are deficient, then the signal through the visual pathway may not be as clear as it could be. This can cause difficulty with learning or performing various tasks, such as reading. Since 75-90% of classroom learning comes through the visual system, poor visual skills can affect a child’s performance. Why?

It takes more energy to use a faulty visual system than it does an efficient one.

A good way to think of visual skills is the following analogy:

Having poor visual skills is like filling a glass of water using a spoon with one or more holes in it. A child may know how to do the task set before them and be a very physically and mentally capable child, but are not able to do the task as well as the child sitting next to them with a regular spoon. A very motivated child may still fill the glass full of water, but it will take more time and effort than a child with a spoon without any holes. Another child may become frustrated and give up or may fill some of the glass every once in awhile if they have more energy that day. The problem is most kids do not know they have a faulty spoon and neither do their parents or teachers.

Vision is one piece of the learning disability puzzle.

Visual skills can heavily influence a child’s ability to learn and process information, especially a child with a learning disability. However, not everyone is affected the same if they do have any inefficiencies with their skills. For some individuals it can be the main contributor, while in others it hardly contributes at all. It is important for all parents and professionals who work with children to understand that vision is just part of the puzzle and one type of intervention does not work for everyone.

A Multi-Disciplinary approach to learning problems is ideal.

Even when visual difficulties are taken out of the equation, other skills, such as basic academic skills, may still be underdeveloped. A multi-disciplinary approach is more the rule than the exception and all areas of difficulty should be considered when developing a diagnosis and treatment plan. This includes educational intervention.
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Visual Skills

Everything you never thought you wanted to know

Why are Visual Skills Important for Reading and Learning?

The process of vision takes more than 65% of all pathways to your brain to work. It takes up more brain power than any other one thing that we do with our brain at a given time! This is because vision is not really a single, solitary happening, but a whole bunch of things happening at the same time. Vision is so complicated it involves 20 visual abilities. It is far more than just seeing objects clearly, but also involves processes such as how we move our eyes together, how we focus, how we achieve depth perception, how we perceive the world around us, how we process, store and recall information, to name just a few! This is why we say vision is a dynamic process, not merely just one of our senses.

Vision is actually developed like walking and talking. It is learned over time from birth on up by our experiences and how we react and solve problems. The visual skills we learn early on provide the foundation for later visual complexities. Any weak link in the visual process can affect the outcome, especially if the visual system is under stress.

85% of classroom learning come through the visual system. Poor visual skills can lead to difficulties with reading, learning, overall school performance and even sports. This happens when a good foundation of vision is not developed properly and stress causes the unstable system to break down under too much load. Fortunately, a person can learn how to use their visual system more efficiently, so they will be better equipped to handle heavier loads on their visual system. This can be achieved through vision training.

For more information on vision training, click here.

We can break down visual skills for the sake of definition, however, it is important to realize that these skills coordinate together almost simultaneously. They can also be influenced by many physiological, environmental and psychological factors such as development, disease, infection, nutrition, fatigue, environmental stress, emotional stress, opportunity, attention and attitude. The more efficient the visual system is the more able it is to handle these influencing factors.

To better understand how to fix visual problems, we need to understand the visual system. On the next few pages the visual process will be broken down into the following categories: 1) visual input, 2) visual processing, and 3) visual integration skills. These skills and the subskills within these categories will be discussed in detail on the next few pages.

This is a lot of information to digest and will take awhile to get through. If you are willing to learn, we are definitely here for you!

Input Skills

If you don't get correct information input, how can you get good output?

A good analogy is having a television that works really well, but the antenna is broken. The T.V. is not going to be as useful if you can't get good reception. In the visual system, there are several factors on why input skills could be affected.

Image clarity (how clear you see) up close or in the distance is a factor.

This can be caused by refractive error (how the light is bent into the eye) or ocular disease. Keeping an image clear also has to do with your focusing, or accommodation, system. If you do not have good focus flexibility, it is hard to sustain objects up close clearly or to switch your focus to different distances easily.

Keeping an image single is another factor.

This is controlled by the vergence system. Vergence is how you move your eyes in or out to look at objects at different distances. If your eyes are not coordinated together well and pointing in the same place, you can experience double vision. This can not only cause lead to misalignment of the eyes (phorias), noticeable eye turns in or out (strabismus), having your brain shut down an (suppression) and can lead to your brain disregarding most of the information coming from one or both eyes (amblyopia).

Any of these things can cause symptoms such as eyestrain, fatigue, avoidance and headaches. If you notice a child having trouble focusing, or a child who is avoiding focusing, you should refer them to a behavioral optometrist for a comprehensive developmental vision exam. If people are exhibiting extra visual stress or tension, symptoms usually worsen over time. Unfortunately, some people (especially kids) can develop bad habits to cope with these problems, like avoidance or amblyopia, so they may end up not having obvious vision symptoms.
For more information on symptoms, click here.

Accommodation and Vergence

These two systems (along with your pupil that changes size to allow the proper light to come in and helps with depth of focus) ideally work together to keep images you are attending to clear and single.

Accommodation and vergence should work hand in hand to help bring you clear and single images.

ACCOMMODATION

Accommodation is difficult to "see," just like it is difficult to see an automatic camera focus, but we can calculate how much is needed at certain distances. Remember, the nearer the distance of interest, the more power we need from our focusing system.

If a person is far or nearsighted, this changes the amount of accommodation needed to see up close clearly.

The farsighted person's eyes are more comfortable focused in the distance and must work much harder to focus at near. Children are expected to be a tiny bit farsighted through much of elementary school with the amount of farsightedness decreasing with age. A lot of farsightedness, however, and its known effects on accommodation, combined with hours of daily desk work, can result in problems for students.

A person who is nearsighted needs to use less power at near than someone who is farsighted because their eyes are already "preset" to focus more closely.

For more information on myopia and hyperopia, click here.

VERGENCE

You can actually watch someone use their vergence system by having a friend look over your shoulder at an object in the distance. If they have do not have any eye turns (strabismus), both of their eyes should be looking straight ahead. Now ask your friend to look at the end of a pencil held approximately 1"-2" from their nose. Did you notice how both of their eyes turned in? This cross-eyed appearance is called convergence. Now have them look back out at the distant object. Did you notice how their eyes went back out again? This outward movement of your eyes is called divergence. This ability can be measured by your eyecare provider.

You can think of accommodation as finding the distance at which to focus (defining the plane focus), while vergence defines the point of focus within the plane. The closer we want to focus and point our eyes, the more "power" or effort we need to do so.

It is important to have effortless control over these systems so when the going gets tough and you need to work a little harder, you can!

If these two systems are not working smoothly or efficiently together and one system is working too hard or not hard enough, the result is a visual system that tires, cramps and basically breaks down after short periods of visual stress.

NOTE: Many medications can negatively effect the visual system. Common medications that can affect accommodation include antihistamines, Phenytoin, Ritalin, and Dexedrine. Phenytoin can also have affect on convergence.

Eye Coordination - Binocularity

Eye coordination is the ability of both eyes to work together as a team, so it seems like they are performing like one.

Each eye actually sees a slightly different image. The brain puts these images together and creates a 3D picture out of it by a process called fusion. If your eyes aren't team players, it is difficult to judge depth, relationships, and other types of spatial awareness.

If your eyes are not aligned well, your brain has a hard time fusing the two images, which can lead to double vision, confusion or ignoring an image (suppression).

Think of a pair of binoculars. If you don't have the two oculars set up correctly, it doesn't feel good and it is hard to concentrate on what you are looking at, or judge where you are looking.
Eye Movement Skills - Ocular Motility

Ocular motility is how well and efficiently you move your eyes. These are motor skills that allow us to move our eyes so we can fixate on objects (fixation), to quickly and accurately jump from one object to another (saccades), and to track moving objects efficiently (pursuits). This is a skill that gives us speed and control of our eye muscles to accurately inspect our environment.

Movements are very important when it comes to paying attention, copying from the page efficiently, and doing well in sports. Problems in this area can lead to all sorts of difficulties and symptoms are not detected early.

and Symptoms of Ocular Motor Dysfunction

- Loses place when reading, writing or copying
- Skips lines when reading
- Uses finger to follow along
- Head moves when reading as if their nose is following along
- Math skills are better than reading skills
- Complains of words moving on the page

may see in the classroom, click here.
What is Vision Training/Therapy (VT)?

Vision training/therapy (VT) is a subspecialty of optometry that strives to improve, enhance and develop visual skills through a prescribed treatment program. Patients learn to use their visual abilities in new or more efficient ways by participating in various vision exercises that utilize the use of lenses, prisms, patches and other materials and equipment. The overall goal is to alleviate signs and symptoms of vision problems, maximize visual and overall performance and comfort, meet the patient's needs and improve the patient's quality of life.

Vision therapy is commonly used for (but not limited to) the following:

- Accommodative dysfunctions
- Ocular motor dysfunctions
- Visual motor disorders
- Visual Perceptual disorders
- Learning related visual problems
- Traumatic brain injury
- Sports vision
- Strabismus
- Amblyopia
- Myopia control

For more information about visual skills, click here.

Vision therapy is similar to physical therapy. In physical therapy, you relearn or enhance the use of various muscles and body parts that are not functioning correctly and/or causing a great deal of discomfort so that you can use those parts more efficiently. In vision therapy, you relearn or enhance the use of different brain (or thought) processes to alleviate visual discomfort and use visual skills more efficiently. This is possible because vision is a learned process and eyes are actually modified brain tissue.

Who Can Benefit From Vision Therapy?

Anybody who has been determined to have a visual problem. Many children who are diagnosed with learning disabilities, reading problems, ADD/ADHD, autism, developmentally delayed, to name a few, usually have a visual component to their problem that can be treated. VT is not limited to young children, however. Patients of ALL ages can benefit from vision therapy. Even many professional athletes use VT to speed their visual reaction times and improve hand-eye coordination. Computer users who notice they are experiencing eye strain can potentially benefit from VT to reduce discomfort. Mature adults that have suffered strokes or adults that have been in car accidents and suffered head trauma can benefit from VT.

What is involved in Vision Therapy?

VT is not a quick fix, but a lifetime correction. Just like physical therapy, VT can be hard work. Commitment to the therapy program is vital to the individual's overall success. Good visual skills are not learned overnight. Remember, it took a lifetime to get to the point before therapy begins. Even if you are three, you had three years to learn inefficient visual skills. VT involves in-office sessions with the doctor or vision therapist, then homework in-between sessions to practice, reinforce and eventually learn new or enhance previously learned visual skills.

VT can take anywhere from 6 weeks to a year or more for severe problems before vision problems are remediated because it takes longer to sort of "unlearn" vision behaviors and then learn new ones. Many problems can be improved dramatically over 10-15 one hour weekly sessions (session length is determined by your doctor and may vary). Certain dysfunctions, like strabismus or severe perceptual problems, can take much longer to treat.

Between office sessions there are often daily homework assignments. These homework sessions generally take between 15-30 minutes and should be done 4-5 times each week, though again this will be decided by your doctor or vision therapist. The homework is often fun and entertaining for kids, but will also be challenging. It is imperative that the homework be completed or new visual skills will not be learned. Motivation and positive reinforcement is very important. Parents and teachers that participate and encourage a child will increase the degree of success immensely! It is also essential to be carefully guided by a trained professional, because visual habits that are learned incorrectly can be reinforced by practicing them.

VT is not the cure all for everything, but it can be a tremendously rewarding therapy for many individuals. To hear
from some people that have benefited from VT, please click here to read their stories.

The benefit of VT for individuals that suffered from vision problems is a lifelong change in overall performance, comfort and quality of life.

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Any of these things can cause symptoms such as eyestrain, fatigue, avoidance and headaches. If you notice a child having trouble seeing or not being able to keep their eyes on an object, they may be exhibiting extraneous single and clear vision, symptoms usually worsen over time. Unfortunately, some people (especially kids) cannot deal with these problems, like avoidance or amblyopia, so they may end up not having obvious vision symptoms.

http://www.visionandlearning.org/visualskills.htm
For more information on symptoms, click here.

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The farsighted person's eyes are more comfortable focused in the distance and must work much harder to focus at near. Children are expected to be a tiny bit farsighted through much of elementary school with the amount of farsightedness decreasing with age. A lot of farsightedness, however, and its known effects on accommodation, combined with hours of daily desk work, can result in problems for students.

A person who is nearsighted needs to use less power at near than someone who is farsighted because their eyes are already "preset" to focus more closely.

For more information on myopia and hyperopia, click here.

VERGENCE

You can actually watch someone use their vergence system by having a friend look over your shoulder at an object in the distance. If they have do not have any eye turns (strabismus), both of their eyes should be looking straight ahead. Now ask your friend to look at the end of a pencil held approximately 1"-2" from their nose. Did you notice how both of their eyes turned in? This cross-eyed appearance is called convergence. Now have them look back out at the distant object. Did you notice how their eyes went back out again? This outward movement of your eyes is called divergence. This ability can be measured by your eyecare provider.

You can think of accommodation as finding the distance at which to focus (defining the plane focus), while vergence defines the point of focus within the plane. The closer we want to focus and point our eyes, the more "power" or effort we need to do so.

It is important to have effortless control over these systems so when the going gets tough and you need to work a little harder, you can!

If these two systems are not working smoothly or efficiently together and one system is working too hard or not hard enough, the result is a visual system that tires, cramps and basically breaks down after short periods of visual stress.

NOTE: Many medications can negatively effect the visual system. Common medications that can affect accommodation include antihistamines, Phenytoin, Ritalin, and Dexedrine. Phenytoin can also have affect on convergence.

Eye Coordination - Binocularity

Eye coordination is the ability of both eyes to work together as a team, so it seems like they are performing like one.

Each eye actually sees a slightly different image. The brain puts these images together and creates a 3D picture out of it by a process called fusion. If your eyes aren't team players, it is difficult to judge depth, relationships, and other types of spatial awareness.

If your eyes are not aligned well, your brain has a hard time fusing the two images, which can lead to double vision, confusion or ignoring an image (suppression).

Think of a pair of binoculars. If you don't have the two oculars set up correctly, it doesn't feel good and it is hard to concentrate on what you are looking at, or judge where you are looking.
Eye Movement Skills - Ocular Motility

Ocular motility is how well and efficiently you move your eyes. These are motor skills that allow us to move our eyes so we can fixate on objects (fixation), to quickly and accurately jump from one object to another (saccades), and to track moving objects efficiently (pursuits). This is a skill that gives us speed and control of our eye muscles to accurately inspect our environment.

Movements are very important when it comes to paying attention, copying from the page efficiently, and doing well in sports. Problems in this area can lead to all sorts of symptoms not detected early.

and Symptoms of Ocular Motor Dysfunction

- Loses place when reading, writing or copying
- Skips lines when reading
- Uses finger to follow along
- Head moves when reading as if their nose is following along
- Math skills are better than reading skills
- Complains of words moving on the page

may see in the classroom, click here.

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Vision Related Learning Problems

Good vision skills can help provide a solid foundation for learning. If a child does not have a good visual foundation, their system is not efficient enough to handle large work loads because it puts too much stress on such a weak system. A poor visual system can lead to poor performance in school.

There are a multitude of reasons why a child may be having trouble in school, and vision is just one of them. Often, it is a combination of problems and one remedy will not solve them all. This is why a multi-disciplinary approach is best, so that no one factor will be left out. However, any problem that CAN be corrected makes it that much easier for a child to be successful. Vision is such a problem than can be taken out of the puzzle. It is treatable and the earlier vision problems are detected and treated, the better. It is for this reason that vision should be checked promptly if your child is falling behind in school and why everyone, especially children, should have their eyes routinely checked.

Following is a list of signs and symptoms that could mean your child has a vision problem:

Signs & Symptoms of Vision Problems

- Failed school vision screening
- Failed eyechart (acuity) test
- Recommendation by:
  - Teacher
  - Physician
  - Psychologist
  - Optometrist
  - Other Professional
- Behind in school
- Not working up to potential
- Hyperactivity
- Frustrates easily
- Poor or short attention span
- Difficulty reading
  - Reads below grade level
  - Lose place frequently
  - Holds material too close
  - Poor comprehension
  - Skips lines
  - Repeats lines
  - Adds extra words
- Has an eye that turns in or out
- Poor eye movements
- Poor hand-eye coordination
- When reading/writing:
  - Covers an eye
  - Turns head to side
  - Complains of blur or double vision
  - Eyes itch or burn
  - Eyes hurt
  - Reverses letters/words (>3rd grade)
  - Headaches
- Trouble in spelling or language arts
- Trouble copying from chalkboard
- Trouble copying from books
- Perception problems
- Failed depth perception/fusion tests
- Poor motivation
- Difficulty writing
  - Letter formation
  - Cannot stay on line
  - Sloppy
  - Crowds letters
  - Eyes too close to paper
  - Grips pencil incorrectly
  - Rich vocabulary, but not on paper
- Excessive effort needed to achieve
- Not working up to potential
- Diagnosed with a learning disability

http://www.visionandlearning.org/whysaeaneyedr.htm
• Physically awkward
• Scores low on standardized tests

Trouble in sports
• Does not work well on their own

For another list of problems that can be seen in a classroom, check out the educator's checklist by clicking here.

Do you suspect your child has a vision problem?

If you suspect your child has a vision problem, we suggest finding a doctor that specializes in children and making an appointment for an optometric consultation. If do not know of any, please click here to find a doctor in your area.
# Educator's Checklist

## A Guide for Detecting Vision Problems in the Classroom

Adopted from a pamphlet created by the Optometric Extension Program Foundation, Inc.

<table>
<thead>
<tr>
<th>Eye Movement Abilities (Ocular Motility)</th>
<th>One eye turns in or out at any time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reddened eyes or lids</td>
</tr>
<tr>
<td></td>
<td>Eyes tear excessively</td>
</tr>
<tr>
<td></td>
<td>Encrusted eyelids</td>
</tr>
<tr>
<td></td>
<td>Frequent styes on lids</td>
</tr>
<tr>
<td></td>
<td>Headaches in forehead or temples</td>
</tr>
<tr>
<td></td>
<td>Burning or itching after reading or desk work</td>
</tr>
<tr>
<td></td>
<td>Nausea or dizziness</td>
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<tr>
<td></td>
<td>Print blurs after reading a short time</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Eye Teaming Abilities (Binocularity)</th>
<th>Complains of seeing double (diplopia)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Repeats letters within words</td>
</tr>
<tr>
<td></td>
<td>Omits letters, numbers or phrases</td>
</tr>
<tr>
<td></td>
<td>Misaligns digits in number columns</td>
</tr>
<tr>
<td></td>
<td>Squints, closes or covers one eye</td>
</tr>
<tr>
<td></td>
<td>Tilts head extremely while working at desk</td>
</tr>
<tr>
<td></td>
<td>Consistently shows gross postural deviations at all desk activities</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Eye-Hand Coordination Abilities</th>
<th>Must feel of things to assist in any interpretation required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eyes not used to &quot;steer&quot; hand movements (extreme lack of orientation, placement of words or drawings on page)</td>
</tr>
<tr>
<td></td>
<td>Writes crookedly, poorly spaced: cannot stay on ruled lines</td>
</tr>
<tr>
<td></td>
<td>Misaligns both horizontal and vertical series of numbers</td>
</tr>
<tr>
<td></td>
<td>Uses his hand or fingers to keep his place on the page</td>
</tr>
</tbody>
</table>

http://www.visionandlearning.org/educatorschecklist.htm
<table>
<thead>
<tr>
<th>Visual Form Perception (Visual Comparison, Visual Imagery, Visualization)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses other hand as &quot;spacer&quot; to control spacing and alignment on page</td>
<td></td>
</tr>
<tr>
<td>Repeatedly confuses left-right directions</td>
<td></td>
</tr>
<tr>
<td>Mistakes words with same or similar beginnings</td>
<td></td>
</tr>
<tr>
<td>Fails to recognize same word in next sentence</td>
<td></td>
</tr>
<tr>
<td>Reverses letters and/or words in writing and copying</td>
<td></td>
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<tr>
<td>Confuses likenesses and minor differences</td>
<td></td>
</tr>
<tr>
<td>Confuses same word in same sentence</td>
<td></td>
</tr>
<tr>
<td>Repeatedly confuses similar beginnings and endings of words</td>
<td></td>
</tr>
<tr>
<td>Fails to visualize what is read either silently or orally</td>
<td></td>
</tr>
<tr>
<td>Whispers to self for reinforcement while reading silently</td>
<td></td>
</tr>
<tr>
<td>Returns to &quot;drawing with fingers&quot; to decide likes and differences</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Refractive Status (Nearsightedness, Farsightedness, Focus Problems, etc.)</td>
<td></td>
</tr>
<tr>
<td>Comprehension reduces as reading continued; loses interest too quickly</td>
<td></td>
</tr>
<tr>
<td>Mispronounces similar words as continues reading</td>
<td></td>
</tr>
<tr>
<td>Blinks excessively at desk tasks and/or reading; not elsewhere</td>
<td></td>
</tr>
<tr>
<td>Holds book too closely; face too close to desk surface</td>
<td></td>
</tr>
<tr>
<td>Avoids all possible near-centerd tasks</td>
<td></td>
</tr>
<tr>
<td>Complains of discomfort in tasks that demand visual interpretation</td>
<td></td>
</tr>
<tr>
<td>Closes or covers one eye when reading or doing desk work</td>
<td></td>
</tr>
<tr>
<td>Makes errors in copying from chalkboard to paper on desk</td>
<td></td>
</tr>
<tr>
<td>Makes errors in copying from reference book to notebook</td>
<td></td>
</tr>
<tr>
<td>Squints to see chalkboard, or requests to move nearer</td>
<td></td>
</tr>
<tr>
<td>Rubs eyes during or after short periods of visual activity</td>
<td></td>
</tr>
<tr>
<td>Fatigues easily; blinks to make chalkboard clear up after desk task</td>
<td></td>
</tr>
</tbody>
</table>

To see more OEP pamphlets like this one, click [here](http://www.visionandlearning.org/educatorschecklist.htm).
Finding an eye doctor, a doctor that suits your needs, can be quite challenging. The type of care you receive when seeing an eye doctor depends, in part, on which eye doctor you choose. Within all medical professions, even specialties, providers have different areas of expertise, philosophies of care and communication styles. In optometry, there is a smaller community of optometrists that specialize in vision and learning.

All optometrists are not the same.

Within optometry, you can practice in a general practice—usually called primary care, or you can specialize in one or more different areas. Some of these specialties include contact lenses, co-management of refractive surgery, dry eye, disease, glaucoma, geriatrics, low vision, sports vision, neuro-rehabilitative optometry, developmental/behavioral optometry, pediatrics, vision training, and learning disabilities.

Choosing the Right Eye Doctor

For very young children (6 months up to age 5-7) it is recommended that you choose a pediatric optometrist that emphasizes developmental vision.

Very young children are not able to respond accurately to the same testing procedures as adults or older children. These doctors specialize in caring for the vision of very young children and often have very different equipment in their offices to accurately test a child's visual system. Pediatric optometrists that emphasize developmental vision are often very skilled in preventative care. This means potential vision problems can be avoided before they become trouble. It also means your child MAY be prevented from needing to wear glasses when they get older. Remember good vision is much more complex than simply seeing 20/20.

