

**The Eye of the Beholder:
The Relationship Between Self-Awareness and Nearsightedness**

Katherine Ida Yarboro

Dissertation
submitted to the Faculty of
Holos University Graduate Seminary
in partial fulfillment of the requirements
for the degree of

DOCTOR OF THEOLOGY

Copyright by Katherine Ida Yarboro, 2008

All Rights Reserved

The work reported in this dissertation is original and carried out by me solely, except for the acknowledged direction and assistance gratefully received from colleagues and mentors.

Katherine Ida Yarboro

ACKNOWLEDGEMENTS

God – Thank you for giving me the strength to question conventional thinking. Thank you for the resources, creativity, and energy to take on and complete graduate school. And thank you for showering me with all the amazing support I needed to bring this project to fruition. By You, I am Blessed in every moment and in every way.

Stephen Dale Yarboro, Jr., RN, BSN – My husband and best friend, thank you for so many things. I am grateful for your creativity and tireless recruiting assistance and for the time that you spent listening, reflecting, and contemplating my project with me. The sacrifices that you made for me have not gone unnoticed. I am eternally grateful for your support and constant belief in me. You kept me moving forward on this project whenever I slowed down. You knew when to take me away to clear my mind. You kept me grounded. You never questioned my ability to succeed. Dale, I thank you for all of this, and most importantly, I thank you for your love.

Karin Cremasco, BEd, ThD, PhD, CCI – Committee Chair, Associate Professor, beloved friend, thank you for your endless emotional and academic support. The immense amount of time and energy that you joyfully and lovingly invested in me is a cherished gift. Your keen attention to detail and high expectations pushed me to do my best. Karin, thank you for your unconditional love and ever-present belief in me. You have helped me grow in many ways.

David A. Eichler, MA, PhD – Committee Member, Associate Professor, thank you for your wisdom and expertise. You challenged me throughout this process with your insight, inquiry, and high standards. You are a model for the professional I wish to be.

Mei-fei Elrick, PhD – Committee Member, Professor, thank you for your insight and attention to detail. Your expert guidance during this process offered me new perspective and gentle support.

Vera M. Borgmeyer, RN, MA, ThD – Committee Member, Assistant Professor, thank you for your authenticity and for your positive encouragement. Your complete and unwavering faith in my ability often left me feeling silly for even questioning it to begin with. You helped me believe in myself.

C. Norman Shealy, MD, PhD – President of Holos University, Professor, your vision and dedication to Holistic and Energy Medicine has paved the way for so many. Thank you for creating a safe and nurturing place for unconventional thinkers to meet and to scientifically explore that which cannot be seen with the eyes.

Nanci Auitable, PhD – Statistician, Angel of Numbers, thank you for your patience. Your ability to help me decipher and write about the numbers was a godsend. I entered my oral defense with far more confidence because of the time and energy you joyfully invested in me.

Robert Nunley, PhD – Professor, thank you for answering my technical questions and for helping me to find my voice as I began to create this study.

Paul Thomlinson, MA, PhD – Associate Professor, thank you for your assistance and review of my statistical questions before I conducted this study. Your expertise helped me feel more secure in the early stages of developing this project.

Rev. Ann Osborne, ThD, PhD, BSc – Former classmate, cherished friend, thank you for your selfless emotional support as I faced many of my own personal demons and fears along this journey. You always had just the right words when I needed strength.

Marc R. Grossman, OD, LAc – Best-selling Author, Optometrist, and Acupuncturist, I felt truly blessed to have your support and recruiting assistance for my study. Your work in the field of Holistic Optometry inspired me to conduct this research.

Otis S. Brown – Advocate for the prevention of myopia, thank you for allowing me to announce my research study on your online message board and discussion group.

Martin Sussman - Founder and President of the Cambridge Institute for Better Vision, thank you for your recruiting assistance and support of my research. To help a perfect stranger without ever being asked, as you did with me, clearly demonstrates your commitment to the ongoing research in this field.

Christa Evans – My dear friend, thank you for helping me maintain balance in my life while completing this project. Our nature walks, teatime, and “girl talks” helped to keep me fueled throughout this process.

I would also like to thank the following people for their creative recruiting assistance and support of my research:

Jason Amos

Denise Anthes, RN, BSN, MBA

Myra L. Blackwell, RN, BSN

Tatyana Buksh

Faith Burris, CLC

Janet Draughn, RN, BSN

Denise M. Hansen, RN, MSN/FNPbc

Sharon Jacques, RN

Laurie Pardo, RN, BSN

Susan Russell, ThD

Aaron Thomas

Pamela Yarboro, RN, BSN

And finally, I must offer a heartfelt **Thank You** to all the participants who volunteered for this study. Your time and energy were very much appreciated. I could not have accomplished this goal without each of you!

ABSTRACT

The purpose of the present study was to determine if there is a relationship between self-awareness and nearsightedness (myopia). For this investigation, myopia was defined as a refractive error of -0.50 diopters or greater in each eye. Participants included 100 adults, 50 with myopia and 50 with normal vision. All subjects completed two written self-assessments, the Personal Orientation Inventory (POI) and Dissociative Experiences Scale (DES). The POI was used to assess level of self-awareness and the DES to measure frequency of dissociation (an absence of self-awareness). A correlational research design was employed. Data were analyzed using the t-test for independent samples, ANCOVA, and Mann-Whitney U tests. Findings were statistically significant between groups ($p = .004$) on the Nature of Man, Constructive of the POI suggesting that nearsighted people tend to view the inherent nature of humankind as more negative than those with normal vision. Reciprocal correlations were found within the nearsighted group between the degree of refractive error and the following POI subscales: Self-Actualizing Value ($r = .43, p = .002$), Spontaneity ($r = .29, p = .04$), Self-Regard ($r = .52, p = .000$), Nature of Man, Constructive ($r = .30, p = .03$), and Synergy ($r = .28, p = .05$). These correlations suggest that a decreased level of self-awareness is related to higher myopia. There was no statistical significance found between groups on the DES. Implications and recommendations for future research are included.

Key Words: myopia, nearsightedness, refractive error, eyesight, vision, self-awareness, dissociation, Personal Orientation Inventory (POI), Dissociative Experiences Scale (DES)

TABLE OF CONTENTS

Section	Page Number
ACKNOWLEDGEMENTS.....	iv
ABSTRACT.....	vi
TABLE OF CONTENTS.....	vii
LIST OF FIGURES.....	x
LIST OF TABLES.....	xi
CHAPTER 1: Introduction.....	1
Background of the Problem.....	1
Statement of the Problem.....	2
Purpose and Importance of the Study.....	2
Statement of Research Questions.....	2
Hypotheses.....	2
Null Hypotheses.....	3
Definition of Terms.....	3
List of Abbreviations and Acronyms.....	5
Abbreviations for Scales and Subscales of the POI.....	5
CHAPTER 2: Literature Review.....	8
Anatomy and Physiology of the Eye.....	8
The Retina.....	9
The Visual Pathway.....	10
Development of Visual Skills.....	12
Measuring Eyesight.....	13
Definition of Myopia.....	14
Prevalence of Myopia.....	15
Etiology.....	15
Structure of the Eye.....	16
Genetics.....	16
Nearpoint Stress.....	19
Nutritional Factors.....	22
Conventional Treatments for Myopia.....	23
Corrective Lenses.....	23
Refractive Surgery.....	25
Alternative Treatments for Myopia.....	28
Acupuncture.....	28
Orthokeratology.....	29
Vision Therapy.....	30
Stress and Vision.....	31
Dissociation.....	33
Stress and the Visual Field.....	35
Emotion and Vision.....	36
Fear and the Eye.....	36
A Holistic Perspective on Eyesight.....	38
Looking versus Seeing.....	39

Metaphysical Cause of Myopia	40
Self-Awareness	42
Summary	45
CHAPTER 3: Research Methods.....	54
Overview.....	54
Study Design.....	54
Measures	55
Personal Orientation Inventory (POI).....	55
Dissociative Experiences Scale (DES)	57
Subjects.....	59
Recruiting.....	59
Inclusion Criteria	60
Exclusion Criteria	61
Discontinuation Criteria.....	61
Pre-Inclusion Screening	62
Pre-Inclusion Vision Screening Protocol.....	62
Subject Demographics	63
Subject Age.....	64
Gender.....	65
Ethnicity.....	66
Marital Status	67
Education Level	68
Subject Confidentiality	69
Procedure	69
Methods of Data Analysis.....	70
The T-Test for Independent Samples.....	70
Mann-Whitney U Test	70
Analysis of Covariance	71
Post-Study Procedures	71
Drawing for Gift Cards	71
Results Letters.....	71
CHAPTER 4: Research Findings.....	73
Statistical Results for the POI.....	74
Correlations with Diopter within the Nearsighted Group.....	74
Self-Actualizing Value (SAV) and Diopter	74
Spontaneity (S) and Diopter.....	75
Self-Regard (Sr) and Diopter	75
The Nature of Man, Constructive (Nc) and Diopter	75
Synergy (Sy) and Diopter	76
Correlations with Age and the POI.....	76
ANCOVA and T-test Results for the POI.....	77
Statistical Results for the DES	80
ANCOVA for the DES	80
Mann-Whitney U Test for the DES	80
CHAPTER 5: Discussion, Suggestions, and Conclusion	85
Summary of Findings.....	85

Review of Purpose and Research Questions.....	86
Hypothesis One.....	86
Hypothesis Two	86
Hypothesis Three	86
Discussion.....	87
Support for Hypotheses One and Two.....	87
Correlations within the Nearsighted Group	88
Lack of Support for Hypothesis Three.....	88
Limitations	90
Limitations of Study Design	90
Limitations of Instrumentation	90
Limitations of Measure Administration.....	91
Limitations of Measures	91
Limitations of the Dissociative Experiences Scale (DES).....	92
Limitations of the Personal Orientation Inventory (POI)	92
Other Limitations of this Study.....	92
Final Thoughts	94
Thoughts on Stress and Myopia.....	94
Thoughts on Perception and Myopia	94
Suggestions for Future Research	95
Suggestions for Improvement of the Current Study	95
Suggestions for Future Studies	96
Conclusion	97
REFERENCES and BIBLIOGRAPHY	99
APPENDIX A Flyer for Recruiting.....	108
APPENDIX B Advertisements for Study.....	110
APPENDIX C Example of Online Message Board Announcement	111
APPENDIX D Letter to Optometrists/Vision Care Specialists	113
APPENDIX E Information Given to Prospective Subjects	114
APPENDIX F Joel Schneider's 3-page Snellen Chart	116
APPENDIX G Joel Schneider's Near Vision Testing Card.....	119
APPENDIX H Normal Vision Verification Slip	120
APPENDIX I Informed Consent Form.....	121
APPENDIX J Subject Background Questionnaire	123
APPENDIX K Eye Health Questionnaire.....	125
APPENDIX L Personal Orientation Inventory (POI).....	126
APPENDIX M Dissociative Experiences Scale	127
APPENDIX N Items Check List.....	132

LIST OF FIGURES

Figure		Page Number
Figure 1.	Vertical Sagittal Section of the Eye.....	8
Figure 2.	The Visual Pathway.....	11
Figure 3.	Graph comparing mean standard scores between groups on POI scales.....	78
Figure 4.	Graph comparing mean rank scores on DES items 1-14.....	81
Figure 5.	Graph comparing mean rank scores on DES items 15-28.....	81

LIST OF TABLES

Table		Page Number
Table 1.	Frequency of Subject Age.....	64
Table 2.	Subject Gender.....	65
Table 3.	Subject Ethnicity.....	66
Table 4.	Subject Marital Status.....	67
Table 5.	Subject Education Level.....	68
Table 6.	T-tests for independent samples on POI scales and subscales.....	77
Table 7.	ANCOVA on POI Scales and Subscales.....	79
Table 8.	ANCOVA results for DES scores.....	80
Table 9.	Mann-Whitney U Test for DES questions 1-8.....	82
Table 10.	Mann-Whitney U Test for DES questions 9-16.....	82
Table 11.	Mann-Whitney U Test for DES questions 17-24.....	83
Table 12.	Mann-Whitney U Test for DES questions 25-28.....	83

CHAPTER 1: INTRODUCTION

Background of the Problem

Nearsightedness (myopia) is a condition in which an individual has constant blurred vision at a distance but is able to see clearly up close.¹ Myopia is considered the most common eye problem in the world.² It is estimated that twenty-five percent of the world's population is myopic³ and epidemiological research indicates that prevalence is increasing.⁴ Along with high prevalence is high financial burden. An estimated two billion dollars a year is spent in the United States alone on corrective lenses.⁵

There are many theories on the cause of myopia but unfortunately since 1611, when the condition was first described,⁶ its origin has yet to be agreed upon. Heavily researched *potential* causes for the condition most often include: genetics and nearpoint (or close work) stress. But despite centuries of research there is still no known etiology for nearsightedness.⁷

There are metaphysical and holistic theories occasionally emerging that consider personality traits, emotions, stress levels, psychological responses, and lack of willingness to see aspects of the self, all as potentially playing a role in nearsighted vision. If fear is related to myopia, is it possible that nearsighted people are responding to stress by dissociating? Or is it possible that a lack of self-awareness is causing blurred vision in myopic people who choose not to see aspects of themselves?

The purpose of this study was to determine if there a relationship between self-awareness and myopia. With myopia affecting such a high percentage of the population, it is well worth exploring alternative links to the condition. Such research could lead to

potential improvements or changes in the way we currently treat this far reaching and rapidly-growing problem.

Statement of the Problem

Current, non-surgical treatments for myopia improve the symptoms of the condition but do not provide a cure. With the near epidemic increases in myopia in various populations around the world, this ailment not only warrants the attention of researchers but demands it. Examining the problem from a new perspective affords investigators the opportunity to traverse uncharted territories while potentially offering hopeful insight to the current understanding of myopia.

Purpose and Importance of the Study

Research seeking alternative links to nearsightedness is important due to the potential impact it may have on both furthering the current understanding of the condition as well as improving treatments. If it can be determined that there is a link between self-awareness and myopia perhaps treatments in the future will include mind-body healing modalities to complement or amend traditional approaches.

Statement of Research Questions

- Is there a relationship between myopia and level of self-awareness?
- Do those with myopia dissociate more frequently than people with normal, 20/20 vision?

Hypotheses

1. Research results will demonstrate a relationship between self-awareness and nearsightedness.

2. Research results will yield a reciprocal correlation between self-awareness and myopia suggesting that a decreased level of self-awareness is related to higher myopia.
3. Research findings will suggest that nearsighted individuals dissociate more frequently than those with normal, 20/20 vision.

Null Hypotheses

1. Research results will not demonstrate a relationship between self-awareness and nearsightedness.
2. Research findings will not suggest that nearsighted individuals dissociate more frequently than those with normal, 20/20 vision.

Definition of Terms⁸

Accommodation – The ability to change visual focus.

Acuity – The clarity of vision.

Alter – An alternate, distinctive personality or identity in an individual with Dissociative Identity Disorder.

Aqueous humor – Watery fluid that fills the anterior chamber of the eye, in front of the lens.

Astigmatism – Blurred vision due to irregular curvature of the cornea or lens; visual asymmetry.

Choroid – Middle layer of the eyeball that contains a dark pigment to prevent the scattering of incoming light rays.

Ciliary muscle – The circular muscle that changes the shape of the lens and holds the lens in place.

Cones – Receptor cells located in the retina that are stimulated by bright light.

Convergence – The ability to point both eyes at the same object at the same time.

Cornea – The convex, transparent, anterior part of the eye which allows light to pass through it to the lens.⁹

Corrective lenses – Glasses or contact lenses used to treat the symptoms of poor vision by compensating for the eye's optical defects.

Diopter – The unit of measure used to determine the refractive power of a corrective lens.

Extraocular muscles – Six extrinsic muscles located around the eyeball.

Fovea centralis – The spot on the retina that contains the highest concentration of cones; the area of sharpest visual acuity. Sometimes referred to simply as fovea.

Hyperopia (Farsightedness) – The ability to see far objects more clearly than near objects.

Iris – The colored, donut shaped structure seen through the cornea.

Lateral geniculate body – One of two elevations in the lateral posterior thalamus receiving visual impulses from the retina via the optic nerve and tracts and relaying the impulses to the visual cortex.¹⁰

Lens – Transparent body behind the pupil, focuses light rays on the pupil.

Myopia (Nearsightedness) – The ability to see near objects more clearly than far objects.

Nearpoint stress – Fatigue of visual strain on the eyes when doing close up work.

Oblique muscles – Voluntary muscles used to roll the eyeball.

Optic chiasm – The location in the brain where about half of the fibers from each eye cross to the opposite side of the brain.

Optical infinity – Light rays entering the eye are roughly parallel from twenty feet or beyond, this point is referred to as optical infinity.¹¹

Orthokeratology – The use of rigid contact lenses for corneal reshaping as a means of temporary myopia reduction.¹²

Presbyopia – The gradual loss of accommodative powers for near vision that usually occurs after age forty.

Primary visual cortex – Region of the brain located in the back of the head where visual impulses are interpreted.

Pupil – The opening in the center of the iris that regulates the amount of light entering the eye.

Refraction – The bending of light as it passes through substances of different densities.

Refractive error – A numerical measurement of the eye’s inability to focus parallel rays of light directly on the retina.

Retina – The light sensitive, innermost layer of the eye; contains rods and cones.

Retinoscope – Instrument used to shine a light into the eye onto the retina to determine errors of refraction.

Retinoscopy – A procedure for examining eyes that involves measuring possible errors of refraction.

Rods – Receptors located in the retina that are responsible for night vision.

Sclera – The tough, white outer layer of the eyeball.

Vitreous humor – The jellylike fluid inside the eye, posterior to the lens.

List of Abbreviations and Acronyms

DES Dissociative Experiences Scale

DID Dissociative Identity Disorder (formerly known as Multiple Personality Disorder)

FDA Food and Drug Administration

MPD Multiple Personality Disorder

PI Principal Investigator

POI Personal Orientation Inventory

Abbreviations for Scales and Subscales of the POI

A Acceptance of Aggression

C Capacity for Intimate Contact

Ex Existentiality

Fr Feeling Reactivity

I Inner-Directed
Nc Nature of Man, Constructive
S Spontaneity
Sa Self-Acceptance
SAV Self-Actualizing Value
Sr Self-Regard
Sy Synergy
TC Time Competence

Chapter 1 Endnotes:

¹ T. D' Alonzo, *Your Eyes!: A Comprehensive Look at the Understanding and Treatment of Vision Problems* (Clifton Heights, PA: Avanti Publishing, 1954), 58.

² S. Saw, J. Katz, O. Schein, S. Chew, and T. Chan, "Epidemiology of Myopia," *Epidemiologic Reviews* 18, no. 2 (1996): 175.

³ R. Kaplan, *The Power Behind Your Eyes* (Vermont: Healing Arts Press, 1995), 16.

⁴ D. Fredrick, "Myopia," *British Medical Journal* 324, (May 2002): 1195.

⁵ S. Saw, J. Katz, O. Schein, S. Chew, and T. Chan, "Epidemiology of Myopia," *Epidemiologic Reviews* 18, no. 2 (1996): 175.

