

Pacific University

CommonKnowledge

---

College of Optometry

Theses, Dissertations and Capstone Projects

---

5-2000

## Children with ADD/ADHD: Survey results provide insights into effective optometric vision management of this special population

Lisa M. Weiss  
*Pacific University*

Dean T. Bryan  
*Pacific University*

Stacey K. Spaulding  
*Pacific University*

### Recommended Citation

Weiss, Lisa M.; Bryan, Dean T.; and Spaulding, Stacey K., "Children with ADD/ADHD: Survey results provide insights into effective optometric vision management of this special population" (2000). *College of Optometry*. 39.

<https://commons.pacificu.edu/opt/39>

This Thesis is brought to you for free and open access by the Theses, Dissertations and Capstone Projects at CommonKnowledge. It has been accepted for inclusion in College of Optometry by an authorized administrator of CommonKnowledge. For more information, please contact [CommonKnowledge@pacificu.edu](mailto:CommonKnowledge@pacificu.edu).

---

## Children with ADD/ADHD: Survey results provide insights into effective optometric vision management of this special population

### Abstract

Optometric management of ADD/DHD children is being done in both the primary vision care practice as well as the vision therapy and pediatric care practice. This is a special population which may pose unique examination or treatment challenges to the general practitioner. The role of the optometrist in the vision care of ADD/ADHD children is explored through an e-mail survey sent via the internet. The survey emphasized the elicitation of clinical pearls from optometrists currently working with this special population regarding their views and experiences on successful examination and management of the ADD/ADHD patient. Certain challenges presented by the process of medical diagnoses and pharmacological treatment of ADD/ADHD is explored. The goal is to enlighten the general practitioner about some of the issues surrounding this often misunderstood condition and provide a collection of clinical advice and optometric viewpoints which will assist the general practitioner in his or her optometric care of this population.

### Degree Type

Thesis

### Degree Name

Master of Science in Vision Science

### Committee Chair

Hannu Laukkanen

### Subject Categories

Optometry

## Copyright and terms of use

If you have downloaded this document directly from the web or from CommonKnowledge, see the "Rights" section on the previous page for the terms of use.

**If you have received this document through an interlibrary loan/document delivery service, the following terms of use apply:**

Copyright in this work is held by the author(s). You may download or print any portion of this document for personal use only, or for any use that is allowed by fair use (Title 17, §107 U.S.C.). Except for personal or fair use, you or your borrowing library may not reproduce, remix, republish, post, transmit, or distribute this document, or any portion thereof, without the permission of the copyright owner. [Note: If this document is licensed under a Creative Commons license (see "Rights" on the previous page) which allows broader usage rights, your use is governed by the terms of that license.]

Inquiries regarding further use of these materials should be addressed to: CommonKnowledge Rights, Pacific University Library, 2043 College Way, Forest Grove, OR 97116, (503) 352-7209. Email inquiries may be directed to: [copyright@pacificu.edu](mailto:copyright@pacificu.edu)

**CHILDREN WITH ADD/ADHD:  
SURVEY RESULTS PROVIDE INSIGHTS INTO  
EFFECTIVE OPTOMETRIC VISION MANAGEMENT OF  
THIS SPECIAL POPULATION**

By

**Lisa M. Weiss**

**Dean T. Bryan**

**Stacey K. Spaulding**

A thesis submitted to the faculty of the  
College of Optometry  
Pacific University  
Forest Grove, Oregon  
for the degree of  
Doctor of Optometry  
May, 2000

**Advisor:  
Hannu Laukkanen, O.D., M.Ed.**



Lisa M. Weiss

*Lisa M. Weiss*

---

Dean T. Bryan

*Dean T. Bryan*

---

Stacey K. Spaulding

*Stacey Spaulding*

---

Hannu Laukkanen, O.D., M.Ed.

*Hannu Laukkanen*

---

Lisa M. Weiss will receive her Doctorate of Optometry and Masters of Education, Visual Function in Learning from Pacific University in May 2000. She graduated from the University of California, San Diego in 1996 with a Bachelor of Science in Animal Physiology and Neuroscience and a Bachelor of Arts in Psychology. Upon graduation from Pacific University she intends to complete a residency in binocular vision/vision therapy.

Dean T. Bryan will receive his Doctorate of Optometry from Pacific University in May 2000. He graduated from Western State College in Colorado in 1989 with a Bachelor of Arts and certification in secondary level education. He is currently a member of Beta Sigma Kappa. Upon graduation from Pacific University he will return to his home state of Colorado to join his father, Wendell Bryan O.D. in private family practice.

Stacey K. Spaulding will receive her Doctorate of Optometry from Pacific University in May 2000. She received her Bachelor of Science in Wildlife Biology from Colorado State University. She is a member of Beta Sigma Kappa and the American Mensa. Upon graduation from Pacific University she intends to join her father-in-law, Dr. Wendell Bryan, in private family practice.

## ACKNOWLEDGEMENT

The writing of this thesis would not have been possible without a few special people. We thank our thesis advisor, Dr. Hannu Laukkanen, for his valuable time and effort. We would also like to thank our family and close friends for their continued support throughout our academic careers.

**Abstract**

*Optometric management of ADD/ADHD children is being done in both the primary vision care practice as well as the vision therapy and pediatric care practice. This is a special population which may pose unique examination or treatment challenges to the general practitioner. The role of the optometrist in the vision care of ADD/ADHD children is explored through an e-mail survey sent via the internet. The survey emphasized the elicitation of clinical pearls from optometrists currently working with this special population regarding their views and experiences on successful examination and management of the ADD/ADHD patient. Certain challenges presented by the process of medical diagnoses and pharmacological treatment of ADD/ADHD is explored. The goal is to enlighten the general practitioner about some of the issues surrounding this often misunderstood condition and provide a collection of clinical advice and optometric viewpoints which will assist the general practitioner in his or her optometric care of this population.*

## Introduction

Vision exams of children can, at times, be both challenging and frustrating. Compound a normal child's attention span and high activity level with the condition of ADD/ADHD and the optometric exam enters a whole new arena of challenge. ADD/ADHD is a recent diagnostic category and is increasing in prevalence. While nearly 2 million children currently exhibit ADD/ADHD,<sup>1,2</sup> it is expected that this number will double to four million by the year 2000.<sup>2</sup> The relative lack of optometric literature on ADD/ADHD can leave the inexperienced practitioner with many unanswered questions. For example, do these children have a higher incidence of certain types of refractive errors or binocular dysfunctions as compared to their non-ADD/ADHD peers? Should these children be examined on or off medication? How successful is vision therapy with these children, and does medication affect the desired outcome? Are there helpful strategies to employ in effectively managing these children? The purpose of this paper will be to address these and related questions based upon responses to a nationwide e-mail survey of optometrists. The purpose of this investigation is to produce a compendium of useful clinical information which can serve as a reference for clinicians unfamiliar with optometric management of ADD/ADHD children.

To introduce the concept of attention and attention deficit, a theoretical background based upon cognitive style, central nervous system (CNS) functioning and CNS feed-back is useful. Although the terms "cognitive style" and "attention" are difficult to quantify, they can be conceptually understood as part of the overall syndrome. According to Borstein,<sup>3</sup> attention can be defined as having the ability to focus one's consciousness on the task at hand and consists of three components: coming to attention, decision making and sustaining attention.<sup>3</sup> Integrated within decision making is the concept of cognitive style which is related to how a person approaches problems.<sup>3</sup> Cognitive style is governed by a complex circular feedback loop where output from the central nervous system to the muscles is fed back to the CNS via all the sense organs including proprioceptive ones.<sup>4</sup> A person who has most of his or her CNS output fed back into his or her CNS is considered to have a reflective cognitive style and has a high level of motor regulation. Conversely, a person with little of his or her CNS output being

fed back into his or her CNS is considered to have an impulsive cognitive style because responses to stimuli are generated with little concurrent perceptual processing. Children who are reflective tend to be thoughtful problem solvers whereas impulsive style children tend to respond to problems quickly and often inaccurately. Children with impulsive cognitive style more frequently meet diagnostic criteria for ADD/ADHD than those with reflective cognitive behaviors. Campbell<sup>5</sup> reported that research has identified clear differences between hyperactive and normal children on measures of sustained attention and motor inhibition, but that Friedbergs found no differences between groups of normals and hyperactives on a concept learning task as long as the hyperactive children received continuous feedback. Friedbergs<sup>6</sup> concluded that ADD/ADHD children do not have conceptual deficits when working at their own pace and receiving continuous positive feedback for correct responses in the form of a tangible reward. These findings support the notion that problem-solving style can interfere with a child's ability to learn efficiently.<sup>5</sup>