For school age children, it is also recommended that your child sees an eye doctor with an emphasis in developmental/behavioral optometry, but one that also specializes in learning disabilities and vision training. It sounds like it would be difficult to find such a doctor, but most optometrists that specialize in children have this type of expertise.

The following is a list of links to organizations that will give you FREE access to referral databases to find an optometrist that specializes in children near you:

Note: Each organization only lists its own members in their database. We suggest you use more than one link to find doctors in your area.

1. **College of Optometrists in Vision Development (COVD) Member Directory**
   This organization serves as the certifying body for Doctors in the Optometric specialty called Behavioral/Developmental/Rehabilitative Optometry. If a doctor chooses, he/she may apply for COVD fellowship. Fellowship is difficult to obtain and is only granted after interviews, publishing and knowledge testing is completed and accepted by a committee. Fellows are certified specialists in vision therapy.

2. **Optometric Extension Program (OEP) Foundation Referral Database**
   The OEP Foundation is an international non-profit organization that serves the educational needs of behavioral optometrists providing continuing education credits and provides public information about vision care. The optometrists listed on the referral list practice preventive and rehabilitative optometry.

3. **Parents Active for Vision Education (PAVE)**
   PAVE is a national non-profit education, resource and support organization founded by parents and teachers who know children that benefited from vision therapy. Their mission is to raise public awareness of the crucial relationship between vision and achievement. This link gives phone numbers to local chapters that may be near you. They also have a national number listed in case a chapter is not in your area. Not only is this a good referral source, but they are a good support group for parents.

4. **Optometrists.org National Network of Optometrists - Pediatric Eyecare and Behavioral Optometry**
   An organization made up of behavioral optometrists around the globe to better educate the public on vision care. This referral program requires that you answer some questions to best choose the doctor that suits your needs and to help create a database to better serve the public. It is made up of doctors that offer vision therapy who have set up webpages on this site.
Neuro-Optometric Rehabilitation Association International, Inc. (NORA)

NORA was established to provide, network and share information about visual rehabilitation between optometrists, ophthalmologists, physicians, rehabilitation professionals, occupational therapists, educators, psychologists, nurses, etc. for the understanding and treatment of persons who have physical disabilities and/or traumatic brain injury. Their mission is to expand awareness about the visual problems and the needs of those that suffer from traumatic brain injury.

This referral database is a little different than the ones above. This site helps find neurorehabilitative optometrists that specialize in traumatic brain injury. Many of them have vision therapy practices and may also diagnose and treat children with learning related.

The links on this web site are provided only for your convenience to provide more information on vision. The creators of this site have no financial interest in any site linked, nor do they claim any responsibility for information found on these sites. No promises or warranties of any kind as to the content of any site linked are expressed or implied.

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Visual Skills

Everything you never thought you wanted to know

Why are Visual Skills Important for Reading and Learning?

The process of vision takes more than 65% of all pathways to your brain to work. It takes up more brain power than any other one thing that we do with our brain at a given time! This is because vision is not really a single, solitary happening, but a whole bunch of things happening at the same time. Vision is so complicated it involves 20 visual abilities. It is far more than just seeing objects clearly, but also involves processes such as how we move our eyes together, how we focus, how we achieve depth perception, how we perceive the world around us, how we process, store and recall information, to name just a few! This is why we say vision is a dynamic process, not merely just one of our senses.

Vision is actually developed like walking and talking. It is learned over time from birth on up by our experiences and how we react and solve problems. The visual skills we learn early on provide the foundation for later visual complexities. Any weak link in the visual process can affect the outcome, especially if the visual system is under stress.

85% of classroom learning come through the visual system. Poor visual skills can lead to difficulties with reading, learning, overall school performance and even sports. This happens when a good foundation of vision is not developed properly and stress causes the unstable system to break down under too much load. Fortunately, a person can learn how to use their visual system more efficiently, so they will be better equipped to handle heavier loads on their visual system. This can be achieved through vision training.

For more information on vision training, click here.

We can break down visual skills for the sake of definition, however, it is important to realize that these skills coordinate together almost simultaneously. They can also be influenced by many physiological, environmental and psychological factors such as development, disease, infection, nutrition, fatigue, environmental stress, emotional stress, opportunity, attention and attitude. The more efficient the visual system is the more able it is to handle these influencing factors.

To better understand how to fix visual problems, we need to understand the visual system. On the next few pages the visual process will be broken down into the following categories: 1) visual input, 2) visual processing, and 3) visual integration skills. These skills and the subskills within these categories will be discussed in detail on the next few pages.

This is a lot of information to digest and will take awhile to get through. If you are willing to learn, we are definitely here for you!

Input Skills

If you don't get correct information input, how can you get good output?

A good analogy is having a television that works really well, but the antenna is broken. The T.V. is not going to be as useful if you can't get good reception. In the visual system, there are several factors on why input skills could be affected.

Image clarity (how clear you see) up close or in the distance is a factor.

This can be caused by refractive error (how the light is bent into the eye) or ocular disease. Keeping an image clear also has to do with your focusing, or accommodation, system. If you do not have good focus flexibility, it is hard to sustain objects up close clearly or to switch your focus to different distances easily.

Keeping an image single is another factor.

This is controlled by the vergence system. Vergence is how you move your eyes in or out to look at objects at different di are not coordinated together well and pointing in the same place, you can experience double vision. This can not only lead to misalignment of the eyes (phorias), noticeable eye turns in or out (strabismus), having your brain shut down an: suppression and can lead to your brain disregarding most of the information coming from one or both eyes (amblyop

Any of these things can cause symptoms such as eyestrain, fatigue, avoidance and headaches. If you notice a child having should refer them to a behavioral optometrist for a comprehensive developmental vision exam. If people are exhibiting extra single and clear vision, symptoms usually worsen over time. Unfortunately, some people (especially kids!) can develop bar to cope with these problems, like avoidance or amblyopia, so they may end up not having obvious vision symptoms.

http://www.visionandlearning.org/visualskills.htm
For more information on symptoms, click here.

Accommodation and Vergence

These two systems (along with your pupil that changes size to allow the proper light to come in and helps with depth of focus) ideally work together to keep images you are attending to clear and single.

**Accommodation**

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If a person is far or nearsighted, this changes the amount of accommodation needed to see up close clearly.

The farsighted person’s eyes are more comfortable focused in the distance and must work much harder to focus at near. Children are expected to be a tiny bit farsighted through much of elementary school with the amount of farsightedness decreasing with age. A lot of farsightedness, however, and its known effects on accommodation, combined with hours of daily desk work, can result in problems for students.

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Hyperopia - Farsightedness

If you are farsighted (hyperopic) you have more trouble seeing up close than you do in the distance. However, it also means that you use your focusing system even out in the distance to make objects clear. People that don’t have any farsightedness are at rest in the distance and don’t need to use their focusing power to see clearly.

Example: Let say a child has a refractive error of +2.00D but does not wear glasses. This means they use 2 units of focusing power in order to see clearly in the distance. Kids potentially have a lot of focusing power and some may even be able to compensate for the 2 units this child is showing. But, what happens when that child reads a book? If that book is held at 40cm, not only do they need to crank in 2.5 units of focusing power that the book requires everyone to use, but they also have to crank in another 2 units of focusing power to compensate for their refractive error in the distance. That is 4.5 units altogether, which puts a huge strain on the visual system and makes it difficult to read efficiently.

NOTE: Diopters (D) are the power units used by your eyecare professionals to measure your eyes. It’s a hard concept to grasp (almost like a calorie!), but if you are a math person, the definition of a diopter is 1/meter.

What does this mean?

It means they have to work harder than kids without this problem. Now, they may be able to handle it for short periods of time (even long enough to do a quick acuity test up close!), but it takes a lot of energy and attention and these kids fatigue fast.

FACT: 33% of kids from age 6 months to 6 years are hyperopic by +1.50D or greater.

Myopia - Nearsightedness

Now, on the flip side, kids that are nearsighted (myopic) have trouble seeing clearly out in the distance but do better up close. Why? These kids use very little effort up close because their eyes are essentially preset to focus at near.

Example: If you have a child with a refractive error of -2.00D without wearing glasses, this means their point of focus is at about 50 cm (Again for the math people, 1 meter/2D=50cm). This means they can see clearly up to this point, but beyond it is blurry. If that child is holding their book at 40 cm, which takes 2.50D to read, they only have 0.50D to crank in to see the book clearly.

What does this mean? Myopia is a great way to adapt to nearpoint stress, as far as the visual system goes. Kids that are nearsighted usually don’t have to work as hard to see up close without their glasses (and I stress the word without).

FACT: 9.4% of kids from age 6 months to 6 years are myopic by -0.50D or greater. By age 6 to 18 years, myopia soars to 20.2% prevalence.

It has been pretty well established in the literature that the amount of nearsightedness increases, not only the prevalence, but the amount measured increases the longer a student remains in school. Nearsightedness is also more common in industrial nations because of the degree of nearwork required in our society.

Nearpoint Stress

Near point stress is exactly what it says, stress on the visual system due to near work. Our visual system is ideally set for use at greater distances (like in the good old days when we had to hunt and gather and watch for bad things in the bushes) and not really designed to do a huge amount of detailed, near work.

In today’s world most of us spend a great deal of time working at close range, children and adults alike. Think about your average day; how much time do you spend reading, writing or working on a computer?

Add to this time many hobbies like playing an instrument where you must read music, sewing, tying flies for fishing, pleasure reading, computer games, internet surfing and a host of others.

Increasing numbers of people are spending greater amounts of time working up close. All this time spent at near without allowing our eyes to relax the way they were meant to, often translates into

http://www.visionandlearning.org/refractiveerror.htm
Nearpoint stress may display itself as generalized eye fatigue, headaches, transient blurred vision (distance or near), or poor ability to concentrate on tasks up close.

Often there are no distinct physical signs of near point stress, so it is often overlooked.

An example of what is happening during times of near point stress might look something like this: Clench your fists and hold them there for several minutes then release your grip. How easy or difficult was it to straighten your fingers? Could you smoothly and quickly extend your fingers? The muscles in your focusing system are often "clenched" in this position for hours on end building in a kind of charlie horse or muscle spasm, but without the intense pain. In your eyes, we call this an accommodative spasm.

When we finally give our eyes a break, they have a difficult time relaxing their focus. Our perception is that our distance vision is blurry.

Another theory is that your body (including your eyes) constantly reacts to its environment. If you are in a state of stress, you will either learn a method to adapt to it (fight), or you will avoid it (flight).

Myopes tend to elicit the fight response and hyperopes tend to elicit the flight response.

As far as the visual system goes, for most people, it is not happy when you work up close for long periods of time. People will either avoid near tasks or your system finds a way to adapt to the near work. It decides to build in plus power (almost like natural reading glasses) to make it easier for you to see up close. This is great!...up close. When you look far away again, things tend to be blurry.

Instead of nearsightedness being only a distance problem, it can actually start out as a near problem!

- The good news is if a doctor catches you when this happens, they may be able to prevent nearsightedness by giving you stress relieving lenses. You wear this cushion to make it easier for you to do things up close (not necessarily clearer up close) and when you take them off...your distance vision is not affected.

Some people's visual system cannot handle these types of lenses. A complete eye examination by a behavioral optometrist will let you know if you or your child can benefit from stress relieving lenses.

For information on finding a behavioral optometrist in your area, click here.

The bad thing is, if you DON'T catch it in time, this adaptation can be permanent. Another thing that can happen is if a person does become myopic this way and they end up getting glasses for the distance and they continue wearing them up close, the cycle continues and their prescription gets stronger and stronger.

For more information on prescribing lenses and philosophies of care, click here.

Remember, there is no guarantee that everyone can prevent myopia.

There are many, many factors that can effect your eyes changing, including things like age, environment, nutrition and heredity. Some people have it harder than others as far as the deck stacked against them.

For more information on risk factors, click here.

However, there is evidence that environmental factors play a much stronger role in vision than heredity.

There was a pretty famous study done by Francis Young of Eskimo populations in Alaska. Even though older generations were farsighted, the first generation of children required to go to school had a 65% incidence of nearsightedness attributed to all the nearwork that was never part of their culture before.

What does this mean to you?

Practice good visual hygiene to minimize the effects of near point stress.

If you must sit and do a lot of nearwork, every 15 minutes give yourself 15-20 seconds to look in the distance, out the window or across the classroom or office at an object far away. It should ideally be a distance greater than 20 feet (looking across the cubicle doesn't count). Make sure the object is as clear as you can make it during these 15-20 seconds before resuming your work.

A good way to remind yourself when you are reading is to use a bookmark. Place the bookmark 5-10 pages in front of the place you are reading. When you get to the bookmark, stop and take your 15-20 second break, move the bookmark ahead again and then resume reading.

Children and adults alike should practice these techniques, teachers can call for "eye stretching" breaks during class time and parents can do the same when their children are studying or engaged in other near point activities.
Remember, the best thing to minimize near point stress is having an efficient and flexible visual system.

Do you know if you or your child has a good working visual system? Maybe it is time to find out. Find a behavioral optometrist in your area by clicking here or for more information contact the Parents Active in Vision Awareness (PAVE) group.

Home

Back to Visual Skills

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Finding an eye doctor, a doctor that suits your needs, can be quite challenging. The type of care you receive when seeing an eye doctor depends, in part, on which eye doctor you choose. Within all medical professions, even specialties, providers have different areas of expertise, philosophies of care and communication styles. In optometry, there is a smaller community of optometrists that specialize in vision and learning.

All optometrists are not the same.

Within optometry, you can practice in a general practice usually called primary care, or you can specialize in one or more different areas. Some of these specialties include contact lenses, co-management of refractive surgery, dry eye, disease, glaucoma, geriatrics, low vision, sports vision, neuro-rehabilitative optometry, developmental/behavioral optometry, pediatrics, vision training, and learning disabilities.

Choosing the Right Eye Doctor

For very young children (6 months up to age 5-7) it is recommended that you choose a pediatric optometrist that emphasizes developmental vision. Very young children are not able to respond accurately to the same testing procedures as adults or older children. These doctors specialize in caring for the vision of very young children and often have very different equipment in their offices to accurately test a child's visual system. Pediatric optometrists that emphasize developmental vision are often very skilled in preventative care. This means potential vision problems can be avoided before they become trouble. It also means your child MAY be prevented from needing to wear glasses when they get older. Remember good vision is much more complex than simply seeing 20/20.

For school age children, it is also recommended that your child sees an eye doctor with an emphasis in developmental/behavioral optometry, but one that also specializes in learning disabilities and vision training. It sounds like it would be difficult to find such a doctor, but most optometrists that specialize in children have this type of expertise.

The following is a list of links to organizations that will give you FREE access to referral databases to find an optometrist that specializes in children near you:

Note: Each organization only lists its own members in their database. We suggest you use more than one link to find doctors in your area.

**College of Optometrists in Vision Development (COVD) Member Directory**

This organization serves as the certifying body for Doctors in the Optometric specialty called Behavioral/Developmental/Rehabilitative Optometry. If a doctor chooses, he/she may apply for COVD fellowship. Fellowship is difficult to obtain and is only granted after interviews, publishing and knowledge testing is completed and accepted by a committee. Fellows are certified specialists in vision therapy.

**Optometric Extension Program (OEP) Foundation Referral Database**

The OEP Foundation is an international non-profit organization that serves the educational needs of behavioral optometrists providing continuing education credits and provides public information about vision care. The optometrists listed on the referral List practice preventive and rehabilitative optometry.

**Parents Active for Vision Education (PAVE)**

PAVE is a national non-profit education, resource and support organization founded by parents and teachers who know children that benefited from vision therapy. Their mission is to raise public awareness of the crucial relationship between vision and achievement. This link gives phone numbers to local chapters that may be near you. They also have a national number listed in case a chapter is not in your area. Not only is this a good referral source, but they are a good support group for parents.

**Optometrists.org National Network of Optometrists - Pediatric Eyecare and Behavioral Optometry**

An organization made up of behavioral optometrists around the globe to better educate the public on vision care. This referral program requires that you answer some questions to best choose the doctor that suits your needs and to help create a database to better serve the public. It is made up of doctors that offer vision therapy who have set up webpages on this site.

http://www.visionandlearning.org/treatmentandRx.htm
Neuro-Optometric Rehabilitation Association International, Inc. (NORA)

NORA was established to provide, network and share information about visual rehabilitation between optometrists, ophthalmologists, physicians, rehabilitation professionals, occupational therapists, educators, psychologists, nurses, etc. for the understanding and treatment of persons who have physical disabilities and/or traumatic brain injury. Their mission is to expand awareness about the visual problems and the needs of those that suffer from traumatic brain injury.

This referral database is a little different than the ones above. This site helps find neurorehabilitative optometrists that specialize in traumatic brain injury. Many of them have vision therapy practices and may also diagnose and treat children with learning related.

The links on this web site are provided only for your convenience to provide more information on vision. The creators of this site have no financial interest in any site linked, nor do they claim any responsibility for information found on these sites. No promises or warranties of any kind as to the content of any site linked are expressed or implied.

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Under Construction

Treatment & Prescribing
Philosophies of Care

Home
Risk Factors

Potential Reasons your Child May Be at Higher Risk for Developing Vision & Learning Related Problems

⚠️ Children of low birth weight (LBW) - not necessarily premature
⚠️ Poor prenatal care and lifestyle (smoking, drinking etc. during pregnancy)
⚠️ Family History of learning disabilities and/or visual problems
⚠️ Poverty
⚠️ Premature birth
⚠️ Malnutrition
⚠️ Complications during pregnancy (preeclampsia, systemic infections, medications, anesthetics at birth, obstetrical trauma, toxemia, hypoxia and many others)
⚠️ Postnatal factors including infections, metabolic disorders, chronic disease, environmental hazards, and hazardous medical events, (seizures, abuse, head injury, etc.)

If your child has any of these factors in their background they may be at a greater risk for acquiring learning or vision dysfunctions. Being aware of these increased risks means you can potentially recognize signs of any problems early and get the help they may need BEFORE it can really affect their performance in school and life.

The sooner any vision and/or learning problems are addressed, the greater your child's chances are of achieving in school!

Facts about Risk Factors Related to Vision and Learning

Studies have shown children of poverty that were below average in height performed below average on sensory-motor and intersensory neurointegrative tests. Children from non-poverty backgrounds who were below average stature were unaffected.

Smoking during pregnancy, even in small amounts, is linked with LBW, premature birth, math and reading problems.

Alcohol consumption during pregnancy also takes its toll on children; infant size is decreased, APGAR scores at birth are lowered and by the age of 4 children show developmental lags in balance and fine motor skills. By the age of 7, a seven point decrease in IQ scores is noted in children whose mothers drank socially during pregnancy.

IQ scores have been shown to decline with decreasing birth weight. LBW children have two times more borderline IQs as compared to full birth weight babies. These children also have an increased prevalence of strabismus (crossed eyes) and amblyopia (lazy eyes).

The greatest impact to the visual systems of LBW babies appears as deficits in visual processing, perceptual development and neurointegrative disorders. Even small amounts of damage to a child's central nervous system, (CNS) can have severe effects on learning. Damages can be so small that they can often be extremely difficult to locate and diagnose. Effects from these damages may not be noticed right away and can manifest themselves later on down the road.
Words of Wisdom about Vision and Learning Risk Factors

Now that we have mentioned all this bad stuff, remember that learning and vision problems can happen without these risk factors too! There is no way to tell exactly what causes these problems, because it is most likely a combination of factors, but we do that some things can contribute. There are ways to manage vision and learning problems so they may not be a great hinderance to your child's success.

If you are blaming yourself, don't! Don't waste time in finding appropriate help if you suspect or know your child has some of these risk factors. These are here so you know whether or not you should intervene. What you do now still affects the rest of their life. Good parenting, good food and a good environment is essential to the well being of your child. And remember, being aware is a very powerful way to help your child.

Your pediatric optometrist is an invaluable resource. Contact them with any questions or concerns you may have about your child's vision. If you don't have an eye doctor, you can find one by going to Finding a Doctor.

To learn about developmental milestones to know if your child is on the right track, click here.

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Developmental Milestones

We expect that in the first few years of life the average child will go through a series of developmental milestones. Early mastery of basic skills lays the foundation for higher level skills. If milestones are delayed, or skipped (the child displays "more advanced" milestones without progressing through earlier skills) the child can have difficulties later on. This is especially true for good vision.

Thinking about toy building blocks gives a good analogy. A firm structure to build is a nice, solid pyramid. It has a strong base to hold the rest of the structure. If you have pieces missing, or if you try to build a bigger top than the base, the structure is not as stable and can come crashing down. Skills that are not fully developed are often called "splinter skills." These skills can be demonstrated by a child in certain situations, but cannot be used in all situations the skill may be called for, especially if in combination with another skill. In reading, for example, a child may be able to read individual words, but if you put them in a sentence and their motor skills are not fully developed (such as eye-teaming ability and ability to track words across a page), it becomes very difficult for the child to decipher the exact same words. However, these motor skills CAN BE TRAINED.

Following is a list of some of the expected motor milestones and the ages at which we expect to see the skill develop. A good foundation comes from good development. Remember these skills involve a combination of senses, hearing, sight, touch and so on. A deficit in any one sense, like vision, can cause delays.