⁶ "Important Dates in Vision Science," http://www.socsci.uci.edu/cogsci/vision/yellott_dates.html (accessed on November 29, 2006).

⁷ S. Fekrat and J. Weizer (Eds), *All About Your Eyes: A Practical Guide in Plain English from the Physicians at the Duke University Eye Center* (North Carolina: Duke University Press, 2006), 18.

⁸ Terms defined by S. Beresford, D. Muris, M. Allen, and F. Young, *Improve Your Vision Without Glasses or Contact Lenses: A New Program of Therapeutic Eye Exercises* (New York: Simon & Schuster, 1996), R. Kaplan, *Conscious Seeing: Transforming your Life through Your Eyes* (Oregon: Beyond Words Publishing, Inc., 2002), and G. Thibodeau, and K. Patton, *Structure & Function of the Body* (Missouri: Mosby, Inc., 2002), unless otherwise cited.

⁹ *Mosby's Medical, Nursing, and Allied Health Dictionary*, 4th Edition (MO: Mosby – Year Book, Inc., 1994), 396.

¹⁰ *Ibid.*, 889.

¹¹ J. Liberman, *Take Off Your Glasses and See: A Mind/Body Approach to Expanding Your Eyesight and Insight* (New York: Three Rivers Press, 1995), 18.

¹² E. Worp and D. Ruston, "Orthokeratology: An Update," *Optometry in Practice* 7 (2006): 47.

CHAPTER 2: LITERATURE REVIEW

This Literature Review is intended to offer the reader an overview of the existing literature and research pertinent to the study. A description of the anatomy and physiology of the eye is followed by potential etiologies and treatments for nearsightedness (myopia). The impact of stress and emotion on eyesight are also discussed. Additionally, a holistic perspective on myopia is considered. The intent of this discourse is to offer support for the present research.

Anatomy and Physiology of the Eye

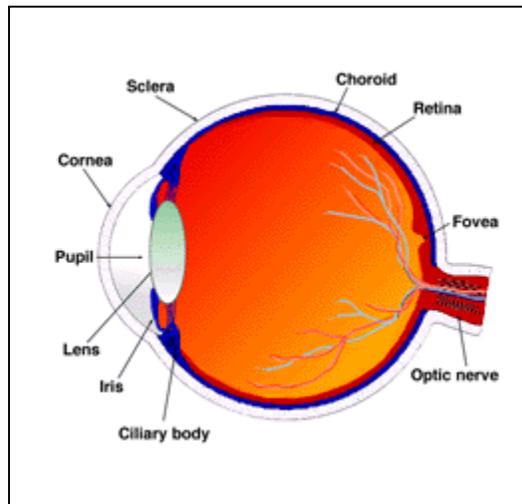


Figure 1. Vertical Sagittal Section of the Eye.¹

The eye is a spherical, light sensing organ made up of three different layers of tissue. These layers are: the *sclera* (the tough, white part of the eye), followed by the *choroid* (a vascular layer of tissue inside the eye),² and on the back side of the interior of the eyeball is the *retina* (the light sensitive layer).³ At the front of the eye is the *cornea*, a

transparent, dome-shaped structure filled with watery fluid called *aqueous humor*. The cornea allows light to enter the eyeball and is said to be responsible for the majority of the eye's focusing power.⁴

When light enters through the cornea, it then travels through the pupil which is actually a hole in the center of the iris (the colored part of the eye). The iris is a doughnut shaped, involuntary muscle, responsible for the dilation and constriction of the pupil. This function controls the amount of light that enters the eye. Typically the iris dilates the pupil, making it bigger, in low light situations and constricts it, when light is brighter.⁵ The pupil, however, can also be dilated by fear, interest, or other emotions.⁶

Behind the pupil is the lens. The lens, a transparent structure, helps the cornea focus light rays onto the back of the eye onto the retina. There is no blood supply to the lens itself. The lens is sustained by aqueous humor in front of it and *vitreous humor*, a clear jellylike substance which fills the inside of the eye, behind it. A ligament called the *ciliary muscle* holds the lens in place. This ligament relaxes when the eye focuses on distant objects creating only a slightly curved shape in the lens. When looking at closer objects, the ciliary muscle contracts causing the lens to bulge, creating more of a curve.⁷ Light rays are further bent, or refracted, by the vitreous humor before it reaches the retina.

The Retina

The purpose of the retina is to detect light and translate it into nerve signals for the brain to interpret. "The retina is part of the brain, having been sequestered from it early in development but having kept its connections with the brain proper through a bundle of fibers – the optic nerve."⁸

The retina contains photoreceptors called *rods* and *cones* which are highly sensitive to light. Rods are used to determine degrees of light and dark and cones to distinguish colors.⁹ There are approximately 125 million rods and 7 million cones in the human eye.¹⁰ The highest concentration of cones exists in a small depression located near the center of the retina, called the *fovea centralis*. Images focused directly on the fovea, in adequate light, provide the sharpest visual acuity.¹¹

Photoreceptors are responsible for changing a light stimulus into nerve impulses which then travel to the optic nerve, located at the posterior of the eyeball. From the optic nerve, these impulses are transported to the visual cortex of the occipital lobe of the brain where interpretation takes place.¹²

The Visual Pathway

“What you see is not what your retina is taking in.”¹³ The image one perceives is a highly processed version of the electrical information the retina sends to the brain.¹⁴ The eye itself is only responsible for approximately ten percent of vision, the other ninety percent occurs throughout the brain.¹⁵

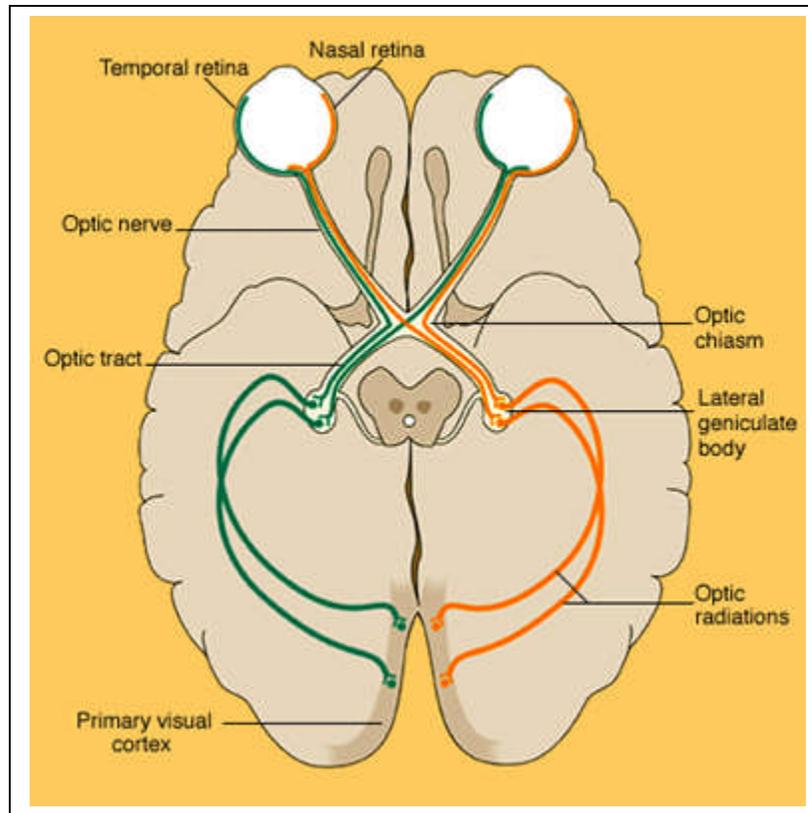


Figure 2. The Visual Pathway.¹⁶

The information sent from the retina of each eye via the optic nerve, described as “an electric cable composed of one million wires called axons”¹⁷ travels through the *optic chiasm*. Here, at the optic chiasm, about half of the fibers from each eye cross to the opposite side of the brain and the other half continues on the same side from which they originated. From the chiasm, fibers travel to several places in the brain, to locations “that have to do with such specific responses as eye movements and the pupillary light reflex, but most terminate in the two lateral geniculate bodies.”¹⁸ The *lateral geniculate bodies* are structures located bilaterally in the midbrain and act as synaptic connections. It is believed that these structures do not “exert any profound transformation” on the visual information sent to them.¹⁹ From the lateral geniculate bodies are another set of axons

that project information to various parts of the *primary visual cortex* (or V1), located at the back of the head.²⁰ (See figure 2).

The eyes are only a small portion of the visual system. These “sense organs are merely aids to their respective brain centers; it is the mind which perceives,” according to Margaret Corbett, in her book, *Help Yourself to Better Eyesight*.²¹ Donald Hoffman, professor at the University of California, discusses the complexities of vision in his book, *Visual Intelligence*. Hoffman explains that, “What happens when you see is not a mindless process of stimulus and response, as behaviorists thought for much of the twentieth century, but a sophisticated process of construction whose intricacies we are now beginning to understand.”²² Disturbances anywhere along the visual pathway, not only in the eyeballs themselves, can result in problems seeing.

Development of Visual Skills

Prior to the 1930’s it was thought that seeing was an innate ability for those born with healthy eyes, it was considered as automatic as one’s ability to breathe. Babies are born with visual reflexes but how to use the eyes to see involves over twenty separate learned skills.²³ “In addition to forming images, the visual system is involved in the ability to determine size, speed, distance, and position of an object; the ability to estimate the composition, texture, weight, purpose, and age of an object without touching it; the ability to compare one object with another; ability to maintain balance, posture, and direction; and the ability to read and interpret written words, signs and symbols.”²⁴ These skills are learned in childhood. It takes humans approximately ten years to acquire a fully developed visual system.²⁵ Some children learn them faster than others, while some develop defective visual skills that hinder them throughout the rest of their lives.²⁶

Measuring Eyesight

Visual acuity refers to one's ability to see clearly. This is determined by having a person placed twenty feet from an eye chart and asking them to identify varying sized letters. Twenty feet is the standard measure used because from this distance light rays entering the eye are roughly parallel. This point is referred to as *optical infinity*, meaning that anywhere from twenty feet or beyond is basically equivalent in terms of the way light is entering the eye.²⁷

An individual with "normal vision" stands twenty feet from the eye chart and is able to identify the row of letters eye care specialists agree a person should be able to see from that distance. Normal vision is referred to as 20/20. Patients are always tested from this standard twenty feet and so the first number remains the same indicating the distance at which the test was given. The second number is the one that changes. For example if a person has 20/100 vision this means that she sees at twenty feet what a person with 20/20 vision can see at one hundred feet.²⁸

The standard eye chart used to measure vision was created by Dr. Hermann Snellen in the mid nineteenth century. He used his assistant, who was a person who he felt had good eyesight, to determine what he could see at twenty feet from this chart. Based on the row of letters his assistant could identify, the standard was set.²⁹

There are two parts to a customary eye exam: the objective and the subjective components. The objective portion is called *retinoscopy*. This is where the examiner creates an artificial state of rest for the eye either by using blurred lenses or with eye drops which paralyze the eye's internal structures. The examiner then looks into the eye

with an instrument known as a *retinoscope*; this instrument shines a light into the eye onto the retina and a measurement of refraction is obtained.

Diopters are the measure used for lens power. Beginning with the smallest unit, one quarter of a diopter, or 0.25, the numbers increase in 0.25 increments. The higher the number the more powerful the corrective lens prescribed.³⁰

In the subjective portion of the eye examination the patient is asked questions, “Which is clearer, number 1 or number 2?” for example, as different lens options are presented to the patient. This is subjective because the patient’s own perception is what is being measured. Both of the conventional objective and subjective measurements used are based on the assumption that we see only with our physical eyes.³¹ “The light [entering the eye] interacts with live tissue, and the combined energy is fed to your brain, where 90 percent of the process we call ‘vision’ occurs. Yet, most optometrists... and ophthalmologists... determine the quality of... vision by examining only [the] eyes themselves.”³²

Definition of Myopia

According to *Mosby’s Medical, Nursing, and Allied Health Dictionary*, myopia is defined as, “a condition of nearsightedness caused by the elongation of the eyeball or by an error in refraction so that parallel rays are focused in front of the retina.”³³ The result is constant blurred vision at a distance but an ability to see clearly close up. The point of clear vision for people with more severe myopia may be as close as two to three inches from the eyes.³⁴

The most common parameters used to define myopia are a refractive error of either -0.25 diopter and greater or a refractive error of -0.50 diopter and greater.³⁵ High

myopia is a condition of extreme nearsightedness (refractive error of more than -6.00 diopters) and is associated with increased risk of retinal detachment, glaucoma, and other severe eye conditions.³⁶

Typically nearsightedness begins in childhood or early adolescence and progresses until early adulthood, at which point it stabilizes.³⁷ Progression may once again resume in late adulthood.³⁸

Prevalence of Myopia

Myopia is considered the most common eye problem in the world.³⁹ Research and epidemiology reports show a strikingly high but variable incidence in the condition around the globe. In the United States, myopia is the most common vision problem, affecting over 25% of the population.^{40 41} In Asia, reports indicate as much as 70-90% of the population is myopic.^{42 43 44} But in Africa only 10-20% of people are reported to be affected.⁴⁵ With such a large portion of the population affected by this condition, the importance of continued research on the subject is evident.

Etiology

There is no known cause for myopia.⁴⁶ Myopia does tend to run in families but there is strong scientific evidence that suggest it is not a genetic disorder.⁴⁷ In fact, there is no gene currently known that causes nearsightedness.^{48 49} A fair amount of evidence exists to suggest that near work, such as reading and other close work, may be related to the development of myopia, but still there is evidence to the contrary (as will be presented). The literature is peppered with contradiction and inconsistencies but one thing is clear, myopia's etiology remains unknown.⁵⁰ The following section begins with

a discussion of the structure of the eye followed by potential causes for nearsightedness. Other associated factors will also be explored.

Structure of the Eye

It is generally agreed that an increased length of the eye (in its antero-posterior axis) is what causes nearsightedness. Nearsighted eyes, on average, measure longer than those of people with normal vision.⁵¹ Light coming into the eye of a myopic individual focuses in front of the retina because the retina is “too far back”⁵² causing blurred distance vision.

In terms of anatomical structure, there are many components to consider. Dr. R. Gottlieb expresses this in his doctoral dissertation on nearsightedness, stating that, “There are a large number of variables which make up the optical anatomy or the refractive accuracy of eyes. These include the curvature of the optical elements (surfaces of the cornea and the lens); the physical length (axial length) of the eyeball from the cornea to the retina; the positioning of the optical elements; the thickness of the optical elements; and the index of refraction of the cornea, lens, end media or the eye.”⁵³ Although most authorities agree that eye structure creates nearsighted vision, the cause of such anatomical irregularities remains disputed.

Genetics

Many sources insist myopia is a genetic disorder. Typically heredity is the most widely accepted cause for the condition despite contradictory evidence. “According to this theory, visual problems are the result of genetic defects and therefore can’t be prevented or cured... Although the evidence to the contrary is overwhelming, the genetic theory of poor vision is still taught at most optometric colleges and medical schools.”⁵⁴

Although some studies on twins support the genetic theory of nearsightedness, they have not defined the mode of inheritance.⁵⁵ Researchers have attempted to isolate a gene responsible for myopia but their efforts have been to no avail. Linkage to specific regions on various chromosomes has been reported in studies on high myopia (refractive error greater than -6.00 diopters) but this linkage cannot be found in more common, juvenile onset myopia.⁵⁶ Experts in the field of genetics confess that, “Despite many decades of research, little is known about the precise molecular defects and abnormal biochemical pathways that result in myopia.”⁵⁷

In a report published on the epidemiology of myopia, Seang-Mei Saw, et al., state that, “The exact mode of inheritance and possible genetic markers for myopia have not been identified. ... There may be an interaction between genetic and environmental factors wherein some individuals have a genetic predisposition such that they are more susceptible to environmental influences causing myopia.”⁵⁸ Dr. Beresford, et al. report that, “In most cases where myopia runs in families, everyone in the family does a lot of reading or close work, which is the common factor causing the myopia, not genetics. As a general rule, inherited visual problems almost always appear early in life. If you had good vision as a child, it’s highly unlikely that your visual problem is inherited.”⁵⁹

Often when discussing genetics the nature versus nurture argument will ensue; clearly it is no different when questioning the cause of refractive errors. Thomas R. Quackenbush, in his book entitled *Relearning to See*, argues that, “The blurred vision of a parent can, *and often does*, make a difference, because a child can emulate the parent’s strained vision habits. Still, the point is, blurred vision is not genetic.”⁶⁰

Further complicating matters is the existing research on Multiple Personality Disorder (MPD) (now referred to as Dissociative Identity Disorder) and optical variation. Dissociative Identity Disorder (DID) is a dissociative disorder characterized by two or more distinctive personality states. Each alternate personality state (often referred to as an *alter*) assumes control over the individual's thought processes and behavior at different times. Alters may be of different genders and may have very distinctive attitudes, preferences, and mannerisms. Individuals with DID may or may not be aware of the existence of their other personalities. Memory during times when different alters are dominating also vary.⁶¹

Research on physiological differences across alter personalities in people with DID brings further question to our understanding of myopia. Consistently, research demonstrates a measurable change in vision between alters in DID.^{62 63} Other measures that have been investigated between personalities include, but are not limited to, cerebral electrical activity by EEG, galvanic skin response and skin temperature, cerebral blood flow, and thyroid function. Although research supports the hypothesis that alters have different physiological activity and responses, there are also a number of studies that do not support such findings.⁶⁴ With vision however, this has not been the case. "One area in which physiological differences between alter personalities of persons with MPD have been consistently reported... is visual functioning."⁶⁵ Both subjective and objective optical measures have demonstrated clinically significant differences. Such differences include visual acuity, manifest refraction, visual fields, and eye muscle balance.^{66 67}

What makes these findings significant is that the individual with DID contains the same physical optical components no matter which personality is dominant at the time.

The same genetic material is present yet a different degree of visual acuity and refractive error, among other measures, can be observed across personalities.

Eulenberg declares that, "...The heredity theory, while plausible and very widely accepted, accounts for only very general tendencies, and is insufficient to explain the variations that do occur in people born with the same genetic material."⁶⁸ Although genetics is often accepted as the cause of myopia, the existing research simply does not fully substantiate this claim.

Nearpoint Stress

A dysfunction in the ciliary muscle of the eye, where the muscle stays in a contracted state (or a perpetual state of focus for close objects), is referred to as *functional myopia*.⁶⁹ This type of myopia is generally believed to be the result of an excess of close-up work. Close-up work, such as reading, writing, computer work, and close television watching require high accommodative demand on the eyes.⁷⁰ "The use-abuse theory states that close-up work causes myopia, as seen in the higher prevalence of myopia among persons who are more highly educated and are in white collar occupations."⁷¹ The demands of prolonged close-up work force various structures of the eye to stay in an unnatural, contracted state for extended periods of time.