Historically, ADD/ADHD has been viewed primarily as a psychiatric disorder of hyperactivity<sup>7</sup> and its literature roots extend back to 1902 when it was first clinically described by Goldman.<sup>8</sup> The condition has been labeled over the years with a variety of terms that include "minimal brain dysfunction," "brain injured child syndrome," "hyperkinetic reaction of childhood," and "hyperactive child syndrome."<sup>9</sup> Historically, many of the children referred to psychiatrists for behavior problems were assumed to have brain damage, despite no history of neurological damage.<sup>10</sup> Thus psychologists created the term "minimal brain damage," and used it as a diagnosis for not only the hyperactive child, but the learning disabled child as well.<sup>10</sup> Eventually the terminology evolved to "minimal brain dysfunction" but the underlying neurological damage hypothesis began to be questioned.<sup>10</sup> The publication of the DSM-II spurred another change in terminology, this time to "hyperkinetic reaction of childhood" due to the increased motor activity in these children.<sup>10</sup> Publication of the DSM-III (1980) and its revision (1987) changed the focus of the definition of ADD/ADHD from one centered upon hyperactive type behaviors to inattentive and impulsive behaviors as well. Currently the most commonly used clinical definition of ADD/ADHD is found in the American Psychiatric Association's Diagnostic and Statistical Manual, 4th Ed., the DSM-

IV. With the DSM-IV the condition can be diagnosed as primarily one of inattention, or primarily one of hyperactivity and impulsivity, or as a combination of the two, thus giving equal weight to both behavior types.<sup>8</sup> The DSM-IV defines ADD and ADHD through observed behaviors, which are detrimental to the child's academic and social functioning. These behaviors cannot be attributed to other disorders or psychosis, and must be present for at least six months at a level which is maladaptive and inconsistent with the child's developmental level. Additionally, some symptoms must be present before the age of seven, and occur in two or more settings.<sup>8</sup>

To be diagnosed as "attention deficit, predominately inattentive", or ADD, the child must exhibit six of the nine symptoms of inattention (Table 1). For "attention deficit predominately hyperactive-impulsive," or ADHD, the child must exhibit six of the nine symptoms of impulsivity and hyperactivity (Table 1). A primary care physician such as a pediatrician and family practitioner most often makes the diagnosis. Child or adolescent psychiatrists diagnose it routinely, and less frequent diagnosis is made from other medical specialties such as child neurology.<sup>11</sup>

Table 1: DSM IV diagnostic criteria for ADD/ADHD\*

A. *Inattention or Hyperactivity and Impulsivity*

*Inattention:* 6 or more of the following symptoms have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

- often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
- often has difficulty in sustaining attention in tasks or play activities
- often does not seem to listen when spoken to directly
- often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace
- often has difficulty organizing tasks and activities
- often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort
- often loses things necessary for tasks or activities
- is often easily distracted by extraneous stimuli
- is often forgetful in daily activities

*Hyperactivity – impulsivity:* 6 or more of the following symptoms have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

- often fidgets with hands or feet or squirms in seat
- often leaves seat in classroom or in other situations in which remaining seated is expected
- often runs about or climbs excessively in situations in which it is inappropriate
- often has difficulty playing or engaging in leisure activities
- is often “on the go” or often acts as if “driven by a motor”
- often talks excessively
- often blurts out answers before questions have been completed
- often has difficulty awaiting turn
- often interrupts or intrudes on others

- B. Some hyperactive –impulsive or inattentive symptoms that caused impairment were present before age 7 years
- C. Some impairment from the symptoms is present in 2 or more settings
- D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning
- E. The symptoms do not occur exclusively during the course of a pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, Personality Disorder)

\*American Psychiatric Association *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*. Washington, DC: American Psychiatric Association 1994.

The prevalence of ADD/ADHD in the US is 3% to 6% of all school-age children.<sup>1</sup> Boys develop the disorder at least three times more frequently than girls,<sup>9</sup> with reports as high as nine times more frequently.<sup>1</sup> The DSM-IV has a broader definition criteria than the DSM-III, resulting in more frequent diagnosis of ADD/ADHD as well as more diagnosis of girls.<sup>8</sup> While most ADD/ADHD children begin manifesting the behavior patterns typical of the disorder between the ages of three and five, some researchers feel the onset can be delayed in some children until late childhood or early adolescence for



unknown reasons.<sup>9</sup> Traditionally, it was thought that the condition regressed with age, but researchers are now finding the disorder can persist into adulthood.<sup>9</sup> Hill<sup>12</sup> found the prevalence of ADD/ADHD decreases by 50% approximately every five years with an average age of diagnosis of nine years.

Currently, ADD/ADHD is considered to be a biological disorder,<sup>1</sup> thought to have a polygenic inheritance pattern.<sup>9</sup> Researchers have found that specific regions of the ADD/ADHD brain appear smaller or underdeveloped compared to normal children.<sup>9</sup> These areas include the right pre-frontal cortex which regulates behavior, the caudate nucleus and the globus pallidus which help dampen automatic responses allowing the cortex to respond to neurologic input and coordinate responses, and the cerebellar vermis which is believed to help regulate motivation.<sup>9</sup>

There appears to be a growing consensus within the medical profession that ideal treatment is multifaceted and includes educational, behavioral, environmental and psychological evaluation in addition to a well monitored pharmacotherapy regimen.<sup>8</sup> In fact, the American Academy of Pediatrics (AAP) promotes exploring behavioral and educational therapy before pharmacotherapy is employed.<sup>13</sup> A problem is, however, that a diagnoses of ADD/ADHD often does not qualify the child for the special educational services within the public school system which could meet the AAP guidelines.<sup>14</sup> Additionally, these diagnoses and treatment approaches are very time consuming, requiring multiple histories, in-depth examination, appropriate testing and follow-up office visits, and consultations with other disciplines and specialists.<sup>8</sup>

When Kwasman<sup>15</sup> surveyed pediatricians diagnosing and treating ADD/ADHD 39% of the respondents co-manage their ADD/ADHD patients with the child's teacher or principal and 62.6% feel school administrators are helpful in aiding their diagnoses of ADD/ADHD. Only 18.7%, however, reported they were likely to refer ADD/ADHD patients to a psychologist, psychiatrist, educational therapist, school social worker or another professional in a related discipline. Only 13.2% of respondents felt they were adequately compensated by insurance companies for the time involved in diagnosing and managing these patients and 9% feel better compensation would change their handling of the ADD/ADHD patients. In the current climate of managed care, whether or not a broad scope approach is used to diagnosis and treat these children may be limited by the

patient's insurance as well as their access to multi-disciplinary services in the community and/or school district.

Typically the management of ADD/ADHD begins with drug therapy.<sup>1</sup> Once the diagnosis of ADD/ADHD is made, stimulant drug treatment is quick and easy to administer because the onset of action is usually only several days, and in only a week or two treatment is considered sufficient to determine whether the child responds well to the drug.<sup>10</sup> The stimulant drugs most commonly used to treat ADD/ADHD include methylphenidate (Ritalin), pemoline (Cylert) and d-amphetamine (Dexedrine).<sup>8</sup> Ritalin is currently the most popular of the three, and is prescribed for more than 90% of the ADHD patients who are prescribed stimulants in the U.S.<sup>8</sup> Ritalin has also been the most studied drug of the three.<sup>16</sup> Cylert is the second most commonly used, but has been shown to be associated with negative effects on liver enzymes.<sup>15</sup> Dexadrine has been avoided by many physicians due to its classification as an amphetamine, a drug class which is often viewed as having a greater potential for abuse.<sup>8</sup>

Stimulant medications are believed to activate the brainstem and cortex to produce their effects.<sup>17</sup> The mechanism of action for how these drugs produce their effects on behavior and attention of children is not fully understood,<sup>17</sup> but is believed to be linked with an increase in the levels of CNS neurotransmitters like dopamine and norepinephrine.<sup>18</sup> Increased levels of excitatory neurotransmitters may increase attention span while increased levels of inhibitory neurotransmitters may improve concentration and impulse control.<sup>1</sup> In general, stimulants have been found to be efficacious for most children with ADD/ADHD with positive effects being observed on the Wechsler Intelligence Scale for Children, as well with learning efficiency, reading and math scores, information processing,<sup>18</sup> and interaction with teachers and family.<sup>8</sup> While studies have shown improvements in core symptoms of ADD/ADHD (hyperactivity, impulsivity and inattentiveness) over the short-term, there are no long-term studies showing the positive or negative effects of stimulant administration over a period of years.<sup>8, 16</sup>

