



2006

There is More to Vision than Seeing Clearly

Dawn Cardinal
University of North Dakota

Genea Nannemann
University of North Dakota

Follow this and additional works at: <https://commons.und.edu/ot-grad>

 Part of the [Occupational Therapy Commons](#)

Recommended Citation

Cardinal, Dawn and Nannemann, Genea, "There is More to Vision than Seeing Clearly" (2006). *Occupational Therapy Capstones*. 188.
<https://commons.und.edu/ot-grad/188>

This Scholarly Project is brought to you for free and open access by the Department of Occupational Therapy at UND Scholarly Commons. It has been accepted for inclusion in Occupational Therapy Capstones by an authorized administrator of UND Scholarly Commons. For more information, please contact zeineb.yousif@library.und.edu.

There is More to Vision than Seeing Clearly

by

Dawn Cardinal

Genae Nanneman

Advisor: Scott Johnson OTD., OTR/L, ATP
Professional Level Coordinator & Faculty Department of Occupational Therapy Casper College Site

A Scholarly Project

Submitted to the Occupational Therapy Department

of the

University of North Dakota

In Partial fulfillment of the requirements

For the degree of

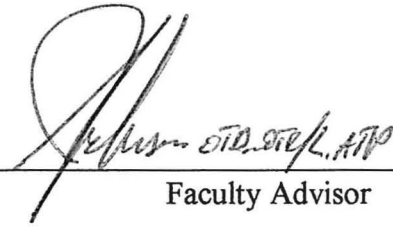
Master's of Occupational Therapy

Grand Forks, North Dakota

May 2006



This Scholarly Project Paper, submitted by Dawn Cardinal & Genae Nanneman in partial fulfillment of the requirement for the Degree of Master's of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.



Faculty Advisor

4-30-06

Date

PERMISSION

Title There is More to Vision than Seeing Clearly
Department Occupational Therapy
Degree Master's of Occupational Therapy

In presenting this Scholarly Project/Independent Study in Partial Fulfillment of the requirements for a graduate degree from the University of North Dakota, we agree that the Department of Occupational Therapy shall make it freely available for inspection. We further agree that permission for extensive copying for scholarly purposes may be granted by the professor who supervised our work or, in his absence, by the Chairperson of the Scholarly Project/Independent Study or part thereof for financial gain shall not be allowed without our written permission. It is also understood that due recognition shall be given to us and the University of North Dakota in any scholarly use which may be made of any material in our Scholarly Project/Independent Study Report.

Signature *Dawn Cardinal, MEd* Date *4/20/2006*

Signature *Leese Ammons, MEd* Date *4/20/2006*

TABLE OF CONTENTS

LIST OF FIGURES.....	vi
ACKNOWLEDGEMENTS.....	vii
ABSTRACT.....	viii
CHAPTER	
I. INTRODUCTION.....	1
Ecological Model.....	3
Terminology.....	8
II. REVIEW OF LITERATURE.....	11
Introduction.....	11
Vision Therapy.....	15
Multi-disciplinary Approach.....	16
Barriers to Accessing Vision Therapy.....	17
Early Vision Screening.....	17
Vision Screening Tools.....	17
Initiatives.....	18
Political.....	19
Professional Knowledge and Collaboration.....	20
Education.....	21
Limited Providers.....	22

	Reimbursement.....	22
	Service Provision.....	23
	Proposed Strategies.....	24
	Reimbursement.....	25
	Education.....	25
	Providers.....	27
	The Vision Therapy Project.....	28
III.	METHOD.....	32
IV.	THE VISION THERAPY PROJECT PARENT/CAREGIVER EDUCATIONAL HANDBOOK.....	35
V.	SUMMARY.....	71
	REFERENCES.....	74

LIST OF FIGURES

Figure	Page
1. Hierarchy of visual perceptual development in central nervous system.....	10

Acknowledgements

The authors wish to express appreciation to their scholarly advisors:

Scott Johnson OTD., OTR/L, ATP and LaVonne Fox PhD, OTR/L

Special thanks for the collaboration and input from the Vision therapy Project by:

Alannah Wellborn, COVT, ABO, NCLC, CPOA

ABSTRACT

There is More to Vision than Seeing Clearly. Dawn Cardinal, Genae Nanneman and Scott Johnson, Department of Occupational Therapy, University of North Dakota School of Medicine & Health Sciences, 501 North Columbia Road, Grand Forks ND 58202

“Vision is not simply the ability to read a certain size letter at a distance of 20 feet. Vision is a complex and adaptable information gathering and processing system which collects, groups, analyzes, accumulates, equates, and remembers information” (American Optometric Association, 2005, p.1). The purpose of this project is to develop a parent/caregiver handbook that will educate parent/caregivers with children who have visual deficits and to benefit the Vision Therapy Project, which is located in Casper, Wyoming. This project is a non-profit organization dedicated to provide assistance and education to parents/caregivers with children in need of vision therapy. Information for The Vision Therapy Project Parent/Caregiver Handbook was gathered from an extensive review of literature and research. The findings from this review demonstrated a high percentage of school-aged children entering the school system do not receive a comprehensive visual screen to detect visual deficits therefore many school-aged children are being misdiagnosed or labeled with learning disorders by educators and parents/caregivers. This handbook is intended to be used by an occupational therapist to facilitate parental involvement, address areas which are impacting children’s learning, and to develop a better understanding of the vision therapy treatment being provided to their child. The parent/caregiver educational handbook contains information regarding the development of the visual system; visual deficits and disorders that result from a dysfunction within the visual system; how other senses work together in conjunction with vision; what is occupational therapy (OT) and vision therapy (VT) and the services provided; parents/caregivers roles with therapy in the home and office; and resources for parents/caregivers to access. The Vision Therapy Project parent handbook will allow parents/caregivers to become effective advocates, and increase the child’s success within their academic environment as well as independence with their occupational performance.

CHAPTER I

INTRODUCTION

“Vision is not simply the ability to read a certain size letter at a distance of 20 feet. Vision is a complex and adaptable information gathering and processing system which collects, groups, analyzes, accumulates, equates, and remembers information” (American Optometric Association, 2005, p.1). Due to the number of complex and interrelated processes, many signs and symptoms of vision related learning disorders could be detected early through a comprehensive vision screen. Cornoldi, C., Venneri, A., Marconato, F., Molin, A., Montinari, C. (2003), stated it is imperative for early vision screens to be completed among preschool children and children entering the primary school system.

Knowing that early detection is the key to preventing learning related visual disabilities, the number of children who do not receive a comprehensive eye exam by an eye care practitioner is “nearly 80% of preschool age children” (Castanes, 2003, p. 217). There is a lack of vision screening tools, processes, and resources available for the detection of visual perceptual deficits. The majority of school-aged children with vision-related learning disorders are not receiving the necessary treatment to be successful in their academic environment due to the limited facilities within the community to provide vision therapy services to this population (Castanes, 2003). Children “have been referred for visual evaluation only as a last resort, not as a first option” (Bowan, 2002, p. 557).

There are three primary barriers identified in the literature as currently impacting service provision. These barriers are: reimbursement, education and service providers.

Reimbursement: Due to the limited resources, funding/reimbursement for services are a factor. Due to the rising costs of healthcare, the majority of company's insurance policies do not provide coverage for vision therapy and related vision needs. Medicare guidelines will reimburse therapists for vision therapy when Certified Optometric Vision Therapist (COVT) and Occupational Therapy (OT) services are considered reasonable and medically necessary. Although Medicare does provide reimbursement, Optometrists do not always utilize preventative vision services for children, due to the minimal number and long delays for reimbursement covered by Medicaid (Castanes, 2003). Written documentation of initial evaluation assessments, the treatment plan, and demonstration of improvements must be provided to Medicare in order to receive or continue reimbursement for COVT and OT services. This often leaves the burden of payment to the parents/caregivers, who may have limited or no ability to pay, which in turn can influence whether or not the child receives vision therapy.

Education: Training and developmental functional abilities are negatively impacted due to the inefficient use of professional resources and skills. Parents, caregivers, and teachers do not have adequate information to help identify any potential risks earlier in order to get the child the assistance they may need. All of this contributes to visual problems not being diagnosed as early as possible, which ultimately limits a child's development in foundational academic skills and necessary activities of daily living skills (ADLs), play and leisure.

Providers: Providers are limited in numbers, especially in rural areas such as Wyoming. Providers are also limited in knowledge of the services each can contribute to ensuring children are receiving the most efficient and effective services. This means that interventions need to be more multidisciplinary and collaborative to get the child ‘up to speed’ as quickly and effectively as possible.

Ecological Model

The Ecological Model of Human Performance was chosen to guide the process of developing an interdisciplinary model of collaboration within the vision therapy project. It is an Occupational Therapy based model that is conducive to interdisciplinary work to meet the needs of each child. It uses a client-centered approach that can be adapted to each individual’s needs. It looks at what is impeding the individual’s task performance, and whether changes need to be made to the person, context or the task itself. The model includes a seven-step process for treatment and intervention as well as five intervention strategies recommended for delivery of services in a collaborative manner. The Ecological Model of Human Performance was developed by Winnie Dunn, Catana Brown, and Mary Jane Youngstrom, not just for the profession of occupational therapy but other healthcare professions as well. In this model “occupation exists when the person and context factors come together to give meaning to task” (Kramer, P., Hinojosa, J., & Brasic Royeen, C., 2003, p. 225). The core constructs of this model include person, task, context, and performance. The core concept of person is defined as: an individual with unique abilities and skills in all areas of occupation. The concept of task includes a set of behaviors that are unique to each individual, which are objective and necessary to

accomplish a goal. The main concept in this model is context. Context is defined as related conditions such as temporal (i.e. chronological age, developmental stage, life cycle, and health status), and environmental (i.e. physical, social and cultural) that encompasses the individual. Lastly, performance is the other concept within this model, which addresses both the process and the result of how the individual skills and abilities are applied when selecting a task they want to perform. (Kramer, P., et al., 2003)

The Ecological Model of Human Performance consists of five therapeutic intervention approaches, these include establish/restore, alter, adapt/modify, prevent and create. In order to utilize establish and restore approach, the occupational therapist will develop interventions which will focus on improving the child's vision skills and abilities that were not correctly integrated from the visual system and all other senses. When considering the approach of adapt and modify, the occupational therapist adapts or modifies the task or the environment to support the occupational performance of the child and to ensure successful outcomes (i.e. changing the lighting, work space, and providing a distract free environment). With the approach of prevent, the occupational therapist can change the child's context or task skills in order to prevent negative outcomes. This can be accomplished by providing an educational handbook to parents/caregivers and vision therapy services to establish and restore necessary visual skills for children to become self-confident, have better self-esteem and to be successful in their academic environment and at home. With the create approach, occupational therapists can become advocates for the child and parents/caregivers. They can also provide comprehensive vision screenings to all children before entering the primary school system to detect early visual deficits.

Occupational therapists use a variety of purposeful activity or interventions designed to achieve purposeful and meaningful outcomes with the child's performance in all contexts. This is done through promoting health and wellness, and further prevention of visual deficits and learning disabilities. Occupational therapists strive to develop, improve, sustain, or restore the highest possible level of independence of any child who has visual deficits or learning disability (AOTA, Inc., 1994).

A child's occupational performance can be impacted by deficits within the visual perceptual system. These deficits can lead to dysfunction in a number of occupational and functional skill areas for children and youth, which can effect overall academic performance in areas such as reading, writing, spelling, visual motor integration, mathematics, activities of daily living, participation in play/recreation/leisure activities, and completion of school-related work. This in turn could have a negative effect on school-aged children's self-esteem, self-concept, development of anxieties and depression over the learning experience.

"Parents may struggle to understand the legal and scientific language that circulates among professionals." This may "alienate parents from the collaborative process" (Reid, D.K., & Weatherly Valle, J., 2004, p. 476). Therefore, it is vital for occupational therapists to include and provide clear and concise information to parents/caregivers when discussing the interventions that will be implemented with their child.

The purpose of this project was to develop a parent/caregiver handbook to 1) educate parent/caregivers with children who have visual deficits. This will allow parents/caregivers to become more effective advocates and increase the child's success

within their academic environment as well as independence in their occupational performance. 2) Educate other disciplines on the benefits of Occupational Therapy and the significant contribution the profession can make to the multidisciplinary team. 3) Promote collaboration of occupational therapists, optometrists and vision therapist to more effectively meet the needs of the child and 4) to benefit the Vision Therapy Project, which is located in Casper, Wyoming. According to The Vision Therapy Project brochure (2005), this project is a non-profit organization dedicated to provide assistance and education to parents/caregivers with children in need of vision therapy. Their mission is to provide vision therapy to children without insurance or the means to pay for vision therapy; implement programs in the school systems that help train teachers and parents on how to identify vision related learning disorders; and implement free screenings to help identify children at risk (Vision Therapy Project Brochure, 2005).