Our ancestors were hunters and warriors, who visually scanned the horizon for predators and prey; clear distance vision was essential to their survival.⁷² Most people are born with normal, healthy eyes, with deformed, myopic eyeballs found in less than two percent of children.^{73 74} To ensure the excellent distance vision needed by our ancestors, by the age of five or six years old, even today, most children are slightly farsighted.^{75 76}

In our modern, industrialized society where people spend hours a day reading, sitting close to a television, doing computer work, and other forms of close work the eyes are used “exactly opposite to the way nature intended.”⁷⁷ Using the eyes in this way for prolonged periods of time can lead to stress, strain, and even cramping in the visual system; this is referred to as *nearpoint stress*.⁷⁸

The ciliary muscles are relaxed when the eyes are focused on a distant object. This indicates that distance sight is a more natural state for the eyes.^{79 80} If the eyes are forced to endure nearpoint stress for extended periods of time the ciliary muscles may respond by permanently staying contracted for near vision. “The ciliary muscles lock each eye’s inner lens into the bulging accommodated state so that they focus on close objects more easily. Likewise, the extraocular muscles lock the eyeballs into the convergent state so that they point at close objects more easily.”⁸¹

Research conducted in pre-industrial societies demonstrates that myopia is almost nonexistent in this population.^{82 83} In 1968 a classic study was conducted by Dr. Francis A. Young on native Alaskan families as they were being assimilated into mainstream American culture. The research occurred as the first generation of children attended school and learned to read and write. Young discovered that, “Of 130 parents, 128 had excellent distance vision and only 2 had myopia. This was expected because the tribe was living the typical native Alaskan lifestyle of hunting and fishing. One parent had 0.25D and the other, who was the tribal record keeper, had 1.50D. On the other hand, more than 60 percent of their children showed significant amounts of myopia!”⁸⁴ If nearsightedness is inherited one would expect to find that children’s vision would be similar to that of their parents, but this was not the case in the Young study. And

nutritional factors could not explain the rapid visual changes because children were eating the same traditional Alaskan food as were their parents.⁸⁵

In 2005 an investigation was conducted involving indigenous people in the Western Amazon Region of Brazil. These indigenous people spoke a language with no written form. The study yielded results quite similar to that of Young's work, in that myopia was almost nonexistent in non-literate individuals, only 1.6% of these indigenous people were bilaterally myopic.⁸⁶ Such findings strongly suggest a correlation between environmental factors and nearsightedness. Still, the close work theory cannot fully explain the cause of myopia because not everyone existing in the same close work environment will develop the condition.

Interestingly, in the 1920's, Dr. William H. Bates, a prominent ophthalmologist in New York City, offered a very different theory on the cause of functional myopia. He related the refractive error to a strain or effort made to see objects at a distance. "The eye with normal sight never *tries* to see,"⁸⁷ Bates declared. This type of strain, he felt, causes the eye to become rounder than it was before.⁸⁸ Bates argued that, "It obviously requires a strain to fail to see at the distance, because ... the eye at rest is adjusted for distant vision."⁸⁹

Bates offered an example to demonstrate that the "phenomena associated with strain in human eyes" have also been observed in other animals. He explained,

I have made many dogs myopic by inducing them to strain to see a distant object. One very nervous dog, with normal refraction as demonstrated by the retinoscope, was allowed to smell a piece of meat. He became very much excited, pricked up his ears, arched his eyebrows and wagged his tail. The meat was then removed to a distance of twenty feet. The dog looked disappointed, but didn't lose interest. While he was watching the meat, it was dropped into a box. A worried look came into his eyes. He strained to see what had become of the meat, and the retinoscope showed that he had become myopic.⁹⁰

Sight will deteriorate, according to Bates, if a strain to see is continued. Bates suggested that this strain goes beyond the anatomical components of the eye, not only affecting the eye muscles, the strain of myopia, he felt, is also mental. “Primarily, the strain to see is a strain of the mind, and, as in all cases in which there is a strain of the mind, there is a loss of mental control. Anatomically, the results of straining to see at a distance may be the same as those of regarding an object at the near-point without strain, but in one case the eye does what the mind desires and in the other it does not.”⁹¹

Examining the mental component of vision is not commonplace in allopathic medicine. Conventional treatments are directed at the physical defects or deficits of the optical structures of the eye. However, as previously mentioned, since only ten percent of vision occurs in the anatomy of the eye, investigating mental and emotional links are warranted.

Nutritional Factors

The eyes, like any other organ, need proper nutrition for optimum functioning. In developing countries, vitamin A deficiency is reported to be the most common cause of blindness in children.⁹² The normal functioning of the retina requires adequate vitamin A among other vitamins and minerals. It is argued that a diet high in carbohydrates, starches, and sugars and low in proteins and fats, may “favor the development of nearsightedness.”⁹³ It is likely that such diets are nutrient deficient further aggravating the condition.⁹⁴

Another theory involving nutrition is associated with nearpoint stress. Due to strain in various optic muscles, some theorists feel that this prohibits the circulation of proper nutrients to the eye via the blood.⁹⁵ Whatever the reason for a low concentration

of nutrients to the eyes, it is likely to negatively affect one's visual acuity. To function properly, the highly complex visual system requires an extremely high portion of nutrients.⁹⁶

Conventional Treatments for Myopia

Conventional treatments for myopia include eye glasses, contact lenses, and various surgeries. Such treatments are designed to treat the symptom of blurry vision and do not necessarily address its cause. If the irregular shape of the eye or cornea results in refractive error, which is the accepted belief of conventional medicine, then corrective lenses and surgical intervention are little more than symptom relievers. These treatments do not address the original cause of the deformity. In his doctoral dissertation, Gottlieb states, "The use of refractive lenses to neutralize or palliate the symptoms of nearsightedness does not correct or cure the problem. To neutralize a problem is not to correct it, just as to treat a symptom is not the same as to eliminate its cause."⁹⁷ It seems no less absurd to take a pain reliever for a headache caused by a brain tumor and expect the tumor to be cured. The pain reliever would only treat (or mask) this symptom of the tumor. Glasses or contact lenses may be doing the very same thing for the symptom of blurred vision in myopia. Still corrective lenses are by far the most popular way to treat this condition.

Corrective Lenses

In order to focus on an object, a healthy eye has the ability to change its refractive power, in other words, the eye can adjust itself to bend light so that it lands directly on the retina for a clear image. This process is referred to as *accommodation*. When the eye focuses on a close up object the curvature of the lens is increased by the ciliary muscles

that surround it.⁹⁸ In the myopic eye, light is focused in front of the retina when looking at a distant object creating a blurred image. Conventional myopia treatment involves the use of lenses to help refract or bend the light so it lands directly on the retina. Minus lenses, concave spectacle or contact lenses that are thicker on the edges than in the middle, are used for this purpose.⁹⁹ With regard to focusing effort, minus lenses make the eye feel as if the viewed object is actually closer than it is.¹⁰⁰

With the first signs of blurred distant vision, eye doctors are quick to prescribe minus lenses. Unfortunately, corrective “lenses are incapable of relieving the underlying condition, the present treatment is felt to be justified because it relieves the most obvious symptom. In spite of this ‘treatment’ however, the condition usually worsens for a number of years, resulting in poorer and poorer vision without glasses, and the necessity for stronger and stronger lenses to provide normal vision.”¹⁰¹

Donald Rehm, Founder of the International Myopia Prevention Association, asserts that most damage from minus lenses is caused by using them for reading or other close work. He explains that because the viewed object *seems* to be closer when wearing these lenses the eye must accommodate more (further increasing the curvature of the lens). This, Rehm insists, creates a vicious cycle of increased myopia.¹⁰² Eulenberg concurs, stating that further loss of visual acuity occurs with corrective lenses because “...minus diopter lenses intensify the dioptric [accommodative] demand on the eye, especially for near vision, they make myopia worse.”¹⁰³ Internationally known scientist, author, and optometrist, Dr. Roberto Kaplan also agrees, insisting that, “...The long-term use of traditional, ‘corrective’ 20/20 lenses leads to further reductions in eyesight.”¹⁰⁴

Another important consideration seldom addressed by conventional medicine is the natural variability of vision. The measurements taken by an ophthalmologist or optometrist may be correct in his or her office, but will vary under a variety of circumstances. Therefore treatment with an unchanging prescription is bound to lead to some level of eye strain and the potential for further visual deterioration.

Vision fluctuates under stress and strain, as well as during various emotions (as will be discussed). This fluctuation is normal but is unaccounted for with prescriptive lenses. In order to see clearly through corrective lenses one must reproduce the same degree of refractive error that the lenses are designed to correct.¹⁰⁵ “If one secures good vision by the aid of concave, convex, or astigmatic lenses, therefore, it means that one is maintaining constantly a degree of refractive error which otherwise would not be maintained constantly. It is only to be expected that this should make the condition worse...”¹⁰⁶

Dr. Bates felt strongly that, “...Problems of vision are far more intimately associated with the mind than is ordinarily supposed, and... they can by no means be solved by putting... [corrective] lenses before the eyes.”¹⁰⁷ The use of glasses and contact lenses is a palliative treatment for myopia; it does nothing whatsoever to heal the refractive error or its underlying cause.

Refractive Surgery

Refractive surgery is used to eliminate the need for corrective lenses. There are a variety of different procedures used to accomplish this task. As with any surgical procedure there are risks involved although the Food and Drug Administration (FDA) reports exceptionally low incidence of complication with laser vision surgery.

LASIK surgery (laser-assisted in situ keratomileusis) has become a well accepted and increasingly popular alternative to corrective lenses. Currently it is one of the most commonly performed surgeries in the United States. And worldwide, over two million LASIK procedures are performed annually.¹⁰⁸

Laser surgery requires a great deal of precision as it is used to reshape the cornea. This reshaping can be accomplished on the corneal surface, as is done with photorefractive keratectomy (PRK) and laser epithelial keratomileusis (LASEK) or under a surgically created flap, as with LASIK surgery.¹⁰⁹

LASIK surgery patients have a 1-2% chance for minor complications that can delay healing and a 0.2-0.4% chance for major complications, according to the FDA.¹¹⁰ Complications include, but are not limited to: dry eye, postoperative scarring, haze, halo and glare, regression (where vision returns toward the preoperative state), astigmatism (blurred vision due to irregular curvature of the cornea or lens), infection, over correction (resulting in hyperopia), and under correction (requiring continued use of corrective lenses or subsequent surgery).¹¹¹ Rates for subsequent surgery after LASIK have been reported between 5% and 28%.¹¹²

In 2003, a retrospective study was conducted to determine the incidence and risk factors for subsequent surgery after an initial, uncomplicated LASIK surgery. In an effort to characterize the predicted need for follow-up LASIK surgery, investigators looked specifically at the incidence of retreatment over 1 year after the initial LASIK procedure. “Of the 2016 eyes in the study group falling into this cohort, 212 (10.5%) required an enhancement LASIK procedure within 1 year of primary surgery. One-year retreatment incidence was 10.8% and 6.0% for initially myopic and initially hyperopic

eyes, respectively.”¹¹³ When examining the effect of the initial degree of refraction on the retreatment rate, Dr. Hersh and colleagues report that, “Both higher degree of myopia ($p < 0.001$) and higher degree of astigmatism ($p = 0.013$) were independent predictors of the need for retreatment. For example, a patient with 10 diopters (D) of myopia had a retreatment incidence of approximately 14%, whereas a patient with only 3 D of myopia had an approximately 7% chance of needing retreatment during the 1 year after initial surgery.”¹¹⁴

Researchers from a medical university in Spain followed patients for ten years after LASIK eye surgery for low, moderate, and severe myopia. Dr. Jorge Alio, et al. reported that, “20% of patients with low to moderate nearsightedness needed retreatment” over the ten year period.¹¹⁵

The FDA states that, “You are probably NOT a good candidate for refractive surgery if: You are not a risk taker. Certain complications are unavoidable in a percentage of patients....”¹¹⁶ Despite known early complications “...a large body of conclusive evidence on the chances of long-term complications is not yet established.”¹¹⁷

Another surgery used to make corrections in myopia involve the placement of corneal rings. The rings are crescent shaped pieces of acrylic implanted to alter the shape of the cornea by flattening it slightly. This procedure is only recommended for mild cases of myopia and shows a complication rate of as much as 20% in clinical trials.¹¹⁸ The types of complications with corneal rings are similar to that of other eye surgeries.¹¹⁹

Alternative Treatments for Myopia

Acupuncture

Acupuncture is an ancient Chinese form of medicine that is based on the flow of energy (or ch'i) throughout the body. This practice, dating back five thousand years, involves the insertion of very fine needles into specific locations on the skin called acupoints.¹²⁰ The needles are rotated or twisted to increase or decrease the flow of energy through the meridians (or energy pathways) of the associated organs to reestablish an energy balance to the patient.¹²¹

Acupressure is a modification of acupuncture that involves massaging the acupoints instead of needle insertion. This technique is also used to rebalance the energy flow throughout the body.¹²²

The visual system, according to ancient Chinese tradition, is associated with the liver and kidneys.¹²³ Certain acupoints are used specifically for the visual system and its associated organs. One vision related acupoint is B1-67 and is located on the lateral, or outside aspect, of each little toe. This point has been shown to activate the visual cortex of the human brain on Magnetic Resonance Imaging (MRI).¹²⁴

Acupressure and acupuncture have been reported to effectively treat a variety of eye-related disorders.¹²⁵ However, “Based on available evidence in the peer-reviewed scientific literature, the Task Force on Complementary Therapies believes that sufficient scientific evidence has not been found to demonstrate the safety or effectiveness of acupuncture to treat various ocular conditions compared to standard therapies. These conditions include myopia [and] high myopia...”¹²⁶ It is clear that to determine just how effective these techniques are will require further research.

Orthokeratology

Orthokeratology is the use of rigid contact lenses to reshape the cornea for temporary myopia reduction.¹²⁷ These rigid, flat-fitting lenses are designed to reduce the curve of the cornea without surgical intervention. There are several types of lenses used for corneal reshaping. Orthokeratology lenses are typically worn only during sleep allowing individuals to have clearer, unaided vision during the day.¹²⁸

Originally orthokeratology was developed by optometrists in the 1960s. It was not until June 2002 that one form of orthokeratology lenses were FDA approved for overnight use in the United States. Since this date other corneal reshaping lenses have been approved in the U.S..¹²⁹ Some practitioners feel that orthokeratology lenses may retard the progression of some types of myopia. The evidence is anecdotal at present but research is currently underway.¹³⁰ Although the mechanisms that produce the refractive changes is not fully understood, it can be stated “with certainty that orthokeratology is efficacious in terms of providing a temporary reduction in myopia.”¹³¹

Orthokeratology related infections are reported as 1.4 in 10,000 in North America.¹³² Other risks may include: corneal abrasion, corneal scarring, cornea hypoxia (lack of oxygen), and permanent loss of vision.¹³³ The Orthokeratology Society of Australia (OSA) reported in 2006 that the risk of acquiring an eye infection with daily use of soft contact lenses is 1 in 2,500 eyes per year. This risk is higher with extended (continuous) wear lenses and is reported as 1 in 500 eyes per year.¹³⁴ The OSA states, “As yet the relative risk of eye infection with orthokeratology contact lenses, compared to other forms of contact lens wear, is unknown.”¹³⁵ Further research is needed to determine the safety and long-term effects of orthokeratology.

Vision Therapy

As previously discussed, vision is a learned skill, and as with any learned skill improvements can be made with practice. Vision therapy is based on this premise.¹³⁶ It consists of eye exercises, stress reduction and relaxation, behavior modification, and improved nutrition. It can also include acupuncture, yoga, hypnosis, biofeedback, and syntonics.¹³⁷ All of which are designed to improve the efficiency of the eyes and mind.

Unlike conventional eye care practitioners, vision therapists are “primarily concerned with what happens *behind the retina*, in the interaction between brain and eyes...”¹³⁸ Developmental optometry, as the specialty is called, is based on the theory that “visual disorders show up in the eyes, but their causes lie elsewhere.”¹³⁹

The exercises used in vision therapy are likened to learning to play the piano. In practicing the piano, muscles are being trained on what to do, the brain is being taught to send the correct messages to the fingers. As with vision therapy, the exercises are not designed for muscle strengthening (because the muscles of the eyes are fifty to one hundred times as strong as are needed for visual functioning).¹⁴⁰ Vision therapy is instead concerned with teaching the muscles binocular and eye-brain coordination.¹⁴¹

A fair amount of optometric and ophthalmologic research has been conducted that supports the use of vision therapy for a variety of vision problems,^{142 143} unfortunately its efficacy in myopia reduction has not been as frequently studied. Studies that have investigated myopia report changes in subjective measures of visual acuity but little or no changes in refractive measurement with the use of visual training.^{144 145} Further scientific research is needed to understand the effectiveness of vision therapy for the treatment of myopia.

Stress and Vision

“Stress is the nonspecific response of the body to any demand made upon it,”¹⁴⁶ as defined by Hans Selye in 1936. Dr. Selye, a medical pioneer, conducted a lifetime of research on the physiological mechanisms of stress and the role of stress hormones in the development of many different diseases. Selye found that stress can come from a wide variety of stimuli. Emotional, psychological, mental, or physical stimuli can all induce a physiological stress response. “...Such essentially different things as cold, heat, drugs, hormones, sorrow, and joy [can] provoke an identical biochemical reaction in the body.”¹⁴⁷

The physiological reaction to stress is necessary for survival; the body’s natural response to stressful events is in place as a protective mechanism. In the 1920’s, Harvard physiologist, Walter Bradford Cannon coined the term “fight or flight” to describe this physiological reaction to stressful stimuli.¹⁴⁸

The fight or flight response is in place to provide the options necessary for survival. If a snarling dog is running towards a woman, her nervous system will take over. The woman can either fight off the threat or flee to safety because the autonomic nervous system kicks in automatically and instantaneously.

According to Drs. Luskin and Pelletier, the normal stress response includes:¹⁴⁹

- an increased heart rate, to move more blood throughout the body
- vasoconstriction resulting in an elevation of blood pressure
- increased respirations to deliver more oxygen to the brain and muscles
- muscles become tense and ready for action
- a decrease in blood flow to the prefrontal cortex (or higher reasoning center)
- an increase in blood flow to the limbic (or more primitive) part of the brain
- digestion stops so more blood is available for brain and muscles
- increased sweating to cool the body

- increase senses of smell and hearing
- pupils dilate to increase visual awareness

All of these physiological changes are designed so that the human body is best prepared to fight off the threat or physically escape from it.

Perceptual deficits occur when an individual is under stress, namely a narrowing of the visual field.^{150 151} In a 2003 study conducted by Rogers, et al., researchers found a relationship between athletes' responses to stress and their prior levels of life-event stress. Athletes "...with high levels of positive life-event stress experienced significantly more narrowing [of the visual field] on game day than those with lower levels of positive life-event stress."¹⁵² These findings suggest that there is a cumulative effect of stress, even of *positive* stress, on the visual system.

Mental effects of stress on vision also need to be considered. The voluntary, extraocular muscles of the eye tighten when the mind is tense, according to Corbett. "This pulls the eye off focus, deflecting the light rays from the keen point of the macula to the less sensitive peripheral nerves."¹⁵³ This causes the mind to strain to decipher images because they are obtained from the peripheral retina where images are normally blurred and non-specific. This creates what Corbett refers to as a "vicious cycle" causing further mental strain and decreased visual clarity.¹⁵⁴ This implies that if one is chronically tense, there may be a continued strain to see, potentially creating a need for corrective lenses.