The success achieved through prescribing stimulants for hyperactive children has traditionally been viewed as paradoxical, but it is important to note that improvement in ability to learn while using stimulants is also seen with non-hyperactive children administered stimulant medications.<sup>8, 18</sup> Because stimulants elicit positive behavioral

changes with many groups of children including the learning disabled, the depressed and normal controls, an individual child's response to stimulants cannot be used as a singular and definitive gauge to confirm or refute the diagnosis of ADD/ADHD.<sup>8</sup> Stimulants have been found not be effective in the management of 20-25% of children who do have ADD/ADHD.<sup>10</sup> Thus, if stimulants are to be used, a closely monitored drug therapeutic regimen with parent and teacher feedback should be employed to determine whether the drug has a significant positive effect upon the child's behavior.<sup>10</sup>

The use of stimulant medication has been shadowed by controversies over drug side effects, misdiagnosis, and alternate theories on treatment. The most common side-effects of Ritalin include nervousness and insomnia,<sup>19</sup> headaches, stomachaches and decreased appetite,<sup>20</sup> along with negative mood changes such as sadness and crying.<sup>1</sup> Other potential side effects reported include hypersensitivity (including skin rashes, exfoliative dermatitis, urticaria and fever), nausea and anorexia, dizziness, and vascular irregularities (including tachycardia, cardiac arrhythmia and blood pressure fluctuation).<sup>19</sup> Side effects are considered to be dose-dependant and are managed through dose-reduction.<sup>19, 20</sup> Ideally, a behavioral profile is performed on a child before medication is administered to aid in determining if behavioral symptoms are pre-existing or true side effects from the medication.<sup>20</sup>

From an optometric standpoint, stimulant medications have many important visual side-effects. Trachman<sup>21</sup> notes that research consistently reports a reduction in accommodative amplitude with administration of sympathomimetics. He reasons that Ritalin, which has sympathomimetic effects, may have a negative effect upon accommodation. Cotter and Scharre<sup>22</sup> report additional published visual side-effects of stimulants (Table 2).

Table 2: Visual Adverse Reactions of Stimulant Medications

<b>Methylphenidate (Ritalin)</b>	<b>Dextroamphetamine (Dexedrine)</b>	<b>Pemoline (Cylert)</b>
Decreased accommodation Blurring of vision	Decreased accommodation Decreased vision	Diplopia Decreased vision Nystagmus Strabismus

For many the use of stimulant medication in children is disturbing when there are many other conditions which can result in similar problems of inattention or impulsiveness. Acquired attention disorders can result in behaviors similar to those seen in ADD/ADHD children and should be differentially diagnosed.<sup>23</sup> Hearing deficits, often the result of chronic otitis media, can result in poor language development and impaired learning.<sup>23</sup> A child can appear inattentive when unable to hear instructions.<sup>23</sup> Allergies, including asthma, can negatively impact a child's ability to attend and learn.<sup>2, 23</sup> This type of learning problem may be seasonal, waxing and waning with allergy bouts.<sup>23</sup> Diseases such as diabetes, hypoglycemia, thyroid disorders and neurologic disorders can also reduce a child's ability to attend.<sup>23</sup> Additionally, the presence of psychological or emotional problems such as depression and anxiety can reduce a child's ability to concentrate, resulting in hyperactivity.<sup>23</sup> Issues such as grief, physical and/or sexual abuse, depression, post-traumatic stress, traumatic brain injury and neglect can be confused with ADHD.<sup>24</sup> A child's diet and nutrition has been reported to impact attention and ability to learn. Food allergies, additive and preservative allergies, high sugar consumption,<sup>2, 23</sup> protein deficiency and consumption of toxic amounts of lead can all reduce attention.<sup>23</sup> Anecdotal reports of the onset of autism and hyperactivity following childhood vaccinations are also reported.<sup>2</sup> Many visual disorders can reduce a child's ability to attend, including uncorrected refractive errors, accommodative and vergence dysfunctions, visual-perception problems and ocular motility problems.<sup>23</sup> Additionally, literature from the Optometric Extension Program notes that many symptoms of ADD/ADHD are common to several other conditions as well as being present in the normal child (Table 3).<sup>25</sup>

Table 3: Comparison of Symptoms of ADD/ADHD and Alternative Diagnoses\*

SYMPTOMS	ADHD (DSM-IV)	Sensory Integration Dysfunction (Ayres)	Learning- related Visual Problems (Kavner)	Nutrition Allergies (Rapp, Crook & Smith)	Normal Child Under 7 (Gesell)
<b>Inattention (At least 6 necessary)</b>					
Often fails to give close attention to details or makes careless mistakes	x	x	x	x	
Often has difficulty sustaining attention in tasks or play activities	x	x	x	x	x
Often does not listen when spoken to directly	x	x	x	x	
Often does not follow through on instructions or fails to finish work	x	x	x	x	x
Often has difficulty organizing tasks and activities	x	x	x	x	x
Often avoids, dislikes or is reluctant to engage in tasks requiring sustained mental effort	x	x	x	x	x
Often loses things	x	x	x	x	x
Often distracted by extraneous stimuli	x	x	x	x	x
Often forgetful in daily activities	x	x	x	x	
<b>Hyperactivity and Impulsivity (At least 6 necessary)</b>					
Often fidgets with hands or feet or squirms in seat	x	x	x	x	x
Often has difficulty remaining seated when required to do so	x	x	x	x	x
Often runs or climbs excessively	x	x		x	x
Often has difficulty playing quietly	x	x		x	
Often "on the go"	x	x		x	x
Often talks excessively	x	x	x	x	
Often blurts out answers to questions before they have been completed	x	x	x	x	
Often has difficulty awaiting turn	x	x	x	x	x
Often interrupts or intrudes on others	x	x	x	x	x

\*Optometric Extension Program Pamphlet #B121 *Attention Deficits - A Developmental Approach*

As one can see, there are many conditions which mimic ADD/ADHD symptoms and behaviors. In essence, ADD/ADHD is considered a diagnosis of exclusion since there is no definitive diagnostic test to confirm it. The fact that the diagnosis is based upon observed behaviors makes diagnosing the condition subjective and open to individual interpretation. This ambiguity begs debate as to the underlying etiology and

the means by which to best manage the condition. Unfortunately, the literature support on alternate etiologies is sparse and often borders on the commercial. This is a ripe area for further investigation.

While the quantity of medical research on ADD/ADHD is substantial, there is a lack of consensus as to diagnoses and treatment. There is also a growing body of anecdotal case studies from practitioners in many professions suggesting alternate etiologies and documenting positive changes from alternate therapies. Although not widely recognized, optometry is involved with the management of ADD/ADHD patients. Optometrists are often sought out for second opinions and recommendations for treatment and should be familiar with the issues surrounding this controversial topic.

Exploring the association between learning disabilities and visual dysfunction can help provide insight into the visual problems that may be found in the ADD/ADHD population. However, the relationship between learning disabilities and ADD/ADHD is complex due to the definitions used to define these conditions.<sup>26</sup> Lemer<sup>2</sup> believes ADD/ADHD, learning disabilities, pervasive developmental disorders and autism exhibit similar symptoms and comprise a continuum of disorders with varying severity and similar etiologies and treatments. ADD is considered the least severe condition of the continuum, with ADHD being the next severe condition and autism the most severe condition. Lemer<sup>2</sup> suggests that research into the etiology of LD and ADD/ADHD primarily focuses on establishing an organic cause and often neglects investigating the presence of underlying visual disorders.

Hoffman<sup>27</sup> found a much larger incidence of visual difficulties in a population of LD children versus a population of non-LD children. The LD population showed a much higher incidence of difficulty with binocular coordination, accommodative facility, ocular motor efficiency and visual motor integration. In this study, refractive error did not discriminate between the two populations. In another study Sucher<sup>28</sup> found a population of LD children to have a higher incidence of visual problems including error in horizontal pursuits, accommodative infacility and uncorrected refractive error, all of which have previously been linked with the presence of learning disabilities. This study also identified a strong association between learning disabilities and the presence of a vertical fixation disparity. Additionally, researchers noted that 21% of the LD population failed

the refractive error criteria which indicated a lack of basic vision care for this population.<sup>28</sup>

Despite the varied etiologies and treatment modalities associated with ADD/ADHD children, the primary obligation of the optometrist is to assess and manage visual function. It is in this capacity that optometrists can have a significant impact in the lives of these children. A child diagnosed with ADD/ADHD may, after optometric intervention, be found to have a visual disorder which is primarily responsible for the child's disruptive behavior. Hyperactivity may result from aberrant visual input and/or visual information processing.<sup>29</sup> For the child with a visual problem co-existent with a true organic disorder, management of the visual problem will benefit the child's overall ability to function with the condition. For example, Solan<sup>4</sup> notes that ADD/ADHD children often have poor oculomotor skills as well as visual-perceptual dysfunctions.