It is intended that the handbook will be used by an occupational therapist to facilitate parental/caregiver involvement, address areas which are impacting children's learning, and provide parents/caregivers a better understanding of the vision therapy treatment being provided to their child.

Chapter I concludes with a list of terminology and their definitions which are used throughout the scholarly paper. Chapter II is a review of literature, which is divided into four sections. The first section will provide background information on normal vision skills; statistics regarding vision deficits and learning disabilities; and various diagnoses related to visual skill deficits. In section two, vision related learning disabilities disorders are often misdiagnosed as learning disabilities (LD), or nonverbal learning disabilities (NVLD), dyslexia, and attention deficit disorder (ADD)/ attention deficit hyperactivity

disorder (ADHD). The third section contains a comparison of vision therapy (VT) and occupational therapy (OT); education requirements for certified optometric vision therapist (COVT) and OT; and the professional collaboration between optometrist and OTs. The final section addresses barriers that affect vision therapy such as: limited therapist, reimbursement, legislation, limited resources, and strategies to overcome the limitations and restrictions. Chapter II will conclude with a summary of the literature and current research, which supports the need for a parent/caregiver handbook. Chapter III describes the methodology that was used for the research and development of the parent/caregiver's educational handbook. Chapter IV is the Vision Therapy Project parent/caregiver's educational handbook. Chapter V is a summary of the literature and a proposal for further evidence-based research for occupational therapists.

Terminology

Accommodation (eye focusing): ability to focus your eyes at different distances.

Accommodative dysfunctions: inability to change focus of the eye so that objects at different distances can be seen clearly

Acuity: clarity of sight; the ability to see objects clearly at distance and near.

Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD): consists of a persistent pattern of severe inattention and/or hyperactive and impulsive behavior

Amblyopia (lazy eye): lowered visual acuity (clarity), not correctable with lenses

Astigmatism: a refractive error where the eye is not spherical or round, but football shaped, and needs a cylindrical lens to provide good acuity.

Binocularity (eye teaming): ability to use both eyes together

Convergence insufficiency (CI): condition in which the eyes have a tendency to drift outward for near work such as reading, while at far distance the eyes work well together

Discriminatory Response: allows the child to know where and what is being touched on the body (i.e. identifying an object only by touch, feeling vibration, light touch, and pressure.)

Divergence excess: condition in which the eyes drift outwards when looking at a distance and function normally when looking at near objects

Dyslexia: impaired ability to recognize words, slow and inaccurate reading, and poor comprehension

Filters: optical devices used to reject light waves of certain frequencies while allowing others to pass

Fine Motor Skills (hand skills): ability to control small muscles of the body comfortably and efficiently.

Fixation: ability to maintain sharp focus on a moving or stationary target with both eyes precisely coordinated

Gross Motor Skills: ability to control the large muscle of the body comfortably and easily

Hyperopia (farsightedness): trouble seeing near distances clearly

Infrared sensing devices: optical device that monitors eye position and provides feedback to the patient to reduce the uncontrolled jumping of the eye.

Integration: ability to put two skills together such as vision and movement

Layovers: transparencies with different geometrical shapes which are laid over a reading task in order to train the eye to ignore extraneous information.

Learning disorders: deficits in acquiring expected skills in reading, writing, speaking, use of listening, reasoning, or mathematics

Lens: optical devices which are used to provide the eye with different visual experiences

Myopia (nearsightedness): trouble seeing far distances clearly

Non-verbal learning disorders: deficits in abstract thinking, visual memory, and spatial recognition

Occluders: a device that occludes the vision of the eye (i.e. patching)

Oculomotor control (eye movement): 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.

Occupational therapy: use of purposeful activity or interventions designed to achieve functional outcomes which promote health, prevent injury or disability and which develop, improve, sustain, or restore the highest possible level of independence of any individual who has an injury, illness, cognitive impairment, psychosocial dysfunction, mental illness, developmental or learning disability, or other disorder or condition

Optometrist: an eye doctor, that 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.

Pattern recognition: identify objects from surroundings.

Prisms: optical devices that make an object appear at a different location or encourage the eyes to move up, down, right or left.

Proprioception system: interpretation of the sensation from the child's own body during movement or standing still, this system tells the brain information about the position of their body.

Protective Response: allows the child to react to sensations (i.e. pain, temperature (hot/cold), and flight or fight responses.)

Pursuits: ability to lock onto and maintain fixation on a moving target across all visual fields

Refractive errors: inability to adapt to different lighting conditions

Saccades: ability of quick, precise eye movements that are made during visual scanning or a visual search

Sensory Integration: process of taking in information about the environment with all senses and from inside the body.

Strabismus: misalignment of the eyes all of the time or part of the time

Syntonics: staring at colored lights

Tactile system: sends information to the brain regarding pressure, pain, texture, heat or cold, and movement from the hairs on the skin.

Vestibular system: information to their brain that is exact and informs the child exactly where they are in relationship to gravity; their ability to maintain and compensate posture when they are moving or standing still; how fast and in what direction they are going.

Visuocognition: gaining information from the environment

Visual analysis: ability to use past experiences to recognize, organize, recollect and utilize the visual information received.

Visual attention: ability to attend to what is in the visual field.

Visual integration skills (visual motor integration (VMI), eye-hand coordination): 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.

Visual memory: ability to recognize, retrieve, and to store visual information from short or long term memory.

Visual perceptual: ability to interpret and understand visual information

Visual scanning: movement of eyes together towards an object in the environment.

Visual spatial skills: how the brain visually integrates coordinated movements within the environment.

CHAPTER II
REVIEW OF LITERATURE
INTRODUCTION

“Vision is more than the limited concept of sight measured in terms of visual acuity. Vision is the process of deriving meaning from what is seen” (American Optometric Association, 2006, ¶3). Vision is a dynamic process where information is obtained from the environment as well as previous experiences and integrated with all other senses through visual perceptual processing (Vision and Learning, 2002). “The process of vision takes more than 65% of all pathways to your brain to work” (Vision and Learning, 2002, p1).

Visual perceptual processing is significant in the normal growth and development of a child since the child’s ability to learn and integrate information mainly occurs from visual skills. Researchers have estimated that “75-90% of classroom learning occurs through the visual system” (Vision and Learning, 2002, ¶4). A child is required to have sustained visual attention during reading, in order to comprehend and maintain visual performance. This requires the child’s ability to focus on the information presented and ignore extraneous information for an extended period of time (Solan, Shelley-Tremblay, Ficarra, Silverman & Larson, 2003, Del Pilar Cardona, Martinez, & Hinojosa, 2000).

Vision abilities can be grouped together into three categories which include: visual spatial, visual analysis and visual integration. These categories are defined as follows:

1. Visual spatial skills are how the brain visually integrates coordinated movements within the environment.
2. Visual analysis is the ability to use past experiences to recognize, organize, recollect and utilize the visual information received.
3. Visual integration skills are the ability to integrate information from vision with all other senses such as tasting, smelling, hearing and touching.

For most children, learning to read is simple, “however, 5%-17% of children have a developmental reading disability or dyslexia” (Hood, M., & Conlon, E., 2004, p. 235). In numerous studies dyslexic readers have shown multiple visual deficits (Skottun, B.C. & Parke, L.A., 1999), within their visual system. The peripheral and central vision system processes vision stimuli to correctly recognize letters, words, and recall how words appear. Problems in either or both systems can impair visual attention in children with dyslexia (Heiervang, E. & Hugdahl, K., 2003; Badian, N.A., 2005). Many children may seem distracted or hyperactive in their academic environment. These behaviors may actually be frustration caused by reading difficulties correlating with decreased visual attention (Willcutt, E.G., Pennington, B.F., Boada, R., Ogline, J.S., Tunick, R.A., Chhabildas, N.A., & Olson, R.K., 2001).

“A child’s problem with visual perception may be based in the more complex issues of sensory processing, or may be primarily a result of visual interpretation issues. Whatever the reason, these children are frequently mislabeled as having behavior problems, or as being under-achievers or slow learners” (Hickman, L. & Hutchins, R., 2000, p 3).

Visual Perceptual Processing is the most prevalent handicapping condition in childhood, and is estimated to affect between 8-12 million children (American Foundation for Vision Awareness (nd). Not only are learning disabilities a personal concern for parents/caregivers, it is also becoming a concern for communities nation wide. This is due to the lack of learning related vision skills, which are in turn causing some children as early as first, second, or third grade to be on a path to juvenile delinquency (PAVE, 2005). "It is currently estimated that 1 out of 4 school-aged children and 7 out of 10 juvenile offenders suffer with undiagnosed vision problems that effect performance in school and in life" (PAVE, 2005, ¶ 1).

According to the American Foundation for Vision Awareness (nd), vision disorders are the fourth most common disability in the United States. Various disorders and dysfunctions that are related to visual perceptual skill deficits are: accommodative dysfunctions, refractive errors, convergence insufficiency, divergence excess, ocular motor dysfunctions, visual-motor disorders, visual perceptual disorders, learning related visual problems, strabismus, amblyopia and other visual information processing dysfunctions. "The most common vision disorders among children are strabismus, amblyopia and optical problems impairing visual acuity and depth perception" (Castanes, 2003, p. 217).

The review of the literature indicates visual perceptual disorders can lead to a misdiagnosis of: Attention Deficit Disorder (ADD)/Attention Deficit Hyperactivity Disorder (ADHD); Dyslexia, Learning Disorders (LD); or Nonverbal Learning Disorders (NVLD) (Bowen, 2002). In many cases school-aged children, who have been diagnosed with ADD/ADHD also have reading disabilities, which can impact visual attention on

cognitive efficiency and the ability to learn to read (Solan, Larson, Shelley-Tremblay, Ficarra, & Silverman, 2001). In addition, a recent study conducted by Dr. David B. Granet, on 266 patients, found that nearly 16% of patients with ADHD also had convergence insufficiency (CI) problems. This study also discovered that children with convergence insufficiency were three times as likely to be diagnosed with ADHD. (College of Optometrists and Vision Development (COVD), nd, p. 1)

Convergence insufficiency is the inability to comfortably sustain focus and maintain near vision demand on the eye to converge for a required assignment (Scheiman, Mitchell, Cotter, Cooper, Kulp, Rouse, Borsting, London, & Wensveen, 2005, p. 14). CI can affect the vision learning process with the following symptoms: “headaches, intermittent crossed dioplopia, blurred vision, eye strain, tired eyes, sleepiness and loss of concentration” (Adler, 2002, p. 565). Due to these symptoms, children tend to avoid homework, which requires near vision such as reading, writing and mathematics, and can often become disruptive or stop paying attention during class time.

A deficit within the visual perceptual system can lead to dysfunction in a number of occupational and functional skill areas for children and youth. This dysfunction can effect overall academic performance in areas such as reading, writing, spelling, visual motor integration, mathematics, activities of daily living (ADLs), participation in play/recreation/leisure activities, and completion of school-related work. This in turn could have a negative effect on school-aged children’s self-esteem, self-concept, development of anxieties and depression over the learning experience (Brown, Rodger & Davis, 2003; Bowan, 2002).

Many children with visual deficits often participate in many special programs in school as well as tutoring for their deficits, with little or no improvements in their academic performance. The earlier any problems can be identified and effectively addressed, the sooner a child can gain a feeling of success academically and in their daily life skills.

Vision Therapy

Vision therapy is also referred to as visual training, vision training or orthoptics. According to the College of Optometrists of Vision Development (COVD), vision therapy (VT) is an individualized treatment program designed to correct or improve specific dysfunctions/deficits impacting visual function and performance (2005). It is a relatively simple, effective, and inexpensive treatment, consisting of shortened treatment times (Adler, 2002).

“Vision therapy trains the entire visual system which includes eyes, brain and body...it is a form of neurological training or rehabilitation (it can be compared to some forms of occupational therapy or physical therapy)” (Optometrists Network, 2006, ¶ 2-3). One goal is to link the visual demands and the ability to process vision in order for the child to become successful within his or her academic environment. The therapy consists of a series of eye exercises conducted in-office and at home to assist children to create and restore the visual processing skills, which will alleviate visual discomfort and improve the way a child uses their vision effectively.

Due to the complexity of vision, not all children are affected the same way. When treating children with vision therapy, “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” (Vision and Learning, 2002, p. 1).

Multi-disciplinary Approach

National organizations such as: The American Optometric Association (AOA), American Association of Schools of Public Health, the American Public Health Association, the American Academy of Ophthalmology, Prevent Blindness America, and the United States Eye Injury Registry, have challenged “clinicians to put prevention and rehabilitation into their private practices...it calls for scientist to pursue new research. Above all, it encourages everyone to work together, using both traditional and innovative approaches” (Bowyer & Kleinstein, 2000, p. 571).