<table>
<thead>
<tr>
<th>Skill</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rolls over</td>
<td>4-5 months</td>
</tr>
<tr>
<td>Sits without support</td>
<td>6-7 months</td>
</tr>
<tr>
<td>Pulls to a standing position</td>
<td>9-10 months</td>
</tr>
<tr>
<td>Walks independently</td>
<td>12-14 months</td>
</tr>
<tr>
<td>Developing spatial confidence</td>
<td>18 months</td>
</tr>
<tr>
<td>Can seat self in small chairs</td>
<td>18 months</td>
</tr>
<tr>
<td>Runs</td>
<td>18-24 months</td>
</tr>
<tr>
<td>Enjoys jumping</td>
<td>24 months</td>
</tr>
<tr>
<td>Can walk on tip-toes</td>
<td>24 months</td>
</tr>
<tr>
<td>Plays well with large and small balls</td>
<td>24 months</td>
</tr>
<tr>
<td>Pedals tricycle</td>
<td>3 years</td>
</tr>
<tr>
<td>Climbs/descend stairs with alternating feet</td>
<td>3.5-4 years</td>
</tr>
<tr>
<td>Developing coordinations</td>
<td>4 years</td>
</tr>
<tr>
<td>Rides a bicycle without training wheels</td>
<td>6-7 years</td>
</tr>
</tbody>
</table>

http://www.vislonandlearning.org/childdev.htm
### Child Development Milestones · Vision and Learning

<table>
<thead>
<tr>
<th>Skill</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfers object from hand to hand</td>
<td>3-5 months</td>
</tr>
<tr>
<td>Brings all objects to mouth</td>
<td>6 months</td>
</tr>
<tr>
<td>Holds a bottle</td>
<td>6 months</td>
</tr>
<tr>
<td>Pincer type grasp</td>
<td>10-12 months</td>
</tr>
<tr>
<td>Eye movements fully coordinated but with head movement</td>
<td>12 months</td>
</tr>
<tr>
<td>Throws objects to the floor</td>
<td>12-15 months</td>
</tr>
<tr>
<td>Eyes team well with little head movement</td>
<td>18 months</td>
</tr>
<tr>
<td>Points to objects and pictures when identifying</td>
<td>18 months</td>
</tr>
<tr>
<td>Scribbles</td>
<td>18-24 months</td>
</tr>
<tr>
<td>Converges eyes easily &amp; accurately to inspect objects</td>
<td>24 months</td>
</tr>
<tr>
<td>Copies a circle</td>
<td>3 years</td>
</tr>
<tr>
<td>Eyes team well at all distances</td>
<td>3 years</td>
</tr>
<tr>
<td>All visual-tactial integrations now developing quickly</td>
<td>3 years</td>
</tr>
<tr>
<td>Buttons clothes</td>
<td>3.5 years</td>
</tr>
<tr>
<td>Using eyes &amp; hands together productively &amp; with increased skill</td>
<td>4 years</td>
</tr>
<tr>
<td>Catches a ball</td>
<td>4-5 years</td>
</tr>
<tr>
<td>Ties shoelaces</td>
<td>5-6 years</td>
</tr>
</tbody>
</table>

**LANGUAGE MILESTONES**

<table>
<thead>
<tr>
<th>Skill</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attends to familiar voices</td>
<td>3-4 months</td>
</tr>
<tr>
<td>Babbles</td>
<td>5-6 months</td>
</tr>
<tr>
<td>&quot;Mama&quot; &amp; &quot;Dada&quot; used</td>
<td>12 months</td>
</tr>
<tr>
<td>Recognizes names of familiar objects</td>
<td>13-15 months</td>
</tr>
<tr>
<td>Can follow simple commands</td>
<td>15-18 months</td>
</tr>
<tr>
<td>Two-word sentences</td>
<td>2 years</td>
</tr>
<tr>
<td>Simple sentences (subject, verb and object)</td>
<td>3 years</td>
</tr>
<tr>
<td>Can name primary colors</td>
<td>4 years</td>
</tr>
<tr>
<td>Vocabulary of 2000-2500 words, counts to &quot;10&quot;</td>
<td>5 years</td>
</tr>
</tbody>
</table>

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Visual Skills

Everything you never thought you wanted to know

Why are Visual Skills Important for Reading and Learning?

The process of vision takes more than 65% of all pathways to your brain to work. It takes up more brain power than any other one thing that we do with our brain at a given time! This is because vision is not really a single, solitary happening, but a whole bunch of things happening at the same time. Vision is so complicated it involves 20 visual abilities. It is far more than just seeing objects clearly, but also involves processes such as how we move our eyes together, how we focus, how we achieve depth perception, how we perceive the world around us, how we process, store and recall information, to name just a few! This is why we say vision is a dynamic process, not merely just one of our senses.

Vision is actually developed like walking and talking. It is learned over time from birth on up by our experiences and how we react and solve problems. The visual skills we learn early on provide the foundation for later visual complexities. Any weak link in the visual process can affect the outcome, especially if the visual system is under stress.

85% of classroom learning come through the visual system. Poor visual skills can lead to difficulties with reading, learning, overall school performance and even sports. This happens when a good foundation of vision is not developed properly and stress causes the unstable system to break down under too much load. Fortunately, a person can learn how to use their visual system more efficiently, so they will be better equipped to handle heavier loads on their visual system. This can be achieved through vision training.

For more information on vision training, click here.

We can break down visual skills for the sake of definition, however, it is important to realize that these skills coordinate together almost simultaneously. They can also be influenced by many physiological, environmental and psychological factors such as development, disease, infection, nutrition, fatigue, environmental stress, emotional stress, opportunity, attention and attitude. The more efficient the visual system is the more able it is to handle these influencing factors.

To better understand how to fix visual problems, we need to understand the visual system. On the next few pages the visual process will be broken down into the following categories: 1) visual input, 2) visual processing, and 3) visual integration skills. These skills and the subskills within these categories will be discussed in detail on the next few pages.

This is a lot of information to digest and will take awhile to get through. If you are willing to learn, we are definitely here for you!

Input Skills

If you don't get correct information input, how can you get good output?

A good analogy is having a television that works really well, but the antenna is broken. The T.V. is not going to be as useful if you can't get good reception.

Image clarity (how clear you see) up close or in the distance is a factor.

This can be caused by refractive error (how the light is bent into the eye) or ocular disease. Keeping an image clear also has to do with your focusing, or accommodation, system. If you do not have good focus flexibility, it is hard to sustain objects up close clearly or to switch your focus to different distances easily.

Keeping an image single is another factor.

This is controlled by the vergence system. Vergence is how you move your eyes in or out to look at objects at different distances. This can not only lead to misalignment of the eyes (phorias), noticeable eye turns in or out (strabismus), having your brain shut down an object (suppression) and can lead to your brain disregarding most of the information coming from one or both eyes (amblyopia).

Any of these things can cause symptoms such as eyestrain, fatigue, avoidance and headaches. If you notice a child having symptoms, refer them to a behavioral optometrist for a comprehensive developmental vision exam. If people are exhibiting extraneous symptoms, symptoms usually worsen over time. Unfortunately, some people (especially kids!) can develop bad habits to cope with these problems, like avoidance or amblyopia, so they may end up not having obvious vision symptoms.

http://www.visionandlearning.org/visualskills.htm
Accommodation and Vergence

These two systems (along with your pupil that changes size to allow the proper light to come in and helps with depth of focus) ideally work together to keep images you are attending to clear and single.

Accommodation and vergence should work hand in hand to help bring you clear and single images.

ACCOMMODATION

Accommodation is difficult to "see," just like it is difficult to see an automatic camera focus, but we can calculate how much is needed at certain distances. Remember, the nearer the distance of interest, the more power we need from our focusing system.

If a person is far or nearsighted, this changes the amount of accommodation needed to see up close clearly.

The farsighted person's eyes are more comfortable focused in the distance and must work much harder to focus at near. Children are expected to be a tiny bit farsighted through much of elementary school with the amount of farsightedness decreasing with age. A lot of farsightedness, however, and its known effects on accommodation, combined with hours of daily desk work, can result in problems for students.

A person who is nearsighted needs to use less power at near than someone who is farsighted because their eyes are already "preset" to focus more closely.

For more information on myopia and hyperopia, click here.

VERGENCE

You can actually watch someone use their vergence system by having a friend look over your shoulder at an object in the distance. If they have not have any eye turns (strabismus), both of their eyes should be looking straight ahead. Now ask your friend to look at the end of a pencil held approximately 1"-2" from their nose. Did you notice how both of their eyes turned in? This cross-eyed appearance is called convergence. Now have them look back out at the distant object. Did you notice how their eyes went back out again? This outward movement of your eyes is called divergence. This ability can be measured by your eyecare provider.

You can think of accommodation as finding the distance at which to focus (defining the plane focus), while vergence defines the point of focus within the plane. The closer we want to focus and point our eyes, the more "power" or effort we need to do so.

It is important to have effortless control over these systems so when the going gets tough and you need to work a little harder, you can!

If these two systems are not working smoothly or efficiently together and one system is working too hard or not hard enough, the result is a visual system that tires, cramps and basically breaks down after short periods of visual stress.

NOTE: Many medications can negatively effect the visual system. Common medications that can affect accommodation include antihistamines, Phenytoin, Ritalin, and Dexedrine. Phenytoin can also have affect on convergence.

Eye Coordination - Binocularity

Eye coordination is the ability of both eyes to work together as a team, so it seems like they are performing like one.

Each eye actually sees a slightly different image. The brain puts these images together and creates a 3D picture out of it by a process called fusion. If your eyes aren't team players, it is difficult to judge depth, relationships, and other types of spatial awareness.

If your eyes are not aligned well, your brain has a hard time fusing the two images, which can lead to double vision, confusion or ignoring an image (suppression).

Think of a pair of binoculars. If you don't have the two oculars set up correctly, it doesn't feel good and it is hard to concentrate on what you are looking at, or judge where you are looking.
Eye Movement Skills - Ocular Motility

Ocular motility is how well and efficiently you move your eyes. These are motor skills that allow us to move our eyes so we can fixate on objects (fixation), to quickly and accurately jump from one object to another (saccades), and to track moving objects efficiently (pursuits). This is a skill that gives us speed and control of our eye muscles to accurately inspect our environment.

Movements are very important when it comes to paying attention, copying from the page efficiently, and doing well in sports. Problems in this area can lead to all sorts of difficulties that are not detected early.

and Symptoms of Ocular Motor Dysfunction

- Loses place when reading, writing or copying
- Skips lines when reading
- Uses finger to follow along
- Head moves when reading as if their nose is following along
- Math skills are better than reading skills
- Complains of words moving on the page

may see in the classroom, click here.

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Educator's Checklist
A Guide for Detecting Vision Problems in the Classroom
Adopted from a pamphlet created by the

Optometric Extension Program Foundation, Inc.

<table>
<thead>
<tr>
<th>Symptom</th>
</tr>
</thead>
<tbody>
<tr>
<td>One eye turns in or out at any time</td>
</tr>
<tr>
<td>Reddened eyes or lids</td>
</tr>
<tr>
<td>Eyes tear excessively</td>
</tr>
<tr>
<td>Encrusted eyelids</td>
</tr>
<tr>
<td>Frequent styes on lids</td>
</tr>
<tr>
<td>Headaches in forehead or temples</td>
</tr>
<tr>
<td>Burning or itching after reading or desk work</td>
</tr>
<tr>
<td>Nausea or dizziness</td>
</tr>
<tr>
<td>Print blurs after reading a short time</td>
</tr>
</tbody>
</table>

Eye Movement Abilities (Ocular Motility)
- Head turns as reads across page
- Loses place often during reading
- Needs finger or marker to keep place
- Displays short attention span in reading or copying
- Too frequently omits words
- Repeatedly omits "small" words
- Writes up or down hill on paper
- Rereads or skips lines unknowingly
- Orient drawings poorly on page

Eye Teaming Abilities (Binocularity)
- Complains of seeing double (diplopia)
- Repeats letters within words
- Omits letters, numbers or phrases
- Misaligns digits in number columns
- Squints, closes or covers one eye
- Tilts head extremely while working at desk
- Consistently shows gross postural deviations at all desk activities

Eye-Hand Coordination Abilities
- Must feel of things to assist in any interpretation required
- Eyes not used to "steer" hand movements (extreme lack of orientation, placement of words or drawings on page)
- Writes crookedly, poorly spaced; cannot stay on ruled lines
- Misaligns both horizontal and vertical series of numbers
- Uses his hand or fingers to keep his place on the page

http://www.visiolearning.org/educatorschecklist.htm
<table>
<thead>
<tr>
<th>Visual Form Perception (Visual Comparison, Visual Imagery, Visualization)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses other hand as &quot;spacer&quot; to control spacing and alignment on page</td>
<td>Repeatedly confuses left-right directions</td>
</tr>
<tr>
<td>Mistakes words with same or similar beginnings</td>
<td>Fails to recognize same word in next sentence</td>
</tr>
<tr>
<td>Reverses letters and/or words in writing and copying</td>
<td>Confuses likenesses and minor differences</td>
</tr>
<tr>
<td>Confuses same word in same sentence</td>
<td>Repeatedly confuses similar beginnings and endings of words</td>
</tr>
<tr>
<td>Fails to visualize what is read either silently or orally</td>
<td>Whispers to self for reinforcement while reading silently</td>
</tr>
<tr>
<td>Returns to &quot;drawing with fingers&quot; to decide likes and differences</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Refractive Status (Nearsightedness, Farsightedness, Focus Problems, etc.)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehension reduces as reading continued; loses interest too quickly</td>
<td>Mispronounces similar words as continues reading</td>
</tr>
<tr>
<td>Blinks excessively at desk tasks and/or reading; not elsewhere</td>
<td>Holds book too closely; face too close to desk surface</td>
</tr>
<tr>
<td>Avoids all possible near-centered tasks</td>
<td>Complains of discomfort in tasks that demand visual interpretation</td>
</tr>
<tr>
<td>Closes or covers one eye when reading or doing desk work</td>
<td>Makes errors in copying from chalkboard to paper on desk</td>
</tr>
<tr>
<td>Makes errors in copying from reference book to notebook</td>
<td>Squints to see chalkboard, or requests to move nearer</td>
</tr>
<tr>
<td>Rubs eyes during or after short periods of visual activity</td>
<td></td>
</tr>
<tr>
<td>Fatigues easily; blinks to make chalkboard clear up after desk task</td>
<td></td>
</tr>
</tbody>
</table>

To see more OEP pamphlets like this one, click here.

Home

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More on Visual Skills

Learning and Visual Perceptual Processing

Visual perceptual processing, or visual information processing, is a set of skills we use to get visual information from the environment and integrate them with our other senses. This is done while incorporating all the integrated information with other things, such as past experiences, motivation and development, so that we can derive understanding and meaning from what we are experiencing.

Visual perceptual processing is very important, but especially so when learning. Without visual perceptual processing, you would not be able to accurately learn to read, give or get directions, copy from the board or from a book, visualize objects or past experiences, remember things visually, have good eye-and coordination, integrate visual information with our other senses to do things like ride a bike, play ball, or hear a sound and be able to visually recognize where it is coming from (like an ambulance), just to name a few.

Visual perceptual processing can be broken into three components - visual spatial skills, visual analysis skills and visual integration skills.

Just like anything else that is broken into components, these skills work together or build upon each other to help you function.

Visual Spatial Skills

These are the skills we use to understand directional concepts to organize our visual space. This is how we visually project our body coordinates out into the world.

For example: When you say, "It is over to the left," the "to the left" has no meaning unless it has a point of reference. So actually, you are really saying to the left of where YOU are. If you don't know where your body is, it is hard to know where things are in relation to you.

Visual spatial skills require observing an object, then accurately reporting its relationship in space relative to your own self.

Signs & Symptoms of Visual-Spatial Dysfunction

- Lack of coordination and balance (clumsy)
- Difficulty learning left and right
- Reverses letters or numbers when writing or copying
- Difficulty with activities involving rhythm
- Not good at sports
- Does not cross the midline when doing tasks (switches objects from hand to hand)
- Does not use nondominant hand for support when writing or copying
- Rotates body when writing or copying (again to not cross the midline)

Laterality

Laterality is an internal self awareness of two body sides and knowing they are different. It requires good balance, vestibular function and an awareness of a body midline (an invisible line that divides your body in half).

FACT: During a study at the Southern California College of Optometry, 73.8% of children already determined to have a learning disability failed tests used to assess laterality and directionality.

Some behaviors observed in kids that have not developed laterality are the following:

- Nondominant hand not used for support

http://www.visionandlearning.org/Visualskills2.htm
Now, these tendencies happen in all young kids, but if they are still happening after 8 years old, this is when laterality dysfunction can potentially cause problems.

Laterality eventually evolves into directionality.

A person must understand laterality on their person before it can be applied in space. This means if you do not know the two sides of your body (left and right), how can you know what to call the two sides of the room? We always learn how to judge where things are by first by learning how to relate to ourselves.

When you start applying left and right concepts to your external visual space, you are beginning to learn directionality.

Directionality

Directionality incorporates up, down, ahead, behind, and any combination thereof into the equation. It also means projecting these directions including left and right out into space. Again, a person must understand these concepts as they relate to themselves before they can apply them to other things.

Directionality is very important in decoding letters.

If you don’t have this concept down, learning to read can be very confusing. For example, the letters “b,” “d,” “p,” and “q,” all look like the same symbol if you do not have any concept of orientation.

FACT: Research has shown that children who still have reversal problems after age 8 will likely have problems developing good reading skills.

These skills, however, can be trained. For more information on how, click here.

Reversals can also come from having a general language dysfunction. This is more commonly seen when they have problems with reversing entire words. See your eye doctor to really know if visual skills are the problem if you suspect your child of directionality issues.

To find an eye doctor near you that specializes in kids, click here.

An important function that bridges laterality and directionality is our eyes.

Efficient eye movement skills are essential in developing good directionality skills. If your eyes cannot move across a page smoothly and accurately, this could mean that you are at risk for reversals and coding problems, because how we scan a letter is important when coding it to the brain.

Bilateral Integration

Bilateral integration is another visual spatial skill that is important. This is the ability to effectively use both sides of the body separately (like typing) and/or simultaneously (like riding a bicycle).

Very young children will use only one side at a time until they learn this skill. This is a normal part of development. However, if a child is still exhibiting this behavior after third grade, this may signify a problem with visual spatial skills.

Watch a young child draw or color. Crayons on the left stay on the left and are manipulated by the left hand and vice versa. If they want something on their right to use on the left side, they will pick up the crayon in the right hand, then pass it to their other hand rather than cross over the midline of their body.

With proper development the left and right side should begin to enhance each other’s function, for example the right hand may stabilize a piece of paper while the left hand draws. Another integration skill you can observe is moving one foot ahead of the other when walking, while at the same time swinging contralateral arms as the foot comes forward, for example the right foot and the left arm, then the left foot and right arm.
This skill cannot be developed fully unless laterality is learned well, too. If you do not have the concept of the difference between both sides of your body, it is very difficult to learn how to coordinate them.

Visual Analysis Skills

Visual analysis, or visual discrimination, is used to identify, sort, organize, store and recall visually presented information. It is the ability to take in visual information remember it and apply it later.

Children with poor visual analysis skills often have trouble learning the A, B, C’s and recognizing words or simple forms even when presented repeatedly; for example, they may correctly read the word “house” in one sentence and incorrectly read “horse” two lines later. These kids tend to mistake words with similar endings or beginnings, generalize when grouping objects. They also have a hard time understanding size and magnitude, (a cup of water in a tall glass and a cup of water in a shallow bowl are not seen as equal amounts).

Signs & Symptoms of Visual-Analysis Dysfunction

- Trouble learning the alphabet
- Trouble recognizing words
- Mistakes words with similar beginnings
- Overgeneralizes - confuses minor likenesses and differences
- Does not recognize the same word if repeated again on a page
- Trouble with remembering and writing letters and numbers
- Distractible
- Short attention span
- Problems concentrating
- Traces or touches figures
- Difficulty with understanding instructions
- Hyper or hypo active

The Subskills of Visual Analysis

Figure Ground: An ability to attend to or search for a specific form or feature while simultaneously ignoring irrelevant information.

Example: Looking for a specific piece of information when reading or searching for a specific tool in a toolbox full of tools.

Activity: Where is Waldo?

Visual Form Recognition/Discrimination & Constancy: The ability to discriminate differences in forms. This includes differences of size, shape, color and orientation. Recognition that visual information in a form is consistent in spite of the object, size in the back of the eye, or location.

Example: DOG = dog = Dog, or that a cup of water is a cup of water whether in a tall glass or shallow bowl.

Activity: Parquetry Blocks

Visual Closure: The ability to recognize clues presented visually that allow him or her to determine the appearance of the final product without all the details being present.

Example: Being able to complete a word when only part of the word is seen; recognizing what will appear in a picture before it is completed.

Activity: Dot-to-dot

Visual Spatial Memory: Ability to recall the spatial location of an object or stimuli. The ability to be able to recall, identify, or reproduce a design or dominant feature of an object.

Example: Being able to picture a lost object; seeing a printed word and developing a mental picture to the corresponding object.

Activity: Memory Card Game

Visual Sequential Memory: Ability to view and then recall a sequence of numbers, letters or objects in the order they were originally presented.
Example: Seeing a flattened box and being able to mentally reconstruct it and picture the dimensions to decide if the object you want to put in the box will fit.

Activity: Pegboard

Visual Speed & Span of Perception: The rate and amount at which information is being handled in visual processing.

Example: Quickly and efficiently copying an assignment off the chalkboard with only a few glances vs. needing to glance at the chalkboard after every one to two words or bits of information is copied.

Activity: Slap Jack

Automaticity

Once all of these skills are developed, it is important for them to become automatic so they take up less brain power to use. Just like learning to drive a car with a manual transmission. At first, it takes a lot of brain power to get your feet to move the right way and for you to time it with what your hand does with the stick shift. Not only are you learning a new skill, but you also have to make sure you pay attention to the road and steer accordingly. Once you get the hang of it, the ability to shift gears became automatic and you can devote that brain power to eating a Big Mac and talking on the cell phone along with everything else (not recommended, by the way). In order to have efficient visual information processing skills, you have to learn the skills well to the point where they become easy.

Automaticity is key in efficient learning.
What is Vision Training/Therapy (VT)?

Vision training/therapy (VT) is a subspecialty of optometry that strives to improve, enhance and develop visual skills through a prescribed treatment program. Patients learn to use their visual abilities in new or more efficient ways by participating in various vision exercises that utilize the use of lenses, prisms, patches and other materials and equipment. The overall goal is to alleviate signs and symptoms of vision problems, maximize visual and overall performance and comfort, meet the patient’s needs and improve the patient’s quality of life.

Vision therapy is commonly used for (but not limited to) the following:

- Accommodative dysfunctions
- Ocular motor dysfunctions
- Visual motor disorders
- Visual Perceptual disorders
- Learning related visual problems
- Traumatic brain injury
- Sports vision
- Strabismus
- Amblyopia
- Myopia control

For more information about visual skills, click here.

Vision therapy is similar to physical therapy. In physical therapy, you relearn or enhance the use of various muscles and body parts that are not functioning correctly and/or causing a great deal of discomfort so that you can use those parts more efficiently. In vision therapy, you relearn or enhance the use of different brain (or thought) processes to alleviate visual discomfort and use visual skills more efficiently. This is possible because vision is a learned process and eyes are actually modified brain tissue.

Who Can Benefit From Vision Therapy?

Anybody who has been determined to have a visual problem. Many children who are diagnosed with learning disabilities, reading problems, ADD/ADHD, autism, developmentally delayed, to name a few, usually have a visual component to their problem that can be treated. VT is not limited to young children, however. Patients of ALL ages can benefit from vision therapy. Even many professional athletes use VT to speed their visual reaction times and improve hand-eye coordination. Computer users who notice they are experiencing eye strain can potentially benefit from VT to reduce discomfort. Mature adults that have suffered strokes or adults that have been in car accidents and suffered head trauma can benefit from VT.

What is involved in Vision Therapy?

VT is not a quick fix, but a lifetime correction. Just like physical therapy, VT can be hard work. Commitment to the therapy program is vital to the individual's overall success. Good visual skills are not learned overnight. Remember, it took a lifetime to get to the point before therapy begins. Even if you are three, you had three years to learn inefficient visual skills. VT involves in-office sessions with the doctor or vision therapist, then homework in-between sessions to practice, reinforce and eventually learn new or enhance previously learned visual skills.

VT can take anywhere from 6 weeks to a year or more for severe problems before vision problems are remediated because it takes longer to sort of "unlearn" vision behaviors and then learn new ones. Many problems can be improved dramatically over 10-15 one hour weekly sessions (session length is determined by your doctor and may vary). Certain dysfunctions, like strabismus or severe perceptual problems, can take much longer to treat.

Between office sessions there are often daily homework assignments. These homework sessions generally take between 15-30 minutes and should be done 4-5 times each week, though again this will be decided by your doctor or vision therapist. The homework is often fun and entertaining for kids, but will also be challenging. It is imperative that the homework be completed or new visual skills will not be learned. Motivation and positive reinforcement is very important. Parents and teachers that participate and encourage a child will increase the degree of success immensely! It is also essential to be carefully guided by a trained professional, because visual habits that are learned incorrectly can be reinforced by practicing them.