Dr. Martin Brofman discusses the relationship of refractive errors and stress in his article entitled, *Vision as a Metaphor*. He concurs, "All kinds of impaired vision represent stressed ways that a person interacts with their environment."¹⁵⁵ He explains how muscle tension caused by stress leads to myopia, "Two muscles around each eyeball,

the oblique muscles, circle it like a belt, and when these muscles are tightened, they squeeze the eyeball, and it elongates. Excessive tension on these muscles is related to nearsightedness...¹⁵⁶

Dissociation

When a stressor is perceived the sympathetic nervous system is aroused, causing the aforementioned physiological responses. The responsible neurotransmitters, epinephrine and norepinephrine, can overwhelm the system causing a third response to stress, that of *freezing*.¹⁵⁷ “Fear-associated freezing/immobilization is a well described, adaptive, defensive behavioral phenomenon that is common in many species of animals and occurs during conditions of natural threat or fear.”¹⁵⁸ The survival advantages of the freezing/immobility response are:

- a. the attacker/predator thinks its victim/prey is dead and therefore may leave it alone or hide it for later consumption and
- b. the victim/prey enters an altered state of consciousness where it does not feel pain in the event that it becomes physically injured.^{159 160}

During the immobility response, when there is diminished or absent sensation of pain, dissociation has occurred to some degree.¹⁶¹ Dissociation allows an individual to separate him/herself from the stress or trauma so there is only selective awareness of the incident. It is a “psychobiological mechanism that allows the mind, in effect, to flee what the body is experiencing.”¹⁶² This phenomenon is often referred to as an out of body experience.¹⁶³

“...Dissociation involves the disintegration of normally integrated systems of the self, such as memory, thoughts, sensations, feelings, behavior and awareness...”¹⁶⁴ This

unconscious disconnect can be observed in most normal individuals to some degree.¹⁶⁵ It can be noted in people who tend to stare; there is a “disengaged quality in their eye contact,” as if the person is not fully present or is dissociated to some extent.¹⁶⁶ In its mildest forms, dissociation, “manifests as a kind of spaciness.”¹⁶⁷ Peter Levine further explains, in his book, *Waking the Tiger: Healing Trauma*, that “A mild variety of this symptom is responsible for the experience many people have when driving home from the corner store; suddenly, they find themselves arriving home with no memory of how they got there – the last thing they remember is driving away from the store. Dissociation is also operating when we put our keys down ‘somewhere’ and then can’t remember where.”¹⁶⁸

The immobility response affects the entire body, including the visual system. Gordon states, “In the visual system when the eyes freeze, they stare, the pupils dilate, the eyelids retract and the perceptual field shrinks.”¹⁶⁹ In normal vision the eye is constantly moving, even when focused on one stationary object. These tiny, involuntary movements are called *saccadic eye movements*. When an individual stares, their eye muscles freeze and these saccadic eye movements are diminished causing the visual image to blur.¹⁷⁰ Gordon explains,

As Dr. Bates said, poor eyesight is due to mental strain. Mental strain is caused by stress. Stress is a form of fear. ...Our physiologic response to fear is automatic and out of our conscious control. When the strain is temporary the system returns to its normal strain-free state. The eyes stop staring, the pupils return to an appropriate size, the muscles relax, the heart rate reduces and breathing normalizes. When the straining becomes chronic, however, the system may not return to its normal state, but stay frozen. The eyes may chronically stare, vision is impaired and dissociation increases and becomes more common.¹⁷¹

Stress and the Visual Field

The visual field is the total area which can be seen at one time when an individual is focused on one object; it includes both central and peripheral vision. Normal fluctuations in the visual field occur as a response to stress, as well as to other emotional states.

Optometrist, Dr. Jacob Liberman, is a pioneer and international authority in the field of holistic vision care. In his book, *Take Off Your Glasses and See*, he discusses visual fields and what they reveal regarding mind/body health and well-being.

Not only do our fields of vision represent how much of the world our brains are perceiving visually, but more specifically, to me, they represent how much of the brain is actually functioning. The field of vision acts like the root system on a tree. Just as the extent of a tree's roots are directly related to the tree's stability, so the expanses of our fields of vision also act to support our postural, emotional, and physiological stability in the world. If a tree's roots were gradually trimmed closer and closer to its base, its physical stability would gradually be reduced and it would eventually fall over. Humans function in a similar manner. As our visual fields gradually contract due to physical or emotional stress, we perceive less and less and eventually look at the world through a "hole," rather than perceiving it as a "whole."¹⁷²

Emotion and Vision

My eye is dimmed from anger; it has aged because of all my adversaries.

- Psalms 6:8

“Our inner world of emotions, intention, and awareness plays a profound role in our ability (or inability) to see clearly.”¹⁷³ Not only is the visual system affected by stress, a variety of emotions can have an impact on vision as well. “Anger, fear, pleasure, and lust can all be read in the movement of the iris and the size of the pupil. Negative emotions make the pupil contract, as if to shut out the offending object. Likewise, an expanding pupil registers hidden attraction, as the eye opens up to feast on light from the object of desire.”¹⁷⁴

Even curiosity, confusion, or lack of interest may affect visual acuity. “When the eye regards an unfamiliar object, an error of refraction is always produced.”¹⁷⁵ It appears that the optical components of the eye are no less affected by emotions than the rest of the body. Liberman explains, “...Our eyes are also made up of thinking cells, just like every other part of the human body. When we feel sad or scared, we see in a depressed or fearful way; when we feel expansive, our vision literally ‘opens up.’”¹⁷⁶

Fear and the Eye

Streams of images in the form of light enter the eye and land upon the retina. One’s perception of the light is affected by emotion, according to Kaplan. “Your ability to receive and make sense of this stream of images will in part be determined by your state of mind. For instance, if you are in a state of fear and anxiety, your level of receptivity will be diminished, and with it your ability to make sense of the light will be

lessened. This suppression of light we experience while in a state of fear is linked with survival reflexes that have evolved with the nervous system.”¹⁷⁷

Aggression and fear are the cardinal emotions of the stress response.¹⁷⁸ Margaret Corbett insists that, “Fear is the basis of imperfect vision...” because fear causes strain which she believes is intimately linked to poor eyesight.¹⁷⁹ Dr. Bates offered a common instance of when fear can lead to visual impairments. He explained, “Many children can see perfectly as long as their mothers are around, but if the mother goes out of the room they may at once become myopic, because of the strain produced by fear.”¹⁸⁰ This fear-induced myopia will typically be alleviated as soon as the situation which produced the emotion is relieved. (Most of Bates’ claims are based on years of anecdotal research he conducted in his ophthalmology practice). Corbett asserts that, “When the nerves and emotions are eased, visual difficulties are alleviated, for the eyes are direct barometers of the emotions; eyes see poorly if mind and heart are upset, vision improves when all is calm within.”¹⁸¹

If fear becomes chronic, as it is an emotion of stress, it may produce lasting effects on one’s ability to see with clarity. Dr. Kaplan affirms that, in most “life situations, thoughts and feelings of fear and the resulting muscular tensions go unnoticed, but those feelings, even if they are not acknowledged, ultimately reach the muscles of your eyes. These muscles can become tense and can spasm.”¹⁸² This tension can affect the ciliary muscle which then can translate as blurry vision. “When a person is in distress, the focusing of his or her ciliary muscle and lens become sluggish. The ability to maintain attention when reading a book or doing work on a computer screen is diminished, for example. Nearsightedness can develop as a result.”¹⁸³

A Holistic Perspective on Eyesight

*The old definition of vision kept us viewing the world
through a hole rather than as a whole...*¹⁸⁴

-Jacob Liberman

Webster's *Universal Encyclopedic Dictionary* defines *holistic* as, "relating to or concerned with wholes or with complete systems rather than with the analysis of, treatment of, or dissection into parts <*holistic* medicine attempts to treat both the mind and the body>."¹⁸⁵

The importance of the mind-body connection in health has become increasingly difficult to ignore. The recent shift in Western medicine to begin to accept more holistic concepts about healing and health, according to endocrinologist and expert in Ayurvedic medicine, Deepak Chopra, "...was almost a forced one, because the old reliance on the physical body alone had begun to crumble."¹⁸⁶ Holistic medicine includes care of the physical body but also addresses emotional, mental, and spiritual health as well. As holistic physician, Dr. Ballentine states, in his book, *Radical Healing*, "From a holistic perspective, our suffering comes from forgetting our wholeness."¹⁸⁷ He declares that, "Often it's your health problems – even the small ones – that clue you in to what you need to address, leading you on to increments of the transformation that moves you closer to an identity with the Greater Whole."¹⁸⁸

Dr. Liberman feels that, "...Body, mind, emotions, behavior, and environment all interact in the creation of vision difficulties. But the process really seems to *begin* when we fall out of harmonious relationship with ourselves – *when we lose sight of our relationship to the whole of life.*"¹⁸⁹

Looking versus Seeing

Optometrist, Dr. Roberto Kaplan, makes a distinction between looking and seeing. He argues that there are two very different ways or styles for using the eyes for vision and when the two are not balanced, visual problems may develop. Each visual style correlates to different personality characteristics, as well as to specific sides of the brain, according to Kaplan.

The first way to use the eyes, as described by Kaplan, is *looking*; looking refers to visual acuity. When clear vision is focused on the fovea centralis it produces a sharp image filled with specific details. People who tend to view the world this way, according to Kaplan, may not always be aware of the big picture because they get lost in the details.¹⁹⁰ The personal characteristics of the *looker* often tend to be of a more intellectual, precise, introverted individual.¹⁹¹

Kaplan states that, “Nearsightedness is a practiced form of looking; it disengages our feelings and our connection to what is happening outside.”¹⁹² Dr. Kaplan asserts that, “The over-looker focuses his or her attention on developing a rational, logical, and analytical way of perceiving the world. *Looking* generally leads to a ‘doing’ of one’s life, with a focus on accomplishment and achievement – getting things done.”¹⁹³

Using the vision in this more foveal (or *looking*) fashion tends to trigger “a left-brain mode of processing (doing).”¹⁹⁴ The left hemisphere of the brain generally performs more logical functions such as mathematics, analytical, logical, and linear thinking and tends to be more objective. The right side or hemisphere of the brain is associated with feeling, creativity, artistic/musical endeavors, wholeness, intuition, and subjectivity.¹⁹⁵

As Kaplan observes, the myopic personality seems to be more left-brained. Research comparing personality types of myopic individuals with others has been conducted. Findings are in agreement with Kaplan's general theory, suggesting that myopic individuals tend to be more introverted than their hyperopic counterparts.¹⁹⁶

The second way to use the eyes that Kaplan discusses, is by *seeing*. Seeing involves right-brain functions. A "seer," according to Kaplan, is someone who may have trouble staying focused on one task at a time and may seem "spacey." This individual is more "retinal" instead of "foveal" because light entering the eye is less focused on the fovea but instead spreads out onto the peripheral areas of the retina. (Recall that the peripheral retina has far fewer cones making vision focused here less acute). "Seeing is creative and involves being."¹⁹⁷ Seeing is related to intuition, creativity, sensing, and involves emotions, according to Dr. Kaplan.

Farsighted people may tend to have the characteristics of a right-brained person as they use their eyes to *see* rather than *look*. "To see is to have feelings about what we are perceiving, not merely to register the presence or absence of an object or person."¹⁹⁸ A balanced integration of these two styles of using the eyes, looking and seeing, is ideal and is what Kaplan terms, "conscious seeing."

Metaphysical Cause of Myopia

Louise Hay, best-selling author, teacher, and counselor, feels that the eyes represent "the capacity to see clearly – past, present, and future" and problems with the eyes may be due to disliking what people see in their lives.¹⁹⁹ Hay lists the specific metaphysical cause of myopia as, "fear of the future."²⁰⁰ Kaplan concurs with Hay, as he states, "Nearsightedness can be related to a fear of seeing. Quite often this fear is related

to an uncertainty about the future. One might presume it is of seeing the outside. But this fear could also be fear of seeing something about yourself.”²⁰¹ How one sees the world may have an impact on the quality of one’s eyesight, according to Dr. Liberman, as well. “Light energy enters our being through our eyes, but our vision of reality is determined more by what we see with our mind’s eye than what we see with our physical eye... Our eyesight is simply a reflection of our view of reality.”²⁰²

Muscle tension around the eyes may also play a role in the development of myopia. Dr. Martin Brofman feels that the location of muscle tension is directly related to the reason one initially feels the discomfort. “Tension in particular muscles is related to particular emotions and mental states.”²⁰³ He explains that the excessive ocular tension which he believes is related to myopia “is experienced in consciousness as hiding within one’s Self, retreating inward, as apprehension, fear, or non-trust as a perceptual filter, a sense of feeling threatened, [and/or] not safe to be one’s Self.”²⁰⁴

Dr. Bates also strongly felt that there is a metaphysical component to myopia. “The origin of any error of refraction, of a squint, or any other functional disturbance of the eye, is simply a thought – a wrong thought – and its disappearance is as quick as the thought that relaxes. ...If the relaxation is only momentary, the correction is momentary. When it becomes permanent, the correction is permanent.”²⁰⁵

Once a new prescription is obtained and the new glasses are put on, visual acuity seems to be improved. The problem is, according to Dr. Liberman, unresolved emotions that may have caused the original need for corrective lenses may still remain. Originally when such undesirable emotions arose, the individual blurred it out in order to create a sense of safety. Now that vision seems clear again, the person begins the same process

again causing more blurring which may lead to an increased need for stronger and stronger lens prescriptions.²⁰⁶ Liberman insists that, “The primary factors that encourage and intensify visual deterioration are the prescription lenses that are used to ‘correct’ vision problems, the social norms that encourage us to analyze instead of feel, and the stress involved in our educational system.”²⁰⁷

Physical functioning “is only the material outward manifestation of something internal,” of our “belief systems and... deeply ingrained patterns of emotion and thought,”²⁰⁸ declares Dr. Ballentine. “Our attitudes, our emotions, and our mental outlook on life can result in powerful physiological changes, both positive and negative, that strongly affect our physical bodies. It is therefore important to start recognizing the state of our emotional and mental balance as powerful contributing factors in the ongoing creation of health or illness.”²⁰⁹

If there is a relationship between thoughts and beliefs and one’s physical eyesight, as these holistic practitioners believe, than this implies that improvements *can* be made in myopic eyes. This theory challenges the long and tightly held conventional belief that myopia cannot be cured. “The most significant factor in natural vision improvement seems to be in the mind, not in the eyes!”²¹⁰

Self-Awareness

The mind's first step to self-awareness must be through the body.

-George Sheehan

Dr. Ballentine, in his book, *Radical Healing*, describes the human body as being much like a biofeedback device for the spirit. By listening to its messages and responding accordingly by making the necessary changes in one’s life, not only is it

possible to improve physical health but also to enhance spiritual well-being. “Effective holistic medical therapy depends on self-awareness,”²¹¹ declares Ballentine. “Bringing awareness to your body, to its unique reactions and processes, and to its symptoms and strengths, sets you up for growthful insight. For where you founder – precisely where your system begins to break down – provides a valuable clue to what needs to change in your life.”²¹²

Improving self-awareness requires self observation and self inquiry; it is a process which is not always comfortable. Abraham Maslow, one of the founders of humanistic and transpersonal psychology, describes the fear of knowing oneself as defensive, in that it protects the individual’s self-esteem and self-image. Self knowledge could lead an individual to dislike an aspect of him or herself, so unconsciously avoiding these potentially harmful or unpleasant truths becomes a more desirable option for some.²¹³ Maslow explains that, “...Fear of knowledge of oneself is very often isomorphic with, and parallel with, fear of the outside world. That is, inner problems and outer problems tend to be deeply similar and to be related to each other.”²¹⁴ Facing unfamiliar aspects of the self can be frightening, even aspects that are positive, according to Maslow. “...We also tend to evade personal growth because this, too, can bring another kind of fear, of awe, of feelings of weakness and inadequacy. And so we find another kind of resistance, a denying of our best side, of our talents, of our finest impulses, of our highest potentialities, of our creativeness.”²¹⁵

Greater wholeness and fuller awareness involves an integration of the many seen and unseen aspects of the self. “As you grow toward consciousness you develop a sense of who you are – your identity. Ideally, your identity is the result of an understanding

and acceptance of your inherent nature and all your life experiences, including your emotional history.”²¹⁶ The avoidance or denial of some aspect of the self is likely to have some impact on the individual, whether it is solely psychological or is physical in its manifestation. In Dr. Kaplan’s practice of optometry, he notes that, “...When you deny your soul’s perception, your own eyes will reveal this refusal to see in very physical terms.”²¹⁷ Kaplan proposes that, “...The eye discloses valuable *invisible* information not just about conditions such as hypertension and cardiovascular dysfunction but about the brain, mind, and human consciousness itself.”²¹⁸

Gaining self-awareness requires some effort and willingness on the part of the seeker. Self-awareness is more than passive consciousness, according to Stuss, et al., “Conscious experience does not come from a passive reception of incoming information but involves the active construction of mental models of the world. We remember, we think, and we plan by using mental models. We are not so much conscious of the world as of our models thereof. Consciousness is hierarchical, with self-awareness occurring at the highest levels.”²¹⁹

Self-awareness is not obtained in a linear fashion. “...Self-awareness develops like onions, layers after layers, in a cumulative consolidation. Accordingly, self-awareness is the experience of ourselves fluctuating through these layers as we act, perceive, and think in the world.”²²⁰ This process is not static; it is constantly fluctuating and dynamic, according to Rochat. “As adults we are constantly oscillating in our levels of awareness: from dreaming or losing awareness about ourselves during sleep, to being highly self-conscious in public circumstances or in a state of confusion and dissociation as we immerse ourselves in movies or novels.”²²¹

Fuller awareness comes when one is present, when fears have subsided and needs have been met. Gaining insight, making great discoveries about one's self has the potential to improve even one's physical well-being. Maslow explains the potential outcomes of acquiring new knowledge, "Supposing our sense organs were to become more efficient, our eyes suddenly keener, our ears unstopped. ... This is what can happen in education and in psychotherapy – and *does* happen often enough."²²² Achieving a higher level of self-awareness through personal insight may well have the potential to improve one's physical vision.

Summary

*Mine eye and heart are at a mortal war,
How to divide the conquest of thy sight.*

-William Shakespeare

As previously discussed, stress and fear may negatively impact visual acuity as well as potentially lead to varying degrees of dissociation as an unconscious coping mechanism. Vision may return to normal once the perceived threat is eliminated but if the stressor remains or becomes routine, a resulting, diagnosable refractive error may ensue. Perhaps willingness for honest, fearless introspection can lead to improved clarity of vision both physiologically, as well as mentally, as Drs. Liberman, Kaplan, Bates, Brofman, and many others insist. Increasing self-awareness, being fully present and embodied certainly has a great potential to increase one's quality of life, perhaps not only emotionally but visually as well.