In support of the necessity of a multi-disciplinary approach, a study conducted by McCabe, Nason, Demurs, Friedman, & Seddon (2000), demonstrated that vision rehabilitation involving an optometrist, occupational therapist and social worker increase’s the child’s level of function not only by observation of visual tasks but also self report with an increase in performance of ADLs and social/leisure activities.

A multi-disciplinary approach to learning problems is ideal” (Vision and Learning, 2002). A multi-disciplinary approach should consist of the child, parents/caregivers, optometrist, occupational therapist, vision therapist, pediatrician, and teachers in order to focus on and treat underlying causes rather than the symptoms, which are affecting the child’s occupational performance and function within the academic environment.

Although it is documented in the literature that vision therapy, with a multi-disciplinary approach is effective, there are several barriers for parents/caregivers in

accessing these services for their child. Children “have been referred for visual evaluation only as a last resort, not as a first option” (Bowen, 2002, p. 557).

Barriers to Accessing Vision Therapy

In researching the barriers it was eye-opening to discover that so many factors influence access to services. This can be extremely frustrating to a parent/caregiver or professional who knows that vision therapy, with a multi-disciplinary approach, is effective while basically inaccessible. The barriers presented here have been primarily categorized in the following areas: 1) early vision screening, 2) reimbursement and 3) professional barriers.

Early Vision Screening

Due to the number of complex and interrelated processes, many signs and symptoms of vision related learning disorders could be detected early through a comprehensive vision screen. Cornoldi, C., Venneri, A., Marconato, F., Molin, A., Montinari, C. (2003), stated it is imperative for early vision screens to be completed among preschool children and children entering the primary school system.

Vision Screening Tools: The visual test that is most commonly used to screen children’s vision in the school systems is the Snellen chart (E-chart). According to Joel Zaba, M.A., O.D., an optometrist that specializes in learning related vision problems, “the Snellen chart is 150 years old and the world has changed significantly over the last 150 years” (Vision Council of America, 2005). Several assessments were developed in the 1930s through the 1960s by researchers to measure visual perception, however, many that were developed lacked adequate documentation of validity and reliability. Since the

1990s, many of these assessments have been revised due to the advancement in technology and evidence-based research on the importance of early detection and therapy techniques to increase visual perceptual skills. (Brown, et al., 2003)

Initiatives: Currently, screening guidelines for vision exist in 34 states, it is voluntary in only 19 of these states, ten states have well-developed screening guidelines and six states only test for visual acuity. (Ciner, E.B., Dobson, V., Schmidt, P.P., Allen, D., Cyert, L., Maguire, M., Moore, B., Orel-Bixler, D., & Schultz, J., 1999, p. 455-456) The majority of the states that do require vision screening in primary schools typically use visual screens that only test for visual acuity and do not detect deficits with visual perceptual skills (The Center for Health and Health Care in Schools (CHHCS), 2004). Knowing that early detection is the key to preventing learning related visual disabilities, the number of children who do not receive a comprehensive eye exam by an eye care practitioner is “nearly 80% of preschool age children” (Castanes, 2003, p. 217).

In July of 2000, Kentucky was the first state to require a comprehensive eye examination from an ophthalmologist or optometrist for all children before entering the public school system (Zaba, Johnson & Reynolds, 2003, p. 149). As Kentucky leads by example in being the first state to set what guidelines and vision screening recommendations are needed, congress can urge “various public health officials...to determine useful screens to efficiently detect” vision deficits and “to provide and evaluate the practicality and effectiveness of ocular screening services for young children” (Castanes, 2003, p. 218). In the Survey of Vision Screening Policy of Preschool Children in the United States by Ciner, et al. (1999), it was found that Wyoming does not screen for any type of visual skill deficits and do not have any set guidelines or written referrals

in place. Currently, each individual school in Wyoming uses their own discretion when and if to screen for visual acuity and this test is usually administered by the school's nurse.

Political: Legislation is needed to ensure that each state provides preschool children as well as children entering kindergarten with a comprehensive vision screen to detect early visual perceptual deficits. The last nationwide study regarding the prevalence of vision problems in children was conducted over 30 years ago by the National Center for Health Statistics and received current estimates from the National Health Interview Survey (NHIS). This NHIS study demonstrated the need for current research to be conducted for early detection of vision problems in children. (CHHCS, 2004)

Federal budget and public funds set aside for national and state programs becomes available for implementing preventative healthcare, however, only "1%-3% of total health expenditures are spent on the public health efforts...and preventative services account for less than 1% of total health care expenditures" (Castanes, 2003, p. 220-21), which include vision therapy. In other words, the majority of health care expenditures is not funding preventative health care (i.e. vision screenings) but is funding secondary and tertiary health care such as prescription lenses, medication, or surgeries. A major concern for children to receive proper treatment for visual problems is the economic implications, which "primarily affect low income families and include lack of insurance or monetary funds to pay for the preventive" health care (Castanes, 2003, p. 217), and lack of resources for parental involvement.

In May of 2003, a bill was introduced to the House of Representative (HR) called The Children's Vision Improvement and Learning Readiness Act of 2003 (HR 2173). This bill has yet to be passed, however, it continues to gain support from organizations and Congress. This bill "would establish a grant program to provide comprehensive eye examinations to children identified or considered at high risk of vision impairment, with priority given to school-based programs for children under the age of nine" (Health and Health Care in Schools (HHCS), 2003, p.1). Funding would also be provided from this bill for educational materials on recognizing signs and symptoms of visual disorders and corrective visual treatments or services for visual problems in children. (HHCS, 2003)

There is a lack of vision screening tools, processes, and resources available for the detection of visual perceptual deficits. The majority of school-aged children with vision related learning disorders are not receiving the necessary treatment to be successful in their academic environment due to the limited facilities within the community to provide vision therapy services to this population (Wellborn, A., personal communication, October 19, 2005).

Professional Knowledge and Collaboration

Many optometrists feel that VT is the most effective treatment, however, they do not prescribe it for the following reasons: 1) the need to educate ophthalmologists and optometrists, 2) the lack of vision therapy providers in rural areas, 3) limited reimbursement with lack of vision coverage by insurance providers and 4) the rising cost of healthcare (Scheiman, Cooper, Mitchell, Land, Cotter, Borsting, London, & Rouse, M., 2002). Castanes (2003), adds to this list by pointing out that the lack of knowledge

of recommended guidelines, inconvenience, language barriers, and unavailability of providers also contribute to the lack of vision screenings being used.

A. Wellborn, who is a Certified Optometric Vision Therapist (COVT), American Board Opticianry (ABO), National Contact Lens Certified (NCLC), Certified Para Optometric Assistant (CPOA), indicated that in Wyoming there is a need to:

- 1) Educate Fellow COVD optometrist on the effectiveness of vision therapy.
- 2) Clearly communicate the qualifications that occupational therapist possess.
- 3) Address the underlying causes of vision deficits versus signs and symptoms of visual disorders.
- 4) Add to the number of COVT's providing quality vision therapy, especially within the state of Wyoming, which is one focus of this project. (Wellborn, A., personal communication, October 19, 2005)

The areas presented in the literature and personal communication vary but for the purposes of this scholarly project three main areas have been identified for further discussion. These areas are of significant interest to the design of the final scholarly project.

Education: The American Optometric Association (AOA) (2005), views vision therapy as a crucial and fundamental piece of clinical optometry.

“Educating ophthalmologists in both the medical and non-medical conditions and situations that could affect learning in a child... will help ensure that a patient receives appropriate, effective, and timely remedial treatment’...It is also important to educate pediatricians and eye care professionals in ‘psychiatry, educational and neuropsychology, physical and occupational therapy, and educational science in all its forms relating to learning differences in children” (Koller, 2002, p. 133).

“Parents and schools have invested enormously in educational and medical interventions to little avail” (Bowen, 2002, p. 557). Parents/caregivers may often not have the information they need to ensure their child is receiving the types of services and interventions the child needs or to understand the interventions their child are currently involved in. Teachers are not trained to properly detect visual perceptual disorders versus actual learning disabilities, which can cause them to inadvertently misdiagnose children with learning disabilities (Bowen, 2002).

Limited Providers: There is a lack of providers offering vision therapy for children living in rural areas versus the abundance serving in urban areas. Earle and Burman (1998) conducted a study where they interviewed 21 women from two Wyoming counties. The researchers found rural children were less likely than urban children to receive well child care (preventative health care for children) because of the lack of knowledge about child health screening, which includes vision screenings, transportation constraints and time off from work, the lack of providers, and financial restrictions. (Earle & Burman, 1998) This is of significant interest to this project since one purpose is to propose the role of an OT as a provider of vision therapy or at least in collaboration with vision therapists, optometrists, and ophthalmologists.

Reimbursement: Due to the limited resources, funding and reimbursement for services are a factor. Due to the rising costs of healthcare, the majority of company’s insurance policies do not provide coverage for vision therapy and related vision needs. Medicare guidelines will reimburse therapists for vision therapy when COVT and OT services are considered reasonable and medically necessary. Although Medicare does provide reimbursement, Optometrists do not always utilize preventative vision services

for children, due to the minimal number and long delays for reimbursement covered by Medicaid (Castanes, 2003). Written documentation of initial evaluation assessments, the treatment plan, and demonstration of improvements must be provided to Medicare in order to receive or continue reimbursement for COVT and OT services. This often leaves the burden of payment to the parents/caregivers, who may have limited or no ability to pay, which in turn can influence whether or not the child receives vision therapy.

Even if early vision screening services were available and reimbursement was not a significant barrier for most children, the final issue of the professions involved in vision therapy is significant. The professional knowledge and collaboration barriers are significant for this scholarly project since it is proposed that occupational therapy needs to increase its visibility as a viable team member of the vision multi-disciplinary team.

Service Provision

In summary, the barriers impacting service provision include:

1. Reimbursement for the services such as assessment and treatment may be a factor, due to the limited resources. In a *Summary of Research on the Efficacy of Vision Therapy for Specific Visual Dysfunctions* by J. Cooper, M.S., O.D., (1998) numerous retrospective studies have provided the necessary evidence on the effectiveness of vision therapy in treating vision related learning disorders.
2. Education: There is a lack of education in several venues:

- a. Visual problems not diagnosed as early as possible limiting a child's development in foundational academic skills and necessary ADLs, play and leisure.
 - b. Training and developmental functional abilities are negatively impacted due to the inefficient use of professional resources and skills.
 - c. Parents, caregivers, and teachers do not have adequate information to help identify any potential risks earlier in order to get the child the assistance they may need.
3. Providers: Providers are limited in numbers, especially in rural areas such as Wyoming. Providers are also limited in knowledge of the services each can contribute to ensuring children are receiving the most efficient and effective services. This means that intervention needs to be more multidisciplinary and collaborative to get the child 'up to speed' as quickly and effectively as possible.

Proposed Strategies

The literature has consistently identified several primary areas that negatively impact access to effective and efficient vision therapy services for children. The impact of a delay in accessing services or never accessing services can significantly affect a child in ways that limit the child's current and future growth and development. The ability of a child to learn in school, enjoy sports and recreation and achieve success on the job in the future depends on efficient vision.

As stated prior, these barriers include: 1) Reimbursement 2) Education, 3) and Providers. In this section, several strategies will be proposed to address these barriers toward the primary strategy, which is a Parent/Caregiver Educational Handbook

Reimbursement: To ensure reimbursement, it is important to maintain evidence-based practice through current research by occupational therapists and other health professions to provide validity and reliability regarding the effectiveness of vision treatments (Dankert, Davies & Gavin, W.J., 2003). Increased research may provide evidence-based data that indicates the effectiveness of vision therapy as a primary intervention versus expensive surgery. The research will provide the necessary means for programs to assist parents/caregivers and teachers in locating information on available funding, where services are provided and to locate informational web pages to answer questions or concerns regarding specific areas in vision deficits and treatment. The research will also confirm the importance of preventative care such as vision therapy and comprehensive visual screens, which will ultimately decrease the cost to insurance companies as well as Medicare/Medicaid versus the high cost of secondary or tertiary health care.

Advocacy is needed in order to educate insurance companies on the cost effectiveness of vision therapy when correcting visual deficits versus paying the substantial expense of multiple surgeries and prescription lenses.

Education: Education is critical for eye care practitioners, teachers, parents/caregivers, other healthcare professions and legislators on a national, state, and community level. This supports the necessity for creating and implementing nationwide criteria regarding preventative vision rehabilitation services and vision screening

programs. In accordance with Healthy People 2010 vision objectives and current research, “the US Congress and the Department of the Health and Human Services are striving to create uniform guidelines with regards to vision screening for children” (Castanes, 2003, p. 218). Once the vision screenings are completed, it is vital for appropriate services to be provided as soon as possible to minimize the negative effects on the child’s academic performance and ADLs.