VT is not the cure all for everything, but it can be a tremendously rewarding therapy for many individuals. To hear
from some people that have benefited from VT, please click here to read their stories.

The benefit of VT for individuals that suffered from vision problems is a lifelong change in overall performance, comfort and quality of life.

Home

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More on Visual Skills

Visual Integration Skills

There are three skills in Visual Perceptual Processing. This processing ability allows you to integrate vision with your other senses or with other visual information.

If you haven't read the first two pages on visual skills, please click here. This part will make much more sense if you start at the beginning.

Visual-Visual Integration

It might sound strange, but there is such a thing as visual-visual integration. This is what happens when you use several visual skills together.

If you stood in front of you a new word to learn, and you looked at the word and matched it with an image in your mind to help better recall what the word means, this would be an example of visual-visual integration.

"siamese," and you saw a picture of that type of cat in your mind.

We won't spend much time here, because we have already discussed most of the visual skills. Let's move on...

Visual-Motor Integration

Visual motor integration (VMI) consists of coordinating visual perceptual skills together with gross-motor movement and fine-motor movement. It is the ability to integrate visual input with motor output. This is how we plan, execute and monitor motor tasks, such as threading a needle, tying shoe laces, catching or hitting a ball. It is also essential in academic performance.

This is commonly referred to as Eye-Hand Coordination.

Continuing with our example from above, if you wrote the word "siamese" after seeing a picture of one, than it would be an example of visual-motor integration.

Little Tidbits from the Research

Children with known learning disabilities have a high prevalence of VMI deficiencies. In one study, out of 51 LD elementary students, 85% of them were correctly identified as being learning disabled by finding problems in this area.

VMI problems affect IQ scores, suggesting that perceptual and cognitive skills necessary for good VMI are generalized.

VMI also correlates well with math skills, especially in the lower grades from kindergarten to second grade!

Children with poor VMI skills have a difficult time on written assignments and tests, erase excessively, show poor penmanship, and do not do well when copying down information. These same children often seem to perform better when answering aloud and can verbalize that they know the material they are being tested on, but seem to test poorly on that same material when writing is required. Not a good thing when you are taking standardized tests.

http://www.visionandlearning.org/visualskills3.htm
More Signs & Symptoms of Visual-Motor:

- Sloppy writing or drawing skills
- Can't stay on or in the lines
- Erases excessively
- Poor organization
- Does not recognize mistakes
- Close working distance
- Poor posture when writing
- Excessive or inadequate pencil grip
- Trouble aligning numbers in columns for math problems
- Can't get answers on paper
- Tests poorly even if they know the subject

VMI problems can be called developmental apraxia, graphomotor dyscoordination, visual-perceptual-motor dysfunction, and non-verbal LD syndrome.

Auditory-Visual Integration

Auditory-visual integration require linking together visual information with information heard. As far as a learning hierarchy of skills, good auditory skills are necessary in order to achieve good vision. Improvement in this area has a positive effect on many areas of visual and auditory function.

Going back to our siamese cat example, if you verbalized or spelled the word "siamese" when you saw it, that would now be integrating auditory and visual information.

Problems in this area are common in people with learning problems and with poor readers. It significantly correlates with reading achievement in elementary school between second grade and sixth grade.

Auditory skills are very similar to vision and include the following:

1. Attention
2. Discrimination
3. Memory
4. Closure
5. Figure-ground
6. Intersensory (example: auditory-verbal)

Deficits in this area often lead to poor spelling even with rigorous studying. Individuals with problems in this area have a hard time matching sounds to letters and sounding out words, and reading speed is extremely slow. During reading, this child may move their mouth and often need to be given directions over and over.

Signs & Symptoms of Auditory-Visual Integration Problems

- Needs to have directions repeated all the time
- Poor spelling ability

http://www.visionandlearning.org/visualkills3.htm
Trouble learning to read phonetically

Difficulty relating symbols to their relevant sounds (Example: The "ah" sound is not recognized as relating to the letter "a")
According to the 1986/87 Future of Visual Development/Performance Task Force, 80% of children who are reading disabled have difficulties with one or more basic visual skills. Visual skills are developed and learned over time, just like learning to walk and talk. It starts from birth and continues throughout life. If these skills are not developed well, this can lead to potential learning problems down the road.

For information on developing good visual skills, click here.

In one masked study of kindergarten and first grade children, development of visual perceptual skills could be used to predict whether a child would have problems or not in reading with the entire group studied. Even when IQ was partially controlled for, vision problems were statistically correlated with reading problems.

Another study showed that 95% of first grade nonreaders had significant vision problems. They had nearly 2.5 times (250%) more visual problems than first grade high achievers.

These are the little guys! If good visual skills have not been developed, or are poorly developed, early on, school learning will always be difficult and stressful. The longer they struggle, the further they get behind or the harder they have to work to keep up with their peers. It's like building a sand castle out of dry sand. If they don't have a good foundation to build upon, their sand castle of vision comes crashing down or they have to work extra hard to keep using what they have. When the going gets tough, these kids can't function well, school performance becomes erratic or downright poor. This can hurt kids' self esteem and confidence to the point where some of them eventually give up and stop trying so hard.

These kids do not have to struggle from visual development difficulties. They can be taught to use their visual system efficiently so that it does not hinder their performance.

For more information on how to train the visual system to work well, click here.

So, what happens if they do not get help in the early grades? Visual function in early grades is a lot less demanding than what is needed at higher grade levels, so many children still perform well in school. However, many students' visual abilities just are not up to the demand level required for higher level reading, so even if they did survive the early years, their visual system is not efficient enough to handle the work load, and these kids start to struggle or work much harder than the rest of the class to keep up.

In one long term study of 160,000 school children in Texas, only 20% of children entering school had clinically significant vision problems. By the middle of second grade, 40% showed clinically significant vision problems. By the end of fifth grade, 80% of these children had clinically significant vision problems.

This is why behavioral optometrists are not surprised when so many of their patients are third, fourth and fifth graders. The visual demand is so much higher that these kids' fragile visual skills break down and they can't sustain good performance over long periods of time.

For signs and symptoms of vision problems considered clinically significant, click here.
There are many visual skills that are required when reading.

During reading, not only must you see things clearly, but you must have good eye movement skills and focusing skills. Integrating the eye movements with higher cognitive processing including paying attention, remembering, processing and utilizing the visual information perceived is also important, in some cases even more so.

Oculomotor skills, accommodation, vergence, visual perceptual skills, and binocularity are just some of the aspects of vision that have been found to statistically impact learning, but most especially reading.

For more information and explanation of these visual skills, click here.

It is important to remember that optometrists DO NOT treat reading and learning disabilities. Optometrists only treat children who manifest vision problems.

Vision problems do not wholly cause reading and/or learning disabilities, or vice versa, but they do play a role in the etiology of some learning disorders and can contribute to some of the difficulties associated with them. The optometrists' job is to alleviate visual problems that could potentially interfere or that are interfering with reading and learning.

Sometimes, this can be the child's major hurdle and extraordinary gains are made in that child's performance by just remediating the vision problem. This can be seen sometimes, for example, when a child is wrongly labelled because certain facets, such as vision, are not fully explored. More often than not, vision is just a small piece of the puzzle and other issues still need to be addressed.

To learn more about Vision and Learning Disabilities, click here.

Kids don't grow out of significant vision problems, so these problems don't just go away.

There have been several studies that have linked vision dysfunction with juvenile delinquency. Some researchers have found that 70% of juvenile delinquents studied had a vision problem. One theory is that vision problems make it difficult to achieve in school, which causes feelings of failure, low self-esteem and disinterest in academics. Consequently, other behaviors are developed. These behaviors may predispose a young child towards criminality.

Beyond the teenage years, one study showed that when illiterate adults were vision screened, there was a 74% failure rate. Illiteracy is a growing problem in our country. According to the U.S. Department of Education, one in five Americans are unable to read or speak well enough to function effectively in their daily lives. That is roughly 35 million Americans. Perhaps this number would not be so high if we caught those people with vision problems early on and corrected them, making it easier for them to learn how to read by having an efficient visual system.

Remember, vision disorders do not just interfere with reading, but also with activities such as copying, spelling and math.

75-90% of classroom learning comes through the visual system. It makes sense to make sure that the visual system is in good working order.

If you know someone who is having trouble reading or performing well in school, suggest to them that they should have their vision checked by a doctor that looks at the entire visual system. To find an eye doctor near you, click here.

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Adapted from:

Developmental Vision Guidance Program

Pacific University College of Optometry Vision Therapy Services

If you have read other pages from our site, you realize that proper visual development is important to overall performance and intelligence throughout life. In order for visual abilities to develop effectively, combining different sensory-motor systems is very important, but especially so during the first through third years of life. The following are some basic activities that can help guide your child’s visual development from BIRTH to 5 YEARS of age:

--- General Developmental Guidelines from Birth ---

Whenever possible, talk, sing & play with your child.

Allow them time to play and explore by themselves.

Vary crib position and the baby’s position in it.

Avoid putting the crib in corners - keep crib out in the room.

Keep in right and left arms alternately - don’t hold baby only on one side.

Limit amount of time strapped in a high chair, stroller, playpen, etc. as much as possible and let the child move around as much as possible.

Do not hinder creeping - encourage it.

Try to approach your child from different sides at different times including feeding or playing.

Do not suspend a toy directly over face all the time - vary its position (over chest, feet, etc.)

Watch for any tendency for eyes to fail to point together after the first four months of life (normal before then).

--- Encourage spinning, rotating and swinging activities to integrate the visual and vestibular system (good development can decrease motion sickness in the future). ---

Activities for 4 Weeks to 2 Years of Age

NOTE: Suggestions by age can be continued for as long as they amuse your child, not just during the weeks given. Think of these activities as building upon or adding to each other.

<p>| Vision Developmental Guidelines |</p>
<table>
<thead>
<tr>
<th>Age</th>
<th>Play Material</th>
<th>Skills Developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 wks - 8 wks</td>
<td>Bright dangling object (mobile, balloon, etc.)</td>
<td>Fixations</td>
</tr>
<tr>
<td></td>
<td>Ring Rattle, Plastic Ring, Rubber Squeaking Toys</td>
<td>Eye-Hand Coordination (E-H); Textures</td>
</tr>
</tbody>
</table>

http://www.visioandlearning.org/childguidance.htm
<table>
<thead>
<tr>
<th>12 wks</th>
<th>Cradle Gym</th>
<th>Grasp &amp; release; Fixation; E-H; Spatial Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>String of Big Beads or Disks, Teething Beads</td>
<td>Grasp &amp; Release; Fixation with Tongue</td>
</tr>
<tr>
<td></td>
<td>Stuffed Animals, Bell on Handle</td>
<td>E-H; Spatial Awareness</td>
</tr>
<tr>
<td>16 wks</td>
<td>Big Rubber Ball</td>
<td>Near to Far &amp; Over Head; Face Down-Roll Baby</td>
</tr>
<tr>
<td>20 wks</td>
<td>Mobile</td>
<td>Close enough that hands might touch it accidentally</td>
</tr>
<tr>
<td>24 wks-32 wks</td>
<td>Say &quot;boom&quot; with Bed Bounce</td>
<td>Bilateral motor response</td>
</tr>
<tr>
<td></td>
<td>Nested Toys</td>
<td>E-H; Grasp &amp; Release; Spatial Awareness</td>
</tr>
<tr>
<td></td>
<td>Small toys to handle</td>
<td>Sizes &amp; shapes; tops &amp; bottoms</td>
</tr>
<tr>
<td></td>
<td>Pots &amp; Pans, Spoon &amp; Cup</td>
<td>Sizes &amp; shapes; tops &amp; bottoms; inside &amp; outside; sounds</td>
</tr>
<tr>
<td></td>
<td>Lift on thumbs</td>
<td>Bilateral motor response</td>
</tr>
<tr>
<td></td>
<td>Mobile</td>
<td>Move out for feet to hit; eye-foot coordination</td>
</tr>
<tr>
<td>36 wks-48 wks</td>
<td>Playpen</td>
<td>Boundaries; up &amp; down space; spatial relations; comparisons; bilateral pull-over &amp; through sides (but still use as little as possible)</td>
</tr>
<tr>
<td></td>
<td>Blocks and Pigs, Basket of Clothes Pins, Ball rolled back &amp; forth, Wheel in trough</td>
<td>Grasp &amp; Release; near &amp; far space; mobility &amp; pursuits; search; field; relationship</td>
</tr>
<tr>
<td></td>
<td>Large books</td>
<td>Name &amp; talk about pictures of common things</td>
</tr>
<tr>
<td></td>
<td>Water toys</td>
<td>Fill &amp; spill, E-H</td>
</tr>
<tr>
<td>1 yr - 1.5 yrs</td>
<td>Kiddie Car</td>
<td>Bilaterality of hands, eyes &amp; feet; Directionality; Coordination &amp; Locomotion</td>
</tr>
<tr>
<td></td>
<td>Pull Toys</td>
<td>Orientation; Directionality; Spatial Awareness; Extension of arms &amp; hands</td>
</tr>
<tr>
<td></td>
<td>Push Toys, Sweep &amp; Mop Sets</td>
<td>Orientation; Directionality; Extension of arms &amp; hands; visual steering &amp; guiding; Coordination</td>
</tr>
<tr>
<td></td>
<td>Blocks</td>
<td>Pile &amp; string; Combining; Build form; Visualization; size; shape; E-H</td>
</tr>
<tr>
<td></td>
<td>Color Cone</td>
<td>Texture; Hand judgments; Associations; Likes &amp; unlikes; Visualization; Imagination</td>
</tr>
<tr>
<td></td>
<td>Woolly &amp; Soft Animals</td>
<td>Form; E-H; Parts &amp; wholes</td>
</tr>
<tr>
<td></td>
<td>Climbing Equipment</td>
<td>High &amp; Low; Gross &amp; fine motor activity; Localization</td>
</tr>
<tr>
<td></td>
<td>Books (cloth or heavy cardboard)</td>
<td>Symbols &amp; Representations; Fixations; Identifications; Visual grasp &amp; release; Parts &amp; wholes</td>
</tr>
<tr>
<td></td>
<td>Sandbox</td>
<td>Filling &amp; spilling; Saccadic hand; hand dexterity; visual cues &amp; steering</td>
</tr>
<tr>
<td>1.5 yrs</td>
<td>Stairs</td>
<td>Gross motor control; Highs &amp; lows</td>
</tr>
<tr>
<td></td>
<td>Swing</td>
<td>Movement through space; visual-vestibular stimulation</td>
</tr>
<tr>
<td></td>
<td>Rocking Horse</td>
<td>Bilaterality</td>
</tr>
<tr>
<td></td>
<td>Large Ball</td>
<td>E-H; Pursuits; Direction control</td>
</tr>
<tr>
<td></td>
<td>Toy Hammer &amp; Peg</td>
<td>E-H</td>
</tr>
<tr>
<td></td>
<td>Blocks (2&quot; colored)</td>
<td>Building, Combinations; Piling</td>
</tr>
<tr>
<td></td>
<td>Push &amp; Pull carts</td>
<td>Loading; Unloading; Visual Steering</td>
</tr>
<tr>
<td></td>
<td>Chest of drawers (child size)</td>
<td>Personal recognition</td>
</tr>
<tr>
<td></td>
<td>Music Box</td>
<td>Sounds, Auditory recall</td>
</tr>
<tr>
<td>2 yrs</td>
<td>Walking Rail &amp; Balance Board</td>
<td>Bilateral coordination</td>
</tr>
<tr>
<td></td>
<td>More Boards &amp; Boxes</td>
<td>Inclines &amp; Slopes; Highs &amp; Lows</td>
</tr>
<tr>
<td></td>
<td>Climbing Equipment</td>
<td>Depths; Coordination; Balance</td>
</tr>
<tr>
<td></td>
<td>Rocking Boat, Jump Board</td>
<td>Speed &amp; Balance; Grasp &amp; Release of total motor system</td>
</tr>
<tr>
<td></td>
<td>Trampoline</td>
<td>Bilaterality</td>
</tr>
<tr>
<td></td>
<td>Pegboard</td>
<td>Grasp &amp; Release; Form; Fixation; Saccades</td>
</tr>
<tr>
<td></td>
<td>Interlocking Toys</td>
<td>Units &amp; wholes</td>
</tr>
<tr>
<td></td>
<td>Toy Telephone</td>
<td>Visualization; Imagination</td>
</tr>
<tr>
<td></td>
<td>Screw Toys</td>
<td>Right &amp; Left Interweaving; Wrist Rotation</td>
</tr>
</tbody>
</table>

http://www.visionandlearning.org/childguidance.htm
<table>
<thead>
<tr>
<th>Small objects (pebbles, toy cars, etc.)</th>
<th>E-H; Imagination; Visualization</th>
</tr>
</thead>
<tbody>
<tr>
<td>More blocks (light, hollow, small colored shapes)</td>
<td>Combinations; Building; Balancing; Control of movement; E-H; Expression</td>
</tr>
</tbody>
</table>

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NOTE: Suggestions by age can be continued for as long as they amuse your child, not just during the weeks given. Think of these activities as building upon or adding to each other.

<table>
<thead>
<tr>
<th>Age</th>
<th>Play Material</th>
<th>Skills Developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5 yrs</td>
<td>Wheelbarrow (2 types)</td>
<td>Bilaterality; Directionality; Coordination; Balance – Hauling and Dumping</td>
</tr>
<tr>
<td></td>
<td>Tricycle</td>
<td>Alternate Bilaterality and Directionality of feet; Unity of hands</td>
</tr>
<tr>
<td></td>
<td>Large Beads for Stringing</td>
<td>E-H; Grasp &amp; Release; Specific Fixations; Color</td>
</tr>
<tr>
<td></td>
<td>Clay Modeling (large lumps)</td>
<td>E-H; Visualization; Imagination</td>
</tr>
<tr>
<td></td>
<td>More Ball Play</td>
<td>Visual Steering &amp; Guiding; E-H; Depth Perception; Tracking; Total arm movement; Space &amp; Time</td>
</tr>
<tr>
<td></td>
<td>Jigsaw Puzzles (6-12 pieces)</td>
<td>E-H; Form; Size; Figure Ground; Visual Closure</td>
</tr>
<tr>
<td></td>
<td>Large Packing Boxes</td>
<td>Gross motor; Imagination; In, Out, Under, On (Spatial Skills)</td>
</tr>
<tr>
<td></td>
<td>Soap Bubbles &amp; Pipes</td>
<td>Breath control; Pursuits; E-H if popping the bubbles</td>
</tr>
<tr>
<td>3 yrs</td>
<td>Blocks - All Shapes</td>
<td>E-H; Form; Size; Units &amp; Whole; Color; Visualization; Figure Ground</td>
</tr>
<tr>
<td></td>
<td>Simple Jigsaw Puzzles</td>
<td>Right &amp; Left; Rotations; Front &amp; Back; Matching; Visualization; Representation; Figure Ground; Visual Closure</td>
</tr>
<tr>
<td></td>
<td>Blunt Scissors &amp; Colored Paper</td>
<td>E-H; Size; Shape; Continuity; Curves; Reversal of Direction; Pursuits</td>
</tr>
<tr>
<td></td>
<td>Easy, Water Colors &amp; Crayons</td>
<td>Boundaries; Discrete E-H; Bi-Dimensionality; Representation; Visualization</td>
</tr>
<tr>
<td></td>
<td>Hopping, Step on Shadows &amp; Cracks</td>
<td>Head to Foot Coordination; Balance</td>
</tr>
<tr>
<td></td>
<td>Ball on String – Push &amp; Catch</td>
<td>E-H; Directionality; Space &amp; Time</td>
</tr>
<tr>
<td></td>
<td>Toys with large nuts, bolts, wrench, etc.</td>
<td>Parts &amp; wholes; Visualization; Relationships; Manual dexterity; E-H</td>
</tr>
<tr>
<td>4 yrs</td>
<td>Trapeze &amp; Swinging Rings, See-Saw</td>
<td>Bilaterality; Mobility; Coordination; High &amp; Low Space</td>
</tr>
<tr>
<td></td>
<td>Gardening &amp; Carpentry Tools</td>
<td>Directionality; Monolaterality; Tridimensionality; E-H; Combining; Short &amp; Long; Fixations; Finger Dexterity</td>
</tr>
<tr>
<td></td>
<td>Doll Clothes, Buttons &amp; Button Holes, Store Material (boxes, cans, paper, money, etc.)</td>
<td>E-H; Closing &amp; Opening; Imagination; Creativity; Visualization</td>
</tr>
<tr>
<td></td>
<td>Finger Painting; Doctor &amp; Nurse Kits; Golden Stamp Books; Sticker Fun</td>
<td>Imagination; Creativity; Visualization; Motor Planning</td>
</tr>
<tr>
<td></td>
<td>Skipping</td>
<td>Gross Motor; Gross Patterning; Cross-patterning; Balance; Coordination</td>
</tr>
<tr>
<td></td>
<td>Flashlight tag, Target practice (bean bag, ball, flashlight, pointing)</td>
<td>Directionality; Pursuits; Depth Perception; Spatial Skills; E-H; Timing; Rhythm</td>
</tr>
</tbody>
</table>

Adapted from:

**Developmental Vision Guidance Program**

Pacific University College of Optometry Vision Therapy Services
<table>
<thead>
<tr>
<th>Parquetry Blocks</th>
<th>Figure Ground; Size; Shape; Color; Visual Discrimination; Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;What is it?&quot; (feel object in a bag without looking), &quot;Where is it?&quot; (eyes closed &amp; point)</td>
<td>Form perception; Visualization; Visual Memory</td>
</tr>
<tr>
<td>I Spy</td>
<td>Figure Ground; Visual Discrimination; Localization</td>
</tr>
<tr>
<td>Blink game - Tachistoscopic (brief exposures) with toys &amp; familiar objects</td>
<td>Visual Memory; Speed of Recognition</td>
</tr>
<tr>
<td>5 yrs</td>
<td>Jump rope, Milk carton bowling</td>
</tr>
<tr>
<td>Memory Game</td>
<td>Motor coordination; E-H; Rhythm; Timing; Balance</td>
</tr>
<tr>
<td>Hole in cardboard</td>
<td>Matching; Visual Memory; Localization</td>
</tr>
<tr>
<td>Chalkboard drawings (big circles, lines and pictures)</td>
<td>Focusing flexibility (look from picture to TV)</td>
</tr>
<tr>
<td></td>
<td>Arm Rotation; Bilaterality; Body-vision Coordination; Form Perception; Centering</td>
</tr>
</tbody>
</table>

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http://www.visionandlearning.org/childguidance2.htm
Vision and Learning Disabilities

How does Vision relate to Learning Disabilities?

It has been estimated that 1 out of 4 children in the U.S. have learning problems. This is roughly 2-7 million children struggling to achieve in school. 25% of all children have a vision problem significant enough to affect their performance in school. According to research on just learning disabled populations, the number of kids with significant learning related vision problems can soar closer to 85% in their studies.

Many of these children are officially diagnosed with a learning disability in part to receive special education services to help them with their difficulties, and many continue to need special services throughout their school experience. This can be a pretty expensive load on the school budget (and on the taxpayer), not to mention on the child’s self-esteem and future success. Unfortunately, the number of children receiving special services for learning disabilities is on the rise.