The preceding review of the literature has presented an overview of many potential factors that may lead to myopia. However, despite centuries of research on the

subject, myopia continues to have an unknown etiology. With treatments that do not address a specific cause, results often lean towards nothing more than palliation.

Little research has been conducted to examine the connection between stress and poor eyesight. And until the present study, no research has inquired about the potential relationship between states of awareness and myopia. There are two pressing questions:

1. Is a decreased level of self-awareness related to nearsightedness?
2. Do people with myopia dissociate more frequently than those with normal vision?

If these findings suggest that such links do exist perhaps one day there will be increased hope for those who suffer from this “incurable” condition.

Chapter 2 Endnotes:

-
- ¹ Webvision, Moran Eye Center, Gross Anatomy of the Eye, “Sagittal Section of the Adult Human Eye,” <http://webvision.med.utah.edu/anatomy.html> (accessed on November 29, 2006). Reproduced with permission from Helga Kolb, Ph.D., Professor Emeritus, Department of Ophthalmology, Moran Eye Center, University of Utah. Permission granted on February 12, 2008.
- ² P. Whitfield, ed., *The Human Body Explained* (New York: Henry Holt & Company, 1995), 56.
- ³ G. Thibodeau and K. Patton, *Structure & Function of the Body* (Missouri: Mosby, Inc. 2000), 204.
- ⁴ P. Whitfield, ed., *The Human Body Explained* (New York: Henry Holt & Company, 1995), 56.
- ⁵ G. Thibodeau and K. Patton, *Structure & Function of the Body* (Missouri: Mosby, Inc. 2000), 207.
- ⁶ A. Smith, *The Body* (New York: Viking Penguin Inc., 1985), 378.
- ⁷ G. Thibodeau and K. Patton, *Structure & Function of the Body* (Missouri: Mosby, Inc. 2000), 207-210.
- ⁸ D. Hubel, *Eye, Brain, and Vision* (New York: Scientific American Library, 1988), 36.
- ⁹ G. Thibodeau and K. Patton, *Structure & Function of the Body* (Missouri: Mosby, Inc. 2000), 208.
- ¹⁰ A. Smith, *The Body* (New York: Viking Penguin Inc., 1985), 379.
- ¹¹ G. Thibodeau and K. Patton, *Structure & Function of the Body* (Missouri: Mosby, Inc. 2000), 208-209.
- ¹² *Ibid.*, 212.
- ¹³ M. Gazzaniga, *The Mind’s Past* (California: University of California Press, 1998), 85.
- ¹⁴ *Ibid.*
- ¹⁵ R. Kaplan, *The Power Behind Your Eyes* (Vermont: Healing Arts Press, 1995), 10.
- ¹⁶ The Eyes Have It, University of Michigan Kellogg Eye Center, “The Visual Pathway,” <http://www.kellogg.umich.edu/theeyeshaveit/anatomy/visual-pathway.html> (accessed on November 29, 2006). Reproduced with permission from the University of Michigan Kellogg Eye Center, <http://www.kellogg.umich.edu>. Permission granted on February 15, 2008.
- ¹⁷ D. Hoffman, *Visual Intelligence: How We Create What We See* (New York: W. W. Norton & Company, 1998), 68.
- ¹⁸ D. Hubel, *Eye, Brain, and Vision* (New York: Scientific American Library, 1988), 62.
- ¹⁹ *Ibid.*, 63.
- ²⁰ D. Hoffman, *Visual Intelligence: How We Create What We See* (New York: W. W. Norton & Company, 1998), 68.
- ²¹ M. Corbett, *Help Yourself to Better Sight* (California: Wilshire Book Company, 1949), 62.
- ²² D. Hoffman, *Visual Intelligence: How We Create What We See* (New York: W. W. Norton & Company, 1998), 1.
- ²³ S. Beresford, D. Muris, M. Allen, and F. Young, *Improve Your Vision Without Glasses or Contact Lenses: A New Program of Therapeutic Eye Exercises* (New York: Simon & Schuster, 1996), 20.
- ²⁴ *Ibid.*
- ²⁵ A. Seiderman and S. Marcus, *20/20 is Not Enough: The New World of Vision* (New York: Alfred A. Knopf, Inc., 1989), 25.
- ²⁶ S. Beresford, D. Muris, M. Allen, and F. Young, *Improve Your Vision Without Glasses or Contact Lenses: A New Program of Therapeutic Eye Exercises* (New York: Simon & Schuster, 1996), 20.
- ²⁷ J. Liberman, *Take Off Your Glasses and See: A Mind/Body Approach to Expanding Your Eyesight and Insight* (New York: Three Rivers Press, 1995), 18.
- ²⁸ *Ibid.*, 19.
- ²⁹ *Ibid.*
- ³⁰ *Ibid.*
- ³¹ *Ibid.*, 21.
- ³² R. Kaplan, *The Power Behind your Eyes* (Vermont: Healing Arts Press, 1995) 10.
- ³³ *Mosby’s Medical, Nursing, and Allied Health Dictionary*, 4th Edition, (MO: Mosby – Year Book, Inc., 1994), 1037.
- ³⁴ T. D’ Alonzo, *Your Eyes!: A Comprehensive Look at the Understanding and Treatment of Vision Problems* (Clifton Heights, PA: Avanti Publishing, 1954), 58.

-
- ³⁵ S. Saw, J. Katz, O. Schein, S. Chew and T. Chan, "Epidemiology of Myopia," *Epidemiologic Reviews* 18, no. 2 (1996): 175.
- ³⁶ S. Fekrat and J. Weizer, eds., *All About Your Eyes: A Practical Guide in Plain English from the Physicians at the Duke University Eye Center* (Durham, NC: Duke University Press, 2006), 18.
- ³⁷ *Ibid.*
- ³⁸ T. D' Alonzo, *Your Eyes!: A Comprehensive Look at the Understanding and Treatment of Vision Problems* (Clifton Heights, PA: Avanti Publishing, 1954), 59.
- S. Saw, J. Katz, O. Schein, S. Chew and T. Chan, "Epidemiology of Myopia," *Epidemiologic Reviews* 18, no. 2 (1996): 175.
- ⁴⁰ S. Fekrat and J. Weizer, eds., *All About Your Eyes: A Practical Guide in Plain English from the Physicians at the Duke University Eye Center* (Durham, NC: Duke University Press, 2006), 18.
- ⁴¹ G. Ibay, B. Doan, L. Reider, D. Dana, M. Schlifka, H. Hu, T. Holmes, J. O'Neill, R. Owens, E. Ciner, J. Bailey-Wilson, and D. Stambolian, "Candidate High Myopia Loci on Chromosomes 18p and 12q Do Not Play a Major Role in Susceptibility to Common Myopia," *BMC Medical Genetics* 5, no. 20 (2004).
- ⁴² D. Fredrick, "Myopia," *BMJ* 324 (May 2002): 1196.
- ⁴³ H. Wu, B. Seet, E. Yap, S. Saw, T. Lim, and K. Chia, "Does Education Explain Differences in Myopia Prevalence? A Population-Based Study of Young Adult Males in Singapore," *Optometry and Vision Science* 78, no. 4 (April 2001).
- ⁴⁴ C. Lam, E. Goldschmidt, and M. Edwards, "Prevalence of Myopia in Local and International Schools in Hong Kong," *Optometry and Vision Science* 81, no. 5 (May 2005): 317-322.
- ⁴⁵ D. Fredrick, "Myopia," *BMJ* 324 (May 2002): 1196.
- ⁴⁶ S. Fekrat and J. Weizer, eds., *All About Your Eyes: A Practical Guide in Plain English from the Physicians at the Duke University Eye Center* (Durham, NC: Duke University Press, 2006), 18.
- ⁴⁷ S. Beresford, D. Muris, M. Allen, and F. Young, *Improve Your Vision Without Glasses or Contact Lenses: A New Program of Therapeutic Eye Exercises* (New York: Simon & Schuster, 1996), 26-29.
- ⁴⁸ *Ibid.*, 26.
- ⁴⁹ G. Ibay, B. Doan, L. Reider, D. Dana, M. Schlifka, H. Hu, T. Holmes, J. O'Neill, R. Owens, E. Ciner, J. Bailey-Wilson, and D. Stambolian, "Candidate High Myopia Loci on Chromosomes 18p and 12q Do Not Play a Major Role in Susceptibility to Common Myopia," *BMC Medical Genetics* 5, no. 20 (2004).
- ⁵⁰ S. Fekrat and J. Weizer, eds., *All About Your Eyes: A Practical Guide in Plain English from the Physicians at the Duke University Eye Center* (Durham, NC: Duke University Press, 2006), 18.
- ⁵¹ A. Eulenberg, "The Case for the Preventability of Myopia," (1996) http://www.i-see.org/prevent_myopia.html (accessed on September 11, 2006).
- ⁵² *Ibid.*
- ⁵³ R. Gottlieb, "The Psychophysiology of Nearsightedness," (1978), <http://www.iblindness.org/articles/gottlieb-psych/> (accessed on September 11, 2006): 25.
- ⁵⁴ S. Beresford, D. Muris, M. Allen, and F. Young, *Improve Your Vision Without Glasses or Contact Lenses: A New Program of Therapeutic Eye Exercises* (New York: Simon & Schuster, 1996), 26.
- ⁵⁵ S. Saw, J. Katz, O. Schein, S. Chew and T. Chan, "Epidemiology of Myopia," *Epidemiologic Reviews* 18, no. 2 (1996): 178.
- ⁵⁶ G. Ibay, B. Doan, L. Reider, D. Dana, M. Schlifka, H. Hu, T. Holmes, J. O'Neill, R. Owens, E. Ciner, J. Bailey-Wilson, and D. Stambolian, "Candidate High Myopia Loci on Chromosomes 18p and 12q do not Play a Major Role in Susceptibility to Common Myopia," *BMC Medical Genetics* 5, no. 20 (2004).
- ⁵⁷ *Ibid.*
- ⁵⁸ S. Saw, J. Katz, O. Schein, S. Chew and T. Chan, "Epidemiology of Myopia," *Epidemiologic Reviews* 18, no. 2 (1996): 178.
- ⁵⁹ S. Beresford, D. Muris, M. Allen, and F. Young, *Improve Your Vision Without Glasses or Contact Lenses: A New Program of Therapeutic Eye Exercises* (New York: Simon & Schuster, 1996), 37.
- ⁶⁰ T. Quackenbush, *Relearning to See: Improve your Eyesight Naturally* (California: North Atlantic Books, 1997), 89.
- ⁶¹ WebMD, "Mental Health: Dissociative Identity Disorder (Multiple Personality Disorder)," <http://www.webmd.com/content/article/118/112901.htm> (accessed on November 17, 2006).
- ⁶² S. Miller, "Optical Differences in Cases of Multiple Personality Disorder," *The Journal of Nervous and Mental Disease* 177, no. 8 (1989): 481.

-
- ⁶³ S. Miller, T. Blackburn, G. Scholes, G. White, and N. Mamalis, "Optical Differences in Multiple Personality Disorder: A Second Look," *The Journal of Nervous and Mental Disease* 179, no. 3 (1991): 132.
- ⁶⁴ S. Miller, "Optical Differences in Cases of Multiple Personality Disorder," *The Journal of Nervous and Mental Disease* 177, no. 8 (1989): 481.
- ⁶⁵ *Ibid.*, 481.
- ⁶⁶ *Ibid.*, 484.
- ⁶⁷ S. Miller, T. Blackburn, G. Scholes, G. White, and N. Mamalis, "Optical Differences in Multiple Personality Disorder: A Second Look," *The Journal of Nervous and Mental Disease* 179, no. 3 (1991): 134.
- ⁶⁸ A. Eulenberg, "The Case for the Preventability of Myopia," (1996) http://www.i-see.org/prevent_myopia.html (accessed on September 11, 2006).
- ⁶⁹ *Ibid.*
- ⁷⁰ S. Saw, J. Katz, O. Schein, S. Chew and T. Chan, "Epidemiology of Myopia," *Epidemiologic Reviews* 18, no. 2 (1996): 179.
- ⁷¹ *Ibid.*, 177.
- ⁷² S. Beresford, D. Muris, M. Allen, and F. Young, *Improve Your Vision Without Glasses or Contact Lenses: A New Program of Therapeutic Eye Exercises* (New York: Simon & Schuster, 1996), 30.
- ⁷³ *Ibid.*, 26.
- ⁷⁴ A. Seiderman and S. Marcus, *20/20 is Not Enough: The New World of Vision* (New York: Alfred A. Knopf, Inc., 1989), 152.
- ⁷⁵ S. Beresford, D. Muris, M. Allen, and F. Young, *Improve Your Vision Without Glasses or Contact Lenses: A New Program of Therapeutic Eye Exercises* (New York: Simon & Schuster, 1996), 26.
- ⁷⁶ A. Eulenberg, "The Case for the Preventability of Myopia," (1996) http://www.i-see.org/prevent_myopia.html (accessed on September 11, 2006).
- ⁷⁷ S. Beresford, D. Muris, M. Allen, and F. Young, *Improve Your Vision Without Glasses or Contact Lenses: A New Program of Therapeutic Eye Exercises* (New York: Simon & Schuster, 1996), 30.
- ⁷⁸ *Ibid.*
- ⁷⁹ A. Seiderman and S. Marcus, *20/20 is Not Enough: The New World of Vision*, (New York: Alfred A. Knopf, Inc., 1989), 153.
- ⁸⁰ W. Bates, *The Bates Method for Better Eyesight Without Glasses* (New York: Henry Holt and Company, 1981), 45.
- ⁸¹ S. Beresford, D. Muris, M. Allen, and F. Young, *Improve Your Vision Without Glasses or Contact Lenses: A New Program of Therapeutic Eye Exercises* (New York: Simon & Schuster, 1996), 31.
- ⁸² *Ibid.*, 26.
- ⁸³ F. Thorn, A. Cruz, A. Machado, and R. Carvalho, "Refractive Status of Indigenous People in the Northwestern Amazon Region of Brazil," *Optometry and Vision Science* 82, no. 4 (2005): 271.
- ⁸⁴ S. Beresford, D. Muris, M. Allen, and F. Young, *Improve Your Vision Without Glasses or Contact Lenses: A New Program of Therapeutic Eye Exercises* (New York: Simon & Schuster, 1996), 26-27.
- ⁸⁵ *Ibid.*, 27.
- ⁸⁶ F. Thorn, A. Cruz, A. Machado, and R. Carvalho, "Refractive Status of Indigenous People in the Northwestern Amazon Region of Brazil," *Optometry and Vision Science* 82, no. 4 (2005): 267-272.
- ⁸⁷ W. Bates, *The Bates Method for Better Eyesight Without Glasses* (New York: Henry Holt and Company, 1981), 45.
- ⁸⁸ *Ibid.*, 37.
- ⁸⁹ *Ibid.*, 45.
- ⁹⁰ *Ibid.*, 38.
- ⁹¹ *Ibid.*, 39.
- ⁹² A. Potter, "Reducing Vitamin A Deficiency: Could Save the Eyesight and Lives of Countless Children," *British Medical Journal* 314, (Feb 1997): 317-318.
- ⁹³ E. Josephson, *Nearsightedness is Preventable* (New York: Chedney Press, 1939), as cited in A. Eulenberg, "The Case for the Preventability of Myopia," (1996) http://www.i-see.org/prevent_myopia.html (accessed on September 11, 2006).
- ⁹⁴ *Ibid.*
- ⁹⁵ A. Eulenberg, "The Case for the Preventability of Myopia," (1996) http://www.i-see.org/prevent_myopia.html (accessed on September 11, 2006).
- ⁹⁶ J. Anshel, *Smart Medicine for your Eyes* (New York: Avery Publishing Group, 1999), 46.

-
- ⁹⁷ R. Gottlieb, "The Psychophysiology of Nearsightedness," (1978), <http://www.iblindness.org/articles/gottlieb-psych/> (accessed on September 11, 2006): 25.
- ⁹⁸ W. Cross and L. Lynn, *Your Vision: All About Modern Eye Care* (New York: MasterMedia Limited, 1994), 58.
- ⁹⁹ T. D' Alonzo, *Your Eyes!: A Comprehensive Look at the Understanding and Treatment of Vision Problems* (Clifton Heights, PA: Avanti Publishing, 1954), 59.
- ¹⁰⁰ D. Rehm, *The Myopia Myth: The Truth About Nearsightedness and How to Prevent It* (Pennsylvania: International Myopia Prevention Association, 1981), 26.
- ¹⁰¹ A. Eulenberg, "The Case for the Preventability of Myopia," (1996) http://www.i-see.org/prevent_myopia.html (accessed on September 11, 2006).
- ¹⁰² D. Rehm, *The Myopia Myth: The Truth About Nearsightedness and How to Prevent It* (Pennsylvania: International Myopia Prevention Association, 1981), 26.
- ¹⁰³ A. Eulenberg, "The Case for the Preventability of Myopia," (1996) http://www.i-see.org/prevent_myopia.html (accessed on September 11, 2006).
- ¹⁰⁴ R. Kaplan, *The Power Behind Your Eyes* (Vermont: Healing Arts Press, 1995), 18.
- ¹⁰⁵ W. Bates, *The Bates Method for Better Eyesight Without Glasses* (New York: Henry Holt and Company, 1981), 28.
- ¹⁰⁶ Ibid.
- ¹⁰⁷ Ibid., 192.
- ¹⁰⁸ S. Fekrat and J. Weizer, eds., *All About Your Eyes: A Practical Guide in Plain English from the Physicians at the Duke University Eye Center* (Durham, NC: Duke University Press, 2006), 31.
- ¹⁰⁹ Ibid. 33.
- ¹¹⁰ S. Fekrat and J. Weizer, eds. *All About your Eyes: A Practical Guide in Plain English from the Physicians at the Duke University Eye Center* (North Carolina: Duke University Press, 2006), 33-34.
- ¹¹¹ T. Sakimoto, M. Rosenblatt, and D. Azar, "Laser Eye Surgery for Refractive Errors," *Lancet* 367 (Apr 2006): 1443-1444.
- ¹¹² P. Hersh, K. Fry, and D. Bishop, "Incidence and Associations of Retreatment After LASIK," *Ophthalmology* 110, no. 4, (April 2003): 749.
- ¹¹³ Ibid.
- ¹¹⁴ Ibid., 749-751.
- ¹¹⁵ eMedicineHealth (2008), "Long-Term Results With LASIK Good," <http://www.emedicinehealth.com/script/main/art.asp?articlekey=86167> (accessed on February 6, 2008).
- ¹¹⁶ US Food and Drug Administration, Department of Health and Human Services, "LASIK Eye Surgery: When is LASIK not for Me?" June 12, 2007. <http://www.fda.gov/cdrh/lasik/when.htm> (accessed on February 6, 2008).
- ¹¹⁷ Wikipedia, "LASIK," February 5, 2008. <http://en.wikipedia.org/wiki/LASIK> (accessed on February 6, 2008).
- ¹¹⁸ Rahmani Eye Institute, "Corneal Rings," http://www.rahmani.com/procedures_cornealrings.html (accessed on October 12, 2006).
- ¹¹⁹ Ibid.
- ¹²⁰ R. Gerber, *Vibrational Medicine for the 21st Century* (New York: Eagle Brook, 2000), 153-154.
- ¹²¹ Ibid., 156-157.
- ¹²² J. Anshel, *Smart Medicine for your Eyes* (New York: Avery Publishing Group, 1999), 209-210.
- ¹²³ T. Quackenbush, *Relearning to See: Improve Your Eyesight Naturally* (California: North Atlantic Books, 1997), 337.
- ¹²⁴ J. Anshel, *Smart Medicine for your Eyes* (New York: Avery Publishing Group, 1999), 210.
- ¹²⁵ H. Lee, H. Park, S. Kim, H. Lee, M. Kim, C. Kim, J. Chung, and H. Lee, "Acupuncture Stimulation of the Vision-Related Acupoint (Bl-67) Increases c-Fos Expression in the Visual Cortex of Binocularly Deprived Rat Pups," *American Journal of Chinese Medicine* 30, no. 2-3 (2002): 379.
- ¹²⁶ Eyecare America: The Foundation of the American Academy of Ophthalmology, "Acupuncture for Ocular Conditions and Headaches," <http://www.eyecareamerica.org/eyecare/treatment/alternative-therapies/acupunture-ocular.cfm> (accessed on January 7, 2008).
- ¹²⁷ J. Nichols, M. Marsich, M. Nguyen, J. Barr, and M. Bullimore, "Overnight Orthokeratology," *Optometry and Visual Science* 77, no. 5 (May 2000): 251.