OTs, COVTs, and optometrists need to provide parents/caregivers opportunities to be a major part in their child's treatment plan. At times, vision therapy can be frustrating to children as well as parents/caregivers. Parents/caregivers can limit their child’s frustration and increase the degree of their child’s success by becoming actively involved with their child’s vision therapy as well as providing positive reinforcement and encouragement during treatments. It is important for the team and the OT to include, provide clear and concise information to parents/caregivers and teachers when discussing the interventions that will be implemented with their child and/or student. “Parents may struggle to understand the legal and scientific language that circulates among professionals” (Reid, & Weatherly Valle, 2004, p. 476). This may “alienate parents from the collaborative process guaranteed by law” (Reid et.al, 2004, p. 476).

In order for vision therapy to be successful and for new vision skills to be learned, the child needs to complete vision therapy at home, 4-5 days per week with each session lasting 15-30 minutes (Vision and Learning, 2002). Not only is it important to complete vision therapy at home, it is imperative for the child to also attend in-office therapy weekly. Careful guidance and frequent monitoring by vision therapists, occupational therapists and optometrists needs to be provided to parents/caregivers to ensure visual

habits are learned correctly, check on the weekly progress being made by the child, and modify the vision therapy program as needed.

Providers: The literature indicates that there is a shortage of professionals to participate in screening, evaluating and treating children who are in need of services. As stated prior, a deficit in the visual perceptual system can lead to dysfunction in a number of occupational and functional skills areas for children and youth. This dysfunction can effect overall academic performance in areas such as reading, writing, spelling, visual motor integration, mathematics, ADLs, participation in play/recreation/leisure activities, and completion of school-related work. This in turn could have a negative effect on school-aged children's self-esteem, self concept, development of anxieties and depression over the learning experience (Brown, Rodger, Davis, 2003; Bowan, 2002).

The vision therapy multi-disciplinary team includes professionals such as an optometrist, occupational therapist, vision therapist, pediatrician, and teachers and social worker.

The focus of this scholarly project was to try and elicit, organize and disseminate valuable information in the most efficient and effective manner and direction. It was felt that the first step begins with educating the parents/caregivers regarding the facts about vision therapy, the effectiveness and efficiency of therapy and the role of each member of the multi-disciplinary team. It is hoped that as parents/caregivers become more informed they can become strong advocates at the local, regional and national level to increase awareness and access to these services for all children. This knowledge and advocacy would push politicians and professionals/clinicians to respond with more motivation and investment to ultimately meet the needs of each child.

The Vision Therapy Project

The primary purpose of this project was to develop a parent/caregiver educational handbook to meet several of the barriers identified prior such as:

1. Educating parent/caregivers with children who have visual deficits and allow parents/caregivers to become effective advocates, and increase the child's success within their academic environment as well as independence with their occupational performance. Parents/caregivers and teachers are not trained as diagnosticians or clinicians to properly detect visual perceptual disorders versus actual learning disabilities, which can cause them to inadvertently misdiagnose children with learning disabilities (Bowen, 2002). However, with proper training, parents/caregivers and teachers can be trained to detect signs and symptoms of visual perceptual problems early and bring the child to an optometrist to have a comprehensive eye exam conducted in order to rule out vision deficits as the main cause of learning disabilities.
2. Occupational therapists are becoming certified in vision therapy and under strict collaboration with optometrists, have blended "their knowledge and experience in cognitive therapy, sensory processing and optic studies. It will be important for OT's to educate other disciplines, parents/caregivers, and teachers on the benefits of using occupational therapist's skills and knowledge. It is also important for the occupational therapists to have a clear understanding of their role, strengths and limitations of their skills and knowledge.

3. To promote the collaboration of optometrists, vision therapists and occupational therapists need to provide a more holistic approach for the child to be successful in their academic environment and gain necessary life skills. Occupational Therapist's have significant skill training in regards to anatomy, visual motor disorders, visual perceptual (visual information processing) disorders, and sensorimotor development. As stated by the Optometrists Network (2006), the neurological training or rehabilitation of vision therapy can be compared to some forms of occupational therapy.
4. A final benefit is that the Vision Therapy Project, which is located in Casper, Wyoming, is interested in utilizing this handbook. This is a local non-profit organization in Casper, Wyoming dedicated to provide assistance and education to children in need of vision therapy as well as to educate parents/caregivers who have children with visual deficits.

The Vision Therapy Project Parent/Caregiver Education Handbook is intended to be used by an occupational therapist to facilitate parent/caregiver and teacher involvement, address areas which are impacting the child's learning, and provide a better understanding of the vision therapy treatment being provided. It is also intended to be used by occupational therapists to facilitate a multi-disciplinary approach using the Ecological Model of Human Performance.

The Ecological Model of Human Performance was developed by Winnie Dunn, Catana Brown, and Mary Jane Youngstrom, not just for the profession of occupational therapy but other healthcare professions as well. In this model "occupation exists when the person and context factors come together to give meaning to task" (Kramer, P.,

Hinojosa, J., & Brasic Royeen, C., 2003, p. 225). This model was chosen to guide the process of developing an interdisciplinary model of collaboration within the vision therapy project. It is an Occupational Therapy based model that is conducive to interdisciplinary work to meet the needs of each child. It uses a client-centered approach that can be adapted to each individual's needs. It looks at what is impeding the individual's task performance, and whether changes need to be made to the person, context or the task itself. The model includes a seven-step process for treatment and intervention, which include: 1) prioritize the individual's wants and needs, 2) analyze prioritized tasks, 3) evaluate performance, 4) evaluate the contexts, 5) evaluate the person variables, 6) develop goals and choose intervention strategies for identified priorities and 7) evaluate the person/task/context match and select achievable goals and reasonable intervention strategies. It also involves five intervention strategies recommended for delivery of OT services these are: 1) establish/restore, 2) adapt/modify, 3) alter, 4) prevent and 5) create.

In regard to the specific role of Occupational Therapy, the role of OT is presented in regard to assessment and intervention. Occupational therapy practice is based upon an understanding of the interactions among children and their environments. The occupational therapist will address all areas that are affected by the child's visual deficits while participating in: ADLs such as bathing, grooming, toileting and eating; carrying out their responsibilities at home and school; education; social participation i.e. activities in their community, with family and friends play and leisure activities. Therefore, when occupational therapists test a child's performance, they are determining whether or not limitations in the child's performance are related to their natural ability or outside factors

in the environment as well as using the child's strengths and skills they already have (Case-Smith, J., 2001). In preparation for intervention, occupational therapist can utilize the Ecological Model of Human Performance to begin to develop interventions, which are aimed at the child, the context, the task, or in many cases the combination of all.

Both vision therapy and occupational therapy look for the underlying causes, not just the signs or symptoms of the disorders. Both therapies examine what areas are affected and designed treatment plans that will enhance the performance of each child. When collaborating together, vision therapists and occupational therapists focus on the integration of visual skills with other sensory systems and functional comprehensive vision is facilitated, thus providing meaningful experiences in school, at play, and in the home" (Cantu, 2005, p12). This integration allows children to automatically have effective responses to the visual tasks they are attending to, which in turn helps in alleviating symptoms that are inhibiting the development of the child or their progress in academics (Cantu, 2005). Vision therapy and occupational therapy collaboration is beneficial when treating the underlying causes of deficits in a child's performance through all areas of occupation.

The Vision Therapy Project Parent/Caregiver Education Handbook contains information regarding the development of the visual system; visual deficits and disorders that result from a dysfunction within the visual system; how other senses work together in conjunction with vision; what is occupational therapy and vision therapy and the services they provide; parents/caregivers roles with therapy in the home and office; and resources for parents/caregivers to access. The Handbook, in its entirety, is presented in Chapter IV.

CHAPTER III

METHOD

From the review of literature school-aged children that suffer with undiagnosed vision problems that effect performance in school and in life is currently estimated to be 1 out of 4 school-aged children (PAVE, 2005). Cornoldi, et al. (2003), stated it is imperative for early vision screens to be completed among preschool children and children entering the primary school system. Also, in the Survey of Vision Screening Policy of Preschool Children in the United States by Ciner, et al (1999), Wyoming does not screen for any type of visual skill deficits and do not have any set guidelines or written referrals in place. Teachers are not trained to properly detect visual perceptual disorders versus actual learning disabilities which can cause them to inadvertently misdiagnose children with learning disabilities (Bowan, 2002). During an interview with A. Wellborn, who is a Certified Optometric Vision Therapist (COVT), American Board Opticianry (ABO), National Contact Lens Certified (NCLC), Certified Para Optometric Assistant (CPOA), on October 19, 2005, stated that there is a need to educate Fellow COVD optometrist regarding the effectiveness of vision therapy, there is a need for COVTs providing vision therapy to school-aged children, and limited awareness of resources for parents/caregivers to access when seeking assistance or information on vision therapy within the state of Wyoming.

The methodology used to gather the information for the development of The Vision Therapy Project Parent/Caregiver Handbook included an extensive literature review, which was conducted to explore the role of Occupational Therapy with visual disorders. In addition, an interview with a vision therapist was conducted to get a practitioners perspective on the current issues and needs of the child. Information was elicited regarding the relationship of vision and visual problems on a child's academic achievements and daily life. The information was then assessed as to the role and practical application of occupational therapy to meet the assessment and intervention needs of the child, family/caregivers and other individuals who are vital to the child's success. The result was the development of the Vision Therapy Project Parent/Caregiver Educational Handbook.

The *Parent/Caregiver Educational Handbook* was developed from the review of literature and is intended to be used by an occupational therapist to (1) facilitate parental/caregiver involvement (2) address areas that are impacting a child's learning and (3) provide parents/caregivers with a better understanding of the vision therapy intervention being provided. It is also recommended as a way to promote the collaboration of optometrist and occupational therapy to provide a child with the necessary vision skills they need to be successful in their academic environment. The handbook contains information regarding:

- Development of the visual system; visual deficits and disorders.
- How other senses work together with vision.
- What is occupational therapy (OT) and vision therapy (VT).
- Parents/caregiver's role with vision therapy in the home and office and

- Resources for parents/caregivers to access.
 - Websites for locating agencies for support and financial assistance.
 - Further definitions to educate and increase parent/caregiver involvement.

One final purpose was to benefit the Vision Therapy Project, which is located in Casper, Wyoming. According to the Vision Therapy Project brochure (2005), this project is a non-profit organization dedicated to provide assistance and education to parents/caregivers with children in need of vision therapy. Their mission is to provide vision therapy to children without insurance or the means to pay for vision therapy; implement programs in the school systems that help train teachers and parents on how to identify vision related learning disorders; and implement free screenings to help identify children at risk (Vision Therapy Project Brochure, 2005).



THE
VISION
THERAPY
PROJECT. ©

Parent/Caregiver Educational Handbook

Dawn Cardinal, MOTS and Genae Nannemann, MOTS
Scott Johnson, OTD., OTR/L, ATP, Advisor
University of North Dakota
Occupational Therapy

Table of Contents

Introduction.....	3
Ecological Model.....	4
Vision.....	6
Understanding the Vision System.....	8
Visual System.....	9
Vision Development.....	10
Vision Deficits & Vision Learning Disorders.....	11
Understanding the Sensory System.....	13
Sensory System.....	14
Proprioceptive System.....	14
Vestibular System.....	15
Tactile System.....	16
Understanding the Treatment Options and Process.....	17
Occupational Therapy.....	18
What is Occupational Therapy?.....	18
Vision Therapy.....	19
What is Vision Therapy?.....	19
What Can Parent/Caregiver Do To Help?.....	23
Parents/Caregivers Role.....	24
Parents/Caregiver’s and Teacher’s Checklist.....	25
Resources.....	27
Parent/Caregiver Advocacy.....	28
Financial Resources.....	29
Terminology.....	30
Terminology.....	31
References.....	34
References.....	35

Introduction

The purpose of this project is to develop a parent/caregiver handbook that will educate parents/caregivers with children who have visual deficits and to benefit the Vision Therapy Project, which is located in Casper, Wyoming. As described by The Vision Therapy Project brochure (2005), this project is a non-profit organization dedicated to provide assistance and education to children in need of vision therapy. Their mission is to provide vision therapy to children without insurance or the means to pay for vision therapy; start programs in the school systems that will help train teachers and parents on identifying sign and symptoms of vision related learning disorders; and perform free screenings to help identify children at risk (Vision Therapy Project Brochure, 2005).

It is intended that the handbook will be used by an occupational therapist to encourage parental involvement, address areas which are affecting children's learning, and provide parents/caregivers a better understanding of the vision therapy treatment being provided to their child. The contents of the handbook are supported by current research and literature.