75% of those identified as learning disabled have their biggest deficit in reading. Out of those children who are reading disabled, 80% of them have difficulties with one or more basic visual skills. Fortunately, these visual deficits can be treated successfully by vision training, as volumes of research studies have illustrated. Though vision is only one factor that can be associated with learning problems, if the children with primarily vision related problems were discovered sooner and treated promptly, the number of children in special education may not be as high.

But what does it mean to be learning disabled?

Traditionally in schools, children are considered learning disabled when they are about two grade levels behind in reading, writing or mathematics despite average intelligence, educational opportunity, and fairly normal home/social environment. They also have been found through standardized testing that their performance is significantly below their potential. This means they are usually in third grade before they receive special services (unless they were lucky enough to qualify for the Title I program, which is another story some of you may be familiar with) and already at a disadvantage compared to the rest of their peers.

Is there something we can do, as parents, educators and professionals, to help these kids obtain the skills they need so they can perform at their potential before they get so far behind in school?

Learning disabilities can occur for a multitude of reasons.

There may be a physiological, psychological, developmental, environmental, genetic, behavioral, social or combination of these factors that cause a child to be diagnosed as learning disabled. Though it is difficult to pinpoint where the problems stem from, one important factor that is often overlooked is vision.

According to research, many children that are considered learning disabled have clinically significant visual problems. As stated above, 80% of children who have definite reading problems, which happen to be 3/4ths of the learning disabled group, have difficulties with one or more basic visual skills. Yet, these children are often labelled as having a specific learning disability before vision is ruled out as a possible contributory factor.

For more information on vision and reading, click here.

If 75-90% of learning in a classroom occurs through the visual system and the visual system is not working properly, this can seriously hinder a child trying to perform up to their potential.

Once a child’s performance significantly falls below their potential, they are tested to see if they have a learning disability. To evaluate learning disabled (LD) children, a series of specialists are called upon to discover where areas of deficit are occurring and how they can be remediated. This team of specialists is called a Multidisciplinary Team (MDT). MDTs decide whether or not your child qualifies for special education services. Unfortunately, eye doctors are not usually on an MDT and vision problems still go undiagnosed.

For more information on MDTs and special education services, click here.

If a child does qualify for special education services, they are fortunate enough to have specialists assist them with their education, but are now very far behind their classmates. If vision was taken out of the equation earlier so it was not one of the factors hindering that child’s performance, it is possible that special education services may never have been needed.

Vision, however, is RARELY the only factor in why a child may not be meeting their potential. It is important to remember that all our senses must work together to bring us information from the world around us; a problem may lie in a single area, such as vision, or there may be concurrent issues to deal with. It is the rule, rather than the exception, that learning disabilities are caused by a combination of factors.

So is there something you can do?

There is something parents, educators and professionals can do to help children obtain the visual skills they need before they fall way behind in
school. Parents and teachers can observe and learn to recognize signs and symptoms of learning-related visual problems.

Knowing when a child is having vision symptoms and knowing when to refer them to an eye doctor that specializes in visual function can significantly reduce the number of children experiencing learning difficulties.

To learn how some signs and symptoms of visual problems, click here.

The earlier these kids are detected, the less time will go by where they can fall behind if left untreated and the easier it is to treat a visual problem. Vision problems CAN be corrected. Vision does not have to be part of the learning problem.

If you haven’t visited the page on vision, click here to learn how vision is more than seeing clearly.
Multidisciplinary Teams (MDT's) and Individual Education Plans (IEP's)

MDT’s, IEP’s and Special Education Services - Why Vision is Important to Consider

Vision is an important and necessary process for learning to think, speak, read, write, spell and perform mathematics. Vision is also a large part of perception and can be associated with dyslexia and developmental aphasia (impairment in the ability to communicate).

According to research, as many as 75% of children that are considered learning disabled have clinically significant visual problems. Yet, these children are often labelled as having a specific learning disability before vision is ruled out as a possible contributory factor. Once labelled and eligible for special education services, most of the time good visual skills are not a goal listed on an Individual Education Plan set forth by Multi-Disciplinary Teams (see below for definitions).

This is an area definitely lacking attention in the education sector, which we are hoping this website will aid in remedying.

How to get Special Education Services

When a child has difficulties in school and is consistently not meeting their potential as shown by standardized tests and IQ tests, they may qualify for special education services in order to better assist them with academic achievement. Funding for special education services is appropriated under the Individuals with Disabilities Education Act (IDEA) set by Congress. In order to qualify for special services, a child must be referred to a multi-disciplinary team (MDT) for evaluation and be determined by the MDT to require these services.

If the child is determined to meet qualifications for special services, the MDT will develop an Individual Education Plan (IEP) for that child that must be followed in order to meet specific educational goals for that child. Periodically, the child's case will be reviewed to ensure that the IEP is being met, determine if other goals need to be set and to determine if the child still needs special services.

Individuals with Disabilities Education Act (IDEA) - revised June 4, 1997

"Designed to ensure that each child with a disability has a free, appropriate public education; that each child's education is determined on an individualized basis and designed to meet his or her unique needs; that each child's education is provided in the least restrictive environment; and that the rights of each child and family are ensured through procedural safeguards."

- 105th Congress

Multidisciplinary Teams (MDT's): MDT’s determine eligibility for special education services and are made up of a diverse group of professionals. This team attempts to devise an Individual Education Plan (IEP) for that student, which is a contract that sets specific goals especially for that student and lists ways to meet those goals.

Professionals most commonly found on MDT's:

- Principal
- Title One Learning Specialist
- Speech/Language Pathologist
- Educational Facilitator
- Teacher
- Child Psychologist
- School Counselor
- Physician

Why is this important for children with vision related learning problems?

MDT’s evaluate individuals that fall into many different categories under the special education heading. However, we will focus on the category specific learning disabilities since it is most relevant to vision and learning. Most children that can benefit from optometric consult fall into this category.

Definition of Specific Learning Disability

A Specific Learning Disability is defined by Congress as a severe discrepancy between intellectual ability and achievement, not correctable without special education in one or more of the following areas:

http://www.visionandlearning.org/mdiep.htm
How a Child gets Referred to an MDT for Evaluation

Referrals for evaluation by an MDT for specific learning disabilities usually occur when a child falls two or more grade levels behind in school and/or are not working up to their potential. Usually it's the learning specialist, teacher, counselor or parent that requests an MDT evaluation.

A referral to an MDT can be submitted from anyone INCLUDING optometrists. Optometrists usually evaluate a child clinically to determine if there is a vision related learning problems usually at the request of the parent and submit a visual assessment to the MDT for a child already being reviewed or to make a referral to the MDT. Optometrists may request further information on a child from the school, including the MDT, with parental permission to better understand the child's needs. Optometrists can also actively participate on a MDT, though this is not commonly seen in many areas.

Let your Optometrist Know if Your Child is Seeking Special Services

It is important to let your optometrist know if a child is getting special services, or under review for special services by an MDT, so that they may not only assist you with the process, but can better manage and treat your child by communicating with all professionals involved regarding your child's visual performance. This can go so far as including certain visual requirements and goals to increase visual skills on their IEP that can be incorporated into their regular school activities.

Politics for such things can be tricky. Schools cannot afford to pay for every child to have vision examinations, let alone pay for vision therapy (It would be nice, however, if more schools incorporated visual guidance programs to prevent the need for vision therapy by helping develop optimally functioning visual systems, but that's a separate issue). It really is not the school's responsibility to provide these services and should not be expected, though it is believed that it is a school's responsibility to detect possible vision problems a child may be experiencing and refer appropriately. However, simple modifications to classroom activities required in school that increase or maximize particular visual skills are easily done, especially on an IEP, because they do not require extra funding or help from an additional special teacher or aide.

Once Eligibility for Special Education Services is Determined

If eligibility is determined after assessment by an MDT, special education services are provided by the state until the age of 21.

Individual Education Plan/Program (IEP): A person that qualifies for special education services under IDEA will have an IEP. Students who are having significant learning difficulties and need an alternate education plan to suit their styles and abilities are evaluated by an MDT for these services. If a person qualifies for special education, an IEP is designed by the MDT to outline specific goals for the student and steps to follow in order to maximize and/or develop his or her strong points. An individual plan for that student is designed and used as a template to teach from and include all the special needs that student has for learning.

If Eligibility for Special Education Services is NOT Determined

If eligibility has not been determined but your child is still being evaluated OR your child has been determined that they DO NOT qualify for special education services, your child cannot obtain services under IDEA. However, arrangements can be made under Section 504 of the 1974 Rehabilitation Act to make sure that any special needs your child requires is still met.

Section 504 - Part of the Rehabilitation Act of 1974.

This section states that no program or activity receiving federal funds can exclude, deny benefits to or discriminate against any person on the basis of handicap. Those that have special needs, but who have yet to be determined as eligible for special education services or do not meet eligibility for services under IDEA are provided for under Section 504. This can include visual needs. Funding to pay for this service is completely different than special education services under IDEA, but may still be determined by an MDT.

Vision Exam Recommended

If your child is receiving special education services, make sure their vision is checked to make sure poor visual skills are not causing part, if not all, of their difficulties. A thorough vision exam by an optometrist specializing in learning related vision problems is also important for any individual seeking special services or currently being evaluated for special services, for the same reason. If poor visual skills are part of their problem, they can be remedied so that a child won't have to deal with visual problems anymore. This can be enough to get them back on track without needing special services, though more often than not, it is only one piece of a larger puzzle.

To find an optometrist near you that specializes in this area, click here.
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Vision, Learning and Dyslexia

Hear the word dyslexia and many people immediately visualize an image of jumbled words printed in reverse. This word reversal phenomenon is certainly true for some dyslexics, however dyslexia is far more complicated than simple word reversals.

Actually, reversal tendencies are normal for small children. By age eight, however, no reversals should be noted in a normally developed child. Because of this fact, reversal tests are good predictors of reading achievement. Reversal problems in children older than eight years old are usually caused by problems with vision, and are likely to affect good reading skill development.

What is Dyslexia?

Dyslexia is a difficult term to define, especially since it has become the catch all word for many types of reading and processing problems. Even among professionals, agreeing on a common definition of dyslexia is not easy. Consequently, there is much controversy about the way to treat dyslexia, sometimes even in the same field.

Dyslexia is generally believed to be a problem with interpretation of information by the brain; information taken in is not processed in standard ways. Words may be read but not understood, or letters rather than the entire word are seen or read.

The definition we prefer is the following:

**Dyslexia is a specific reading, writing and/or spelling dysfunction due to a slight brain dysfunction and/or differential brain function.**

This means it could be caused by something physically wrong with the brain, or because the brain never really learned how to do it correctly in the first place. Dyslexia is not related to intelligence, teaching methods or sociocultural opportunity. Those that suffer with dyslexia are a population of children who have difficulty learning to read in spite of good intelligence, educational opportunities, cultural experiences and normal sensory development.

The prevalence of dyslexia has been estimated to be 10-20% of children in a regular classroom and greater than 50% in a special education classroom. The prevalence is equal in males and females, but tends to be more severe in males.

The issue of learning disabilities becomes even more complicated when dyslexia is a factor, especially since many kids are labelled dyslexic unnecessarily. In order to explain how an optometrist can help diagnose and manage dyslexic individuals, it may be helpful to briefly explain some of the categories of dyslexia.

The three most common types of dyslexia and how optometrists can help:

1. **Dysphonesia** - A dysfunction where the primary problem is letter-sound integration. They are unable to identify words or letters with their accompanying phonetic sounds. They cannot attack unfamiliar words using skills such as phonics, syllabication and/or structural analysis. This is a decoding problem. Dysphonetics rely on eidetic coding (word attack skills). You can think of eidetic coding as memorizing words instead of sounding them out. Words like "pneumonia" and "mnemonics" are eidetically coded. Dysphonetics may recognize familiar words, but are incapable of efficiently decoding unfamiliar and multisyllabic words because they have difficulty sounding out and blending sounds together. For example, if they were taught the word "deal" they may still have difficulties with the word "seal" or not know how to read the word "dealing." These children tend to need more educational rather than optometric remediation, though remediating any vision problems that could be causing some of the difficulty is always a good idea.

2. **Dyseidesia** - A dysfunction that involves whole word decoding, a more global process in which words are recognized based upon their shape and configuration. This is the opposite of dysphonesia. People that are considered dyseidetic lack the ability to take whole words or configurations and perceive them as a unit symbol (or gestalt), but can use skills such as phonetics (sounding out words), syllabication and structural analysis. This means they don't have good word attack skills. It is more of an encoding problem. They have problems storing information, which involves sequential memory (knowing the right order of things). Consequently, retrieval of information is difficult. People who experience this dysfunction rely on phonetic coding instead, which can lead to incorrect spelling. Dyseidetics are the most difficult to treat, but optometrists can still assist these individuals. Some researchers have found that these
individuals have deficient short-term visual memory (the ability to recall previously presented visual experiences), visual discrimination (the differentiation between visual patterns), visual figure ground (differentiating a particular part of a visual field, e.g. Where's Waldo), and visual sequential memory (visualizing in a particular order). Many clinicians have found that if these problems are remediated by visual perception training, a person that is dysideitic can improve their reading skills and comprehension.

3. Dysnemkinesia - A dysfunction that involves memory and motor movement. Individuals with this dysfunction tend to be distinguished by their abnormally high frequency of letter reversals. It is the dysfunction most people think about when they hear the word dyslexia. This is actually a developmental issue. It occurs due to poor development of the visual spatial skills known as laterality and directionality. They have problems with things like symbol orientation. For example, "p" "b" "q" and "d" are all the same symbol oriented in different ways. Dysnemkinesics will not see this symbol as being different letters when oriented differently and will confuse them. Consequently, Dysnemkinesics tend to transpose letters and syllables, exhibit faulty eye movements, demonstrate excessive reversals, and have spatial difficulties. They often have poor sight recognition, and tend to have trouble building up a sight vocabulary. Reading tends to be slow and difficult, since they often read and spell phonetically. Dysnemkinesia is the easiest type of dyslexia to identify and treat by an optometrist. Skilled in vision training. They actually have the highest success rate out of the three types.

NOTE: You can have one or more types of dyslexia at the same time, e.g. dysphoneidetic.

Learning to read requires both phonetic and eidetic processes, which are cognitive ways to decode and encode words, respectively. Visual skill deficits can interfere with both encoding and decoding words, in a host of different ways. Vision problems can cause problems with sight recognition, reading comprehension, memorization, recall, fluency, speed, rhythm and the length of time spent reading or writing.

For more information on visual skills, click here.

What should you do if you suspect a child of having dyslexia?

Since vision is such an integral part of the way we learn and process information, children who have difficulty in reading and/or who are poor spellers may have coding problems and should receive a thorough optometric exam to rule out poor visual skills.

According to research, it is clear that dyslexics, learning disabled, and children experiencing academic difficulties can all benefit from optometric intervention, such as vision therapy, but it is important to realize that the earlier patients can be treated, the more beneficial vision therapy tends to be. The longer a person goes without treatment, the farther they get behind in school, the lower their self esteem and the longer it takes to change "bad" learning habits.

Not all optometrists specialize in learning related vision problems. Out of those that do, not all of them specifically screen for dyslexia, though they recognize if it is there. To find an eye doctor in your area that specializes in learning related vision problems, click here.

Testing Methods for Dyslexia

There are several different tests used today to screen for dyslexia. Two tests most commonly used to test for dyslexia by optometrists are the ADT (adult dyslexia test) and the DDT (dyslexia determination test). Two additional tests that may be routinely encountered include the PLCT (pre-dyslexia letter coding test) designed for use with kindergartners, and the DSF (dyslexia screener for first graders).

The PLCT test takes into consideration the fact that children of this age do not have the same reading and decoding skills as older children and so bases skills on letters rather than whole words. The DSF also acknowledges the age of the children being tested and includes writing out individual numbers and letters in addition to the decode and encode sections.

The break down of scoring techniques varies by test and tests vary in the complexity of words used. Each test however generally uses the same underlying test sequence. To begin with the student/adult is asked to read aloud from a list of words (decoding). The list of words progress in difficulty. After a specified number of mispronunciations in any one list a level of decoding skills is calculated. Next an encoding procedure is done. The student/adult is asked to write a series of words read aloud. The words chosen are words that were read correctly in the decoding sequence. The words are checked for spelling accuracy and scored. Finally a series of unknown or missed words from the decoding sequence are read aloud to the person and they are asked to spell them phonetically, that is spell the word as it sounds not as you expect it to be correctly spelled. Using specified guidelines a score is reached to determine whether dyslexia is present.

An important note to remember

Though it is an optometrist's responsibility to help diagnose and treat children who manifest some type of visual dysfunction, and that visual dysfunction can make learning and reading more difficult, it is important to reiterate the fact that optometrists DO NOT treat learning or reading disabilities. There are learning specialists and special educators that specialize in learning disabilities. Vision therapy can be an effective method in improving academic performance, but often a multidisciplinary approach with other professionals dedicated to working with these kids is the best course of action.

To learn more about vision therapy, click here.

Remember, treatment options for diagnosed dyslexia vary greatly due in part to the lack of agreement about how it creates the dysfunction and what aspects are considered most important. Many professionals disagree on or flat out reject certain types of treatment due to different areas of expertise and the lack of knowledge about other professions. Don't be surprised if you find this in your search for treatment options.

http://www.visionandlearning.org/dyslexia.htm
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Vision, Learning and ADD/ADHD

Attention deficit disorder (ADD) and attention deficit hyperactivity disorder (ADHD), are frequently diagnosed conditions among school age children, now more than ever. In fact, it is one of the most common behavioral disorders diagnosed in children living in the U.S.

It is estimated that 3%-5% of school age children have ADHD, or about 3 1/2 million American children. Boys outnumber girls 3 to 1 and are more often diagnosed with ADHD. Since girls tend not to have the hyperactivity component, it is suspected that girls are underidentified.

Once thought that symptoms fade with the onset of adulthood, it is now estimated that 1/3 to 2/3 of all ADHD children become ADHD adults.

Did you know that almost all of the symptoms associated with both ADD and ADHD are also symptoms found in vision related learning problems? If these symptoms are due to vision, the vision problem can be fixed and the symptoms will stop.

Definitions of ADD and ADHD

ADD is characterized by poor attention span and difficulty controlling impulses. According to the Diagnostics and Statistical Manual of Mental Disorders IV (DSM-IV) which sets the criteria for diagnosis, six or more symptoms listed for inattention must be observed for six months in a manner that is considered inconsistent with that child's developmental level before ADD can be diagnosed.

ADHD also includes hyperactivity. Six or more symptoms listed in hyperactivity or impulsivity must be observed for six months in a manner inconsistent with that child's developmental level in order to be diagnosed with ADHD.

Many children truly do suffer from ADD and ADHD, but certain visual and learning problems may appear as ADD and ADHD type symptoms.

Many symptoms seen in ADD and ADHD are similar to vision related learning difficulties. Visual dysfunctions will not respond to most ADD/ADHD treatments, especially pharmaceutical treatments. It is possible that a child can be medicated unnecessarily, therefore it is important to know if the correct problems are being treated.

Children with vision problems, even those such as hyperopia (farsightedness), accommodative (focusing), or binocular dysfunctions (how their eyes work together), may exhibit the same signs as ADD/ADHD in the classroom. Their visual systems cannot tolerate the demands within the classroom for very long, so avoidance behaviors are common. A thorough vision exam will rule out any possible vision problems that may be part of the reason for a child's behavior.

General habits that may be observed in children with vision problems, but can also be ADD/ADHD symptoms include:

- Careless mistakes in homework and class work
- Poor ability to sustain attention and stay on task
- Poor listening skills
- Difficulty following directions
- Loses and misplaces things often
- Talks excessively and interrupts others
- Fidgety
- Difficult time organizing, prioritizing work and activities
- Shifts from one activity to another
- Difficulty playing quietly

Remember, vision is important, but it can be only ONE part of a bigger problem. It is even possible to have ADD or ADHD, as well as a vision problem. Fixing the vision problem may not be all that is needed to help your child. This is why a multidisciplinary approach is ideal.

Who diagnoses ADD/ADHD?

Any physician is actually able to diagnose these disorders. However, many general practitioners do not take the time to make sure their patient fits all the criteria for diagnosis, before they determine it is the only cause of the symptoms. Often their first treatment is to prescribe medication.

Psychiatrists are specialty medical doctors. Child and adolescent psychiatric training requires 4 years of medical school, at least 3 years of approved residency training in medicine, neurology, and general psychiatry with adults, and 2 years of training in psychiatric work with children, adolescents, and their families in an accredited residency in child and adolescent psychiatry. They are trained to look at biological and

http://www.visionandlearning.org/addadhd.htm
Physiological problems, but also psychological and social factors in working with patients.

Psychologists obtain their doctorate in clinical psychology (though their masters programs available in counseling) and pass board tests in order to practice. They also look at psychological and social factors when working with patients, as well as the physiological and biological factors, since mind and body are closely linked. At this time are not able to prescribe medication themselves, but do take more time to observe the child to make a proper diagnosis. If medication is deemed necessary, they will refer to the appropriate professional.

Other professionals, such as teachers, school counselors, optometrists, etc., can recognize the signs and symptoms of ADD/ADHD and may refer you to one of the above professionals for appropriate testing to rule out these disorders.

Unfortunately, many children are being diagnosed hastily by primary care physicians, pediatricians, etc. based on parent or teacher recommendations. This often leads to medication prescriptions to handle the problem. It is our opinion that a person that specializes in behavioral conditions, such as a psychiatrist or psychologist, will be able to test and observe a child more thoroughly to diagnose individuals with ADD/ADHD and decide if medication is absolutely necessary. They are also trained to rule out other possible behavioral issues. This is not meant to undermine the family doctors and pediatricians. It is meant to illustrate that there are specialists specifically trained in behavioral problems. If you were having a baby, would you want your family physician taking care of you, or would you want to go to an obstetrician that is specially trained to deliver babies? Your family physician may know how to deliver a baby, but the obstetrician does it all the time and will be more trained to handle problems along the way. The same goes for a diagnosis of a behavioral problem that will be there for the rest of a child’s life.

Psychostimulant Medications - Ritalin, Dexedrine, Cylert

A huge number of children diagnosed with ADD or ADHD are treated with psychostimulant medications. In 1995 it was estimated that more than 1.5 million American children aged 5 to 18 were taking Ritalin. This number has about doubled by now.

These medications have been found to improve easier manageability of children and increased time on tasks, but it has not been proven that these medications actually affect academic achievement. One double blind study shows no cognitive, academic or behavior improvement over time between children diagnosed with ADHD that have taken medication compared to those who have not.

Psychostimulant Medications and their Visual Side Effects

Paradoxically, these drugs can also cause visual side effects that can actually make it more difficult for a child with ADD/ADHD to concentrate on learning related tasks. Ritalin (methylphenidate) and Dexedrine (dextroamphetamine) may include decreased focusing power, dilated pupils (also related to focusing) and blurry vision. Cylert (pemoline) can cause double vision, eye turns and nystagmus ("jumpy" eyes). If a child has already been experiencing some of these visual problems, these medications may actually enhance their problem.