-
- ¹²⁸ Ibid., 251-259.
- ¹²⁹ Wikipedia, 2006, "Orthokeratology," <http://en.wikipedia.org/wiki/Orthokeratology> (accessed on January 7, 2008).
- ¹³⁰ E. Worp and D. Ruston, "Orthokeratology: An Update," *Optometry in Practice* 7 (2006): 57.
- ¹³¹ Ibid., 51.
- ¹³² Ibid.
- ¹³³ Wikipedia, 2006, "Orthokeratology," <http://en.wikipedia.org/wiki/Orthokeratology> (accessed on January 7, 2008).
- ¹³⁴ Orthokeratology Society of Australia, 2006, "Eye Infections and Orthokeratology," http://www.osa.net.au/infection_control.htm (accessed on January 8, 2008).
- ¹³⁵ Ibid.
- ¹³⁶ S. Beresford, D. Muris, M. Allen, and F. Young, *Improve Your Vision Without Glasses or Contact Lenses: A New Program of Therapeutic Eye Exercises* (New York: Simon & Schuster, 1996), 22.
- ¹³⁷ Ibid., 18.
- ¹³⁸ A. Seiderman and S. Marcus, *20/20 is Not Enough: The New World of Vision* (New York: Alfred A. Knopf, Inc., 1989), 15.
- ¹³⁹ Ibid., 18.
- ¹⁴⁰ Ibid., 21.
- ¹⁴¹ J. Anshel, *Smart Medicine for your Eyes* (New York: Avery Publishing Group, 1999), 236.
- ¹⁴² J. Cooper, "Summary of Research on the Efficacy of Vision Therapy for Specific Visual Dysfunctions," http://www.visiontherapy.org/vision-therapy/pdfs/03_sum_vt_research_Cooper.pdf (accessed on August 15, 2006).
- ¹⁴³ The 1986/87 Future of Visual Development/Performance Task Force, "The Efficacy of Optometric Vision Therapy," *Journal of the American Optometric Association* 59, no. 2 (Feb 1988): 95-105.
- ¹⁴⁴ R. Balliet, A. Clay, K. Blood, "The Training of Visual Acuity in Myopia," *Journal of the American Optometric Association* 53, no. 9 (Sept. 1982): 719-724.
- ¹⁴⁵ C. Berens, L. Girard, G. Fonda, and S. Sells, "Effects of Tachistoscopic Training on Visual Functions in Myopic Patients," *American Journal of Ophthalmology* 44 (1957): 25-47, as reported by Eyecare America: The Foundation of the American Academy of Ophthalmology.
- ¹⁴⁶ H. Selye, *Stress Without Distress* (New York: New American Library, 1974), 14.
- ¹⁴⁷ Ibid., 16.
- ¹⁴⁸ Sound Medicine, University of Indiana University School of Medicine, "Fight or Flight," <http://soundmedicine.iu.edu/segment.php4?seg=224> (accessed on November 19, 2006).
- ¹⁴⁹ F. Luskin and K. Pelletier, *Stress Free for Good: 10 Scientifically Proven Life Skills for Health and Happiness* (New York: HarperSanFrancisco, 2005), 14.
- ¹⁵⁰ T. Rogers, B. Alderman, and D. Landers, "Effects of Life-Event Stress and Hardiness on Peripheral Vision in a Real-Life Stress Situation," *Behavioral Medicine* 29, no.1 (Spring 2003): 21.
- ¹⁵¹ R. Gordon, "The Reptilian Brain, Dissociation and Seeing from the Core," (Paper presented at The 17th Annual International Conference for Holistic Vision, Paris France, October 2002), <http://www.visioneducators.com> (accessed on August 14, 2006).
- ¹⁵² T. Rogers, B. Alderman, and D. Landers, "Effects of Life-Event Stress and Hardiness on Peripheral Vision in a Real-Life Stress Situation," *Behavioral Medicine* 29, no.1 (Spring 2003): 24-25.
- ¹⁵³ M. Corbett, *Help Yourself to Better Sight* (California: Wilshire Book Company, 1949), 15.
- ¹⁵⁴ Ibid.
- ¹⁵⁵ M. Brofman, "Vision as a Metaphor: The Relationship Between Eyesight and Consciousness," http://healing.about.com/library/uc_vision_0201.htm (accessed on August 15, 2006).
- ¹⁵⁶ Ibid.
- ¹⁵⁷ R. Gordon, "The Reptilian Brain, Dissociation and Seeing from the Core," (Paper presented at The 17th Annual International Conference for Holistic Vision, Paris France, October 2002), <http://www.visioneducators.com> (accessed on August 14, 2006).
- ¹⁵⁸ B. Cortese and T. Uhde, "Immobilization Panic" *American Journal of Psychiatry* 163, no. 8 (2006): 1453.
- ¹⁵⁹ P. Levine, *Waking the Tiger: Healing Trauma* (California: North Atlantic Books, 1997), 16-17.

-
- ¹⁶⁰ R. Gordon, "The Reptilian Brain, Dissociation and Seeing from the Core," (Paper presented at The 17th Annual International Conference for Holistic Vision, Paris France, October 2002), <http://www.visioneducators.com> (accessed on August 14, 2006).
- ¹⁶¹ Ibid.
- ¹⁶² E. Waites, *Trauma and Survival: Post-Traumatic and Dissociative Disorders in Women* (New York, NY: W. W. Norton & Company, Inc., 1993), 14.
- ¹⁶³ P. Levine, *Waking the Tiger: Healing Trauma* (California: North Atlantic Books, 1997), 137.
- ¹⁶⁴ E. Somer, "Posttraumatic Dissociation as a Mediator of the Effects of Trauma on Distressful Introspectiveness," *Social Behavior and Personality* 30, no. 7 (2002): 672.
- ¹⁶⁵ E. Bernstein and F. Putnam, "Development, Reliability, and Validity of a Dissociative Scale," *The Journal of Nervous and Mental Disease* 174, no. 12 (1986): 727.
- ¹⁶⁶ R. Gordon, "The Reptilian Brain, Dissociation and Seeing from the Core," (Paper presented at The 17th Annual International Conference for Holistic Vision, Paris France, October 2002), <http://www.visioneducators.com> (accessed on August 14, 2006).
- ¹⁶⁷ P. Levine, *Waking the Tiger: Healing Trauma* (California: North Atlantic Books, 1997), 137.
- ¹⁶⁸ Ibid.
- ¹⁶⁹ R. Gordon, "The Reptilian Brain, Dissociation and Seeing from the Core," (Paper presented at The 17th Annual International Conference for Holistic Vision, Paris France, October 2002), <http://www.visioneducators.com> (accessed on August 14, 2006).
- ¹⁷⁰ Ibid.
- ¹⁷¹ Ibid.
- ¹⁷² J. Liberman, *Light: Medicine of the Future* (Vermont: Bear & Company, 1991), 82.
- ¹⁷³ J. Liberman, *Take Off Your Glasses and See: A Mind/Body Approach to Expanding Your Eyesight and Insight* (New York: Three Rivers Press, 1995), 60.
- ¹⁷⁴ S. Beresford, D. Muris, M. Allen, and F. Young, *Improve Your Vision Without Glasses or Contact Lenses: A New Program of Therapeutic Eye Exercises* (New York: Simon & Schuster, 1996), 12-13.
- ¹⁷⁵ W. Bates, *The Bates Method for Better Eyesight Without Glasses* (New York: Henry Holt and Company, 1981), 24.
- ¹⁷⁶ J. Liberman, *Take Off Your Glasses and See: A Mind/Body Approach to Expanding Your Eyesight and Insight* (New York: Three Rivers Press, 1995), 15.
- ¹⁷⁷ R. Kaplan, *Conscious Seeing: Transforming your Life through your Eyes* (Oregon: Beyond Words Publishing, Inc., 2002), 18.
- ¹⁷⁸ G. Dotevall, "Involvement of Cardiac, Respiratory and Gastrointestinal Functions in Neural Responses to Stress Events," *Integrative Physiological & Behavioral Science* 29, no. 4 (Oct-Dec 1994): 374 -382.
- ¹⁷⁹ M. Corbett, *Help yourself to Better Sight* (California: Wilshire Book Company, 1949), 62.
- ¹⁸⁰ W. Bates, *The Bates Method for Better Eyesight Without Glasses* (New York: Henry Holt and Company, 1981), 47.
- ¹⁸¹ M. Corbett, *Help yourself to Better Sight* (California: Wilshire Book Company, 1949), 209.
- ¹⁸² R. Kaplan, *Seeing without Glasses*, 3rd Ed., (Oregon: Beyond Words Publishing, Inc., 2003), 62.
- ¹⁸³ R. Kaplan, *Conscious Seeing: Transforming your Life through your Eyes* (Oregon: Beyond Words Publishing, Inc., 2002), 15.
- ¹⁸⁴ J. Liberman, *Take Off Your Glasses and See: A Mind/Body Approach to Expanding Your Eyesight and Insight* (New York: Three Rivers Press, 1995), xxi.
- ¹⁸⁵ *Webster's Universal Encyclopedic Dictionary* (New York: Barnes and Noble Books, 2002), 872.
- ¹⁸⁶ D. Chopra, *Quantum Healing* (New York: Bantam Books, 1989), 21.
- ¹⁸⁷ R. Ballentine, *Radical Healing* (New York: Harmony Books, 1999), 5.
- ¹⁸⁸ Ibid., 6.
- ¹⁸⁹ J. Liberman, *Take Off Your Glasses and See: A Mind/Body Approach to Expanding Your Eyesight and Insight* (New York: Three Rivers Press, 1995), 16.
- ¹⁹⁰ R. Kaplan, *Seeing without Glasses*, 3rd Ed., (Oregon: Beyond Words Publishing, Inc., 2003), 34.
- ¹⁹¹ R. Kaplan, *The Power Behind your Eyes* (Vermont: Healing Arts Press, 1995), 143.
- ¹⁹² Ibid., 142.
- ¹⁹³ R. Kaplan, *Conscious Seeing: Transforming your Life through your Eyes* (Oregon: Beyond Words Publishing, Inc., 2002), 35.

-
- ¹⁹⁴ R. Kaplan, *Seeing without Glasses*, 3rd Ed., (Oregon: Beyond Words Publishing, Inc., 2003), 35.
- ¹⁹⁵ Ibid.
- ¹⁹⁶ S. L. Beetle, F. A. Young, "Values, Personality, Physical Characteristics, and Refractive Error," *American Journal of Physiological Optometry* 53, no. 11 (1976).
- ¹⁹⁷ R. Kaplan, *Conscious Seeing: Transforming your Life through your Eyes* (Oregon: Beyond Words Publishing, Inc., 2002), 37.
- ¹⁹⁸ Ibid., 34.
- ¹⁹⁹ L. Hay, *Heal your Body* (California: Hay House, Inc., 1982), 31.
- ²⁰⁰ Ibid.
- ²⁰¹ R. Kaplan, *Conscious Seeing: Transforming your Life through your Eyes* (Oregon: Beyond Words Publishing, Inc., 2002), 175.
- ²⁰² J. Liberman, *Take Off Your Glasses and See: A Mind/Body Approach to Expanding Your Eyesight and Insight* (New York: Three Rivers Press, 1995), xx.
- ²⁰³ M. Brofman, "Vision as a Metaphor: The Relationship Between Eyesight and Consciousness," http://healing.about.com/library/uc_vision_0201.htm (accessed on August 15, 2006).
- ²⁰⁴ Ibid.
- ²⁰⁵ W. Bates, *The Bates Method for Better Eyesight without Glasses* (New York: Henry Holt and Company, 1981[originally 1943]), 50.
- ²⁰⁶ J. Liberman, *Take Off Your Glasses and See: A Mind/Body Approach to Expanding Your Eyesight and Insight* (New York: Three Rivers Press, 1995), 66.
- ²⁰⁷ Ibid., 62.
- ²⁰⁸ R. Ballentine, *Radical Healing* (New York: Harmony Books, 1999), 233.
- ²⁰⁹ R. Gerber, *Vibrational Medicine for the 21st Century* (New York: Eagle Brook, 2000), 53.
- ²¹⁰ J. Liberman, *Take Off Your Glasses and See: A Mind/Body Approach to Expanding Your Eyesight and Insight* (New York: Three Rivers Press, 1995), 6.
- ²¹¹ R. Ballentine, *Radical Healing* (New York: Harmony Books, 1999), 4.
- ²¹² Ibid., 4-5.
- ²¹³ A. Maslow, *Toward a Psychology of Being* (New York: Van Nostrand Reinhold, 1968), 60.
- ²¹⁴ Ibid.
- ²¹⁵ Ibid., 61.
- ²¹⁶ R. Kaplan, *Conscious Seeing: Transforming your Life through your Eyes* (Oregon: Beyond Words Publishing, Inc., 2002), 145.
- ²¹⁷ R. Kaplan, *The Power Behind your Eyes* (Vermont: Healing Arts Press, 1995), 45.
- ²¹⁸ R. Kaplan, *Conscious Seeing: Transforming your Life through your Eyes* (Oregon: Beyond Words Publishing, Inc., 2002), 16.
- ²¹⁹ D. Stuss, T. Picton, and M. Alexander, "Consciousness, Self-Awareness, and the Frontal Lobes," <http://www.psych.utoronto.ca/~pgsa/Course%20Readings/Frontal%20Lobes/Stuss,%20Picton,%20&%20Alexander.pdf> (accessed on August 15, 2006).
- ²²⁰ P. Rochat, "Five Levels of Self-Awareness as they Unfold in Early Life," *Consciousness and Cognition* 12 (2003): 730.
- ²²¹ Ibid., 728.
- ²²² A. Maslow, *Toward a Psychology of Being* (New York: Van Nostrand Reinhold, 1968), 65.

CHAPTER 3: RESEARCH METHODS

I believe there is no source of deception in the investigation of nature which can compare with a fixed belief that certain kinds of phenomena are impossible.

-William James

Overview

This chapter discusses the methodology used in this research study. It includes the study design, recruiting techniques, screening procedures, subject demographic information, inclusion and exclusion criteria, information on measures used, confidentiality protocol, and methods of data analysis.

Study Design

A correlational research design was used in the present study as a way to observe the relationship between the two groups in question, i.e. subjects with nearsighted and normal vision. The variable under investigation in this study was myopia which was defined as -0.50 diopters or greater in each eye. The use of a cross-sectional case-control design permitted the Principal Investigator (PI) to obtain a “snapshot” of each participant’s state of self-awareness and then compare the results between the two groups. The comparisons between subject groups were based on scores from two quantitative measures employed to assess the construct of “self-awareness.”

Correlational (or case-control) designs are used frequently in epidemiological research and are useful “for identifying correlates and associated features”¹ of a particular characteristic. The goal of this research was to elicit information regarding a potential relationship between two variables, not to look for a cause. “Correlational research

designs are founded on the assumption that reality is best described as a network of interacting and mutually-causal relationships. Everything affects and is affected by everything else. This web of relationships is not linear, as in experimental research. Thus, the dynamics of a system, how each part of the whole system affects each other part, is more important than causality.”²

The groups in case control designs vary by the characteristic under investigation. In this study this characteristic was myopia. The most basic design was employed which consisted of two groups, cases and controls. Groups were compared using the scores from The Personal Orientation Inventory (POI) and the Dissociative Experiences Scale (DES). Differences between groups were attributed to “reflect a critical facet of the problem.”³

Measures

The Personal Orientation Inventory (POI) and the Dissociative Experiences Scale (DES) were the two measures employed to assess the construct of “self-awareness.” Each participant completed both measures and returned them along with the Subject Background Questionnaire (appendix J), Eye Health Questionnaire (appendix K), and verification of eyesight to the Principal Investigator. Subjects were not given information about their individual POI or DES scores.

Personal Orientation Inventory (POI)

The Personal Orientation Inventory (POI) was developed in 1963 by psychologist and author, Everett L. Shostrom, Ph.D. Since its introduction it has been used in hundreds of scientific research studies⁴ on a wide variety of topics. The POI was selected for a number of reasons, including the measure’s longevity and high frequency of use in

research, as well as good reliability, and ease of administration. “Major considerations contributing to the wide applicability of the POI certainly have been the objectivity of measurement, the positive, non-threatening nature of the concepts measured, its resistance to faking, and the relevant ‘in the now’ statement of items and description of the constructs.”⁵ A diverse collection of studies support the construct validity of this measure deeming it a reliable instrument for research.^{6 7}

The POI consists of 150 two-choice questions designed to measure the values and behavior associated with the self-actualizing individual.⁸ The test takes approximately thirty minutes to complete. The POI was chosen for the present study because it is the leading measure for self-actualization.⁹ “Self-actualizing persons are those living primarily in the present, with full self-awareness and contact, and full feeling reactivity.”¹⁰ Time orientation and inner-directedness are characteristics assessed by this measure as they are considered important facets in the development of the self-actualized person.¹¹

There are two major scales and ten subscales in the POI, as described by Robert Knapp in the *Handbook for The POI*. The major scales are *Time Competence (TC)* which reflects the degree to which the individual lives in the present, rather than the past or future, and the *Inner-Directed (I)* scale which assesses the extent to which an individual is guided primarily by internalized principles and motivations or influenced more by his or her peer group or other external forces.¹²

The ten subscales measure different facets of self-actualization and are as follows:

Self-Actualizing Value (SAV) – measures the affirmation of primary values of self-actualizing individuals.

Existentiality (Ex) – measures the ability to situationally or existentially react without rigid adherence to principles.

Feeling Reactivity (Fr) – measures sensitivity or responsiveness to one’s own needs and feelings.

Spontaneity (S) – measures freedom to react spontaneously, or to be oneself.

Self-Regard (Sr) – measures affirmation of self because of worth or strength.

Self-Acceptance (Sa) – measures the affirmation or acceptance of oneself in spite of one’s weaknesses or deficiencies.