The *Parent/Caregiver Educational Handbook* contains information regarding the development of the visual system; visual deficits and disorders that result from a dysfunction within the visual system; how other senses work together with vision; what is occupational therapy (OT) and vision therapy (VT) and the services they can provide, parents/caregiver's involvement with vision therapy in the home and office; and resources for parents/caregivers to access. At the end of the handbook there is a list of resources which contain excellent information on all aspects of vision; websites for parents/caregivers to locate agencies for support and financial assistance; and further definitions that may not be included in the handbook, so that parents/caregivers can further educate themselves and increase their involvement in their child's vision therapy treatment.

Ecological Model

The Ecological Model of Human Performance was chosen to guide the process of developing an interdisciplinary model of collaboration within the vision therapy project. It is an occupational therapy based model that is conducive to interdisciplinary work to meet the needs of each child. It uses a client-centered approach that can be adapted to each individual's needs. It looks at what is impeding the individual's task performance, and whether changes need to be made to the person, context or the task itself. The model includes a seven-step process for treatment and intervention as well as five intervention strategies recommended for delivery of services in a collaborative manner. The Ecological Model of Human Performance was developed by Winnie Dunn, Catana Brown, and Mary Jane Youngstrom, not just for the profession of occupational therapy but other healthcare professions as well. In this model "occupation exists when the person and context factors come together to give meaning to task" (Kramer, P., Hinojosa, J., & Brasic Royeen, C., 2003, p. 225). The core constructs of this model include person, task, context, and performance. The core concept of person is defined as: an individual with unique abilities and skills in all areas of occupation. The concept of task includes a set of behaviors that are unique to each individual, which are objective and necessary to accomplish a goal. The main concept in this model is context. Context is defined as related conditions such as temporal (i.e. chronological age, developmental stage, life cycle, and health status), and environmental (i.e. physical, social and cultural) that encompasses the individual. Lastly, performance is the other concept within this model, which addresses both the process and the result of how the individual skills and abilities are applied when selecting a task they want to perform. (Kramer, P., et al., 2003)

The Ecological Model of Human Performance consists of five therapeutic intervention approaches, these include: establish/restore, alter, adapt/modify, prevent and create. In order to

utilize establish/restore approach, the occupational therapist will develop interventions which will focus on improving the child's vision skills and abilities that were not correctly integrated from the visual system and all other senses. When considering the approach of adapt/modify, the occupational therapist adapts/modifies the task or the environment to support the occupational performance of the child and to ensure successful outcomes (i.e. changing the lighting, work space, and providing a distract free environment). With the approach of prevent, the occupational therapist can change the child's context or task skills in order to prevent negative outcomes. This can be accomplished by providing an educational handbook to parents/caregivers and vision therapy services to establish and restore necessary visual skills for children to become self-confident, have better self-esteem and to be successful in their academic environment and at home. With the create approach, occupational therapists can become advocates for the child and parents/caregivers. They can also provide comprehensive vision screenings to all children before entering the primary school system to detect early visual deficits.

Occupational therapists use a variety of purposeful activity or interventions designed to achieve purposeful and meaningful outcomes with the child's performance in all contexts. This is done through promoting health and wellness, and further prevention of visual deficits and learning disabilities. Occupational therapists strive to develop, improve, sustain, or restore the highest possible level of independence of any child who has visual deficits or learning disability (AOTA, Inc., 1994).

A child's occupational performance can be impacted by deficits within the visual perceptual system. These deficits can lead to dysfunction in a number of occupational and functional skill areas for children and youth, which can effect overall academic performance in areas such as reading, writing, spelling, visual motor integration, mathematics, ADLs,

participation in play/recreation/leisure activities, and completion of school-related work. This in turn could have a negative effect on school-aged children's self-esteem, self-concept, development of anxieties and depression over the learning experience.

Vision

Vision is a dynamic process where information is obtained from the environment as well as previous experiences and combined through multiple sensory systems. Vision alone cannot understand the importance for what is being experienced; this is due to the complexity of vision. Vision is a fundamental factor in a child's learning process. There are three interrelated areas of visual function:

1. Visual pathway integrity including eye health, visual acuity and refractive status;
2. Visual efficiency including accommodation (eye focusing), binocular vision and eye movements; and
3. Visual information processing including identification and the ability to tell the difference between objects, color, size, touch, and smell; knowing the distance between objects; and a combination of other senses (Optometrist Network; 2004).

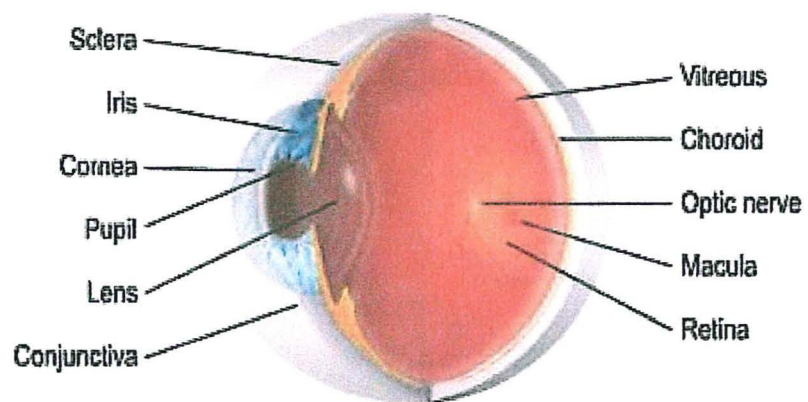
Vision abilities can be grouped together in three categories. These categories include:

1. Visual spatial: How the brain visually combines coordinated movements within the environment.
2. Visual analysis: the ability to use past experiences to recognize, organize, recollect and utilize the visual information received.
3. Visual integration skills: the ability to combine information from vision with all other senses.

Researchers have estimated that “75-90% of classroom learning occurs through the visual system” (Vision and Learning, 2002, ¶4). A deficit (problem) within the visual perceptual system can lead to dysfunction which can effect overall school performance in areas such as reading, writing, spelling, eye-hand coordination, mathematics, ADLs, participation in play/recreation/leisure activities, and completion of school-related work (Maples, W.C., 2000). However, the lack of information and research on the benefits of vision therapy available to optometrists and parents/caregivers, and limits the use of vision therapy.

In a *Summary of Research on the Efficacy of Vision Therapy for Specific Visual Dysfunctions* by J. Cooper, M.S., O.D. (1998), numerous research studies have provided the necessary evidence on the effectiveness of vision therapy in treating vision related learning disorders. Vision therapy is an effective and useful treatment for children with vision related learning disabilities. Children are often misdiagnosed by teachers or parents/caregivers with Learning Disabilities (LD)/Nonverbal Learning Disabilities (NVLD), Dyslexia, and Attention Deficit Disorder (ADD), and Attention Deficit Hyperactivity Disorder (ADHD) (Bowan, M.D., 2002).

UNDERSTANDING THE VISION SYSTEM



Visual System

Vision is learned and developed from birth, and is the ability to identify, recognize and understand what is seen in the environment in which we live. Vision is a necessary element in our ability to learn, work, socialize and play. The visual system is supported by three basic foundations of visual skills (Pedretti, L. & Early, M.B., 2001) these are:

1. oculomotor control: allows eye movements to be completed rapidly and precisely.
2. visual fields: provides complete visual information as seen by the eye and relays it to the central nervous system (CNS) which interprets information received.
3. visual acuity: provides an accurate account of the information sent to the CNS.

The visual system is made up of a pyramid that consists of:

- gaining information from the environment (visuocognition);
- ability to recognize, retrieve, and
- to store visual information from short or long term memory (visual memory);
- identify objects from surroundings (pattern recognition);
- movement of eyes together towards an object in the environment (visual scanning);
- ability to attend to what is in the visual field (visual attention) and
- the foundations for visual function as defined above. (Pedretti, L. & Early, M.B., 2001; Case-Smith, J., 2001)

These visual skill builds on another, step-by-step, as children develop into adults. Vision related learning disabilities can occur if one of the basic foundational visual skills is skipped, or not completed, which can cause deficits within the visual system. Refer to *Figure 1. Hierarchy of visual perceptual development in central nervous system.*

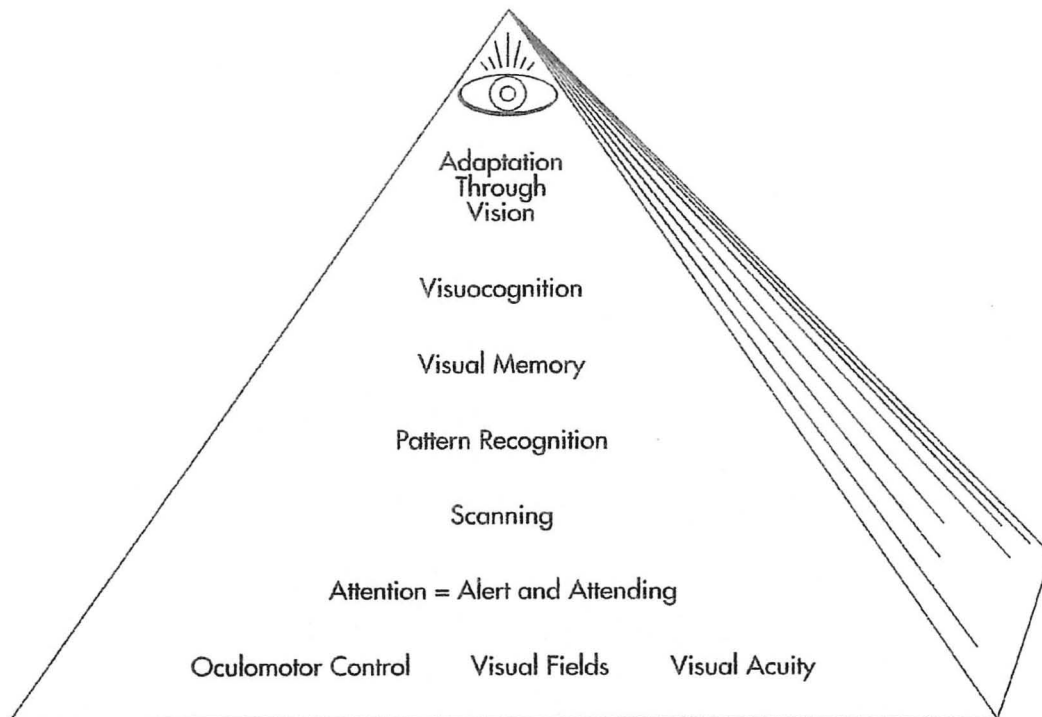


Figure 1: Hierarchy of visual perceptual development in central nervous system: adopted from Pedretti, L. & Early, M.B. (2001 p. 392)

Vision Development

Vision has become our major means of relating to space, but the sensory systems such as the vestibular, proprioceptive, and touch systems must contribute to visual development and function (Ayers, A.J., 2000). The development of

“visual learning starts early in life. From birth on, a baby is laying the foundation for understanding so many aspects of vision: what is up and down, and what is diagonal, horizontal, or vertical? What is close and what is far away? Is something soft or hard, rough or smooth, hot or cold? All this must first be experienced through touch, and then associated with visual interpretation. Additionally, how the primary caregivers choose to move a child about ... has a huge impact on the child’s understanding of directionality and gravity; which also play a part in visual development. As more and more independence in balance and movement develops, the baby is freer to explore the environment and refine the relationships between spatial and tactile experiences in our complex world.” (Hickman, L. & Hutchins, R., 2000, p. 2)

Visual/perceptual skills develop from general to specific, whole to parts, concrete to abstract, and familiar to unfamiliar. Much of this development takes place by nine years of age.

When one of these skills is not working correctly, deficits can occur with visual learning abilities.

Vision Deficits and Vision Learning Disorders

The following is a variety of disorders and dysfunctions that are related to visual/perceptual skills deficits: accommodative dysfunctions, refractive errors, convergence insufficiency, divergence excess, ocular motor dysfunctions, visual-spatial disorders, visual/perceptual disorders, learning related visual problems, strabismus, and amblyopia.