The goal of this paper is to provide useful and clinically relevant information to the practitioner to aid in the optometric management of children diagnosed with ADD/ADHD. Interested optometrists responded to a survey designed to elicit clinical insights and helpful strategies to employ with this special population of children. What follows is a compilation of that data.

## Methods

### Procedure

The survey (Appendix A) was designed to probe the knowledge of optometric management of ADD/ADHD and any co-existing conditions. The survey is a 27-item questionnaire including both multiple choice (closed-ended) and open-ended question items. The closed-ended questions served to give a demographic picture of each respondent and a background of his/her knowledge of ADD/ADHD. The purpose of the open-ended questions was to give the respondent an opportunity to elaborate upon specific case examples, training techniques, and other information that he/she deems important to share with other practitioners with respect to the management of visual

dysfunction in ADD/ADHD children. With the help of feedback from several faculty members, we were able to refine the survey several times before distribution through email.

### Subjects

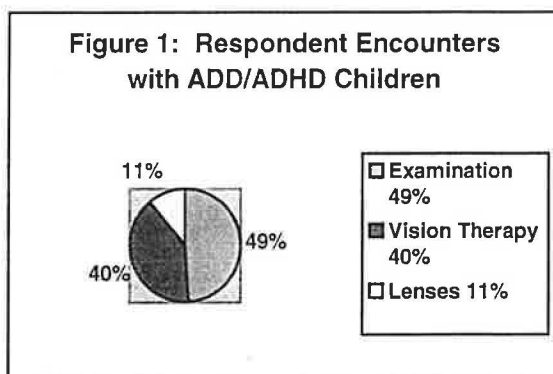
Twenty-four optometrists participated and returned the survey. The survey was distributed via email using the Optcom e-mail list, which is only available to optometrists and optometry students. Several thousand doctors and students from all over the world subscribe to the list. In this way, we were able to reach a very large portion of the optometric community. The respondents represent a group of doctors from the list that chose to complete the survey after receiving it by e-mail from the Optcom list. Because of the lack of information about optometric participation in e-mail surveys we do not know whether our response rate is typical, atypical, better than average, or below average for this type of survey. Our intention is to present the reader with both quantitative and qualitative information we have gathered on the current thinking in optometry related to the management of the visual conditions associated with ADD/ADHD.

### Respondent Demographics

Of the 24 doctors who completed the survey, five were from a rural setting of less than 25,000 people, seven were from an urban setting of 25,00-100,00 people and twelve were from an urban setting of greater than 100,000 people (Question 22). Most of the respondents spend a majority of their time in primary care practice settings that include areas such as vision therapy, pediatrics and neurorehabilitative optometry. Our



respondents spend a very small percentage of their practice providing care in ocular disease, low vision and contact lens services (Question 2). Respondents were more likely to work with children between the ages of seven and seventeen than between birth and six years of age (Question 1). We also asked what percentage of children seen in each office had the diagnosis of ADD/ADHD. The responses varied from as little as 1-2% to as much as 70% of the children seen. (Question 4). Figure 1 represents the different services our respondents provide for ADD/ADHD patients (Question 3).



Most of the respondents provide a combination of these exam and treatment services for the ADD/ADHD child (Question 3). Appendix B illustrates a complete percentage breakdown of each respondent's answers for the time they spend in the various area of practice; the percent of children seen in the various age groups; the percent of children in their practice diagnosed with ADD/ADHD; and the exam and treatment services provided for these patients.

## Results

The results of our survey can be interpreted by the responses given for each area of questioning. These areas include: 1) general knowledge of the characteristics of

ADD/ADHD children, 2) referral of ADD/ADHD children, 3) co-management of ADD/ADHD children, 4) examination techniques and results, 5) vision therapy techniques and results, and 6) favorite tricks and techniques that each respondent finds most helpful when dealing with this population.

#### General Knowledge of the Characteristics of ADD/ADHD Children

Question 2 of this survey was designed to get a feel for how the respondents view the relative importance of the symptoms commonly associated with ADD/ADHD. This question asked the respondent to rank the behaviors they most commonly associate with ADD/ADHD children. Inattention was most often chosen as the common behavior associated with ADD/ADHD. Hyperactivity was chosen as the next common behavior. From our list, the least common behavior that the doctors associate with ADD/ADHD children is excessive talking. Table 4 illustrates the ranking each doctor assigned to the various behaviors commonly associated with ADD/ADHD children.

Table 4: ADD/ADHD Behavior Rankings by Doctor Surveyed

Dr	HYP	INAT	PSP	IMPUL	DISTR	TLKX	DRS	NONE
1	5	2	6	3	1	7	4	
2	5	1	2	6	3	7	4	
3	6	8	2	5	7	3	1	
4	2	1	3	5	4	7	6	
5	6	4	2	1	3	7	5	
6	5	1	6	2	3	4	7	
7	1	3	5	6	4	7	2	
8	5	2	4	7	1	6	3	
9	2	1	6	4	3	5	7	
10	1	5	2	6	4	7	3	
11	1	5	6	2	4	7	3	
12	6	1	2	4	3	7	5	
13	4	1	6	2	3	7	4	
14	2	6	1	4	5	7	3	
15	2	3	1	4	5	6	3	
16	5	1	6	4	2	7	3	
17	6	1	4	5	2	7	3	
18	2	4	5	6	3	7	1	
19	Y	Y	Maybe	Y	Y	Y	Y	
20	7	3	4	6	1	2	5	
21	7	3	4	2	1	6	5	
22	6	3	4	1	2	7	5	
23	2	1	4	7	3	6	4	
24	2	3	5	1	4	7	6	

(1) = most common behavior; (7) = least common behavior

HYP = hyperactivity; INAT = inattention; PSP = poor school performance;

IMPUL = impulsivity; DISTR = distractibility; TLKX = talks excessively;

DRS = difficulty remaining still

### Referral of ADD/ADHD Children

These questions were designed to learn what doctors do in a situation where the child is suspected of having ADD/ADHD but has not yet been diagnosed. Forty-eight percent of the respondents refer these children out for other testing less the 24% of the time. Twenty-four percent of respondents refer greater than 75% of these children to other professionals (Question 7). Figure 2 illustrates the professionals that our respondents will refer ADD/ADHD children to (Question 8).

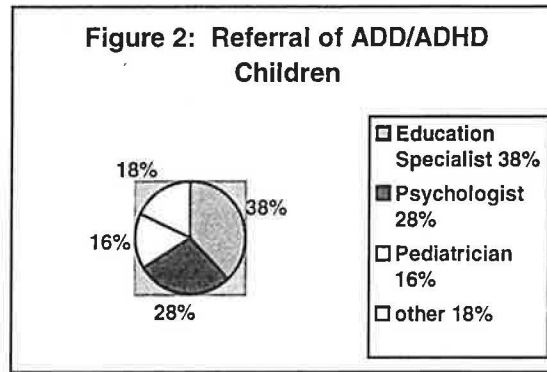


Table 5 lists the other professionals that the respondents tend to refer these children to.

Table 5: Other Referral Sources of respondents for ADD/ADHD Children

Health Care Professional	Specialty
Cranial Osteopath	Medically trained, but with a holistic philosophy. Can provide nutritional and allergy counseling.
Osteopathic Physician	Skilled in manipulation of soft tissues.
Naturopath	Trained in physical medicine, homeopathy, herbal medicine. Holistic and natural approach.
Pediatric Neurologist	Trained in neuro-imaging and neurotransmitter chemistry
Occupational Therapist	Can provide help for sensory integration difficulties and adaptations necessary to live with this condition.

### Co-management of ADD/ADHD Children

ADD/ADHD is a condition that affects many aspects of a child's life. With the goal of providing the best possible care, optometrists will commonly co-manage the patient with other professionals and co-ordinate care. We asked our respondents if they tend to co-manage ADD/ADHD children, and if so, with specifically which other professionals. Forty-three of the doctors co-manage 24% or less of their ADD/ADHD patients with other professionals, 26% co-mange 75-100% of the time, 21% co-manage between 25-49% of the time, and 9% co-manage 50-74% of the time (Question 5).