Nature of Man-Constructive (Nc) – measures the degree of one’s constructive view of the nature of man.

Synergy (Sy) – measures the ability to be synergistic – to transcend dichotomies.

Acceptance of Aggression (A) – measures the ability to accept one’s natural aggressiveness – as opposed to defensiveness, denial, and repression of aggression.

Capacity for Intimate Contact (C) – measures the ability to develop contactful intimate relationships with other human beings, unencumbered by expectations and obligations.¹³

The Personal Orientation Inventory was used with the permission of EdITS, the publishers of the measure, (see appendix L for publisher contact information).¹⁴

Dissociative Experiences Scale (DES)

The Dissociative Experiences Scale (DES) was developed by Eve Bernstein Carlson, Ph.D. and Frank W. Putnam, M.D. in 1986 as a clinical tool to help identify dissociative psychopathology. In the present study the DES was selected as a quantitative measure to directly assess the dissociative continuum in subjects.

The DES is a brief, self-report scale that consists of 28 questions and requires approximately ten minutes to complete. Answers are placed on a response scale which

permits subjects to quantify the frequency of dissociative experiences in their daily lives.¹⁵ The DES has been reported to have good reliability, internal consistency, and construct validity.^{16 17} It is both easy to administer and easy to score. (See appendix M to view the DES in its entirety).

The principle subcomponents of dissociation assessed by the DES include: absorption/imaginative involvement, amnesia, and depersonalization/derealization. Absorption/imaginative involvement can occur when an individual is absorbed in a movie or book and temporarily loses full awareness of their surroundings. Amnesic dissociation refers to a complete lack of memory of an event or time period. Depersonalization/derealization is when a person experiences the external world as strange or unreal. This type of dissociation might be experienced as a feeling that one's body is not their own or as being in a familiar place but finding it unfamiliar.¹⁸

Although the frequency of different types of dissociation may be measured by the DES, factor analytic studies have been conducted to query “the nature of the underlying constructs” measured by the scale.¹⁹ However results from such studies are reported as somewhat contradictory.²⁰ “At present, it is impossible to tell whether subscale scores for a particular subject or group really measure subcomponents of dissociation, or whether they just measure endorsement frequency. It appears that the scale will *reliably* measure only the general dissociation factor.”²¹

Subjects

All participants in this study self-selected in response to recruiting efforts and advertisements for the study. Two subject groups, cases (those with a minimum -0.50 diopters of myopia in each eye) and controls (those with normal, 20/20 vision) were included in the study.

Recruiting

Several methods were used to recruit participants. Flyers were posted, emails were sent out, and announcements for the project were printed in newspapers and on internet message boards. Word of mouth and networking were also utilized to make potential subjects aware of the project.

Flyers were posted in two health food stores, two coffee shops, one community college, two locally owned restaurants, one yoga center, two fitness centers, one public library, three other local businesses, and on staff bulletin boards in two hospitals in Asheville, North Carolina²² (appendix A). Free classified advertisements were placed in newspapers in the surrounding area, (See appendix B for advertisements, names of newspapers, and dates posted). Flyers were taken to an energy healing conference in Kansas, MO in April 2007. An announcement for the study was posted on two nearsightedness message boards online (appendix C). An announcement was also posted online at Western Carolina University. And letters were written and mailed to a total of seven optometrists and vision care specialists requesting that they post a flyer advertising the project (appendix D). Of the seven eye care specialists sent this request, three agreed to assist with recruiting. Two of the letters were returned to the PI unopened and the PI

received no word from the other two practitioners. Recruitment was also accomplished by networking through emails (appendix A and appendix E) and face to face.

Inclusion Criteria

To be a participant in this study subjects were required to:

- Be nearsighted with a prescription of -0.50 diopters or more in each eye as determined by an optometrist or ophthalmologist within the last two years

OR

- Have normal vision with 20/20 distance vision or better in each eye as declared by an eye doctor or other examiner²³ within the last two years

Participants were required to provide verification of their eyesight by one of the following:

- a.) a copy of the prescription for their eye glasses or contact lenses dated within the last two years
- b.) a copy of or actual piece of the packaging that contains the prescription for their contact lenses purchased within the last two years
- c.) evidence from an eye doctor, medical doctor, or study examiner indicating that the subject's vision was 20/20 dated within the last two years

To be included in the present study, subjects were required to:

- be able and willing to participate in the research,
- understand, sign, and return one copy of the informed consent form (appendix I),
- be between 18 and 65 years of age,
- verify their current eyesight, and
- have approximately 45 minutes of quiet, undisturbed time to complete the written materials.

Exclusion Criteria

Subjects were excluded from the study if they:

- were farsighted,
- had cataracts,
- had glaucoma,
- had double vision,
- had presbyopia,
- wore bifocal, trifocal, or progressive lenses,
- wore prescribed or over-the-counter reading glasses,
- were currently being treated for other eye diseases or infections,
- were currently taking eye medications (other than for dry eyes),
- had a history of eye surgery,
- were currently taking psychiatric medications,
- were not between ages 18-65.

Subjects that were nearsighted *were* permitted to participate if they had astigmatism in one or both eyes.

Discontinuation Criteria

Participants were free to withdraw from the study at any time without penalty of any kind. Subjects were encouraged to withdraw if completing the surveys became uncomfortable in any way.

Pre-Inclusion Screening

All potential subjects were screened for eligibility by the PI or by one of the recruiting assistants prior to receiving any materials for the study. Volunteers who showed interest in participating were given a brief description of the project and a list of inclusion criteria either by telephone, in person, or email (appendix E). Subjects were not told of the actual construct under investigation.

Pre-Inclusion Vision Screening Protocol

Subjects who reported normal vision, who did not have verification from a doctor, had their vision screened by one of the two assisting Registered Nurses or by the PI (who is also a Registered Nurse). This screening was conducted using Joel *Schneider's 3-page Snellen Chart plus Near Vision Testing Cards*²⁴ (appendix F) printed in black ink on white, Georgia Pacific, acid-free, card stock (weight: 110 lb, size: 8.5 x 11 inches). Printing was done on a Hewlett-Packard, 2175v, all-in-one printer, scanner, copier with a #56 Hewlett-Packard inkjet print cartridge. The big letter "E" on the chart measured exactly 3.49 inches (88.7mm) tall to ensure chart accuracy.

Screening was conducted in well lit areas. The three paged distance chart was taped together on the back side using clear, plastic tape so that the chart hung vertically down the wall. A pre-measured, twenty foot piece of string was used to measure distance from the subject to the wall where the eye chart was hung at eye level. The string was black, 100% nylon crochet thread, by J&P Coats. Knots were tied and burned (to ensure they could not move) on each end of the string. This string was measured prior to use by two people separately to ensure length accuracy.

Near vision was assessed using a sixteen inch string from the subject to the “Near Vision Testing Card.” A small hole was placed 0.25 inches above the center of the “T” on the top line of the Near Vision Testing Card (appendix G). A piece of the same type of string was slide through the hole, knotted, burned, and securely taped so it could not slide. Sixteen inches from the card a second knot was tied in the string and burned. This string was measured prior to use by two people separately to ensure accuracy.

Near vision was assessed by asking subjects to place the knot on the end of the string to their forehead and hold the card out in front of them. Each eye was tested separately and then both tested together as was done in the distance vision assessment. To do this, subjects were asked to completely cover their left eye with their hand and read the chart while both eyes remained open. The second eye was then tested in the same fashion, followed by the assessment of both eyes at the same time.

The subject’s vision measurement was recorded with the subject’s name, date, and examiner’s initials onto a bright pink slip of paper (appendix H). The subject was instructed to return this slip of paper in lieu of a doctor’s verification of their normal vision with all other completed study materials.

Subject Demographics

The Principal Investigator received 112 completed subject packets; however twelve subjects were excluded from the study. The reasons for exclusion include: one subject reported wearing reading glasses, one subject reported the use of psychiatric medications, and ten myopic subjects submitted prescriptions indicating they had presbyopia (a need for reading prescription). A total of one hundred participants were included in the present study.

Chi-square analyses showed no significant differences between the groups based on gender ($p = .69$), ethnicity ($p = .08$), marital status ($p = .33$), or education ($p = .63$). It is worth noting that due to the small cell sizes (frequencies of less than 5) for some of the categories, results of the test may not be valid. However, examination of the crosstabulation frequencies and percents indicate that there are no differences in the distributions for these variables. Subject groups were determined to be similar based on the demographic information collected.

Subject Age

Subject age ranged from 19 to 59 years old with the majority of participants in their thirties. The mean age of subjects was 33.43 (standard deviation = 7.829).

Subject Age in Years	Frequency/Percent
19	1
20-29	32
30-39	44
40-49	19
50-59	3
unknown	1
Total	100

Table 1. Frequency of Subject Age.

Gender

The subject sample included thirty-two males and sixty-eight females. Both groups were balanced in terms of gender. The nearsighted group contained 17 males and 33 females and the control group contained 15 males and 35 females.

Subject Gender Crosstabulation					
			subject's gender		Total
			Male	Female	
subject group	Nearsighted	Count	17	33	50
		% within subject group	34	66	100
		% within subject's gender	53.1	48.5	50
	Normal Vision	Count	15	35	50
		% within subject group	30	70	100
		% within subject's gender	46.9	51.5	50
Total	Count	32	68	100	
	% within subject group	32	68	100	
	% within subject's gender	100	100	100	

Table 2. Subject Gender.

Ethnicity

Subject ethnicity in the total population included 89% Caucasian, 4% African American, 3% Asian American, and 3% “other,” one subject chose not to identify his/her ethnicity. The majority of participants were Caucasian in both groups with 42 in the nearsighted group and 47 in the control group.

Subject Ethnicity Crosstabulation								
			subject ethnicity					Total
			Caucasian	African American	Asian	Other	Chose not to answer	
subject group	Nearsighted	Count	42	1	3	3	1	50
		% within subject group	84	2	6	6	2	100
		% within subject ethnicity	47.2	25	100	100	100	50
	Normal Vision	Count	47	3				50
		% within subject group	94	6				100
		% within subject ethnicity	52	75				50
Total	Count	89	4	3	3	1	100	
	% within subject group	89	4	3	3	1	100	
	% within subject ethnicity	100	100	100	100	100	100	

Table 3. Subject Ethnicity.

Marital Status

The majority of total participants (64%) reported that they were married/cohabitating followed by 23% who reported being single. When comparing the two groups, 43.75% of nearsighted subjects were married whereas the control group contained 56.25% married subjects.

Marital Status Crosstabulation							
			Marital Status				Total
			Single	Married/ cohabiting	Divorced	Widowed	
subject group	Nearsighted	Count	14	28	7	1	50
		% within subject group	28	56	14	2	100
		% within marital status	60.9	43.75	58.3	100	50
	Normal Vision	Count	9	36	5		50
		% within subject group	18.0	72	10		100
		% within marital status	39.1	56.25	41.7		50
Total	Count	23	64	12	1	100	
	% within subject group	23	64	12	1	100	
	% within marital status	100	100	100	100	100	

Table 4. Subject Marital Status.

Education Level

The highest level of participant education ranged from General Education Development (GED) to one subject with a Doctoral degree. Both groups contained a majority of subjects with a Bachelor’s degree.

Education Level Crosstabulation									
			education level						Total
			GED	High school	Associate's degree	Bachelor's degree	Master's degree	Doctoral degree	
subject group	Nearsighted	Count	1	7	12	26	3	1	50
		% within subject group	2	14	24	52	6	2	100
		% within education level	50	63.6	42.9	48.1	75	100	50
	Normal Vision	Count	1	4	16	28	1		50
		% within subject group	2	8	32	56	2		100
		% within education level	50	36.4	57.1	51.9	25		50
Total	Count	2	11	28	54	4	1	100	
	% within subject group	2	11	28	54	4	1	100	
	% within education level	100	100	100	100	100	100	100	

Table 5. Subject Education Level.

Subject Confidentiality

All subjects were insured that complete confidentiality would be maintained during and after the completion of the study. Upon receiving subjects' completed packets the Principal Investigator coded all materials and removed the Informed Consent form (appendix I) and verification of vision, placed them in a secure file cabinet, where only the PI has any access to the documents. Subjects' personal identifying information only existed on these two documents and on no other forms as a measure to protect subject confidentiality. On the Personal Orientation Inventory there is a box that asks for information such as name, gender, occupation, etc.; this box was crossed out in ink by the PI prior to distribution so that subjects would not fill this information out directly on the scoring sheet. Confidentiality was stressed due to the personal and psychological nature of the questions asked on the employed measures.

Procedure

After the initial screening, if subjects met the inclusion criteria and remained interested in participating they were given the packet of materials either by mail or by hand. Subjects were instructed to completely fill out the materials and return them to the PI via the postage-paid, self-addressed envelop included in the packet of materials.

Each research packet was a 9 x 12 inch, clasped, manila envelop that contained: two Informed Consent Forms (appendix I), one Subject Background Questionnaire (appendix J), one Eye Health Questionnaire (appendix K), the Personal Orientation Inventory (POI) with booklet (appendix L), the Dissociative Experiences Scale (DES) (appendix M), one Items Check List (appendix N), one folded, self-addressed, postage-paid, 9 x 12 inch, manila, clasped envelop, and one sharpened number 2 pencil.

Completed materials were hand delivered or mailed back to the PI in the postage paid envelopes provided. Both the POI and the DES were scored by the PI using the methods defined in their respective scoring manuals. Scores were then entered onto a spreadsheet using SPSS computer software by the Principal Investigator. This spreadsheet was then emailed to Nanci Avitable, Ph.D., a hired statistician, who analyzed the data.

Methods of Data Analysis

Data analyses were conducted to detect statistical differences between the myopic and normal vision groups. Several statistical methods were employed for this purpose. The t-test for independent samples, ANCOVA, and Mann-Whitney U tests were each utilized to examine group differences based on their scores from the POI and DES. SPSS computer software was used for analysis.

The T-Test for Independent Samples

The t-test for independent samples is used to examine group differences between two unrelated groups. This test is appropriate when each subject is tested only one time, results are normally distributed, and variances are equal.²⁵ T-tests for independent samples were utilized for variables that met these assumptions.

Mann-Whitney U Test

When the assumptions required for using the t-test are not met, a non-parametric test such as the Mann-Whitney U test can be used to determine group differences. The Mann-Whitney U test is used to analyze ordinal data based on rank order.²⁶ This test was used to conduct an item analysis for individual questions on the DES.

Analysis of Covariance

Analysis of covariance (ANCOVA) is used to find differences between groups while controlling for certain extraneous variables by neutralizing their effects.

ANCOVAs were employed to control for such factors where necessary.

Post-Study Procedures

Drawing for Gift Cards

Upon completion of the study five subject numbers were randomly drawn from a shoebox by an uninvolved party. The subject numbers were then taken by the PI and matched to their rightful names. These five subjects were each awarded one \$50.00 Visa Gift card. As promised, the minimum odds of winning (1 in 25) were maintained. With a total of 112 subjects²⁷, 5 cards were randomly drawn and given away, making the actual odds of winning 1 in 22.4.

Results Letters

A letter was sent by regular mail to all subjects to thank them for participating, as well as to inform them of the results of the study. The five \$50.00 Visa gift cards were sealed inside the winners' envelopes and mailed (using "Delivery Confirmation" from the U.S. Postal Services) with a slightly different version of the letter. The three optometrists that assisted in recruiting in response to the request were also mailed results. A thank you letter and a \$20.00 Visa gift card were sent using "Delivery Confirmation" from the U.S. Postal Services to these three optometrists.

Chapter 3 Endnotes:

-
- ¹ A. Kazdin, *Research Design in Clinical Psychology* (Boston, MA: Allyn and Bacon, 2003), 236.
- ² J. Davis, "The Model Underlying Correlational Research Methods," <http://clem.msced.edu/~davisj/prm2/correl1.html> (accessed on January 18, 2007).
- ³ A. Kazdin, *Research Design in Clinical Psychology* (Boston, MA: Allyn and Bacon, 2003), 236.
- ⁴ R. Knapp, *Handbook for the POI* (San Diego, CA: EdITS Publishers, 1976), 2.
- ⁵ *Ibid.*, 93.
- ⁶ D. Tosi and C. Lindamood, "The Measurement of Self-Actualization: A Critical Review of the Personal Orientation Inventory," *Journal of Personality Assessment* 39, no. 3, (1975): 222.
- ⁷ J. Hattie, P. Hancock, and K. Brereton, "The Relationship Between Two Measures of Self-Actualization," *Journal of Personal Assessment* 48, no. 1 (1984): 17.
- ⁸ R. Knapp, *Handbook for the POI* (San Diego, CA: EdITS Publishers, 1976), 2.
- ⁹ G. Leak, "A Multidimensional Assessment of the Validity of the Personal Orientation Inventory," *Journal of Personality Assessment* 48, no. 1, (1984): 37.
- ¹⁰ R. Knapp, *Handbook for the POI* (San Diego, CA: EdITS Publishers, 1976), 5.
- ¹¹ *Ibid.*, 5-6.
- ¹² *Ibid.*, 5.
- ¹³ *Ibid.*, 6-7.
- ¹⁴ EdITS does not permit copies of the POI to be made, therefore the present document does not contain a copy of this psychometric measure. See appendix L for publisher contact information.
- ¹⁵ E. B. Carlson and F. Putnam, "An Update on the Dissociative Experiences Scale," *Dissociation* VI, no.1 (1993): 16.
- ¹⁶ C. Ross, J. Ellason, and G. Anderson, "A Factor Analysis of the Dissociative Experiences Scale (DES) in Dissociative Identity Disorder," *Dissociation* VII, no. 1 (1995): 229.
- ¹⁷ E. B. Carlson and F. Putnam, "An Update on the Dissociative Experiences Scale," *Dissociation* VI, no.1 (1993): 18-19.
- ¹⁸ C. Ross, J. Ellason, G. Anderson, "A Factor Analysis of the Dissociative Experiences Scale (DES) in Dissociative Identity Disorder," *Dissociation* VII, no. 1 (1995): 229-235.
- ¹⁹ E. B. Carlson and F. Putnam, "An Update on the Dissociative Experiences Scale," *Dissociation* VI, no.1 (1993): 20.
- ²⁰ *Ibid.*
- ²¹ *Ibid.*, 21.
- ²² In 2005 The US Census Bureau reported a population of 74, 889 in Asheville, North Carolina. http://factfinder.census.gov/servlet/ACSSAFFacts?_event=&geo_id=16000US3702140&_geoContext=01000US%7C04000US37%7C16000US3702140&_street=&_county=Asheville&_cityTown=Asheville&_state=04000US37&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgsl=160&_submenuId=factsheet_1&ds_name=DEC_2000_SAFF&_ci_nbr=null&qr_name=null®=null%3Anull&_keyword=&_industry (accessed on September 11, 2006).
- ²³ Other acceptable examiners included: Medical Doctors, The Principal Investigator, and two Registered Nurses used to assist with the project.
- ²⁴ Eye charts were originally designed by Joel Schneider in May of 2002 and released to the public domain, printed from http://www.i-see.org/block_letter_eye_chart.pdf (accessed on March 11, 2007).
- ²⁵ N. Salkind, *Statistics for People who (Think They) Hate Statistics* (California: Sage Publications Inc., 2000), 192-193.
- ²⁶ P. Hilton, *Statistics Explained* (New York: Routledge, 1995), 210.
- ²⁷ All subjects who returned a packet to the PI were entered into the drawing regardless of their inclusion in the study. The total subject count was 100 eligible and 12 ineligible subjects, all had an equal chance at winning one of the five \$50.00 Visa gift cards.