Careful diagnosis of ADD/ADHD is important

To make a careful diagnosis of ADD/ADHD, it is important to rule out all other explanations for the symptoms manifesting, including health reasons, allergies, other behavioral problems such as depression, hearing problems and vision problems. This means that it is wise to see different professionals that specialize in the mentioned areas, along with seeing a psychologist. This can get expensive, but if you want to really know what your child is struggling with, it may be worth the cost to find the most appropriate treatment(s) for your child.
Developmental Vision Exams

Developmental vision exams are important for several reasons. Not only do they ensure the eyes are physically healthy and that there are no signs of disease or birth defects, but they also ensure vision is developing properly.

Vision is a learned process and good visual development is necessary for an efficient visual system. Good visual skills are vitally important to a child's academic and life achievements. If the visual system is inefficient, a child has to work extra hard to keep up with others, or else find they cannot work up to their own potential.

For this reason, vision exams should be viewed as wellness check ups.

Just like going to the pediatrician to get a clean bill of health, children should be checked by their optometrist to make sure their vision is developing properly. If not, poor visual skills can really hinder a child in school, as well as other activities such as sports.

Poor visual skills are not outgrown. They stay with you throughout life and can prevent people from ever reaching their true potential. The sooner you can identify and treat vision problems, the better.

Routine Vision Exams - Stop a problem before it starts

Just like seeing the dentist, it is better to visit your eye doctor BEFORE something is seriously wrong, so that risk factors can be identified, small problems managed and bigger problems avoided. This goes beyond the quick eye health check pediatricians do during their routine exam. They are only looking for physical anomalies and eye diseases. They do not check the development of vision (and neither do most ophthalmologists and some optometrists!). A thorough exam should not only identify problems such as near or farsightedness, astigmatism and general eye health, but also evaluate visual skills.

American Optometric Association (AOA) Exam Frequency Guidelines

According to AOA guidelines, vision exams for ALL healthy pediatric patients should be given at the following times:

- By 6 months
- At 3 years of age
- Before 1st grade
- Every 2 years thereafter

NOTE: Children who are found to be at risk for visual problems may be examined annually or as recommended by your eyecare professional.

What Developmental Optometrists Evaluate in an Exam

In order to determine if a child has normal, health vision, their eye examination should include testing and/or observation of the following basic visual skills and eye assessments:

- Eye Health
Visual Acuity at Distance and Near (includes looking for potential lazy eyes)
Eye Alignment (looking for potential eye turns)
Binocularity
Depth Perception
Eye Movements Skills (including tracking and fixating)
Eye Teaming Skills
Focusing Skills
Color vision testing
Visual Perception Skills
Gross Motor Development
Fine Motor Development

It is extremely important to realize that the many different parts of the visual system work together in order to be an efficient system. Let us use the analogy of an automobile. If one vital part or several parts are missing or malfunctioning, a car will not run properly, especially for long distances or when there is added stress to the engine (like on a hot day). Similar to a car, the visual system cannot function well with pieces missing or not working properly, especially when there is added stress to the system (like reading for content). Engine parts that are defective and not in peak condition will give the car a rough and inefficient ride. A poorly acting visual system cannot smoothly and efficiently take in, process, store or use information and can eventually break down.

If you would like to learn more about these skills, read about visual skills by clicking here.

If you suspect your child has a learning related vision problem, but the timing does not fall during the recommended times to see an eye doctor, have your child examined by a behavioral optometrist who works with children and/or specializes in vision therapy anyway. If it is, indeed, a vision problem, there is a huge benefit to identifying and remedying it sooner than later. For one, it means the vision problem has less time hindering learning in a classroom. For another, bad habits are hard to break the longer they are ingrained.

Remember, vision problems are not outgrown and can affect a person's achievement in all activities, such as school performance, job performance and sport activities, throughout life. Don't let this happen to your child.

Home

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Luci Johnson Nugent

Luci Johnson, the daughter of President Johnson suffered from learning difficulties due to vision problems. Her story is inspirational and shows us that anyone, regardless of status may be forced to struggle with vision dysfunction. We often look for these problems more diligently in children as they go through school but adults too can suffer. Problems overlooked or missed in childhood do not disappear, people simply compensate and often compromise, to deal with the problems as best they can.

The following story was written by Luci Johnson Nugent and appeared in the magazine "Family Circle." It was re-printed by the Optometric Extension Program Foundation (OEP) and it is with their permission (and our special thanks) that we share her personal experience with you.

For more information on the OEP Foundation, click here.

At 16, I was an underachiever in school and had been most of my life. I had been told- as the result of every kind of test imaginable- that I was a relatively bright child. There were times when I actually believed it and would go home and spend hours writing a paper I thought so brilliant a special assembly would be called to have it read- only to have my teacher tell me, "Oh, Luci can't you see where you made mistakes?" (But that was the crux of the problem. I couldn't really see.)

The fact that we use the word "see" to mean understand indicates just how important vision is to our learning process. Here I was, the younger daughter of the man who was then Vice President - and a few months later became President- of the United States. My father certainly had the desire and the means to have my health problems diagnosed and treated. And yet, I had a major visual problem that went undetected for many years. I came from a family of achievers and worked diligently at school, but no matter how hard I tried, I found it impossible to rise from C to even a C+. Not only were my academic abilities affected, but because my eyes did not work well together, my total coordination was poor. And because I was physically uncoordinated, I was inevitably the last choice for team games throughout my childhood.

And so, at 16, I was on my way to dropping out. You can't face the frustration of not being able to succeed indefinitely without wanting to run from the scene of your failure. Fortunately for me, my problem became so acute that I started blacking out during tests. Finally, as a last-ditch effort, Dr. Janet Travell, then White House physician and a lovely lady, suggested that I visit a local optometrist, Dr. Robert A. Kraskin. We had never considered going this route before because I apparently had no acuity problem. (In fact, the Snellen eye chart indicated that I had 20/20 vision.)

Dr. Kraskin told me that my eye coordination was poor. In response to my request, he supplied me with the following information about my type of visual difficulty:

"This type of problem arises initially as a reaction to stress created by the use of the eyes for close work and, in turn, brings about an interference in the coordination of the visual system. In other words, there results a dysfunction in the coordination of both eyes which reduces and lessens the ability to derive meaning from that which is seen. Not only is reading efficiency restricted, but there is also difficulty in general coordination activities, such as sports, which are highly dependent upon the use of visual information. Thus, hand-eye activities are limited. More frequently than not, there are no measureable ocular defects (such as nearsightedness) and 20/20 visual acuity usually is measured.

"Fortunately, this type of visual problem can be alleviated. Generally, glasses alone will not solve the problem, although the use of proper glasses for close work is an essential aspect of the proper therapy. To alleviate the problem, a program of activities and exercises is recommended."

When I began my visual training course I was probably the most belligerent patient Dr. Kraskin ever knew. (Since I later worked in his office, I can tell you this attitude is not uncommon among people who are frustrated by visual difficulties.) I complained constantly. I couldn't see the sense of being yanked from my study hall to do seemingly senseless exercises- like drawing circles on chalk boards, or writing down numbers flashed from a tachistoscope onto a screen, or putting pegs in proper holes, or tracing pictures through a machine called a cheiroscope. (Actually Dr. Kraskin was teaching me to use my eyes as a team.)

Then came that November day in 1963 that none of us will forget. As a nation we endured great trauma and transition. As an individual whose father's responsibility it was to lead our nation, I felt the tension of the time acutely. My adjustment was quite a demanding one. In fact, my teacher expected my grades to stay on the low level they were- or even go down. Instead they rose a grade point per subject- and then kept on rising!

From then on, my grades improved and a year-and-a-half later I had gone from Ds to Bs. During my freshman year at college, I made the honor roll- and for someone who had been on scholastic probation for so long, this achievement was a thrilling one indeed. Also, my physical coordination noticeably improved. I was still far from being an athlete- but I'd come a long way. Then, I had a long way to come.

http://www.visionsandlearning.org/testimonials.htm
During the summer of 1964, I began to reflect on how my life had been radically changed by my visual training. The memory of my early resentment and rebelliousness was still vivid and I felt that I could not just reap the benefits I’d had and walk away. I knew the frustration that students in visual training were going through—having faced these problems myself—and decided to work for Dr. Kraskin as an assistant during the summer. I worked that summer and the following summer, while I continued to take training myself. During that time, I saw a bright little boy who was having difficulty in kindergarten transformed from an angry failure into a happy, successful student. I saw youngsters like myself go from failing grades to the honor roll. I saw young men eager to be military pilots make such marked improvement that they finally achieved their wish. One young girl who won my heart had had two unsuccessful operations to correct strabismus (crossed eyes). With persistent effort, she achieved a marked degree of control.

Out of my own personal experience first as a patient and then later as assistant, I found a permanent vocation in helping the visually disadvantaged child. When a preschool vision screening program, Volunteers for Vision, was born I was asked to be national honorary chairman and later became a member of their board of directors.

Since the time I first saw Dr. Kraskin, I have graduated from high school, have attended college, have married and have been blessed with two lovely children. As a mother, my interest in VFV has not dimmed at all; it has only grown. In 1969 I formed a local chapter of VFV in Austin, Texas where I now live. During our first six months in operation, we screened 2100 children.

I speak as an interested mother, but I am by no means an authority in this field. My only hope is that this simple testing, which only detects gross visual problems, will serve as an impetus to get parent to take their children to a vision specialist of their own choosing. For, just because your child passes a test, he is not necessarily problem free. The three major tests—the Keystone Telebinocular, the Titmus Vision Screener, and the Massachusetts Vision Test Screener—are not substitutes for a professional examination.

As a parent, there are many things you can do to promote good vision. Start at birth by hanging toys and mobiles over the crib to develop hand-eye coordination. Later, encourage your child to use proper lighting and posture when he reads, and to maintain adequate distance for reading, studying or watching TV.

There are also danger signals a parent can look for. Do your child’s eyes frequently “run,” as if he were crying? Does one eye turn involuntarily? Does your child have persistent sties about his eyes? What about his reading habits? Does he (or she) experience headaches or nausea; does print blur after only short reading periods? Does he see double, squint or omit words or letters when writing?

Does he have hand-eye coordination problems? One indication of this is a need to touch things in order to understand or interpret information.

Helping someone to see better is a magnificent achievement, particularly since seeing and understanding are considered synonymous in our society. For as I once pointed out in a speech I made a few years ago, if the key to a better society is education, then the key to a better education is better vision. If you don’t have that key, you can’t open the door to a better life.
Galaburda (Boston) feels that dyslexics cannot break down words into basic word sounds. He said,

To give credence to what Dr. Tabb and others are finding with their dyslexic patients, Sandra Blakeslee, writer for the New

connections in the cerebral nervous system. Novel approaches to help these children before they turn off the whole academic scene are all

Dr. Paula Tallal (Rutgers) emphasized that early poor language expression and clumsiness seem to be correlated with later dyslexia. Dr. Albert

youngster, who had been retained in the special ed. class, had a sequencing problem. The boy could read a word in a sentence and then be

This optometrist, Dr. Tabb, told me story after story of children who were called dyslexic, stupid, or emotionally blunted, but after a few short

up into a more rapid time, and then the rhythm was established.

I recently received a letter from the PR firm of Fleshman and Hillard, of New York, reminding me that it is important that children should be

time when I was five years old, a condition called amblyopia exanopsia, or suppression blindness. (My confused brain got tired of seeing double so it blocked out the images coming from my right eye. It was a smart move on my brain's part, as it did not know which image to use.) The ophthalmologist surgically corrected the cross-eyed look, but the loss of vision remained. They

All my life I have had an eye problem. I was cross-eyed as a baby but nothing was done. This was in the 1920's: "He'll outgrow it; we'll wait

Do you remember how easy the alphabet was to learn when you could sing it? A...B...C...D... etc.? The sequence of the letters was easier

This optometrist, Dr. Tabb, told me story after story of children who were called dyslexic, stupid, or emotionally blunted, but after a few short

This ophthalmologist told me that it was a smart move on my brain's part, we as we came on, I jumped on a trampoline while spelling out words both backwards and forwards, and I recited the alphabet while reading a chart (easy), but had to raise my right or left hand, depending upon whether there was an R or L under the letter (tough).

The message he revealed to me was that the eyes are connected to everything that we do: thinking, feeling, moving, planning, and most of the

For more information on the OEP Foundation, click here.

http://www.visionandlearning.org/testimonials2.htm
All this research shows that the visual system consists of more than one pathway into the brain, its association areas and the sections that put what we see and hear into something meaningful for our conscience and higher judgement centers. The brain distributes language processing over many areas. With modern sophisticated measuring devices, researchers have found different speeds of processing of incoming language and visual stimuli. All this reinforces the perceptual sensory way: get the whole picture, then sequence it, then get the timing down, and finally the rhythm. By George, I've got it.

I'm an old guy, but these methods are working. I can go upstairs to get a couple of things and remember to get both. (If you lose your keys or your glasses occasionally that's okay, but if you find them and don't know what they are for you are over the hill.)

Developmental optometry, and its special method called perceptual sensory training, is for young and old alike.

If you have tried all the nutritional changes that you can think of, and the teacher says that your child just cannot "get it," it would be smart to consult with a developmental optometrist. Nearsightedness, farsightedness, astigmatism, strabismus, amblyopia, and poor accommodation can often be figured out by the parents or the ophthalmologist, but how the child processes what is coming into the retina and on back to the brain for organization may have to be left to the optometrist, preferably one who does developmental optometry including perceptual sensory training.

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Why See an Eye Doctor?

Vision Related Learning Problems

Good vision skills can help provide a solid foundation for learning. If a child does not have a good visual foundation, their system is not efficient enough to handle large work loads because it puts too much stress on such a weak system. A poor visual system can lead to poor performance in school.

There are a multitude of reasons why a child may be having trouble in school, and vision is just one of them. Often, it is a combination of problems and one remedy will not solve them all. This is why a multi-disciplinary approach is best, so that no one factor will be left out. However, any problem that CAN be corrected makes it that much easier for a child to be successful. Vision is such a problem than can be taken out of the puzzle. It is treatable and the earlier vision problems are detected and treated, the better. It is for this reason that vision should be checked promptly if your child is falling behind in school and why everyone, especially children, should have their eyes routinely checked.

Following is a list of signs and symptoms that could mean your child has a vision problem:

**Signs & Symptoms of Vision Problems**

- Failed school vision screening
- Failed eyechart (acuity) test
- Recommendation by:
  - Teacher
  - Physician
  - Psychologist
  - Optometrist
  - Other Professional
- Behind in school
- Not working up to potential
- Hyperactivity
- Frustrates easily
- Poor or short attention span
- Difficulty reading
  - Reads below grade level
  - Lose place frequently
  - Holds material too close
  - Poor comprehension
  - Skips lines
  - Repeats lines
  - Adds extra words
- Has an eye that turns in or out
- Poor eye movements
- Poor hand-eye coordination
- When reading/writing:
  - Covers an eye
  - Turns head to side
  - Complains of blur or double vision
  - Eyes itch or burn
  - Eyes hurt
  - Reverses letters/words (>3rd grade)
  - Headaches
- Trouble in spelling or language arts
- Trouble copying from chalkboard
- Trouble copying from books
- Perception problems
- Failed depth perception/fusion tests
- Poor motivation
- Difficulty writing
  - - Letter formation
  - - Cannot stay on line
  - - Sloppy
  - - Crowds letters
  - - Eyes too close to paper
  - - Grips pencil incorrectly
  - - Rich vocabulary, but not on paper
- Excessive effort needed to achieve
- Not working up to potential
- Diagnosed with a learning disability

http://www.visionandlearning.org/whysaehyedr.htm
Physically awkward

• Scores low on standardized tests
• Trouble in sports
• Does not work well on their own

For another list of problems that can be seen in a classroom, check out the educator's checklist by clicking here.

Do you suspect your child has a vision problem?

If you suspect your child has a vision problem, we suggest finding a doctor that specializes in children and making an appointment for an optometric consultation. If do not know of any, please click here to find a doctor in your area. 

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DISCLAIMER: This website is for your information only. Its purpose is to increase your level of awareness about vision and learning. The educational content on these pages is not intended to take the place of medical advice from a licensed health care professional. If you feel you or someone you know may have a vision problem, please make an appointment to see a licensed optometrist. The creator of this site assumes no responsibility for any service provided by any optometrist found via this site.
What is the Difference Between Eye Care Professionals?

Optometrists (O.D.)

Optometry is fairly a new profession that has been around for about the last 100 years. It has changed dramatically in the last 20 years, including the diagnosis and treatment of eye diseases with the use of pharmaceuticals.

An optometrist is a doctor that has spent four years beyond an undergraduate program in a professional graduate program studying subjects such as the anatomy and physiology of the eyes, how the eyes function and how that function can be trained to bring us the most from our visual world.

There training not only includes learning how to prescribe glasses and contacts to bring our world more clearly into focus, but also training our eye movements (how our eyes work together), vergence (how we point our eyes), accommodation (sustaining and changing your focus), perceptual skills (information processing, spatial skills, visualization, memory), and eye-hand coordination (gross and fine motor skills) to improve the way we learn, play, use our computers or simply enjoy looking at a beautiful garden.

For more information on what vision is, click here.

Not only do optometrists study the eyes, but they study the rest of the body because so many systemic (body) diseases and problems manifest as problems in the eye such as diabetes, multiple sclerosis, cancer, hypertension, high cholesterol, stroke, heart disease, herpes simplex and thyroid problems. Optometrists can also diagnose and co-manage with other healthcare professionals, including ophthalmologists, on the systemic conditions that have eye related problems, but they also can diagnose and treat eye conditions, infections and diseases such as "pink eye" and conjunctivitis, as well. Many optometrists do pre and post operative care for eye surgeries including cataracts, retinal detachments, laser refractive surgeries and diabetic retinopathy. Most optometrists are trained and certified to administer drugs when necessary.

Within optometry, you can practice in a general practice usually called primary care, or you can specialize in different areas. Some of these specialities include contact lenses, refractive surgery co-management, dry eye, disease, glaucoma, geriatrics, low vision, neuro-rehabilitative optometry, sports vision, developmental/behavioral optometry, pediatrics, vision training, and learning disabilities. They can also choose to go into vision research or teaching.

There are also fellowship programs available to optometrists where they can apply to become an officially recognized specialist in their field by their colleagues. One of the fellowship programs is offered by the College of Optometrists in Vision Development (COVD). A COVD fellow is a person that specializes in vision training and binocular vision. Another fellowship program is offered by the American Academy of Optometry (AAO). They have several different specialities that they recognize and each fellowship requirements are different. Some of the subspecialties are Binocular Vision, Perception and Pediatric Optometry, Cornea and Contact Lenses, Disease and Low Vision. These programs require that the candidate prove their knowledge by rigorous training, publishing, testing and interviewing by the fellowship committees before fellowship is granted.

For information on COVD click here. For information on AAO, click here.

Ophthalmologists (M.D./D.O.)

Ophthalmologists are also doctors that spends four years in a graduate program, but their program is in medicine or osteopathy. They study systemic disease, treatment and management. Once they earn their general medical degree M.D. or osteopathic degree (D.O.), they also go on to do a four year residency specialized in eye care in order to earn the title of ophthalmologist (also D.O.).

Residency includes learning how to manage and treat eye conditions, infectious and diseases and also co-manage the systemic problems that can affect the eyes. They also get roughly 6 weeks of training in refraction, depending on the residency, so they can prescribe glasses and contacts if they choose. It is very rare for residency programs to teach visual function and if they do, it is only within the last several years.

Most of their training is in eye surgery. This includes removal of cataracts, retinal tears, retinal detachment, hemorrhages, tumors, strabismus surgery, plastic reconstructive surgery of the eye and surrounding structures, and laser procedures to correct astigmatism, near and farsightedness.

Just like optometrists, they can choose to specialize in any one area such as ocularplastics, neuro-ophthalmology, cornea, retina, glaucoma, pediatrics and strabismus. They can also choose to go into vision research or teaching.

Most of the time, optometrists and ophthalmologists work in conjunction with each other. Some work in the same offices to co-manage patients. However, they can disagree on their philosophies of care and treatment strategies based on their training, especially when it comes to visual function. Many ophthalmologists, especially ones trained before any residencies taught visual function, do not believe vision training can improve many visual problems and reject the scientific research that proves the validity of vision training.

http://www.visionandlearning.org/eyecaregivers.htm
Opticians

Opticians are not doctors, but professionals that dispense glasses and sometimes contact lenses. Some even make the glasses themselves in the labs. They are knowledgeable about materials used and appropriate tints, etc. that fit your needs. Some opticians are required to do 1-2 year associate degree to become certified in their field. This varies from state to state and can be optional. In some states, they are allowed to refract patients to find out their prescription, but they are not heavily trained in eye conditions, disease or systemic disease that can affect the eyes. They also do not get trained in visual function.

You will often find opticians often work for doctors in their eyeglass dispensaries or contact lens laboratories. You may also see them in commercial eyeglass stores.

Ophthalmic Technicians

Ophthalmic technicians usually assist eye surgeons in surgery and in pre and post operative care. There are associate programs that they can complete in order to become a certified technician.

Vision Therapists

Vision therapists are specifically trained to design and/or implement vision therapy programs once an optometrist has completed a comprehensive eye exam and determines that an individual needs therapy. In most vision therapy offices, vision therapists are the professionals you see each week that works along side the individual needing training. The optometrist works with the vision therapist before the individual comes in for therapy to discuss and develop the training program.
What is a Behavioral Optometrist (OD)?

Behavioral Vision Care

Behavioral optometry is an emerging clinical care system based on the understanding that vision is the dominant process in the human species and develops throughout one's life. Behavioral optometrists use powerful tools to facilitate the development of a more efficient and complete visual process in their patients. This enhanced visual process allows these patients to meet greater and greater visual and life demands with less effort and less stress. The patients of behavioral optometrists perform better in the workplace, in recreational activities, and in their personal lives.

Behavioral optometrists define vision as the ability to derive meaning and to direct actions as triggered by light. Vision is much more than simply seeing. It is the entire process whereby an individual understands what he or she sees. Here the word "see" is used in a broad context. Not only is vision the understanding of that which is seen, but it is also the ability to use this information to direct one's own actions and motor activities accurately and efficiently with a minimum expenditure of effort and energy.

For example, in a person driving a car, vision is much more than reading license plates clearly at two hundred feet; it is the total process whereby the spatial relationships between the cars and trucks and other things around are taken in and processed by the driver to guide the car properly to its destination without an accident and with minimum stress on the driver. Vision judges the relative speeds of the other cars, and alerts the driver to a pedestrian or another car in an intersection, or a door opening from a parked car. Vision is what directs the baseball player to swing the bat at exactly the right moment at exactly the right place in space to make contact and hit a home run. Vision is what is used by students to understand what they read and to direct the pencil across the page to answer an essay test or fill in the blanks on a quiz. It has been said that more than 85% of all learning is done through vision, which is the dominant process in the human species. Fortunately, it is also the most accessible to alteration through the use of behavioral treatment or stress-relieving lenses and through a process called vision therapy.