- **Accommodative dysfunctions-** (eye focusing) inability to change focus of the eye so that objects at different distances can be seen clearly
- **Refractive errors-** inability to adapt to different lighting conditions
- **Convergence insufficiency-** condition in which the eyes have a tendency to drift outward for near work such as reading, while at far distance the eyes work well together
- **Divergence excess-** condition in which the eyes drift outwards when looking at a distance and function normally when looking at near objects
- **Ocular motor dysfunctions-**
 - Binocularity-inability to use both eyes together
 - Saccades- inability of quick, precise eye movements that are made during visual scanning or a visual search
 - Fixation- inability to maintain sharp focus on a moving or stationary target with both eyes precisely coordinated
 - Pursuits- inability to lock onto and maintain fixation on a moving target across all visual fields
- **Visual-spatial-** inability of the brain to visually combine coordinated movements within the environment
- **Visual/perceptual-** inability to recognize and understand visual information
- **Strabismus-** misalignment of the eyes all of the time or part of the time
- **Amblyopia-** lowered visual acuity (clarity), not correctable with lenses (Scheiman, M., 2001)

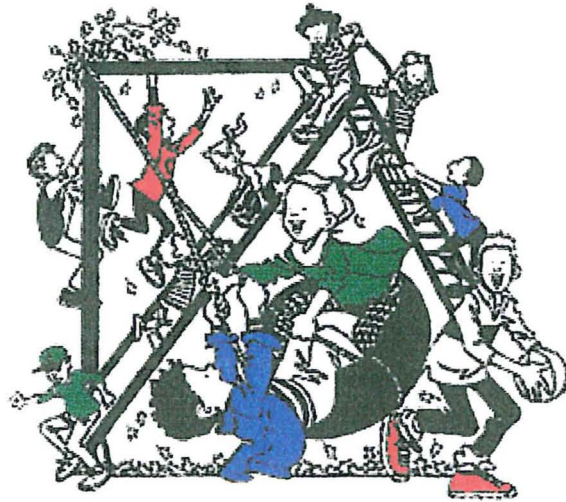
These dysfunctions can lead teachers and parents/caregivers to misdiagnose children as having as ADD/ADHD, Dyslexia, LD, or NVLD and are defined below:

- **ADD/ADHD-** consists of a persistent pattern of severe inattention and/or hyperactive and impulsive behavior
- **Dyslexia-** impaired ability to recognize words, slow and inaccurate reading, and poor comprehension

- **Learning disorders-** deficits in acquiring expected skills in reading, writing, speaking, use of listening, reasoning, or mathematics
- **Non-verbal learning disorders-** deficits in abstract thinking, visual memory, and spatial recognition (Sadock, B.J., & Sadock, V.A., 2004; Koller, H.P., 2002).

A child is required to have constant visual attention during reading in order to understand and maintain visual performance, this requires the child's ability to focus on required information and ignore outside information for an extended period of time. (Solan, H. A., Shelley-Tremblay, J., Ficarra, A., Silverman, M., & Larson, S., 2003; Del Pilar Cardona, M., Martinez, A. L., & Hinojosa, J., 2000). Many children may seem distracted or hyperactive in their academic environment which maybe caused by frustration from reading difficulties as a result of decreased visual attention (Willcutt, E.G., Pennington, B.F., Boada, R., Ogline, J.S., Tunick, R.A., Chhabildas, N.A., & Olson, R.K., 2001). For most children, learning to read is simple, "however, 5%-17% of children have developmental reading disability or dyslexia" (Hood, M., & Conlon, E., 2004, p. 235). The visual system which processes visual information in order to correctly recognize letters, words, and recall how words appear can impair visual attention in children with dyslexia (Heiervang, E. & Hugdahl, K., 2003; Badian, N.A., 2005). "A child's problem with visual perception may be based in the more complex issues of sensory processing, or may be primarily a result of visual interpretation issues. Whatever the reason, these children are frequently mislabeled as having behavior problems, or as being under-achievers or slow learners" (Hickman, L. & Hutchins, R., 2000, p 3).

UNDERSTANDING
THE
SENSORY SYSTEM



Sensory System

Most of our learning must occur first through the integration of our sensory systems. The sensory system consists of proprioceptive, vestibular, and tactile systems. These systems along with the visual system work together in a manner that puts the environment into perspective and provide information on the physical conditions of our body. These three systems give meaning to what the child sees by connecting the visual information with the experiences from movement and touch during their lifetime. A great deal of sensory integration is required when the child is participating in reading, writing and mathematic activities. A child may have a normal capacity for learning, however a dysfunction with sensory integration may directly interfere with the learning process or it may cause disruptive behavior that interferes with their academics. When the sensory systems works together in a child, the more they can learn and easier it is for them.

(Ayers, A.J., 2000; Pedretti, L. & Early, M.B. 2001)

Proprioceptive System

Proprioception system is the interpretation of the sensation from the child's own body during movement or standing still, this system tells the brain information about the position of their body. When the proprioception system is working correctly, the child is able to maintain upright posture, coordinate body movements, write without looking at the pencil, and type on a computer without looking at the keys (Pedretti, L., Early, M.B., 2001). When the proprioception system is not working correctly, a child may have trouble with fine and gross motor skills.

Examples of fine motor skills are academic tasks such as writing, art, playing a musical instrument or any classroom tasks that require small movements of the fingers. Examples of gross motor skills are running and jumping during physical education (P.E.) class or while at recess, walking down steep stairs or playing sports that require large movement of the body. A

dysfunction in proprioception system would cause body movements to be slower, clumsier, and involve more effort to be made by the child. Children with poorly organized proprioception have difficulty accomplishing school, home and community activities when they cannot see what their body is doing with their eyes. This is due to the child's dependence on their visual system and the information received by the brain to know actually what their body is doing. (Ayers, A.J., 2000; Pedretti, L. & Early, M.B. 2001)

Vestibular System

The vestibular system provides information to their brain that is exact and informs the child exactly where they are in relationship to gravity; their ability to maintain and correct posture when they are moving or standing still; how fast and in what direction they are going. (Pedretti, L., Early, M.B., 2001) When the vestibular system is working correctly children are able to make appropriate adjustments with their postural balance (sitting, standing and moving) and adjusts vision correctly with their head movements. The vestibular system also maintains a steady visual field, so object that children see do not appear to flutter as they move. Children with poor vestibular processing skills often will have learning problems. Dysfunction in this system can cause difficulty in tracking a moving object in front of their eyes, and moving their eyes accurately from one spot to another. Instead of moving smoothly, their eyes may lag behind and then jerk to catch up. This makes playing ball, drawing a line with a piece of chalk, or reading a line of print very hard. When the child sees something move in front of their eyes, the child must know whether it is an object, their head or whole body that is moving. If the whole vestibular system is not working correctly, the child can develop poor postures which can affect academics; inability to judge how far they can lean before falling or judge how far to step on/off a curb; and difficulty with movements against gravity such as reaching while sitting.

(Ayers, A.J., 2000; Pedretti, L. & Early, M.B. 2001) Visual performance is dependent on the relationship between the proprioception, vestibular and tactile perception systems (Hickman, L. & Hutchins, R., 2000).

Tactile System

The tactile system is a crucial part of learning during infancy and childhood. All aspects of vision are first experienced through touch from a child's mouth and hands as they develop. The tactile system is closely associated with visual system, thus problems in both these systems are commonly seen in children. (Case-Smith, J., 2001) According to Ayers (2000), the tactile system sends information to the brain regarding pressure, pain, texture, heat or cold, and movement from the hairs on the skin. Responses to tactile sensations can be broke down in to discriminatory or protective. The discriminatory response allows the child to know where and what is being touched on the body, for example identifying an object only by touch, feeling vibration, light touch, and pressure. The protective response allows the child to react to sensations for example pain, temperature (hot/cold), and flight or fight responses. When the tactile system is working correctly children are able to precisely locate where on their body an object has touched them; identify if an object is safe or not safe to touch for example sharp/dull and hot cold; or identify common objects and shapes through hand manipulation without the use of sight. When the tactile system is not working correctly fine motor skills such as writing with a pencil or holding a piece of paper with one hand and cutting with the other are the most likely to suffer as well as a child's ability to decide between safe and unsafe objects. When the whole body and other senses work together as a whole, adaptation and learning are easy for the brain. (Ayers, A.J., 2000; Pedretti, L. & Early, M.B. 2001)

UNDERSTANDING
THE
TREATMENT OPTIONS
AND
PROCESS



Occupational Therapy

What is Occupational Therapy?

Occupational therapy is a profession that uses activities that are meaningful to a child to promote the child's health, prevent further injury or disability and help to develop, improve, or restore a child's ability to function on their own. Occupational therapy practice is based upon an understanding of the interactions among children and their environments. The occupational therapist will address all areas that are affected by the child's visual deficits while participating in:

- activities of daily living (ADLs) such as bathing, grooming, toileting and eating;
- carrying out their responsibilities at home and school;
- education;
- social participation i.e. activities in their community, with family and friends
- play and
- leisure activities.

Therefore, when occupational therapists test a child's performance, they are determining whether or not limitations in the child's performance are related to their natural ability or outside factors in the environment as well as using the child's strengths and skills they already have (Case-Smith, J., 2001).

A child's ability to learn and integrate information mainly comes from vision skills, due to the complexity of vision not all children are affected the same way. "It is important for all parents/caregivers and professionals who work with children to understand that vision is just part of the puzzle and one type of treatment does not work for everyone. A multi-disciplinary approach to learning problems is ideal" (Vision and Learning, 2002). A multi-disciplinary approach is a team of individuals that consists of: the child, parents/caregivers, optometrist,

occupational therapist, vision therapist, pediatrician, and teachers in order to focus on and treat the underlying causes rather than the symptoms which are affecting the child's performance within the academic environment. Vision therapists only address the child's visual deficits and the impacts it has on the area of education. Occupational therapist can compliment the work of the vision therapist by providing a more holistic approach to vision therapy by focusing on the integration of visual skills with other sensory systems as well as adapting the environment for the child to develop the necessary vision skills to be successful in their daily life. This integration allows children to automatically have effective responses to the visual tasks they are attending to, which in turn helps in improving the symptoms that are preventing the development of the child or their progress in school (Cantu, C. O., 2005).

Vision Therapy

What is Vision Therapy?

According to the College of Optometrists of Vision Development (COVD) (2005), vision therapy (VT) is an individualized treatment program designed to improve visual function and performance. Vision therapy trains the entire visual system which includes eyes, brain, and body. The goal of vision therapy is to train the child's brain to use the eyes to receive information effectively, understand the information quickly, and the body's ability to react appropriately.

Vision therapy sessions include:

1. Procedures designed to improve the brain's ability to control eye alignment, eye movements, focusing abilities and eye teamwork (Optometrists Network, 2004). A series of eye exercises that are conducted in-office and at home to assist children to create and

restore the visual processing skills, which will decrease visual discomfort and improve the way a child uses their vision effectively.

Your vision therapist will provide specific exercises designed to meet your child's needs. It is strongly recommended that you ask your therapist to clarify anything that does not make sense, and to give you clear examples and demonstrations of what they expect you and your child to do for home exercises.

2. Visual motor skills and endurance are developed through the use of specialized computer programs and optical devices, including therapeutic lens, prisms, and filters.

Other optical devices used are:

- a. infrared sensing devices,
 - b. layovers,
 - c. pen and pencil activities,
 - d. mirrors,
 - e. balance boards,
 - f. exercises (i.e. eye-hand coordination drills, watching a series of blinking lights, staring at colored lights (Syntonics),
 - g. bouncing on a trampoline and even sleeping in a certain position, and
 - h. eye patching.
3. These tools are used to improve:
- Eye Focusing
 - Eye Coordination
 - Eye teaming (binocular vision)
 - Eye Movement
 - Visual Perceptual Skills
 - Blurry Vision problems such as:
 - Nearsightedness (myopia)
 - Farsightedness (hyperopia)
 - Astigmatism

Deficiencies in any one of the above areas may indicate a visual deficit and you may see one or more of the following signs and symptoms:

- Holding a book very close (7 or 8 inches away)
- Turning head to use only one eye
- Covering or closing one eye while reading
- Squinting for either near or far visual tasks
- Moving head back and forth, rather than eyes, while reading
- Omitting letters, words or phrases
- Complains of seeing double or of blurred vision
- Writing that is difficult to read, crowded or inconsistent in size
- Mistakes words with similar beginnings
- Miscalls or omits “small” words
- Excessive blinking or watering of eyes
- Losing place while reading
- Using a finger or marker to keep place
- Headaches during or after reading
- Misaligns digits in columns of numbers
- Writing uphill or downhill
- Reversing letters (d for b) or words (saw for was)
- Rereads or skips words while reading
- Excessive rubbing of eyes while engaged in visual tasks
- Fatigues easily
- Lip reading or whisper reading to reinforce comprehension
- Poor eye-hand coordination, i.e. difficulty with catching a ball
- Burning or itching eyes
- Sloppy writing or drawing skills
- Can’t stay on or in the lines
- Erases excessively
- Poor organization
- Does not recognize mistakes
- Poor posture when writing
- Excessive or inadequate pencil grip
- Can’t get answers on paper
- Tests poorly even if they know the subject
- Needs to have directions repeated all the time
- Poor spelling ability
- 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”)
- Lack of coordination and balance (clumsy)
- Difficulty learning left and right
- Difficulty with activities involving rhythm
- Does not cross the midline when doing tasks (switches object from hand to hand)
- Does not use non-dominant hand for supporting when writing or copying (http://www.add-adhd.org/learning_disabilities.html; <http://visionandlearning.org/visualskills.htm>)

In order for vision therapy to be successful and for visual skills to be learned a child needs to practice by completing vision therapy at home, 4-5 days per week with each session lasting 15-30 minutes (Vision and Learning, 2002). Not only is it important to complete vision therapy at home, it is necessary for the child to also attend in-office therapy weekly. Careful guidance and frequent monitoring by vision therapists, occupational therapists and optometrists are provided to parents/caregivers to insure visual habits are learned correctly, check on the weekly progress being made by the child and modify the vision therapy program as needed.