Figure 3 depicts the different professionals with whom our respondents co-manage ADD/ADHD children (Question 6).

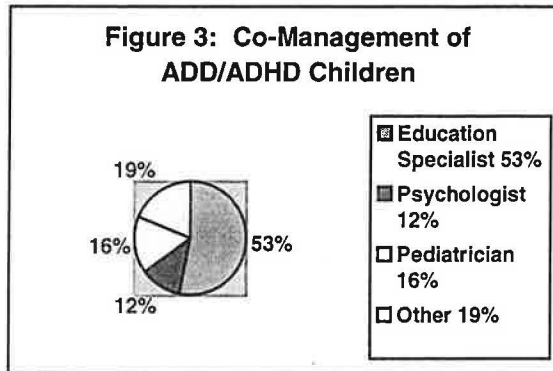


Table 6 lists the other professionals that the respondents tend to co-manage the care of ADD/ADHD children with.

Table 6: Suggested Health Care Professionals to Co-manage ADD/ADHD Children with

Health Care Professional	Specialty
Osteopath	Skilled in manipulation of soft tissues.
Nutritionist	Skilled in determining dietary requirements.
Speech and Language Specialist	Helps in the school system to diagnose and treat any reading/language problems children may experience.

Examination Techniques and Results

Several questions in the survey were designed to gain an understanding of the examination techniques that practitioners use to get results during from ADD/ADHD diagnosed children. Question 9 asked how difficult the respondents feel it is to do an examination on these children. Figure 4 illustrates the respondents answers to this question.

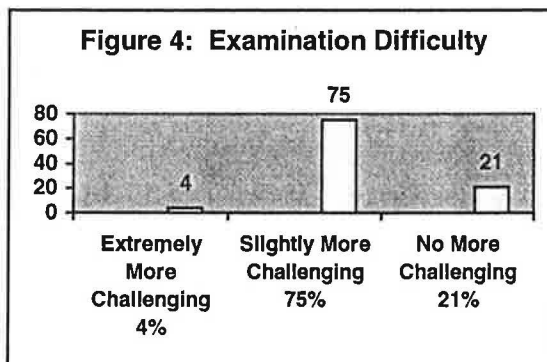


Table 7 relates some of the examination tips that the respondents included with the answers to this question.

Table 7: Respondent Suggestions for Examination of ADD/ADHD Children

Tips for Examination of ADD/ADHD Children
1. Exam should be comprehensive including both functional and developmental portions.
2. Emphasize visual function tests when the child is fresh and save ocular health for later in the exam.
3. Exam has to flow in an uninterrupted manner in order to maintain the attention of the child and the authenticity of the findings.
4. Rely more on objective tests, especially Bell Retinoscopy
5. Obtain minimum visual competency information rather than a large quantity of endpoints for analysis.
6. Find out what is of interest to the patient and try to incorporate these into exam when needed.
7. Give the patient frequent breaks.
8. Let them push the buttons, for example raising and lowering the chair a few times.
9. Out-hyper the hyperactive kid.
10. ADD/ADHD children lag developmentally behind non-ADD/ADHD children of the same age; examination of a 7 year old ADD/ADHD child may be more similar to the examination of a 3-4 year old non-ADD/ADHD child.
11. The more of these children you see, the easier examining them becomes.

Next, we asked if practitioners tend to schedule more exam time for ADD/ADHD children or alter their exam sequence for these children (Questions 10, 11). Seventy percent of the respondents tended to not schedule more time to examine these patients. Of those that do, one respondent schedules 90 minutes for these patients and another will schedule 40 more minutes if the child is ADD/ADHD. One doctor will schedule more time if the parent identifies the visit as a school referral or the child as ADD/ADHD and others will just have the child return if enough data could not be gathered in the first exam. More than half (56%) of our respondents do not alter their exam sequence for ADD/ADHD children (Question 13). Table 7 also illustrates some ways to alter the examination sequence for these children. We also inquired about what time of day the respondents prefer to see these patients (Question 12). Figure 5 relates the responses to this question.

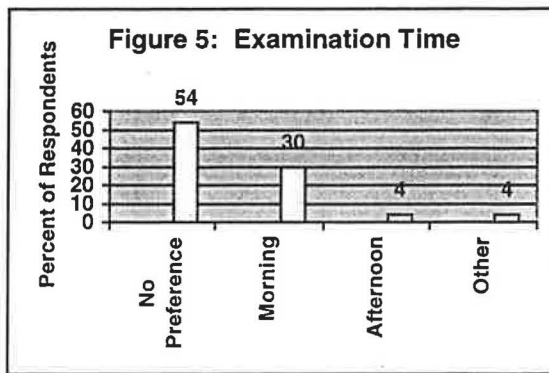


Table 8 includes some of the comments we received regarding the scheduling of exams for ADD/ADHD children.

Table 8: Scheduling Exams for ADD/ADHD Children

Examination Scheduling Tips for ADD/ADHD Children
1. Ask parents when child's best time is.
2. Seeing children in morning hours if possible for best attention
3. All times can give you a perspective of child's performance and abilities. If you have difficulty getting results during a "bad time," reschedule for a morning or non-school day.

The next two questions deal with the effects that stimulant medications have on the examination results (Question 17) and if the practitioner prefers to examine children when they are taking or not taking their medications (Question 15). Seventy-five percent of the respondents feel that medications do affect the exam results and Figure 6 relates the medication preference-during the examination.

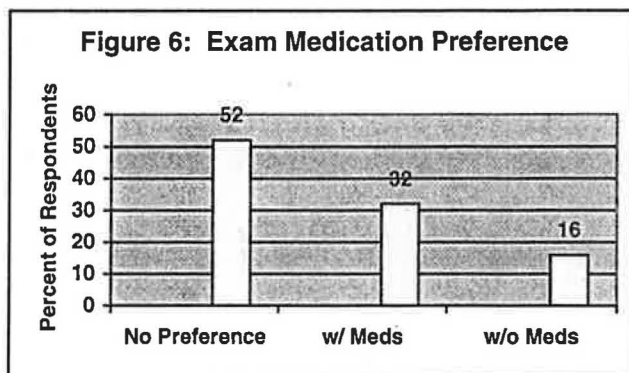


Table 9 summarizes the various reasons for these responses that our respondents provided with their answers.

Table 9: Stimulant Medication Considerations

<b>Medication Preference During Examination</b>
1. No medication gives truer results, but you need to know the effects of the medications on the visual system.
2. Examine children on medication because this is how the child is most of the time.
3. Only examine the child off medications if he is expected to go off of the medications.
4. If the child is adapted to medications, you may get extra rebound hyperactivity if you attempt to examine them without their medications.
5. Do not alter their present habitual state for the examination.
6. If the child truly needs medication they are more attentive and therefore better observers during the exam.
7. Medication generally turns the child off and you may not be obtaining a true evaluation of the problem
<b>Affects of Medications on the Visual System</b>
1. Ritalin affects accommodation and the patient may benefit from a reading prescription.
2. More hyperopia
3. Poor relative vergences,
4. Poor accommodative and vergence facilities
5. Poor oculomotor performances

Lastly, we wanted to know if practitioners feel that certain refractive conditions are more likely to be found in the ADD/ADHD population compared to the non-ADD/ADHD population (Question 20). This information can be found in Figure 7.

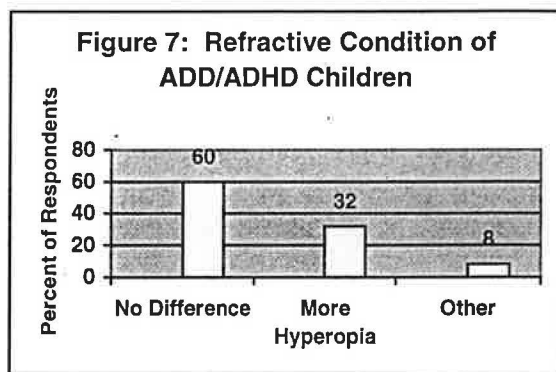


Table 10 relates some of the additional comments we received on this question.

Table 10: Refractive Errors Present in ADD/ADHD Children

<b>Refractive Conditions</b>
1. More hyperopia while medicated
2. No refractive errors more common when unmedicated



## Vision Therapy Techniques and Results

Several questions in the survey were designed to tease out how doctors manage the visual problems associated with ADD/ADHD in vision therapy. Our first question of this type (Question 14) asked if the respondents tended to structure vision therapy differently for an ADD/ADHD child than from a non-ADD/ADHD child with the same diagnosis. Fifty-four percent did not structure vision therapy differently, 29% did structure it differently and 17% of respondents did not do vision therapy at all. Table 11 lists some ways in which our respondents might structure vision therapy different for ADD/ADHD children.