Origins of Vision: Writing the "Software"

The key to understanding how vision can be enhanced by behavioral optometric care is in knowing how one acquires vision in the first place. Except in rare cases, most babies are born with the necessary hardware to allow the development of normal vision. They are born with eyes, nerves, a brain, a head and neck, a torso, arms and legs, etc. They are also born with certain basic visual reflexes such as the startle reflex (The baby while in the delivery room will startle in response to the ringing of a bell) or the pupillary reflex (The baby's pupil will constrict to a light shined at it as soon as the eyes open). The experiences that children have over the first few years of life set the stage for their educational and adult lives. Vision is learned and developed through these experiences. As children encounter problems to solve in the course of their development, they "write" mental software that allows them to utilize the hidden potential of their hardware. As an example, let's look at a child learning to ride a bicycle.

Let's assume we are watching a physiologically mature 6 year old boy who has never ridden a two-wheeled bicycle before. We see that the child has normal hardware (body, arms, legs, muscles, tendons, etc.) that has the potential to be utilized to ride the bike. However, the boy has yet to have the meaningful experiences to have written the software to learn to ride the bike successfully. He mounts the bicycle, begins to ride for the first time, and he falls. We do not jump to the conclusion that there is something wrong with his legs or that he needs to work out in a gym. We just see that he has not yet learned to ride the bike correctly. Once the boy learns to ride the bike, the change that occurs is not in his legs or arms or in the hardware of the bike. The change that takes place is in the software in the brain.

Vision is normally acquired through life experiences. To develop a well-functioning, efficient visual process capable of meeting a myriad of demands requires the individual to have had many, many different developmental opportunities throughout his or her life. In practice, no one has developed the ultimate visual process; however, many have developed exceptional visual abilities beyond the normal range. Elite athletes are excellent examples. The difference between the average athlete and the elite athlete most often is the difference in their visual abilities. Sports superstars frequently report that the ball seems to look larger or move slower to them. This is because their excellent visual process derives meaning from the environment so rapidly and efficiently that events seem to unfold in slow motion for that individual. Thus, their performance is increased well beyond the abilities of those around them and they become recognized as superstars.

As with the child learning to ride the bicycle, the differences in the athletes are not in the hardware. Some exceptional athletes have not been exceptional physical specimens. Football defensive superstar Lawrence Taylor had the vision to make the game unfold as if in slow motion. He always found the hole between players, even those that at times seem to be confused by nonbehavioral practitioners as having to do with hardware. However, it is understood that the vast majority of problems are software related, even those that at times seem to be confused by nonbehavioral practitioners as having to do with hardware. For example, most eye turns are viewed by

http://www.visionandlearning.org/whatisbehav.htm
We don't say, September 19, 2001

nonbehavioral practitioners as muscle problems (hardware), whereas behavioral optometrists know that they are a software problem that can be corrected. In general, a problem found does not imply a damaged person.

Typically, I might ask a parent of a patient if they themselves can speak a foreign language such as Urdu or Swahili. The parent nearly always answers no. I then ask them if that means that there is something wrong with them. They also answer no to this question. This generally imparts the idea that just because they or their child cannot do something does not mean that there is something permanently wrong with them that cannot be fixed. They all agree that under the right circumstances they could learn the foreign language.

**Treatment Alternatives**

The three treatment alternatives available to the behavioral optometrist are compensatory lenses, treatment lenses, and vision therapy.

**Compensatory Lenses**

Behavioral optometrists take a series of measurements that reveal the current refractive status of the patient. Some patients simply want to see clearly, despite the information that prescriptions provided merely to help the person see most clearly generally decrease overall visual efficiency and promote future deterioration of both the visual process and the refractive condition. These patients are provided with compensatory lenses only.

**Treatment Lenses**

In well over 90% of the patients who seek the services of behavioral optometrists, lenses are prescribed, but for a different purpose. The lens treatment alternative is derived from the understanding of the development of progressive refractive conditions and the fact that sustained near-point activity is stressful to all humans. Special lenses are prescribed that reduce the stresses of the near-centered tasks, such as working on video display terminals of reading, to reduce the forces creating the nearsightedness (myopia), astigmatism, farsightedness (hyperopia), strabismus (eye-turn), or amblyopia (lazy eye). Distance prescriptions may be modified from the lens that is merely the "clearest" to guide the future development of the person to a less adapted condition. Only behavioral optometrists utilize small amounts of yoked prisms (prisms placed in the patient's prescription lenses so that the prism bases are the same direction in each eye, such as both base up or both base right) to develop more desirable and efficient vision. Lenses are the most powerful tool available to alter human behavior. Lenses provide the opportunity for people to immediately alter their perception of the world around them and immediately change how they function in their environment. Behavioral optometric tests provide the information necessary for creating these special lenses. Patients are provided with these lenses to alter their behavior and allow them to process more information more efficiently, with less stress, and in a shorter period of time and to come away from that stressful act less altered by it. The lens treatment alternative provides the patient with a tool to help them perform their visual tasks.

To demonstrate how this type of lens treatment works, consider the following analogy. Many children over the years have played with erector sets: sets of steel girders, nuts and bolts, and other assorted pieces, which can be put together to create all kinds of objects. With every erector set the owner is given a set of tools, (usually a screwdriver and a wrench) that matches the size of the nuts and bolts. When the proper tools are used, the object made from the pieces generally goes up more quickly and is more sturdy, and the people building the object have less wear and tear on their fingers than if they tried to build the same structure without using the tools. Many adults try to help their children build the erector sets using just their fingers. This takes more time than if they used the proper tools, the finished building is wobbly, and everyone's fingertips are sore for a day or two. Stress-relieving lenses work in the same manner. They are the proper tool to use when working in today's demanding visual environment, which is filled with sustained, near-point visual demands done indoors with artificial lighting and within restricted environs.

**Vision Therapy**

The final treatment alternative available to the behavioral optometrist is vision therapy. This is an exciting treatment program in which the optometrist provides the patient the opportunity to learn and develop those abilities that either were not present or were poorly developed in the patient's overall profile of visual abilities. Vision therapy is a step-by-step, development-based series of activities and procedures that the patient practices over time. The therapy is designed to facilitate the development of a more efficient and comprehensive visual process.

**Types of Visual Problems Remediated**

**For Learning Related Visual Problems**

Approximately 25% of all patients entering a behavioral optometric practice elect to enroll into a program of vision therapy. Of this population, nearly one-third are children with reading and learning difficulties, most of whom have 20/20 sight acuity but who have a primary visual difficulty. A primary visual difficulty is most often found to be the cause of the child's learning disability. The most common problems seen in this group are tracking difficulties (inability to keep one's place when reading), eye-teaming difficulties (inability to keep both eyes pointed to the same place in space), and visual focusing difficulties (inability to keep attention on a particular object in space). Vision therapy has been shown to have cure rates in the high 90th percentile for these types of visual difficulties. Once the visual difficulty has been eliminated, the student learns much more easily. On average, treatment for these difficulties involves 6-9 months of 40-50-minute treatment sessions 1-2 times a week.

**Strabismus and Amblyopia**

Another third of patients going into vision therapy includes patients with eye turns (strabismus) and lazy eyes (amblyopia). Vision therapy in these cases is far more effective than the surgical alternative. On average, when surgery is done for the treatment of these difficulties, the patient will undergo three separate operations! Functional cure rates of vision therapy for strabismus and amblyopia are from 2 to 3 times more effective than surgery, even for people who have undergone all three surgeries. On average, treatment for these problems lasts 9-12 months.

**For Performance and/or Stress-Related Visual Disabilities**

The final third of patients in vision therapy comprises children and adults suffering from stress-related visual difficulties or whose visual abilities are inadequate for the rigorous demands of their lives. These patients may suffer from attention difficulties, reading comprehension difficulties, or slow reading speeds. They may be experiencing headaches, double vision, or general eye strain or fatigue. They may be athletes who want to develop their visual abilities to their maximum potential to allow them to excel in their sport. Vision therapy for these patients usually lasts 4-6 months.

**Preventive Care**

http://www.visionandlearning.org/whatisbehavioraloid.htm
After the successful completion of vision therapy and for those patients for whom vision therapy was not necessary, behavioral optometry is also involved in programmed preventive care. Only behavioral optometrists recognize their role in helping all their patients maintain a complete efficient visual process. To do this, behavioral optometrists will see their patients frequently. The longest time between visits may be one year. At each visit the patient’s entire visual process is surveyed so that treatment alternatives can be updated as necessary. The behavioral optometrist wants to see the patient before a problem becomes noticeable, because early detection can lead to early intervention and the elimination of the problem before it can have a negative impact on the patient’s life.

**New Opportunities for Enhanced Vision**

Behavioral optometry offers many new and exciting treatment alternatives to the public. These different levels of care are unique and are based on the simple idea of understanding the role of vision in relation to the total organism. The developmental nature of most visual problems leads to the understanding of the expanded examination routines and the unique service of vision therapy to remedy those problems found. The role of lenses not only as a tool to make the world clear but to alter perception and reduce stress is of paramount importance in this emerging discipline. Behavioral optometry is the key to a more productive and happy life.
Treatment & Prescribing
Philosophies of Care
Finding an eye doctor, a doctor that suits your needs, can be quite challenging. The type of care you receive when seeing an eye doctor depends, in part, on which eye doctor you choose. Within all medical professions, even specialties, providers have different areas of expertise, philosophies of care and communication styles. In optometry, there is a smaller community of optometrists that specialize in vision and learning.

All optometrists are not the same.

Within optometry, you can practice in a general practice—usually called primary care, or you can specialize in one or more different areas. Some of these specialities include contact lenses, co-management of refractive surgery, dry eye, disease, glaucoma, geriatrics, low vision, sports vision, neuro-rehabilitative optometry, developmental/behavioral optometry, pediatrics, vision training, and learning disabilities.

Choosing the Right Eye Doctor

For very young children (6 months up to age 5-7) it is recommended that you choose a pediatric optometrist that emphasizes developmental vision.

Very young children are not able to respond accurately to the same testing procedures as adults or older children. These doctors specialize in caring for the vision of very young children and often have very different equipment in their offices to accurately test a child's visual system. Pediatric optometrists that emphasize developmental vision are often very skilled in preventative care. This means potential vision problems can be avoided before they become trouble. It also means your child MAY be prevented from needing to wear glasses when they get older. Remember good vision is much more complex than simply seeing 20/20.

For school age children, it is also recommended that your child sees an eye doctor with an emphasis in developmental/behavioral optometry, but one that also specializes in learning disabilities and vision training. It sounds like it would be difficult to find such a doctor, but most optometrists that specialize in children have this type of expertise.

The following is a list of links to organizations that will give you FREE access to referral databases to find an optometrist that specializes in children near you:

Note: Each organization only lists its own members in their database. We suggest you use more than one link to find doctors in your area.

**College of Optometrists in Vision Development (COVD) Member Directory**

This organization serves as the certifying body for Doctors in the Optometric specialty called Behavioral/Developmental/Rehabilitative Optometry. If a doctor chooses, he/she may apply for COVD fellowship. Fellowship is difficult to obtain and is only granted after interviews, publishing and knowledge testing is completed and accepted by a committee. Fellows are certified specialists in vision therapy.

**Optometric Extension Program (OEP) Foundation Referral Database**

The OEP Foundation is an international non-profit organization that serves the educational needs of behavioral optometrists providing continuing education credits and provides public information about vision care. The optometrists listed on the referral list practice preventive and rehabilitative optometry.

**Parents Active for Vision Education (PAVE)**

PAVE is a national non-profit education, resource and support organization founded by parents and teachers who know children that benefited from vision therapy. Their mission is to raise public awareness of the crucial relationship between vision and achievement. This link gives phone numbers to local chapters that may be near you. They also have a national number listed in case a chapter is not in your area. Not only is this a good referral source, but they are a good support group for parents.

**Optometrists.org National Network of Optometrists - Pediatric Eyecare and Behavioral Optometry**

An organization made up of behavioral optometrists around the globe to better educate the public on vision care. This referral program requires that you answer some questions to best choose the doctor that suits your needs and to help create a database to better serve the public. It is made up of doctors that offer vision therapy who have set up webpages on this site.

http://www.visionandlearning.org/findingadoctor.htm
Neuro-Optometric Rehabilitation Association International, Inc. (NORA)

NORA was established to provide, network and share information about visual rehabilitation between optometrists, ophthalmologists, physicians, rehabilitation professionals, occupational therapists, educators, psychologists, nurses, etc. for the understanding and treatment of persons who have physical disabilities and/or traumatic brain injury. Their mission is to expand awareness about the visual problems and the needs of those that suffer from traumatic brain injury.

This referral database is a little different than the ones above. This site helps find neurorehabilitative optometrists that specialize in traumatic brain injury. Many of them have vision therapy practices and may also diagnose and treat children with learning related.

The links on this web site are provided only for your convenience to provide more information on vision. The creators of this site have no financial interest in any site linked, nor do they claim any responsibility for information found on these sites. No promises or warranties of any kind as to the content of any site linked are expressed or implied.

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Glossary
AVision and Learning Resource

Accommodation: The ability to focus your eyes at different distances. Accommodation works with vergence; it is a neuromuscular process. To accommodate for clear vision at various distances the lens in our eye actually changes shape. The somewhat gelatinous material of the lens is "stretched" or "squashed" due to muscle actions within the eye, this change in shape changes the power of the lens. A camera lens that can zoom in and out simulates this idea.

Accommodative Excess: A clinical diagnosis term used when a focusing system is overactive, uses more power than necessary and stays simulated even when stimulus is absent. A person with this condition cranks in too much power and consequently fatigues very quickly when doing near tasks.

Accommodative Infacility: A clinical diagnosis term used when a focusing system is underactive, so it does not supply enough power to provide a clear image at that particular distance. A person with this condition will have trouble switching their focus easily from different distances, such as from their work on their desk to the chalkboard.

Accommodative Facility: The speed at which we can clear objects from one distance to another.

Accommodative Posture: The measured distance ahead of or behind the object of regard where the focusing system "rests." If this posture is closer than the object, such as a book being read, or too far behind the book, this can be stressful to the visual system and cause such symptoms as fatigue, avoidance or blurriness.

Acuity: The clarity or distinctness with which we view our world. It is commonly measured by looking at charts of letters or pictures. Good, average acuity is considered 20/20, meaning at 20 feet, a letter that is 20 mm can be seen clearly, though it is possible to have acuties better than this measurement.

Amblyopia: Low or reduced visual acuity not correctable by refractive means, such as glasses or contacts, and exists despite any apparent structural or pathologic abnormalities of the eye. Amblyopia is a coping mechanism for confusing visual information, where the brain decides to ignore information coming into one eye (or some of both eyes in rare cases). Amblyopes often are strabismic (have an eye turn). A common lay term for amblyopia is "lazy eye."

Astigmatism: Astigmatism nearly usually refers to the shape of the front of the eye, the cornea (occasionastigmatism exists in the lens of the eye). It happens when all the light rays do not hit the fovea at the back of the eye all at one time, so you experience a range of blurriness. A spherical cornea has no astigmatism, a cornea shaped more like the bowl of a spoon distorts images, the light rays are being bent and focused at more than one spot creating a less than clear image, the image appears to have a haze surrounding it, or a "ghost image."

Auditory Visual Integration: The ability to simultaneously integrate or mesh information received both auditorily and visually, in order to gain more meaning than either piece alone; for example listening to a story as you read along.

Behavioral Optometry: An optometrist who considers the whole person when determining treatment plans and realizes that vision is affected by other factors besides the health of the eyes and how clearly a person sees. Behavioral optometrists (also called developmental optometrists) will sometimes consider how environmental, nutritional and/or behavioral factors affect visual health. They know that what they prescribe for their treatment plans will affect their patients' visual function in the future and weigh the outcomes of their decisions. Behavioral optometrists are usually specialists in vision therapy.

Bilateral Integration: This is the ability to effectively use both sides of the body separately (like typing) and/or simultaneously (like riding a bicycle). Young children will first use one side of the body at a time. With proper development the left and right side of the body should begin to enhance each others function. For example the right hand may stabilize a piece of paper while the left hand draws. Other integration skills to observe are moving one foot ahead of the other in walking or climbing and swinging contralateral arms as the foot comes forward.

Binoocular Fusion: When two eyes working in conjunction with each other to give the brain two separate images, which then combines them into a single image with more meaning and information. Problems with binocular fusion can lead to double vision or suppression of an image. SEE: STEREOPSIS

Binocularity: Using both eyes together, so information from both eyes can be combined to make one picture. Binocular vision allows us to see depth and dimension, people lacking good binocular vision are unable see the images in the "magic pictures."
Convergence: The ability to turn both eyes toward each other in a coordinated fashion to look at near objects in such a way as to make them single. SEE: VERGENCE

Convergence Excess: A clinical diagnosis term used when a person has a tendency at near distances to move the eyes to an excessive degree toward the nose. This may result in symptoms such as headaches and can lead to nearpoint stress.

Convergence Insufficiency: A clinical diagnosis term used when a person has an inability at near distances to turn their eyes toward their nose enough to meet their near demands. This may result in doubling at near.

Cornea: The clear area that curves outward in front of the colored part of the eye (iris) and the pupil. Contact lenses sit on the cornea.

Depth Perception: SEE STEREOPSIS

Diopter (D): Power units used by your eyecare professionals to measure your eyes. You will see these units on your prescription for glasses or contacts. It is defined as 1/meter, where 40 cm is 1/0.4m = 2.50 Diopters.

Directionality: A visual skill that we develop to understand directional concepts to organize our visual space. Directionality incorporates left, right, up, down, ahead, behind, and any combination thereof, and projecting these directions into space (or our environment around us). Directionality is very important in decoding letters. For example, the letters "b," "d," "p," and "q," all look like the same symbol if you do not have any concept of orientation. A person must understand these concepts as they relate to themselves before they can apply them to other things. SEE: LATERALITY.

Divergence Excess: A clinical diagnosis term used when a person has the inability at far distances to converge their eyes enough to meet the visual demand.

Divergence Insufficiency: A clinical diagnosis term used when a person has a tendency at far distances to move the eyes away from each other instead of converging for the visual demand needed.

Dysesidetic: A dysfunction in the ability to match whole word visual gestalts with whole word auditory gestalts, meaning they don't have good word attack skills. It is a problem with storing and retrieving information and involves sequential memory. People who experience this dysfunction rely on eidetic coding. This can lead to incorrect spelling.

Dysnemikinetlc: A form of dyslexia that involves a dysfunction in memory and motor movement. It occurs due to poor development of the visual spatial skills known as laterality and directionality. This dysfunction is the one people think about when they think of dyslexia, because it causes letter reversals. It is also the easiest type to identify and treat by an optometrist skilled in vision training.

Dyslexia: A specific reading, writing and/or spelling dysfunction due to a slight brain dysfunction and/or differential brain function. This means it could be caused by something physically wrong with the brain, or because the brain never really learned how to do it correctly in the first place.

Dysphonetic: A dysfunction in attacking unfamiliar words using skills such as phonics, syllabication and structural analysis. This is a decoding problem. People with this problem rely on eidetic coding, or word attack (gestalt), skills. This can lead to letter transpositions in spelling.

Esophoria: The tendency for the eyes, in a resting position without a stimulus for fusion, to settle in a more converged position. SEE: VERGENCE, FUSION

Esotropia: A form of strabismus where one or both eyes turn inwards towards the nose instead of looking at the intended object. This eye turn may be evident all the time or only when a person is fatigued and may be subtle enough that only a trained eye professional will detect the turn. The eye turn may be related to a high refractive error, poor visual function, a muscle or nerve weakness, and occasionally a muscle trapped against a bone.

Exophoria: The tendency for the eyes, in a resting position without a stimulus for fusion, to settle in a more diverged position. SEE: VERGENCE, FUSION

Exotropia: A form of strabismus where one or both eyes turn outwards toward the temple instead of looking at the intended object. This eye turn may be evident all the time or only when a person is fatigued and may be subtle enough that only a trained eye professional will detect the turn. The eye turn may be related to a high refractive error, poor visual function, a muscle or nerve weakness or occasionally a muscle trapped against a bone.

Eye-Hand Coordination: SEE: VISUAL-MOTOR INTEGRATION (VMI)

Eyesight: The ability to see light, a sense that most of us are born with. SEE: VISION

Farsighted: SEE: HYPEROPIA.

http://www.visionandlearning.org/glossary.htm
Figure Ground: An ability to attend to or search for a specific form or feature while simultaneously ignoring irrelevant information. Example: Looking for a specific piece of information when reading or searching for a specific tool in a toolbox full of tools.

Fixation: The ability to direct and maintain steady, immediate visual attention on a target. Fixations are actually a form of pursuits. Accurate fixations are very important in reading. SEE: SACCADIES

Fovea: The fovea is a small area located on the retina in the back of the eye which allows us to see details clearly, sharply and with rich color when the light focuses there correctly. In a normal visual system the fovea of the left and right eye are directed at the same point in space at the same time giving us a better image than either eye alone.

Fusion: SEE STEREOPSIS, BINOCULAR FUSION

Grapheme: A grapheme is a unit (a letter or letters) of a writing system that represents one phoneme; a single sound that has one phonemic correspondent. Example: "sh" in shirt.

Hyperopia: A refractive error where the light overshoots the fovea and requires focusing power or compensating lenses (glasses or contacts) to move the light back onto the fovea. This condition is often called farsightedness. A farsighted person has to work harder to see up close than far away. They often have good vision at near and far distances (unless it is a substantial amount), especially for short amounts of time, but require a lot of extra effort to bring near objects into focus. This extra effort required to keep things clear can lead to eye fatigue, headaches, poor reading comprehension and performance, poor ability to stay on task, and even amblyopia and/or strabismus.

Hypertropia: A form of strabismus where one or both eyes has a vertical imbalance in which one eye's image is seen higher than the other eye. People with hypertropias often tilt their head to one side to align the images seen by each eye; prisms are often helpful in creating visual alignment of images. The vertical imbalance may occur due to injury, or muscle or nerve weaknesses. You can also have a hypertropia, when looking at the eye that sees the image lower than the other eye, but it is common practice to describe a vertical imbalance by the eye that is hyper.

Individual Education Plan/Program (IEP): A person that qualifies for special education services under the Individuals with Disabilities Educate Act (IDEA) will have an IEP. Students who are having significant learning difficulties and need an alternate education plan to suit their styles and abilities are evaluated by a multidisciplinary team (MDT) for these services. If a person qualifies for special education, an IEP is designed by them to outline specific goals for the student and steps to follow in order to maximize and/or develop his or her strong points. An individual plan for that student is designed and used as a template to teach from and include all the special needs that student has for learning. SEE: MULTIDISCIPLINARY TEAM (MDT)

Iris: This is a structure that we see as the colored part of the eye. Two muscles within the iris relax and contract the pupil so it can help control and focus the light coming in to the eye.

Laterality: A visual skill that we develop to understand directional concepts to organize our visual space. Laterality is an internal/self awareness of two body sides and knowing they are different. It requires good balance, vestibular function and an awareness of a body midline (an invisible line that divides your body in half). Good development of laterality helps us develop good directionality. SEE: DIRECTIONALITY.

Lens (crystalline): The crystalline lens of the eye is located behind the pupil and iris of the eye and its job is to flex and bend to help focus the light coming in. The lens relaxes and contracts when focused at near and far distances to apply more or less "zoom" power in order to see object clearly. This structure is generally quite clear and cannot be seen without special equipment. If it gets cloudy, we refer to this as a "cataract." SEE: ACCOMMODATION.