WHAT CAN
PARENTS/CAREGIVERS
DO TO HELP?



Parent/Caregiver Role

Vision therapy can be frustrating and hard work for both the child as well as parents/caregivers. Vision skills cannot be learned overnight, and may take anywhere from 6 weeks to a year for therapy to be completed. Parents/caregivers can limit their child's frustration by providing positive reinforcement and encouragement during treatments in-office and at home. As well as increase the degree of their child success by becoming actively involved with their child's vision therapy through participation with their child in treatment both in the home and at the office.

Due to the significant role that visions plays in learning, a checklist has been provided for parents/caregivers and teachers to fill out in order to increase awareness of the signs and symptoms related to visual deficits. By increasing the awareness, parents/caregivers and teachers can offer input from both the home and academic environments in order to provide the optometrist with a better indication on how the child is performing visually. If the child demonstrates any of the signs and symptoms from the Parent's/Caregiver's and Teacher's Checklist on the next page, a comprehensive eye exam should be completed by a qualified optometrist. When diagnosed accurately, learning related vision problems can be treated successfully and permanently.

Parents/Caregiver's and Teacher's Checklist Observable Signs and Symptoms

This checklist was designed for use by those adults who spend a considerable amount of time with the child. Although this Handbook was written specifically for use Parents/Caregivers, a teacher does spend a considerable amount of time with the child as well. The teacher would be an excellent resource for information as well so it is recommended that you ask your child's teacher to review and complete the checklist.

1. Appearance of Eyes:

- _____ One eye turns in or out at any time
- _____ Reddened eyes or lids
- _____ Eyes tear excessively
- _____ Encrusted eyelids
- _____ Frequent sties on

2: Complaints When Using Eyes at Table or Desk:

- _____ Headaches in forehead or temples
- _____ Burning or itching after reading or desk work
- _____ Nausea or dizziness
- _____ Print blurs after reading a short time

3. Behavioral Signs of Visual Problems:

A. 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
- _____ Orients drawings poorly on page

B. Eye Teaming Abilities (Binocularity):

- _____ Complaints 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

C. 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 hands or fingers to keep his place on the page
- _____ Uses other hand as "spacer" to control spacing and alignment on page
- _____ Repeatedly confuses left-right directions

D. Visual Form Perception (Visual Comparison, Visual Imagery, Visualization):

- _____ Mistakes words with same or similar beginnings
- _____ Fails to recognize same word in next sentence
- _____ Reverses letters and/or words in writing and copying
- _____ Confuses likenesses and minor differences
- _____ Confuses same word in same sentence
- _____ Repeatedly confuses similar beginnings and endings of words
- _____ Fails to visualize what is read either silently or orally
- _____ Whispers to self for reinforcement while reading silently
- _____ Returns to "drawing with fingers" to decide likes and differences

E. Refractive Status (Nearsightedness, Farsightedness, Focus Problems, etc.):

- _____ Comprehension reduces as reading continued; loses interest too quickly
- _____ Mispronounces similar words as continues reading
- _____ Blinks excessively at desk tasks and/or reading; not elsewhere
- _____ Holds book too closely; face too close to desk surface
- _____ Avoids all possible near-centered tasks
- _____ Complains of discomfort in tasks that demand visual interpretation
- _____ Closes or covers one eye when reading or doing desk work
- _____ Makes errors in copying from reference book to notebook
- _____ Squints to see chalkboard, or requests to move nearer
- _____ Rubs eyes during or after short periods of visual activity
- _____ Fatigues easily; blinks to make chalkboard clear up after desk task

Checklist adapted from www.oep.org

RESOURCES



Resources

Parent/Caregiver Advocacy

American Optometric Association

243 N. Lindbergh Blvd. 1st Floor
St. Louis, MO 63141
Phone: (800) 365-2219
Fax: (314) 991-4101
Website: www.aoa.org

Excellent information on all aspects of vision.

**The Center for Health and Health Care in Schools
School of Public Health and Health Services
The George Washington University Medical Center**
2121 K Steet NW, Suite 250
Washington, DC 20037
Phone: (202) 466-3396
Fax: (202) 466-3467
Website: <http://www.healthinschools.org>
E-mail: chhcs@gwu.edu

Information on children's health issues; tips on keeping your child safe and healthy.

College of Optometrists and Vision Development

234 N. Lindbergh Blvd., Suite 310
St. Louis, MO 63141-7851
Phone: 888-268-3770
Fax: 314-991-1167
Website: www.covd.org

Excellent information on all aspects of vision.

National Center for Learning Disabilities

Website: www.nclld.org
Information to parents/caregivers, professionals and individuals with learning disabilities, and advocates for policies to protect and strengthen educational rights and opportunities

National Eye Institute

2020 Vision Place
Bethesda, MD 20892-3655
Phone: (301) 496-5248
Website: www.nei.nih.gov

Conducts and supports research that helps prevent and treat eye diseases and other disorders of vision

National Parent Teacher Association (PTA)

541 N Fairbanks Court, Suite 1300
Chicago, IL 60611-3396
Phone: (312) 670-6782
Toll-Free: (800) 307-4PTA (4782)
Fax: (312) 670-6783
Website: www.pta.org

Provides parents/caregivers and families with a powerful voice to speak on behalf of every child

Optometric Extension Program Foundation, Inc. (OEP)

1921 E. Carnegie Ave. Suite 3-L
Santa Ana, CA 92705-5510
Phone: 949-250-8070
Website: www.healthy.net/oepe

Products, information, and workshops relating to improving visual motor skills.

The Optometrists Network

ATTN: Rachel Cooper
93 Bedford Street, Suite 5D
New York, NY 10014
Website: www.optometrists.org

Excellent information on all aspects of vision.

P.A.V.E. (Parents/caregivers Active for Vision Education)

National Headquarters
9620 Chesapeake Drive, Suite 105
San Diego, CA 92123
Phone: 619-467-9620 or 800-728-3988
E-mail: vision@pave-eye.com
Website: www.paveevision.org

Excellent information on all aspects of vision.

Vision and Learning: A Resource for Parents/caregivers and Educators

Website: www.visionandlearning.org

Information to increase a level of awareness about vision and learning.

Financial Resources

Kid Care CHIP (Children's Health Insurance Program)- Wyoming

6101 Yellowstone Rd, Suite 210

Cheyenne, WY 82002

Phone: 1-877-KIDS NOW (1-877-543-7669)

Email: kidcare@state.wy.us

Website: <http://kidcare.state.wy.us/>

For children and teens through age 18 who are uninsured and meet income eligibility guidelines.

State Children's Health Insurance Program (SCHIP)

2424 Pioneer Ave, Suite 100

Cheyenne, WY 82002

Phone: 1-307-777-8923 or 1-877-293-8744

E-mail: kidcare@state.wy.us

Website: <http://kidcare.state.wy.us>

For children and teens through age 18 who are uninsured and meet income eligibility guidelines.

VISION USA

243 North Lindbergh Blvd.

St. Louis, MO 63141

Fax: 314/991-4101

E-mail: visionusa@aoa.org

A source for financial help for vision screening.

Terminology



Terminology

Accommodation (eye focusing): ability to focus your eyes at different distances.

Accommodative dysfunctions: inability to change focus of the eye so that objects at different distances can be seen clearly

Acuity: clarity of sight; the ability to see objects clearly at distance and near.

Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD): consists of a persistent pattern of severe inattention and/or hyperactive and impulsive behavior

Amblyopia (lazy eye): lowered visual acuity (clarity), not correctable with lenses

Astigmatism: a refractive error where the eye is not spherical or round, but football shaped, and needs a cylindrical lens to provide good acuity.

Binocularity (eye teaming): ability to use both eyes together

Convergence insufficiency (CI): condition in which the eyes have a tendency to drift outward for near work such as reading, while at far distance the eyes work well together

Discriminatory Response: allows the child to know where and what is being touched on the body (i.e. identifying an object only by touch, feeling vibration, light touch, and pressure.)

Divergence excess: condition in which the eyes drift outwards when looking at a distance and function normally when looking at near objects

Dyslexia: impaired ability to recognize words, slow and inaccurate reading, and poor comprehension

Filters: optical devices used to reject light waves of certain frequencies while allowing others to pass

Fine Motor Skills (hand skills): ability to control small muscles of the body comfortably and efficiently.

Fixation: ability to maintain sharp focus on a moving or stationary target with both eyes precisely coordinated

Gross Motor Skills: ability to control the large muscle of the body comfortably and easily

Hyperopia (farsightedness): trouble seeing near distances clearly

Infrared sensing devices: optical device that monitors eye position and provides feedback to the patient to reduce the uncontrolled jumping of the eye.

Integration: ability to put two skills together such as vision and movement

Layovers: transparencies with different geometrical shapes which are laid over a reading task in order to train the eye to ignore extraneous information.

Learning disorders: deficits in acquiring expected skills in reading, writing, speaking, use of listening, reasoning, or mathematics

Lens: optical devices which are used to provide the eye with different visual experiences

Myopia (nearsightedness): trouble seeing far distances clearly

Non-verbal learning disorders: deficits in abstract thinking, visual memory, and spatial recognition

Occluders: a device that occludes the vision of the eye (i.e. patching)

Oculomotor control (eye movement): 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.

Occupational therapy: use of purposeful activity or interventions designed to achieve functional outcomes which promote health, prevent injury or disability and which develop, improve, sustain, or restore the highest possible level of independence of any individual who has an injury, illness, cognitive impairment, psychosocial dysfunction, mental illness, developmental or learning disability, or other disorder or condition

Optometrist: an eye doctor, that 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.

Pattern recognition: identify objects from surroundings.

Prisms: optical devices that make an object appear at a different location or encourage the eyes to move up, down, right or left.

Proprioception system: interpretation of the sensation from the child's own body during movement or standing still, this system tells the brain information about the position of their body.

Protective Response: allows the child to react to sensations (i.e. pain, temperature (hot/cold), and flight or fight responses.)

Pursuits: ability to lock onto and maintain fixation on a moving target across all visual fields

Refractive errors: inability to adapt to different lighting conditions

Saccades: ability of quick, precise eye movements that are made during visual scanning or a visual search

Sensory Integration: process of taking in information about the environment with all senses and from inside the body.

Strabismus: misalignment of the eyes all of the time or part of the time

Syntonics: staring at colored lights

Tactile system: sends information to the brain regarding pressure, pain, texture, heat or cold, and movement from the hairs on the skin.

Vestibular system: information to their brain that is exact and informs the child exactly where they are in relationship to gravity; their ability to maintain and compensate posture when they are moving or standing still; how fast and in what direction they are going.

Visuocognition: gaining information from the environment

Visual analysis: ability to use past experiences to recognize, organize, recollect and utilize the visual information received.

Visual attention: ability to attend to what is in the visual field.

Visual integration skills (visual motor integration (VMI), eye-hand coordination): 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.

Visual memory: ability to recognize, retrieve, and to store visual information from short or long term memory.

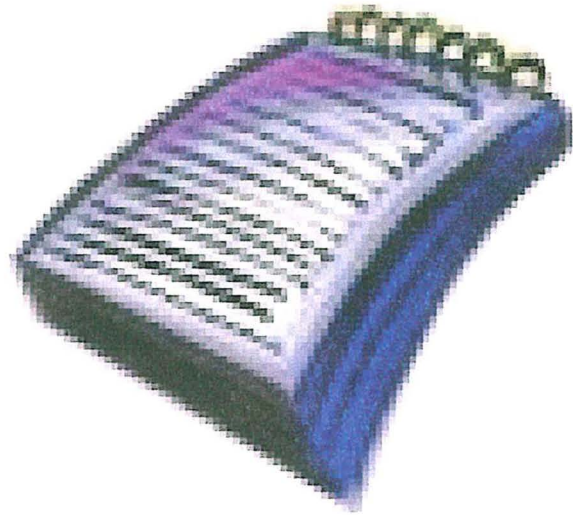
Visual perceptual: ability to interpret and understand visual information

Visual scanning: movement of eyes together towards an object in the environment.

Visual spatial skills: how the brain visually integrates coordinated movements within the environment.

Vision therapy (VT): a program or arranged conditions of learning directed toward development of a more efficient and effective visual system.