Table 11: Techniques for Structuring Vision Therapy for ADD/ADHD Children

Techniques for Structuring Vision Therapy for ADD/ADHD Children
1. Everyone has an individualized program.
2. Use syntonics, especially different colors in the blue spectrum.
3. Incorporate more perceptual training
4. Shorter work time with frequent breaks for running around.
5. Require more individual attention such as one on one therapy.
6. Therapy may need to be in a separate room or area.
7. Add a metronome to affect a shift in speed and rhythm.
8. Expect therapy to take longer than it would for a non-ADD/ADHD child.
9. Be prepared ahead of time so that you can easily shift from one activity to the next.

The next question regarding vision therapy practices (Question 16) involves the use of medication during the vision therapy sessions. Figure 8 illustrates the respondents answers to this question.

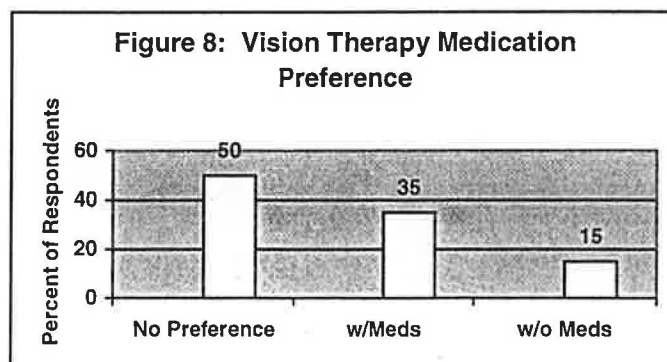


Table 12 relates some of the reasons respondents gave for their answers to this question (Question 16).

Table 12: Use of Medication During Vision Therapy Sessions

Taking Medication
1. Start vision therapy with medications and then try taking them off when the visual skills are better.
2. Use medications if the child is a true ADD/ADHD.
3. Reserve the option of requesting reduction in medication use at the appropriate time during therapy.
4. Use medications only if it makes a difference.
5. If the child is currently on medications, don't alter their normal routine.

We also were curious if doctors feel that the medications affect vision therapy success (Question 18). Forty-eight percent of the respondents feel that the use of stimulant medication affects vision therapy success and 48% feel that it does not. Four percent do not do vision therapy at all. Table 13 relates some of the underlying reasons for answers to Question 18.

Table 13: Effect of Medications on Vision Therapy Success

Effect of Medications on Vision Therapy Success
1. The child gets more out of the therapy session if they are more attentive to the activities.
2. Medications may help patient attend to task more easily: better attention=better results.
3. Vision therapy takes longer to achieve.

Question 21 asked respondents whether certain binocular or perceptual dysfunctions are more common in the pediatric ADD/ADHD population. Figure 9 depicts the responses to this question.

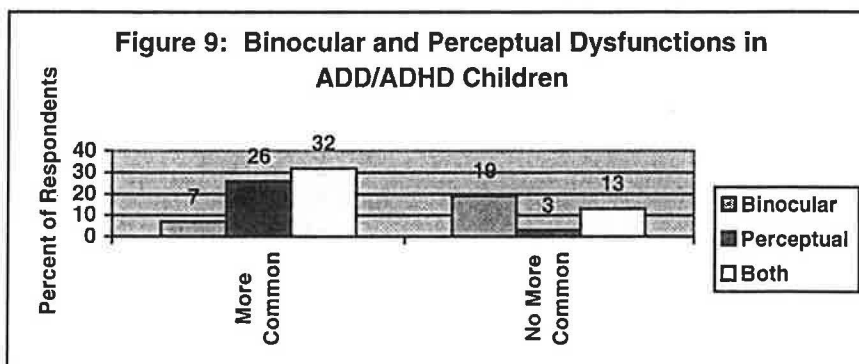
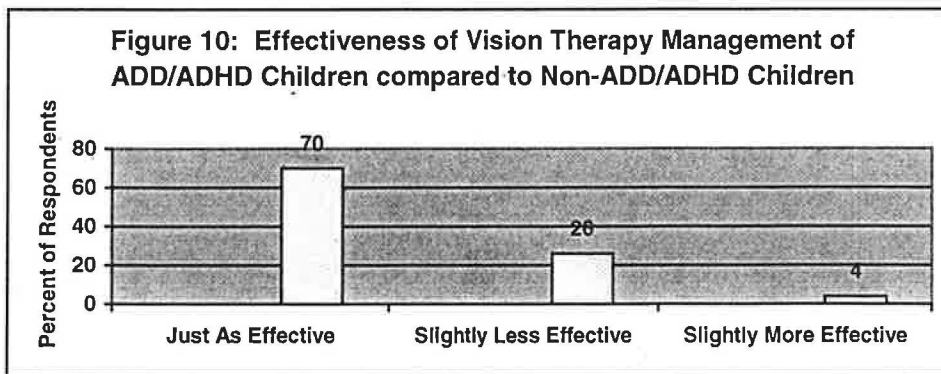


Table 14 illustrates some of the binocular and perceptual conditions our respondents feel are more common in ADD/ADHD children.

Table 14: Binocular and Perceptual Conditions Present in ADD/ADHD Children

Common Binocular Dysfunctions	Common Perceptual Dysfunctions
1. Reduced accommodative amplitude, accuracy, facility, and sustainability – especially with medication therapy	1. Laterality and directionality confusion
2. Reduced accommodative convergence	2. Reduced visual memory
3. Poor oculomotor skills	3. Reduced visual sequential memory
4. Tend towards esophoria	4. Reduced visual sequencing
5. Low binocular ranges and recoveries	5. Reduced visual closure
	6. Reduced figure ground
	7. Reduced sensory integration
	8. Reduced visual analysis

The final questions from the survey deal with the outcomes of vision therapy for the visual problems associated with ADD/ADHD. We asked our respondents to rank the effectiveness of their management of the visual problems in ADD/ADHD children compared to non- ADD/ADHD children with the same diagnosis (Question 19). The results from this question can be seen in Figure 10.



Finally, we asked what improvements in the ADD/ADHD children the respondents note after completion of vision therapy (Question 24). Eighty-two percent of respondents

notice improvements in visual performance, school performance, home behavior, and social interactions with peers. Fourteen percent notice improved visual performance and school performance and 4% notice improved visual performance only.

## Discussion

We designed this project with the goal of providing the inexperienced practitioner with clinically relevant information and suggestions for the optometric management of the ADD/ADHD child. Our results section describes the general trends and summarizes most of the specific comments that we received from our respondents. Questions 25-27 requested the respondent to provide additional information that was not requested by other questions. We received several interesting comments and helpful criticisms in this section. These additional comments can be found in Appendix C.

The first section of the survey contains questions related to the general knowledge that practitioners have of the characteristics of ADD/ADHD children. This section was designed to give us an idea of how comfortable optometrists are with the official definition of ADD/ADHD. Most of the respondents chose hyperactivity and inattentiveness as the most common behaviors and excessive talking as the least common behavior of ADD/ADHD children. This indicates our respondents' familiarity with the official DSM diagnostic findings as well as an understanding of the importance of the "official" signs and symptoms of the disorder.

The next two sections of the survey relate to the referral and co-management practices of our responding optometrists with regards to their management of ADD/ADHD children. With these questions, we were interested in how many

optometrists prefer to refer these children on to other specialists when they suspect a diagnosis of ADD/ADHD is warranted and then how many will co-manage the condition with other professionals once the diagnosis is known. For both referral and co-management, the services of education specialists were elicited most often and the services of pediatricians were elicited least often by our respondents. Our finding can be compared to the referral/co-management practices of pediatricians that Kwasman<sup>15</sup> discovered in his survey. According to Kwasman<sup>15</sup>, pediatricians will co-manage ADD/ADHD children with teachers or principals but will not refer these children on to psychologists, psychiatrists, educational therapists, or any other professional for treatment. We also found that our respondents tend to agree on the type of professionals that ADD/ADHD children should be referred to or co-managed with. Our respondents prefer sending these children on to more holistic medicine providers such as naturopaths and osteopaths.