Lenses: A set of tools in the form of glasses, contacts or vision therapy equipment used by eye doctors to compensate for refractive error and administer passive or aggressive vision therapy.

Motor: The ability to move. Motor skills can be thought of as "output" signals from the brain. Many visual skills involve motor components.

Multidisciplinary Team (MDT): A team found in public schools that can be composed of any combination of the following: occupational therapist, audiologist, physical therapist, speech therapist, special education teacher, principal, regular teacher, all types of doctors, psychologist, etc. They evaluate students who are having significant learning difficulties and potentially need special education services under the Individuals with Disabilities Education Act (IDEA) to suit their styles and abilities.

Myopia: A refractive error where the light undershoots the fovea and requires compensating lenses (glasses or contacts) to move the light back onto the fovea. This condition is often called nearsightedness. A myopic person has trouble seeing far distances clearly, and unless they have a substantial amount of myopia, nearsighted people often have good vision at near. This blurriness at far distances can lead to headaches, eye fatigue, and difficulty reading the chalkboard.

Nearsighted: SEE: MYOPIA.
Ocular Motility: A motor skill that allows us to effectively and efficiently voluntarily move our eyes and its parts into expected directions of gaze fully and without restriction. It is a skill that gives us speed and control of our eye muscles to accurately inspect our environment. Good ocular motility allows us to move our eyes so we can fixate on objects (fixation), to quickly and accurately jump from one object to another (saccades), and to track moving objects efficiently (pursuits).

Optician: One whose vocation involves the design or manufacture of ophthalmic appliances or instruments or one who compounds and adapts ophthalmic prescriptions. They are professionals that are not doctors, but dispense glasses and sometimes contact lenses. Some opticians are required to do 1-2 year associate degree to become certified in their field. This varies from state to state and can be optional. In some states, they are allowed to refract patients to find out their prescription, but they are not heavily trained in eye conditions, disease or systemic disease that can affect the eyes. They also do not get trained in visual function.

Optometrist: An eye doctor that has spent four years beyond an undergraduate program in a professional school earning a doctor of optometry degree studying the body and how it works, but really specializing in how the eyes works and the fundamentals of visual function. Their training primarily consists of the following: learning how to test for refractive error, prescribe glasses and contacts, how to test visual skills and treat problems when detected, treating eye diseases and conditions, managing disease with pharmaceuticals, and co-managing eye surgeries. See What is the Difference Between Eyecare Professionals.

Ophthalmologist: An eye doctor that spends four years in a graduate program in medicine or osteopathy. Then spend four years of residency specializing mostly in eye surgery, but also in diagnosing and treating eye diseases and conditions. Some ophthalmologists also prescribe glasses and contacts, but very few gain training in the function of the entire visual process. See What is the Difference Between Eyecare Professionals.

Orthoptics: A form of vision training that concentrates more on eye exercises to help train accommodation, vergence, oculo-motility and binocularity, rather than total sensory-motor integration and visual perception. Many eye doctors use the terms "orthoptics" and "vision therapy/training" synonymously. Most behavioral optometrists feel orthoptics is only a small part of vision therapy. SEE: VISION THERAPY

Phoneme: A phoneme is a member of the set of the smallest units of speech that serve to distinguish one utterance from another in a language or dialect. Example: cat vs. rat.

Phoria: The "resting" position of the eyes with each eye viewing a non-fused target. This is the position where your eyes tend to want to go if they are not having to work. Phoric postures are not eye turns, but can lead to visual symptoms if they are measuring higher than normal. SEE: ESOPHORIA, EXOPHORIA

Pupil: The black empty space located at the center of the eye. A normal pupil will shrink when a light is directed into it and should enlarge in the dark. The pupil should also constrict or shrink when focused on a near object. This is controlled by muscles located in the Iris.

Pursuits: Smooth deliberate eye movements that help us track (follow) a moving object efficiently. Pursuits are important in activities such as sports, music, and riding a bike. Fixations are pursuits with little or no movement. It can be called a zero pursuit.

Prisms: A set of tools in the form of glasses, contacts or vision therapy equipment used by eye doctors to either compensate for eye misalignments (high phorias or tropias) or as part of an active or passive vision therapy technique. They are most commonly used to compensate for double vision complaints. Prisms, or lenses used to produce a prismatic effect, allow an eye doctor to bend light rays and make it so images appear to move. In this way, eye doctors can change the perception of what is seen.

Refractive Error: This term is typically used to describe eye problems that can be compensated with glasses or contact lenses. It is a term used when the light rays do not hit the fovea correctly or effortlessly to allow for the best image possible. Myopia, hyperopia, and astigmatism are common terms used to describe refractive error. Astigmatism can be in combination with myopia or hyperopia.

Retina: A structure located at the back of the eye that is actually specialized brain tissue. It is here that light information is transferred through special photoreceptor cells and nerves to the brain and converted into images. Once a part of the retina is permanently damaged, just like the rest of the brain, it does not regenerate and that area cannot be used any longer.

Saccades: Rapid eye movements used to jump from one point of interest to the next. Accurate saccades (along with fixations) are very important skills to master when reading. When you read, you fixate on a chunk of words, then saccade to the next chunk of words. During a saccadic eye movement, visual information is suppressed until another fixation occurs. SEE: FIXATION.

Sensory: Information received through a variety of pathways that ultimately get routed to the brain. This is considered "input" signals to the brain. Vision is one of the sensory pathways.

Sensory-Motor (Motor-Sensory): The integration of information received (input) and acted upon (output).

Stereo Acuity: The measured amount of three dimensional depth perception, or stereopsis. SEE STEREOPSIS

Stereopsis: When both eyes work together well and good binocularity is achieved, the end result is 3D vision, or stereopsis. This happens when the perceived image of one eye and the perceived image of another eye are combined in the brain and produce one image with more information. Each image separately are similar, but not exactly the same. The mind takes the small differences between the two images and adds them up into a richer, final picture. The combined image is more than the two parts it was created from. It is this added perception of the depth dimension that makes stereopsis so important.

http://www.visinandlearning.org/glossary.htm
Strabismus: A disorder of the eye where one or both eyes do not align well, making it difficult to maintain binocularity. Strabismus can be very obvious, where other people can see it, or very subtle where only a trained professional can detect it. It can be a condition that is experienced all the time, or occasionally when under visual stress or fatigue. This condition can be caused by a reduction in visual acuity, reduced visual function, high refractive error, traumatic brain injury, oculomotor nerve lesion, or eye muscle injury. Many times, strabismics also experience amblyopia. Strabismics have many visual perceptual difficulties, including good spatial skills and depth perception. Depending on how the strabismus occurred, it can be eliminated by vision therapy and sometimes compensated for by a correct glasses or contact lens prescription. Eyes can be made to look better by eye surgery, but good visual function cannot be obtained with surgery alone. When an eye does not align where it is intended, this is called "troping" or having a "tropia." Common terms that are used to describe strabismus are "wall eyed," "cross eyed," or "wandering eye." It can be referred by your doctor as a squint or eye turn and be described as an exotropia, esotropia, hypertropia, or hypotropia (or a combination of some of these terms).

Tracking: SEE: PURSUITS

Tropia: A word used by eye doctors to describe the condition where one eye does not align with the other. A person with strabismus has a tropia, or eye turn. It is usually used with other prefixes to describe the direction of the eye turn, such as exotropia, esotropia, hypertropia, or hypotropia (or a combination of some of these terms). SEE: STRABISMUS

Vergence: The ability to move your eyes in or out in a coordinated fashion to look at objects at different places in space so that we may keep images single. If your eyes are not coordinated together well and pointing in the same place, you can experience double vision. Vergence works in combination with accommodation. SEE: CONVERGENCE, DIVERGENCE.

Vergence Facility: The speed with which we can move our eyes from a converging to diverging position.

Vergence Posture: The measured distance ahead of, on or behind the object of regard where the vergence system "rests." If this posture is closer than the object, such as a book being read, or too far behind the book, this can be stressful to the visual system and cause such symptoms as fatigue, avoidance or double vision.

Vision: Vision is a learned, dynamic (or changing) process of organizing, interpreting and understanding what is seen. It is a process that integrates sensory and motor information generated by the brain and body to derive meaning and direct movement. We use vision to guide motor behavior, interpret space and time, as well as integrate information from our other senses (hearing, touch, taste and smell), so we may think, understand and react to the world around us. It involves 20 visual abilities and more than 65% of all pathways to the brain. Vision is a significant part of how we process information and a key factor in how we learn. SEE: EYESIGHT. For more information, see What is Vision?

Vision Enhancement: Any training or therapy designed to expand a person's current visual function by helping them increase their interpretation of the information that they see; a program to improve vision.

Vision Training/Therapy: A type of therapy used by behavioral/developmental optometrists that helps people develop more efficient visual skills such as visual perception, visual-motor integration, binocularity, and visual coordination in order to function better in everyday life. It is used to eliminate or reduce problems such as amblyopia and strabismus. SEE: WHAT IS VISION THERAPY?

Visual Closure: The ability to recognize clues presented visually, that allow him or her to determine the appearance of the final product without all the details being present. Example: Being able to complete a word when only part of the word is seen; recognizing what will appear in a dot-to-dot picture before it is completed.

Visual Form Recognition/Discrimination & Constancy: The ability to discriminate differences in forms. This includes differences of size, shape, color and orientation. Recognition that visual information in a form is consistent in spite of the object, size in the back of the eye, or location.

Visual Information Processing: SEE VISUAL PERCEPTION

Visualization: Ability to recall a previously viewed image or object and mentally manipulate the image from various aspects. Example: Seeing a flattened box and being able to mentally reconstruct it and picture its' dimensions to decide if the object you want to put in the box will fit.

Visual Motor Integration (VMI): A visual skill that consists of coordinating visual perceptual skills together with gross-motor movement and fine-motor movement. It is the ability to integrate visual input with motor output. This is how we plan, execute and monitor motor task such as threading a needle, tying shoe laces, catching or hitting a ball, etc. It is also essential in academic performance. This is also called eye-hand coordination. See Visual Skills - Page 8.

Visual Perception: Visual perception is a form of processing involving a set of skills used to get visual information from the environment and integrate them with our other senses. This is done while incorporating all the integrated information with other things, such as past experiences, future intentions, and language. It is a form of organizing, interpreting and understanding what is seen.
Visual Speed & Span of Perception: The rate and amount at which information being handled is in visual processing. Example: Quickly and efficiently copying an assignment off the chalkboard with only a few glances vs. needing to glance at the chalkboard after every one to two words or bits of information is copied.
Recommended Reading

The following is a small list of books that will help you understand vision and how it relates to learning written by top professionals. You can order most of these books through the Optometric Extension Program Foundation (OEP) and/or Amazon.com. The best way to find them through Amazon is by the ISBN code that is provided for you.

For a broader array of titles, visit OEP’s website and click on Books and Help.


Vision and Learning
Frequently Asked Questions

"My child passed the vision screening test at school and at the pediatrician's office, doesn't that mean their vision is fine?"

Many children successfully pass school eye screenings that may still have vision problems because most screening tests only check a child's distance vision. Only children who are nearsighted (myopic) or who have a severe 'lazy eye' (amblyopia, strabismus) will fail this screening. Children who are farsighted (hyperopic), have astigmatism, or who have much more subtle, and often more debilitating problems with eye movements, perceptual skills and control of their ocular focusing system may pass these tests with flying colors.

For more information visit What is Vision?

"At what age should my child have an eye exam and who/where should I schedule the appointment?"

According to the American Optometry Association (AOA), your child's vision should first be evaluated at 6 months of age. This is when the structures of the eye are fully developed. If all is well, your child should be examined again at age 3, then again before beginning school. Once your child has started attending school, they should get examined every 2 years unless your doctor advises otherwise (Adults should be examined every 2 years, too!).

Remember, it is good to get a clean bill of health from your eye doctor. Eye exams should be thought of as wellness exams. Just like seeing the dentist, you should visit your eye doctor before something is wrong.

For very young children, up to age seven, a pediatric optometrist would be recommended. They often have more specialized equipment to test young children who don't yet know their letters or numbers and who cannot yet follow some of the standard tests used on most adults. Optometrists who specialize in pediatrics often note this specialty in their business listing. Doctors who list an association with the American Optometry Association (AOA), College of Optometrists in Vision Development (COVD), or specialize in the areas of vision training, vision therapy, or sports vision are also good resources.

For further information on these organizations see Recommended Links. Also see How to Find a Doctor if you don't have one already.

"What is the difference between an optometrist and an ophthalmologist?"

Both ophthalmologists and optometrists are highly trained eye doctors with different areas of specialty.

An optometrist has spent four years beyond an undergraduate program in a professional school earning a doctor of optometry degree studying the body and how it works, but really specializing in how the eyes works and the fundamentals of visual function.

Their training primarily consists of the following: learning how to test for refractive error, prescribe glasses and contacts, how to test visual skills and treat problems when detected, treating eye diseases and conditions, managing disease with pharmaceuticals, and co-managing eye surgeries.

Ophthalmologists also spends four years in a graduate program in medicine or osteopathy. Then they spend four years of residency specializing mostly in eye surgery, but also in how to manage and treat eye diseases and conditions. Some ophthalmologists also prescribe glasses and contacts, but very few gain training in the function of the entire visual process.

For more information please see Differences Between Eyecare Professionals.

"If the optometrist recommends vision therapy for my child will insurance pay for it?"

Many plans now cover some vision therapy (VT) sessions, but every insurance plan is different. Some plans will cover it without a referral. Others require a referral from an ophthalmologist or primary care provider. Some plans require certain diagnoses in order for them to approve coverage. Then there are the insurance companies that consider VT preventative or homeopathic care and will not cover it.

Most optometry offices handle a large number of insurance plans and often know if your particular plan is accepted and many are often willing to call for you to verify your benefits as they know the proper steps to find this information.

When in doubt, ask your eye doctor that provides vision therapy. If they can't answer your questions, they can tell you what you need to ask your insurance company in order to get a good answer.

"Is vision therapy only useful for children?"

VT can be useful for people of all ages but undoubtedly the plasticity so apparent in children is not seen to nearly the same degree in adults. Adults can be set in their ways and be less resistant to change, but it all depends on patient motivation. Who says you can't teach old dogs new

http://www.visionandlearning.org/FAQ.htm
VT can work for adults, but the rates of progress and therapy strategies may be different. Another aspect to consider is the type of dysfunction being treated; different problems respond more readily to VT (but this also applies to kids, too).

An ever-growing and more specialized area of VT is treating people who have suffered traumatic brain injuries (head injuries, strokes, etc.). 85% of our brain is involved in vision and brain injuries can really affect visual skills. The people who are affected come in all ages and sizes.

For more information on traumatic brain injury, you may want to visit the Neuro-Optometric Rehabilitation Association International (NORA) site to learn more.

"I am over 40 and need bifocals. Will VT help me?"

VT cannot remove the need for reading glasses or bifocals as our vision ages (presbyopia), however it has been shown that doing VT exercises prior to the onset of presbyopia may delay the need for reading glasses or bifocals and the power needed may be reduced as compared to cohorts.

Unfortunately, presbyopia happens to everyone. As you age, from your late teens on, you slowly lose your focusing ability (accommodation) due to the lens that focuses the light getting bigger, less flexible and the way it pushes against the muscles that flex it. All these things eventually make it too difficult for you to change how the light comes into the eye to make things clear.

"Can taking vitamins improve my vision?"

Vitamins, particularly the antioxidants with lutein, are showing great promise in delaying changes associated with certain eye diseases, such as those associated with age-related changes. However, there is much controversy surrounding the use of vitamins because of the difficulty to study the effects of JUST vitamins without other factors such as age, sex, race, environment, current health, heredity and so forth. Some professionals need definitive proof, while others are satisfied enough with the studies out there to recommend vitamins.

Vitamins do not seem to affect refractive error, however, so vitamins will not lessen your need for wearing glasses or prevent you from ever needing them.

For possible prevention of some types of refractive error, see Near & Farsightedness.

"Why is this refractive vision problem (nearsighted/farsighted/astigmatism) showing up now?"

Vision difficulties can "show up" at any time, however some definite trends have been noted. Studies have shown distinct trends toward myopia (nearsighted vision) in certain age groups, primarily ages 8-11 years old.

During this same time frame, usually around third grade, we find that the size of text gets smaller and the classroom demands get more intense. Not only are students asked to read smaller words on a page, but they are reading more words than ever before AND now have to add reading comprehension! This change in reading demand can will impact kids with fragile visual systems.

Some kids are just not caught earlier on because they have vision problems that are not as easy to spot by parents and educators. For example, a child that is farsighted can often "hide" or cover up their farsightedness (involuntarily) by putting their focusing system into overdrive. Eventually due to constant stress the system breaks down and the child cannot compensate any longer. Third grade is a good time for this.

Care by the doctor should be taken when prescribing lenses by taking into considering their patient's age, visual skills performance, overall development and environmental demands.

For more information on prescribing and treatment techniques, click here.

"Will wearing glasses or contacts make my vision worse?"

If glasses or contacts are worn appropriately this should not create any problems. Glasses for hyperopia are generally worn at all times and a prescription with extra power is sometimes needed for near work. Prescriptions correcting large amounts of astigmatism should also be worn full time and at all distances. Myopic corrections for most people should be worn to see clearly in the distance and taken off to do near work (homework, computer work, reading, desk top work). There are cases where this is not possible, such as myopes with high prescriptions and people with certain types of visual dysfunction. Many times, one pair of glasses is not the ideal wearing regimen. A second pair of lower powered lenses or a bifocal may be needed up close (even over contact lenses) for optimal visual function.

Contact your doctor to see what wearing schedule you should be on so your prescription is worn appropriately.

If you need to find an eye doctor, go to How to Find a Doctor.

"Will I become dependent on my glasses or contacts?"

People sometimes feel they have become dependent on their glasses when the more likely case is that they have grown used to enjoying seeing things clearly and when the glasses are removed the world is not as sharp and crisp in appearance. Now that you have a basis of comparision, it feels like your eyes are getting worse, but in fact, your level of tolerance has changed.

Some people can make their vision worse by wearing their glasses or contacts inappropriately. See your doctor if you are unsure of your wearing schedule, or if you want more information about different pairs of glasses for different types of activities that may be more appropriate than the one pair you may have.
For more information on these issues, look at Near & Farsightedness and Treatment & Prescribing.

"Will wearing glasses or contacts, improve my vision?"

Most of the time glasses and contacts will not improve your vision, but only compensate for the refractive error you have. They are an aid, not a cure for your refractive error.

There are doctors, however, that may use glasses or contacts as part of their vision therapy regiment that CAN make long term improvements to their patient's vision.

For more information on vision therapy, click here.

"Can refractive surgery correct my vision problems?"

Laser refractive procedures are becoming more common everyday. Just as the procedure says, refractive surgery is intended to correct REFRACTIVE problems that include myopia, hyperopia and astigmatism. This will help you see clearly, but problems related to visual dysfunction WILL NOT be corrected by these procedures. People with fluctuating prescriptions are not candidates for these procedures. Most surgeons will not touch children or adolescents, either.

Patients who are nearing 40 years of age or older should be aware that correcting their distance vision will not eliminate the need for near reading glasses. An exception to this statement is the patient who has successfully functioned in a state of monovision, (one eye corrected to see in the distance and the other eye corrected to see up close). These people may have the option to have the refractive procedure done correcting the eyes in a state of monovision. Monovision works very well for many patients, but it does affect binocularity and glasses worn during driving, to re-establish binocular vision, should be worn.

Refractive procedures will not prevent the development of cataracts that come with age; cataracts can cause refractive error to change and involve an additional surgery to be removed. The good news is, cataracts are generally not a problem for most people until they near 70 years of age or more; a thirty year old patient having a laser refractive procedure could reap the benefits for decades before these issues arise.

If you are seriously considering a refractive procedure, you should discuss whether you are a good candidate and surrounding issues with your eye doctor; educate yourself. Most institutes performing these procedures have free seminars to discuss risks and benefits. If you attend a seminar, go prepared with questions. Ask questions like... How many procedures has this doctor done? How many surgeries of the particular procedure you need has this doctor done? What is their success rate? What does the procedure entail?

"If I wear glasses/contacts and/or had learning difficulties as a child, will my child have the same problem?"

There is a chance that your child's chances of having similar problems that you experience are increased if a parent has refractive problems. The same is true with learning difficulties and visual dysfunctions. This can happen for a number of reasons, including heredity, similar environment, and similarly learned behaviors and adaptations.

If the parent has/had any of these issues, regular and thorough vision exams are strongly recommended for their children. Remember detecting problems early increases your child's rate of success and can possibly prevent or better manage vision changes that may occur.

For more information on risk factors, click here.
Vision and Learning References


Pacific University College of Optometry. Learning related visual problems. Pacific University Family Vision Centers-Vision Therapy Services, 1994; patient pamphlet.


This website project was Function in Learning De
vision and learning.

NOTE: The educational content on these pages is not intended to
be professional.

If you would like to have your child or someone you know eva:
Right Doctor page so that you can schedule a comprehensive vision exam. Make sure you give your doctor a good history of the
problems they may have so they can better help them if help is needed.

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us.

About the Authors

Mary McMains was born and primarily raised in Las Vegas, Nevada. She received her Bachelor degree in Pre-Optometry studies in 1995 before studying at Pacific University on scholarship. While attending Pacific University, she was an active member of the following: American Optometric Student Association (AOSA), American Optometric Association (AOA) Sports Vision Chapter, AOA Contact Lens Section, American Academy of Optometry (AAO), College of Optometrists in Vision Development (COVD), Optometric Extension Program (OEP), Beta Sigma Kappa International Honor Society and Amigos Eyecare. She also held offices including Class Secretary and Class Representative, OEP local student liaison and COVD local student vice-president. This year, Mary won the COVD Award for Excellence in Vision Therapy. Believe it or not Mary also has a social life. She was married on January 1, 1999, to her dashing husband Keven Scott. Mary is a candidate to concurrently receive her Doctorate of Optometry Degree and Master of Education, Visual Function in Learning Degree during May 2000. After graduation, Mary plans to join a practice that specializes in vision therapy, visual learning disorders and pediatric optometry in the Northern California Bay Area.

Elizabeth Davis was raised in Portland, Oregon and continues to reside in the small town of Banks west of Portland at the foothills of the coast range. A 1996 graduate of Pacific University College of Optometry, Elizabeth practices optometry in Portland and works with second year optometry students at Pacific University. Elizabeth is a sustaining member of AOSA, (American Optometry Student Association) a member of the AOA (American Optometric Association) and OOPA (Oregon Optometric Physicians Association). In 1998 Elizabeth was voted the Amigos screening doctor of the year for her time volunteered to vision screenings of children and adults throughout the Willamette valley. When not seeing patients or working with students Elizabeth enjoys spending her free time riding her two horses Bizmark and Burley, hiking with her husband Rick and dog Splash, or just about any sport on the water or in the great outdoors!
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Dear Visitors,

The creators of visionandlearning.org would love to hear from you! Any feedback you could give us would be greatly appreciated. Anything you would like us to change, add, edit or delete in order to improve our site would also fall upon listening ears. Just click on the image below.

Thanks in advance!

Mary McMains, O.D., MEd.

http://www.visionandlearning.org/feedback.htm