REFERENCES



REFERENCES

- AOTA Inc. (1994). Policy 5.3.1, definition of occupational therapy practice for state regulation. *American Journal of Occupational Therapy*, 48, 1072-1073.
- Ayers, A.J. (2000). *Sensory integration and the child*. Los Angeles: Western Psychological Services.
- Bowan, M.D. (2002). Learning disabilities, dyslexia, and vision: a subject review. *Optometry*, 73(9), 553-575.
- Cantu, C. O. (2005) Vision therapy. *Advance for Occupational Therapy Practitioners*, 21(6), 12.
- Case-Smith, J. (2001). *Occupational therapy for children* (4th ed.). Missouri: Mosby Inc.
- Cooper, J. (1998). Summary of Research on the Efficacy of Vision Therapy for Specific Visual Dysfunctions. Adapted from *The Journal of Behavioral Optometry*; 9(5), 115-119.
- Heiervang, E. & Hugdahl, K. (2003). Impaired visual attention in children with dyslexia. *Journal of Learning Disability*, 36(1), 68-73.
- Hickman, L. & Hutchins, R., (2000). *Seeing clearly*. United States: Bellcurve Records Inc.
- Hood, M. & Conlon, E. (2004) Visual and auditory temporal processing and early reading development. *Dyslexia*, 10, 234-252.
- Maples, W.C. (2000). Test-retest reliability of the college of optometrists in vision development quality of life outcomes assessment. *Optometry*, 71(9), 579-585.
- Optometrists Network. (2004) Retrieved February 10, 2005, from http://www.add-adhd.org/learning_disabilities.html
- Pedretti, L. & Early, M.B. (2001). *Occupational therapy: Practice skills for physical dysfunction* (5th ed.). Missouri: Mosby Inc.
- Scheiman, M. (2001, August). *Understanding and managing visual deficits: A guide for occupational therapists*. Conference for the Wyoming Occupational Therapy Association.
- Skottun, B.C. & Parke, L.A. (1999) The possible relationship between visual deficits and dyslexia: Examination of a critical assumption. *Journal of Learning Disabilities*, 32(1), 2-5.
- Solan, H. A., Larson, S., Shelley-Tremblay, J., Ficarra, A., & Silverman, M. (2001) Role of visual attention in cognitive control of oculomotor readiness in students with reading disabilities. *Journal of Learning Disabilities*, 34(2), 107-118.

- Solan, H. A., Shelley-Tremblay, J., Ficarra, A., Silverman, M., & Larson, S. (2003)
Effect of attention therapy on reading comprehension. *Journal of Learning Disabilities*,
36(6), 556-563
- Vision and Learning. (2002) Retrieved September 8, 2005, from
<http://visionandlearning.org/visualskills.htm>
- Willcutt, E.G., Pennington, B.F., Boada, R., Ogline, J.S., Tunick, R.A., Chhabildas, N.A.,
& Olson, R.K. (2001) A comparison of the cognitive deficits in reading disability and
attention-deficit/hyperactivity disorder. *Journal of Abnormal Psychology*
[PsychARTICLES], 110(1), 157-172.

CHAPTER V

SUMMARY

The Vision Therapy Project Parent/Caregiver Educational Handbook was developed from a review of literature with the primary purpose of developing a parent/caregiver handbook. This handbook was designed to address several of the barriers identified in the literature such as:

1. Educating parent/caregivers with children who have visual deficits and allow parents/caregivers to become effective advocates, and increase the child's success within their academic environment as well as independence with their occupational performance.
2. OT's need to educate other disciplines, parents/caregivers, and teachers on the benefits of using occupational therapist's skills and knowledge. It is also important for the occupational therapists to have a clear understanding of their role, strengths and limitations regarding skills and knowledge.
3. To promote the collaboration of optometrists, vision therapist and occupational therapists in to provide a more holistic approach for the child to be successful in their academic environment and gain necessary life skills.
4. A final benefit is that the Vision Therapy Project, which is located in Casper, Wyoming, is interested in utilizing this handbook. This is a local non-profit organization in Casper, Wyoming dedicated to provide assistance and education

to children in need of vision therapy as well as to educate parents/caregivers who have children with visual deficits.

The limitations of this scholarly project include:

1. High percentage of children with vision disorders are not receiving vision therapy.
2. Limited number of facilities providing services and
3. Lack of awareness regarding the importance of vision screening.

It is the authors' recommendations that there is more need for future action, development, or research for:

1. Educating eye care practitioners, teachers, parents/caregivers, other health care professions and legislators on a national, state, and community level.
2. Creating and implementing nationwide criteria for preventative vision rehabilitation services and vision screening programs.
3. Increased research to provide evidence-based data showing the effectiveness of vision therapy.
4. Legislation is needed to insure that each state provides preschool children as well as children entering kindergarten with a comprehensive vision screen to detect early visual perceptual deficits.

Conclusions for this scholarly project have shown that vision therapy and occupational therapy are beneficial when treating the underlying causes of deficits in a child's performance through all areas of occupation. Both therapies look for the underlying causes, not just the signs or symptoms of the disorders, examine what areas are affected, and design treatment plans that will enhance the performance of each child.

However, due to the education and training that occupational therapists receive, they are qualified in providing a more holistic approach to treatment and address all areas that are impacted by the child's deficit from their vision.

REFERENCES

- Adler, P. (2002) Efficacy of treatment for convergence insufficiency using vision therapy. *Ophthal. Physiol. Opt.*, 22, 565-571
- American Occupational Therapy Association. (2005) Retrieved October 18, 2005, from <http://www.aota.org/featured/area6/index.asp>
- AOTA Inc. (1994). Policy 5.3.1, definition of occupational therapy practice for state regulation. *American Journal of Occupational Therapy*, 48, 1072-1073.
- Badian, N. A. (2005) Does a Visual-Orthographic deficit contribute to reading disability? *Annals of Dyslexia*, 55(1), 28-52.
- Bowan, M.D. (2002). Learning disabilities, dyslexia, and vision: a subject review. *Optometry*, 73(9), 553-575.
- Bowyer, N.K., & Kleinstein, R.N. (2000) Healthy people 2010-vision objectives for the nation. *Optometry*, 71, 569-78.
- Brown, G.T., Rodger, S., Davis, A. (2003) Test of visual perceptual skills – revised: An overview and critique. *Scandinavian Journal of Occupational Therapy*, 10, 3-15.
- Cantu, C. O. (2005) Vision therapy. *Advance for Occupational Therapy Practitioners*, 21 (6), 12.
- Castanes, M.S. (2003). Major review: The underutilization of vision screening (for amblyopia, optical anomalies and strabismus) among preschool age children. *Binocular Vision & Strabismus Quarterly*. 18(4), 217-232.
- Ciner, E.B., Dobson, V., Schmidt, P.P., Allen, D., Cyert, L., Maguire, M., Moore, B., Orel-Bixler, D., & Schultz, J. (1999). A survey of vision screening policy of preschool children in the united states. *Survey of Ophthalmology*, 43(5), 445-457.
- Cooper, J. (1998). Summary of Research on the Efficacy of Vision Therapy for Specific Visual Dysfunctions. Adapted from *The Journal of Behavioral Optometry*; 9(5), 115-119.

- Cornoldi, C., Venneri, A., Marconato, F., Molin, A., Montinari, C. (2003) A rapid screening measure for the identification of visuospatial learning disability in schools. *Journal of Learning Disabilities*, 36(4), 299-306.
- Dankert, H.L., Davies, P.L., & Gavin, W.J. (2003) Occupational therapy effects on visual-motor skills in preschool children. *American Journal of Occupational Therapy*, 57, 542-549.
- Del Pilar Cardona, M., Martinez, A. L., & Hinojosa, J. (2000) Effectiveness of using a computer to improve attention to visual analysis activities of five preschool children with disabilities. *Occupational Therapy International*, 7(1), 42-56.
- Earle, L.P., & Burman, M.E. (1998). Benefits and barriers to well child care: Perception of mothers in a rural state. *Public Health Nursing*, 15, 180-187.
- Hickman, L. & Hutchins, R., (2000) *Seeing clearly*. United States: Bellcurve Records Inc.
- Hood, M. & Conlon, E. (2004) Visual and auditory temporal processing and early reading development. *Dyslexia*, 10, 234-252.
- Health and Health Care in Schools (HHCS). (2003) A report from the center for health and health care in schools on the policies, politics and financing of health programming in schools. 4(4).
- Heiervang, E. & Hugdahl, K. (2003). Impaired visual attention in children with dyslexia. *Journal of Learning Disability*, 36(1), 68-73.
- Koller, H.P. (2002). An ophthalmologist's approach to visual processing/learning differences. *Journal of Pediatric Ophthalmology & Strabismus*. 39(3), 133-170.
- Kramer, P., Hinojosa, J., & Brasic Royeen, C. (2003). *Perspectives in human occupation: Participation in life*. Baltimore: Lippincott, Williams & Wilkins.
- McCabe, P., Nason, F., Demers Turco, P., Friedman, D., & Seddon, J.M. (2000). Evaluating the effectiveness of a vision rehabilitation intervention using an objective and subjective measure of functional performance. *Ophthalmic Epidemiology*, 7(4), 259-270.
- National Board of Certification in Occupational Therapy (2005). *NBCOT certification renewal handbook :OTR & COTA*. NBCOT, Inc.
- Optometrists Network. (2004) Retrieved December 17, 2004, from <http://www.children-special-needs.org/questions.html>
- Parents Active for Vision Education (PAVE). (2005) *Vision and learning*. Retrieved September 8, 2005, from <http://www.pavevision.org/visionandlearning.htm>

- Reid, D. K. & Weatherly Valle, J. (2004) The discursive practice of learning disability: Implications for Instruction and Parent-School Relations. *Journal of Learning Disabilities*, 37(6), 466-481.
- Scheiman, M., Cooper, J., Mitchell, G.L., Land, P.D., Cotter, S., Borsting, E., London, R., & Rouse, M. (2002) A survey of treatment modalities for convergence insufficiency. *Optometry and Vision Science*, 79(3), 151-157.
- Scheiman, M., Mitchell, L.M., Cotter, S., Cooper, J., Kulp, M., Rouse, M., Borsting, E., London, R., & Wensveen, J. (2005) A randomized clinical trial of treatments for convergence insufficiency in children. *Archives of Ophthalmology*, 123, 14-24.
- Skottun, B.C. & Parke, L.A. (1999) The possible relationship between visual deficits and dyslexia: Examination of a critical assumption. *Journal of Learning Disabilities*, 32(1), 2-5.
- Solan, H. A., Larson, S., Shelley-Tremblay, J., Ficarra, A., & Silverman, M. (2001) Role of visual attention in cognitive control of oculomotor readiness in students with reading disabilities. *Journal of Learning Disabilities*, 34(2), 107-118.
- Solan, H. A., Shelley-Tremblay, J., Ficarra, A., Silverman, M., & Larson, S. (2003) Effect of attention therapy on reading comprehension. *Journal of Learning Disabilities*, 36(6), 556-563
- Stein, J. F., Richardson, A. J., & Fowler, M. S. (2000) Monocular occlusion can improve binocular control and reading in dyslexics. *Brain*, 123, 164-170.
- The American Optometric Association (AOA). (2005). Retrieved September 8, 2005 from <http://www.aoa.org>
- The Center for Health and Health Care in Schools (CHHCS). (2004) *Childhood vision: What the research tells us*. Retrieved August 13, 2005, from <http://www.healthinschools.org>
- The College of Optometrists in Vision Development (COVD). (2005) Retrieved September 8, 2005, from http://www.covd.org/od/vt_what.html
- University of North Dakota School of Medicine: Grand Forks (nd). *Occupational therapy: Skills for the job of living*. [Brochure].
- Vision Council of America (2005) *Send Children Back to School With Focus*. Retrieved September 8, 2005, from http://visionsite.org/s_vision/print.asp?CID=835&DID=1395

Vision and Learning. (2002) Retrieved September 8, 2005, from <http://visionandlearning.org/visualskills.htm>

Vision Therapy Project (2005). *The Vision Therapy Project*. [Brochure].

Wellborn, A., personal communication, October 19, 2005.

Willcutt, E.G., Pennington, B.F., Boada, R., Ogline, J.S., Tunick, R.A., Chhabildas, N.A., & Olson, R.K. (2001) A comparison of the cognitive deficits in reading disability and attention-deficit/hyperactivity disorder. *Journal of Abnormal Psychology [PsychARTICLES]*, *110*(1), 157-172.

Wyoming Board of Occupational Therapy (2005) Retrieved November 11, 2005, from <http://ot.state.wy.us/>

Zaba, J.N., Johnson, R.A., & Reynolds, W.T. (2003) Vision examinations for all children entering public school-the new Kentucky law. *Optometry*, *74*, 149-58.