The next sections of the survey deal with specific examination techniques and vision therapy techniques that the respondents find most useful with ADD/ADHD children as well as vision therapy results. The responses we received portray a specific picture of the way in which some optometrists manage these difficult patients. The following list illustrates this specific picture:

- Our responding doctors generally feel that it is more challenging to do an examination on these patients compared to their non-ADD/ADHD peers.
- Vision therapy typically takes longer, but several doctors noted that the more they work with these children, the easier and more effective their examination and therapy techniques have become.

- Most doctors recognize that the stimulants will have an effect on the visual system but prefer to do the examination and vision therapy in the child's habitual state, whether that be medicated or not.

These results may not be applicable to the entire optometric community because this sample represents only a small number of practitioners. The 24 doctors who were generous enough to share the information with us represent a self-selected group familiar with this topic and e-mail/internet savvy. Even though our respondents are a diverse group from different regions of the country, we cannot generalize our findings to other optometrists who manage ADD/ADHD children due to our limited number of respondents. It would have been ideal to try to solicit other practicing optometrists by telephone call or by mail rather than using e-mail as the exclusive vehicle to deliver the survey to doctors around the country. A longer term and multifaceted approach might have yielded a bigger sample size and more information to synthesize.

We did find many of the suggestions provided by the respondents useful and insightful. By compiling this information we have gained valuable knowledge on the optometric management of ADD/ADHD children and will have an idea of how to approach vision therapy with these children in our practices.

We do believe that optometrists who work with ADD/ADHD children should perform more quantitative experiments with the goal of proving the efficacy of vision therapy with ADD/ADHD children. Studies such as these will not only help the novice practitioner learn the approach that is the most successful, but will serve as hard proof for parents, educators, and medical doctors that the remediation of visual dysfunction

combined with other treatment (pharmacological, educational, or behavioral) is truly the best way to service these children.

The correspondence and support that we received throughout the length of this project was exceptional. It was heartening and inspirational to learn that there are many optometrists in the real world who practice with a functional/behavioral approach whom we can emulate.

The successful management of the visual consequences of ADD/ADHD in the behavioral optometric setting is crucial to the overall management of these children. The goal of this project was to compile qualitative information on this topic from a variety of practitioners that have experience in this area. Our hope was that this exchange of information will give fresh ideas to seasoned practitioners and good a place to start with ADD/ADHD children for those that have less experience in this area.

## References

- <sup>1</sup>Ballard, S., Bolan, M., Burton, M., Snyder, S., Pasterczyk-Seabolt, C., Martin, D. The Neurological Basis of Attention Deficit Hyperactivity Disorder. *Adolescence* 1997; 32(128):855-862.
- <sup>2</sup>Lemer, P. S. From Attention Deficit to Autism: A Continuum. *J Behav Optom* 1996; 7(6):143-149.
- <sup>3</sup>Borsting, E. Overview of Visual and Visual Processing Development. In: Scheiman, M. M., Rouse, M. W. *Optometric Management of Learning-Related Vision Problems*. Mosby-Year Book, Inc., 1994:35-68.
- <sup>4</sup>Solan, H. A. Overview of Learning Disabilities. In: Scheiman, M. M., Rouse, M. W. *Optometric Management of Learning-Related Vision Problems*. Mosby-Year Book, Inc., 1994:88-123.
- <sup>5</sup>Campbell, S. B., Douglas, V. I., Morgenstern, G. Cognitive Styles in Hyperactive Children and the Effect of Methylphenidate. *J Child Psychol Psychiatry* 1971; 12:55-67.
- <sup>6</sup>Freibergs, V., Douglas, V. I. Concept Learning in Hyperactive and Normal Children. *J Abnorm Psychol* 1969; 74(3):388-395.
- <sup>7</sup>Maino, D. M. *Diagnosis and Management of Special Populations*. Mosby-Year Book, Inc., 1995:136.
- <sup>8</sup>Goldman, L. S., Genel, M., Bezman, R. J., Slanetz, P. J. Diagnosis and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. *J Am Med Assoc* 1998; 279(14):1100-1107.
- <sup>9</sup>Barkley, R. A. Attention-Deficit Hyperactivity Disorder. *Sci Am* 1998 Sept; 66-71.
- <sup>10</sup>Pliszka, S. R. Attention-Deficit Hyperactivity Disorder: A Clinical Review. *AFP* 1991 April; 1267-1275.
- <sup>11</sup>Zarin, D. A., Tanielian, T. L., Suarez, A. P., Marcus, S. C. Treatment of Attention-Deficit Hyperactivity Disorder by Different Physician Specialties. *Psychiatr Serv* 1998; 2(49):171.
- <sup>12</sup>Hill, J. C., Schoener, E. P. Age-Dependent Decline of Attention Deficit Hyperactivity Disorder. *Am J Psychiatry* 1996; 153(9):1143-1146.
- <sup>13</sup>American Academy of Pediatrics Committee on Children with Disabilities and Committee on Drugs. Medication for Children with an Attention Deficit Disorder. *Pediatrics* 1987; 80(5):758-60.
- <sup>14</sup>Campbell, L. R., Cohen, M. Management of Attention Deficit Hyperactivity Disorder (ADHD), A Continuing Dilemma for Physicians and Educators. *Clin Pediatr* 1990; 29(3):191-193.
- <sup>15</sup>Kwasman, A., Tinsley, B. J., Lepper, H. S. Pediatricians' Knowledge and Attitudes Concerning Diagnosis and Treatment of Attention Deficit and Hyperactivity Disorders: A National Survey Approach. *Arch Pediatr Adolesc Med* 1995; 149:1211-1216.
- <sup>16</sup>Diagnosis and Treatment of Attention Deficit Hyperactivity Disorder. NIH Consensus Statement Online 1998 Nov. 16-18; In press. [cited 1999, Mar 29]:16(2): In press.
- <sup>17</sup>"Methylphenidate." Online. Internet. <http://www.rxlist.com/cgi/generic/methphen.htm>. accessed 29 apr. 1998.



- <sup>18</sup>Tan, G., Schneider, S. C. Attention-Deficit Hyperactivity Disorder: Pharmacotherapy and Beyond. *Postgrad Med* 1997; 101(5):201-222.
- <sup>19</sup>Physician's Desk Reference. Montvale: Medical Economics Company, Inc., 1998:1896-1897.
- <sup>20</sup>Efron, D., Jarman, F., Barker, M. Side Effects of Methylphenidate and Dexamphetamine in Children with Attention Deficit Hyperactivity Disorder: A Double-blind, Crossover Trial. *Pediatrics* 1997 Oct.; 100(4):662-666.
- <sup>21</sup>Trachtman, J. N. The Efficacy of the Use of Ritalin for Hyperactive Children: A Critical Evaluation. *J Behav Optom* 1991; 2(7):179-185.
- <sup>22</sup>Cotter, S. A., Scharre, J. E. Optometric Assessment: Case History. In: Scheiman, M. M., Rouse, M. W. *Optometric Management of Learning-Related Vision Problems*. Mosby-Year Book, Inc., 1994:226-266.
- <sup>23</sup>Groffman, S. Ritalin and Behavioral Optometry. *J Optom Vis Dev* 1996; 27:205-208.
- <sup>24</sup>Fay, J., Fay C., Sornson, R., Levy, R. *Common Sense Solutions to the Chaos of ADHD*. Golden: School Consultant Services, Inc., 1995.
- <sup>25</sup>Lemer, P. S. Attention Deficits-A Developmental Approach. Optometric Extension Program Foundation, Inc., 1995. Pamphlet #B121.
- <sup>26</sup>Cantwell, D. P., Baker, L. Association Between Attention Deficit-Hyperactivity Disorder and Learning Disorders. *J Learning Disab* 1991; 34(2):88-94.
- <sup>27</sup>Hoffman, L. G. Incidence of Vision Difficulties in Children with Learning Disabilities. *J Am Optom Assoc* 1980; 51(5):447-451.
- <sup>28</sup>Sucher, D. F. Stewart, J. Vertical Fixation Disparity in Learning Disabled. *Optom Vis Sci* 1993; 70(12):1038-1043
- <sup>29</sup>Wunderlich, Jr., R. C. The Hyperactivity Complex. *J Optom Vis Dev* 1977; 8(1):8-45.

## Appendix A

### PLEASE HELP US MANAGE THE VISUAL CONDITIONS OF ADD/ADHD CHILDREN....

We are 3rd year students at Pacific University College of Optometry and we need your help. It is our understanding that ADD/ADHD kids pose some real challenges to optometrists.

Many optometrists are aware that a strong link exists between learning disabilities and visual dysfunction. ADD/ADHD especially has been associated with increased learning difficulties. Because the frequency of the diagnosis of ADD/ADHD has increased in the past decade the amount of optometric literature related to the specific management of the ADD/ADHD child in the optometric setting is limited.

This is where we need your help and expertise. We would like to talk to optometrists who examine, diagnose, and manage children with visually related learning difficulties and ADD/ADHD.

Attached is a brief survey on the optometric management of this special population. Please type an "X" next to the answer that corresponds to your choice (or simply delete all the answers except your choice) and enter numbers and other information as appropriate. We would greatly appreciate your input, insights, and clever ideas. The results of the survey will be made available to you once it is completed. Another objective of this thesis is to produce a public education orientated slide presentation about ADD/ADHD and donate it to ILAMO where it can be made available to practitioners interested in raising their community's knowledge of ADD/ADHD.

Please respond in private to [clarissa@aracnet.com](mailto:clarissa@aracnet.com)

If you prefer a phone interview please e-mail us your phone number and the most convenient time for us to phone you. Thank you in advance for your time and help.

If you prefer to print the survey, fill it out, and mail us a hard copy, please mail to:

Lisa Weiss  
UC BOX 2000  
2043 College Way  
Forest Grove, OR 97116

1. What percent of the patients you examine fall in each of these age brackets?
  - a. birth - 2 years old
  - b. 3 - 6 years old
  - c. 7 - 11 years old
  - d. 12 - 17 years old
  
2. Of the following, select the behaviors you most commonly associate with ADD/ADHD and rank them with (1) being the most common behavior and (8) being the least associated with ADD/ADHD.
  - a. hyperactivity
  - b. inattention
  - c. poor school performance
  - d. impulsivity
  - e. easily distracted
  - f. talks excessively
  - g. difficulty remaining still
  - h. you don't associate any of these behaviors with ADD/ADHD
  
3. In what capacity do you work with ADD/ADHD patients? Mark an "X" by those that apply:
  - a. exam
  - b. VT
  - c. lenses
  - d. do not work with ADD/ADHD patients
  
4. Approximately what percent of children in your practice have a diagnosis of ADD/ADHD?
  
5. Of the children you examine with a diagnosis of ADD/ADHD, what percent do you co-manage (exchange information about the management and progress of the patient) with other professions?
  - a. 0 -24%
  - b. 25-49%
  - c. 50-74%
  - d. 75-100%
  
6. To whom do you most often co-manage the ADD/ADHD child with?
  - a. education specialist
  - b. pediatrician
  - c. psychologist
  - d. other:

7. Of the undiagnosed children that you suspect of having ADD/ADHD, what percent of these children do you refer for testing and treatment by other professionals?
- 0-24%
  - 25-49%
  - 50-74%
  - 75-100%
  - none
8. To whom would you most likely refer the child (feel free to choose more than one)?
- education specialist
  - pediatrician
  - psychologist
  - other:
9. On a scale of 1-5, how hard do you feel it is to do an EXAMINATION on an ADD/ADHD child compared to a non-ADD/ADHD child of the same age?
- easier
  - slightly easier
  - no more challenging
  - slightly more challenging
  - extremely more challenging

Please explain:

10. When scheduling children, does your staff routinely screen for a specific type of problem that might warrant an extended or modified exam time slot?
- yes
  - no
11. Do you schedule extra time for ADD/ADHD patients when their parent mentions their child's condition while scheduling their exam?
- schedule more minutes
  - do not schedule more time
12. Do you prefer to see these patients at a certain time of the day?
- morning
  - afternoon
  - no preference
  - other

13. Do you change your standard exam sequence for the ADD/ADHD child compared to a non ADD/ADHD child of the same age?

- a. yes
- b. no

Please explain:

14. Do you structure VT differently for an ADD/ADHD child compared to non-ADD/ADHD children with the same diagnosis?

- a. yes if yes, please explain:
- b. no
- c. I don't do VT

15. Do you have a preference as to whether the child is taking or not taking their stimulant medication (if any) when you EXAMINE them?

- a. on medications
- b. off medications
- c. no preference

16. Do you prefer if the child is taking or not taking their stimulant medication when you conduct VT?

- a. on medications
- b. off medications
- c. no preference

17. Do you feel use of stimulant medications affects your EXAM results?

- a. yes
- b. no

Please explain:

18. Do you feel use of stimulant medications affects your VT success?

- a. yes if yes, please explain:
- b. no
- c. I don't do VT

19. On a scale of 1-5, how would you rank the effectiveness of your management of the visual problems in ADD/ADHD children compared to non-ADD/ADHD children with the same diagnosis?

- 1. significantly less effective
- 2. slightly less effective
- 3. just as effective
- 4. slightly more effective
- 5. extremely more effective

20. Is it your sense that those with ADD/ADHD are more likely to have a certain refractive condition than non ADD/ADHD children of the same age?
- a. more hyperopia
  - b. more myopia
  - c. more astigmatism
  - d. no difference in refractive condition between ADD/ADHD children and non ADD/ADHD children
  - e. other:

21. Do you feel that certain binocular/perceptual dysfunctions are more common in ADD/ADHD children than non ADD/ADHD children of the same age?
- a. binocular dysfunctions are NO more common
  - b. binocular dysfunctions are more common
  - c. perceptual dysfunctions are NO more common
  - d. perceptual dysfunctions are more common
  - e. both perceptual and binocular dysfunctions are NO more common
  - f. both perceptual and binocular dysfunctions are more common

please specify which binocular/perceptual conditions you find most common among ADD/ADHD children:

22. Where is your practice located?
- a. rural setting <25,000 people
  - b. urban setting 25,00- 100,000 people
  - c. urban setting >100,000 people
  - d. other setting
- please specify:

23. What percent of your time is spent in each area of practice?
- a. primary care
  - b. VT
  - c. contact lens
  - d. disease
  - e. low vision
  - f. pediatrics
  - g. neurorehabilitative
  - h. other

24. Mark an "X" by all of the areas that are improved in this population after management with vision therapy:

- a. improved visual performance
- b. improved school performance
- c. improved home behavior
- d. improved social interactions with peers

25. Can you share with us any tricks, techniques, and methods you have found particularly effective with ADD/ADHD children?

26. Is there a particular case example that you would like to share in order to help other optometrists with ADD/ADHD children?

27. Is there anything else about the optometric management of the visual problems of ADD/ADHD children that this survey has not addressed?

**THANK YOU VERY MUCH FOR YOUR HELP WITH OUR PROJECT.... WE  
COULD NOT HAVE DONE IT WITHOUT YOUR VALUABLE INPUT!**





## Appendix C

The following is a summary of the additional responses we received on questions 25-27 categorized by comment type.

### Examination Techniques:

1. Be on their level of attentiveness and go with the flow.
2. Do not spend too much time on any one procedure.
3. Let them touch everything.
4. Explain everything and let them ask questions.
5. Give the child a break when you sense frustration or the need to move around.
6. Like any diagnosis that is based on a pattern of observation, the diagnosis may not always be accurate. Don't assume that the diagnosis means the same issues will be present from one case to another: there may be more problems with a patient diagnosed with ADD/ADHD than with others who are diagnosed but not medicated.

### Vision Therapy Techniques:

1. Use eye movement activities such as the Visagraph.
2. Teach visualization of maps, forms, and objects and teach mental calculations in order to help with attention and getting control of thinking.
3. Do the same procedure twice in a therapy session but for half the time each time.
4. Tachistoscopic training seems to integrate some of the deficient problem areas.
5. Use computerized vision therapy programs as a reward for good work during the

therapy session.

6. Try to judge which sense is dominant in their performance and provide an activity that uses that sense. Allow them to perform the activity in their usual manner and then try to direct a change that modifies that performance in a more controlled way. Example: If the child is highly tactile, use an activity that involves a lot of touch (chalkboard) and combine it with another sense (auditory-metronome). First match the sound with the child's normal pace and then have the child try to match the sound with their activity while changing to a slower pace. Later, add a strobe light to bring in the visual sense to the activity. Using this method, the child soon finds that they have a way of controlling what they are doing. As they start to feel the difference, their attention span increases and their hyperactivity diminishes.

#### Medication Considerations:

1. Try two cups of coffee for one week to see if they settle down before going on to Ritalin or Cylert. The child that caffeine does not impact will not be helped by medications. Often times two cups of coffee is enough to get the same results as medication.

#### Ergonomic Considerations:

1. Encourage the child to sit toward the front of the class.
2. Move all distractions including bright colors.
3. Encourage motor activity in the home and on the playground.