CHAPTER 4: RESEARCH FINDINGS

...man will occasionally stumble over the truth, but usually manages to pick himself up, walk over or around it, and carry on.

-Winston S. Churchill

This chapter contains the research findings of the study. Data analyses were conducted using an alpha level of .05 for all statistical tests. A preliminary examination of the data within groups was conducted. No severe normality problems were found that could affect the results. T-tests for independent samples, analyses of covariance (ANCOVAs), and Mann-Whitney U tests were used to examine the data to address the research questions. All analyses were performed using SPSS 6.0 for Macintosh computers by a hired statistician.

Although homogeneity of the groups for the demographic variables was established, review of the correlations between age and the other independent variables suggested that controlling for age in the analyses might be appropriate. Tests of parallel slopes were done to determine if the relationship with age was the same for both groups; no group differences were found. Analyses of covariance (ANCOVAs) were then conducted to discover which variables had age as a significant covariate. For those scores with which age was significant, the result of the ANCOVA is reported. T-tests for independent samples were calculated for variables that did not have age as a significant covariate. Lastly, an item analysis was done for individual DES questions using Mann-Whitney U tests.

Statistical Results for the POI

Correlations with Diopter within the Nearsighted Group

As a result of the selection criteria for the nearsighted group the range of diopter (degree of nearsightedness) values was restricted to > -0.25 . With this in mind, it is worth noting that statistically significant correlations were found within the nearsighted group between diopter and five of the ten subscales of the of the POI.

It was not possible to assess the relationship within the normal vision group or for the groups combined because in the control group diopter was not measured. It is possible that some subjects in the normal vision group had an unknown refractive error of -0.25 or more even though they were able to pass examination with the eye charts. (The likelihood that this has occurred is unknown to the PI due to lack of evidence/research found the literature).

A correlation can be noted in nearsighted subjects between the degree of refractive error and the following POI subscales: SAV ($r = .43$, $p = .002$), S ($r = .29$, $p = .04$), Sr ($r = .52$, $p = .000$), Nc ($r = .30$, $p = .03$), Sy ($r = .28$, $p = .05$). The strength of these correlations range from weak to moderate.

Self-Actualizing Value (SAV) and Diopter

The SAV subscale “was derived from Maslow’s concept of self-actualizing people. A high score suggests that the individual holds and lives by values of self-actualizing people, and a low score suggests the rejection of values of self-actualizing people.”¹ “A self-actualizing person lives in terms of their wants, likes, dislikes, and values.”² Data analysis indicated that the higher the subject’s diopter, the lower their

score was on the SAV subscale($r = .43, p = .002$). This correlation implies that the more nearsighted an individual is the less he or she tends to share and live by the values of self-actualized people.

Spontaneity (S) and Diopter

On the Spontaneity (S) subscale the POI Manual states that, “A high score measures the ability to express feelings in spontaneous action. A low score indicates that one is fearful of expressing feelings behaviorally.”³ A correlation was also found between the S subscale and diopter although the correlation was not very strong ($r = .29, p = .04$). These results suggest that people with higher myopia may have more difficulty expressing themselves behaviorally.

Self-Regard (Sr) and Diopter

On the Self-Regard (Sr) subscale, “A high score measures the ability to like one’s self because of one’s strength as a person. A low score indicates low self-worth.”⁴ Findings indicate that there is a moderate relationship between diopter and the Sr subscale ($r = .52, p = .000$). This suggests that there is a relationship between increased nearsightedness and lower self-esteem.

The Nature of Man, Constructive (Nc) and Diopter

The Nature of Man, Constructive (Nc) measure assesses subjects’ general perception of the inherently positive or “good” nature of people. According to the POI Manual, “A high [Nc] score means that one sees man as essentially good. He can resolve the goodness-evil, masculine-feminine, selfishness-unselfishness and spirituality-sensuality dichotomies in the nature of man. A high score, therefore measures the self-

actualizing ability to be synergistic in [one's] understanding of human nature. A low score means that one sees man as essentially evil or bad and is not synergistic.”⁵

It was found that the higher the refractive error was, the lower the subject scored on the Nc subscale. This correlation ($r = .30$, $p = .03$) suggests that individuals with a higher degree of myopia tend to view the nature of people as more negative than their less myopic counterparts.

Synergy (Sy) and Diopter

On the Synergy (Sy) subscale, “A high score is a measure of the ability to see opposites of life as meaningfully related. A low score means that one sees opposites of life as antagonistic. When one is synergistic one sees that work and play are not different, that lust and love, selfishness and unselfishness, and other dichotomies are not really opposite at all.”⁶ A weak correlation was found between diopter and the Sy subscale ($r = .28$, $p = .05$). The less synergistic the subject, the more myopic they were.

Correlations with Age and the POI

Within the nearsighted group, a statistically significant correlation was observed between subjects' age and scores on the following scales and subscales of the POI: I ($r = .32$, $p = .03$), SAV ($r = .35$, $p = .01$), Sr ($r = .31$, $p = .03$), and Sa ($r = .31$, $p = .03$). This was expected to some degree, as the POI is a measure of self-actualization and some components of self-actualization (self-worth, self-acceptance, level of independence, etc.) might be expected to improve (or more fully develop) with age (or more life experience). Interestingly, however, these correlations were not noted in the normal vision group. Because this suggested that age might affect the results of the normal versus nearsighted

comparisons, subsequent analyses examined the impact of age and controlled for it when significance was found.

ANCOVA and T-test Results for the POI

T-tests revealed no significant differences between groups on the one main scale, Time Competence (TC), or on six of the ten subscales of the POI ($p > .05$ for each scale for which age was not a significant covariate). (See table 6).

Variable	Subject Group	Mean	Standard Deviation	t-test (p value)
TC	Nearsighted	15.32	3.35	.52
	Normal vision	15.76	3.52	
Ex	Nearsighted	19.38	5.51	.99
	Normal vision	19.36	5.17	
Fr	Nearsighted	14.50	2.64	1.00
	Normal vision	14.50	3.22	
S	Nearsighted	11.82	3.12	.29
	Normal vision	12.44	2.70	
Sy	Nearsighted	6.68	1.30	.35
	Normal vision	6.90	1.04	
A	Nearsighted	15.46	3.61	.56
	Normal vision	15.88	3.64	
C	Nearsighted	17.48	3.30	.73
	Normal vision	17.74	4.10	

Table 6. T-tests for independent samples on POI scales and subscales.

It is interesting to note that the mean scores for each of these scales was lower by several tenths of a point for the nearsighted group with the exception of Fr and Ex (see table 6). Figure 3 offers a visual comparison of mean standard scores⁷ between groups on the POI. These data indicate that nearsighted subjects generally were somewhat “less self-actualized,” although the differences overall were not statistically significant.

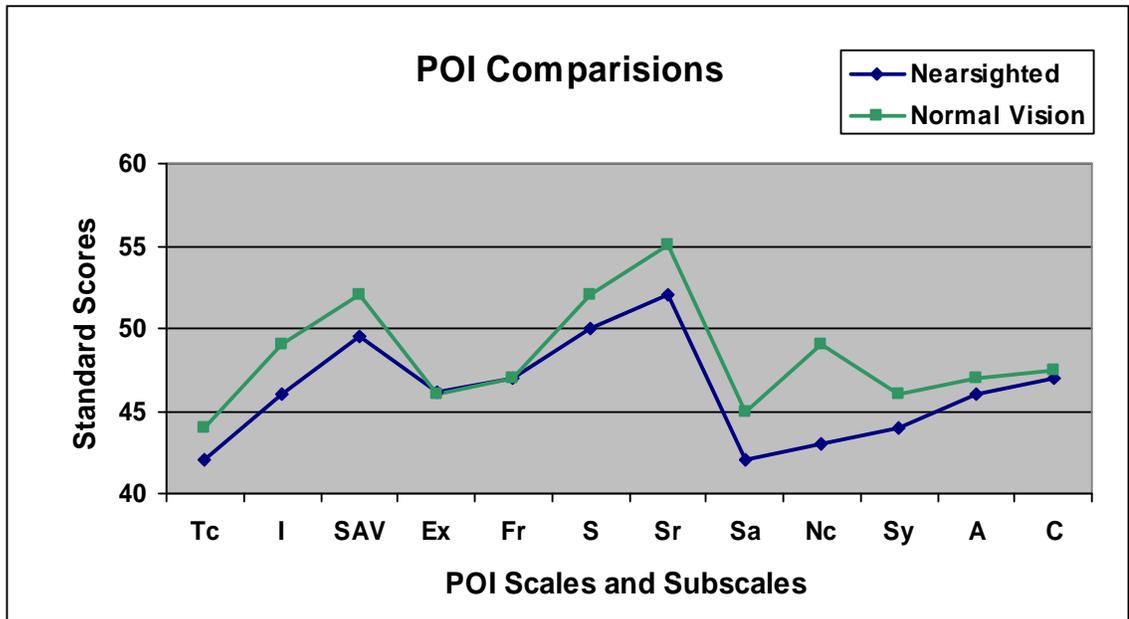


Figure 3. Graph comparing mean standard scores between groups on POI scales.

The ANCOVAs, controlling for age, found a statistically significant difference between groups for the Nc subscale of the POI ($p = .004$). Table 7 presents the ANCOVA results along with the observed and adjusted means.

Variable	Subject Group		Mean	Standard Deviation	ANCOVA (p value)
I	Nearsighted	Observed	81.48	11.02	.06
		Adjusted	81.34		
Normal vision	Observed	85.47	12.14		
		Adjusted		85.61	
SAV	Nearsighted	Observed	19.94	3.17	
		Adjusted	19.90		
	Normal vision	Observed	21.00	2.61	
			Adjusted		21.04
Sr	Nearsighted	Observed	12.64	2.68	.08
		Adjusted	12.60		
	Normal vision	Observed	13.43	2.30	
			Adjusted		
Sa	Nearsighted	Observed	14.02	3.53	.13
		Adjusted	13.98		
	Normal vision	Observed	14.96	3.16	
			Adjusted		
Nc	Nearsighted	Observed	11.18	2.10	.004
		Adjusted	11.15		
	Normal vision	Observed	12.20	1.55	
			Adjusted		

Table 7. ANCOVA on POI Scales and Subscales.

On the Nc subscale of the POI, subjects in the nearsighted group scored lower than did subjects in the control group. The significant difference between the groups for Nc suggests that nearsighted people may tend to perceive people as more negative than do those with normal vision.

Statistical Results for the DES

ANCOVA for the DES

When the ANCOVA was conducted to compare the means between the two groups no statistical significance was found on the DES ($p = 0.10$) (see table 8). An item analysis of the individual DES questions was then executed to more closely examine the data.

Variable	Subject Group		Mean	Standard Deviation	ANCOVA (p value)
DES score	Nearsighted	Observed	13.06	10.49	.10
		Adjusted	13.17		
	Normal vision	Observed	10.18	8.27	
		Adjusted	10.07		

Table 8. ANCOVA results for DES scores.

Mann-Whitney U Test for the DES

A non-parametric test was chosen to conduct an item analysis of the DES as the scores violated the normality assumption required for t-test analyses. The Mann-Whitney U test was selected as it is “one of the most powerful of the non-parametric tests for comparing two populations.”⁸

Interestingly, mean scores for the majority of the questions on the DES were slightly higher for the nearsighted group (see figures 4 and 5). These differences, however, were not statistically significant, except for three questions (as will be discussed).

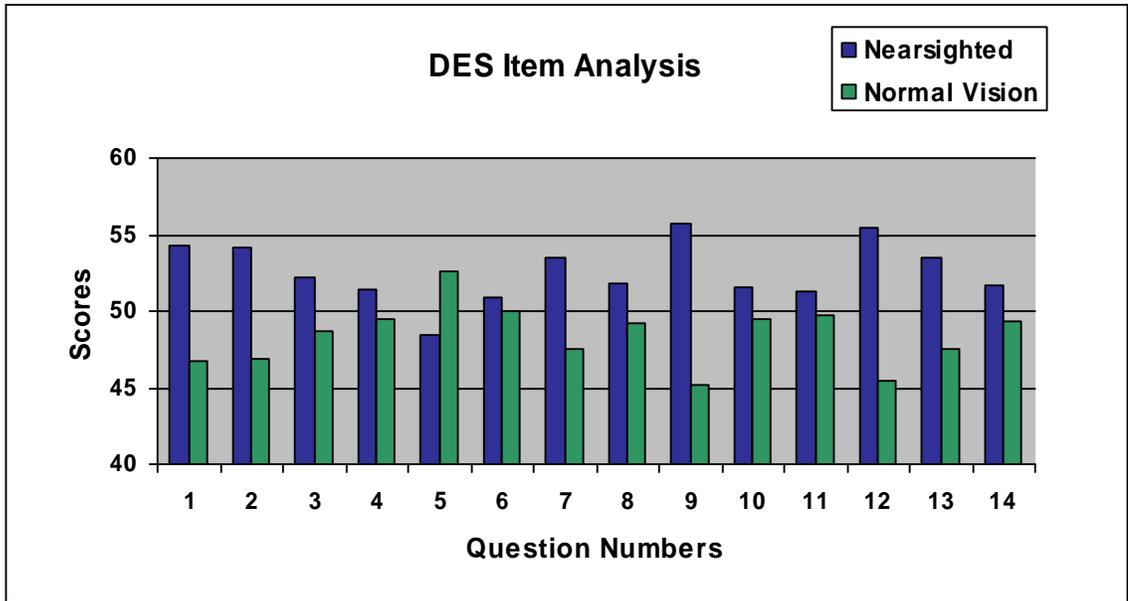


Figure 4. Graph comparing mean rank scores on DES items 1-14.

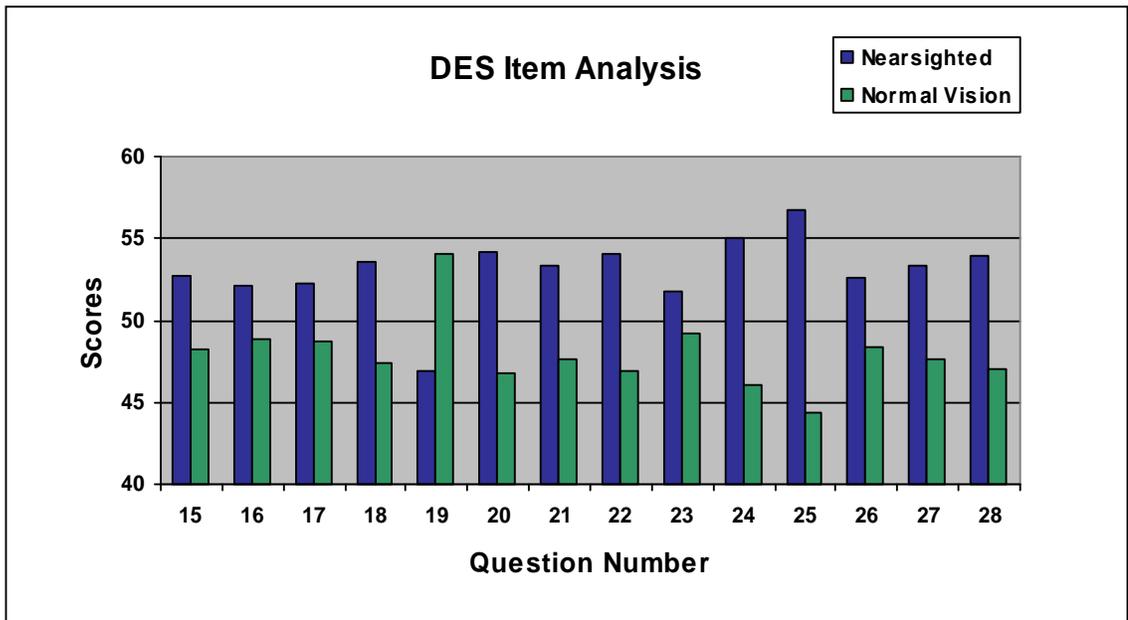


Figure 5. Graph comparing mean rank scores on DES items 15-28.

There were no significant differences between groups for the majority of the DES questions (see tables 9-12). The groups, however, were found to differ at a statistically significant level on questions 9, 12, and 25 (see appendix M). Questions 9 and 25 assess

the frequency of amnesic dissociation and question 12 inquires about the frequency of depersonalization/derealization. On these three items the nearsighted group scored a statistically significant amount higher than the controls. This might imply that these types of dissociation occur more often in people with myopia, however since only three questions show statistically significant differences, it would be unfounded to make such a claim without further investigation. In the end, the differences on these questions did not impact the overall means in a manner that resulted in an overall difference between the groups.

	DES question 1	DES question 2	DES question 3	DES question 4	DES question 5	DES question 6	DES question 7	DES question 8
Mann - Whitney U	1063.00	1070.00	1162.00	1201.00	1146.50	1228.00	1101.00	1183.50
Wilcoxon W	2338.00	2345.00	2437.00	2476.00	2421.50	2503.00	2376.00	2458.50
Z	-1.33	-1.27	-.81	-1.00	-1.02	-.16	-1.54	-.69
Asymp. Sig. (2-tailed)	.19	.21	.42	.32	.31	.87	.13	.49

Table 9. Mann-Whitney U Test for DES questions 1-8.

	DES question 9	DES question 10	DES question 11	DES question 12	DES question 13	DES question 14	DES question 15	DES question 16
Mann - Whitney U	987.00	1198.50	1211.50	1000.00	1102.00	1189.50	1136.50	1166.00
Wilcoxon W	2262.00	2473.50	2486.50	2275.00	2377.00	2464.50	2411.50	2441.00
Z	-2.18	-.39	-.40	-2.19	-1.53	-.44	-.82	-.65
Asymp. Sig. (2-tailed)	.03	.70	.70	.03	.13	.66	.41	.52

Table 10. Mann-Whitney U Test for DES questions 9-16.

	DES question 17	DES question 18	DES question 19	DES question 20	DES question 21	DES question 22	DES question 23	DES question 24
Mann - Whitney U	1161.00	1096.00	1069.50	1063.00	1105.50	1069.50	1184.50	1026.50
Wilcoxon W	2436.00	2371.00	2344.50	2338.00	2380.50	2344.50	2459.50	2301.50
Z	-.63	-1.17	-1.27	-1.33	-1.01	-1.31	-.46	-1.57
Asymp. Sig. (2-tailed)	.53	.24	.20	.18	.31	.19	.65	.12

Table 11. Mann-Whitney U Test for DES questions 17-24.

	DES question 25	DES question 26	DES question 27	DES question 28
Mann -Whitney U	941.00	1142.00	1107.00	1076.00
Wilcoxon W	2216.00	2417.00	2382.00	2351.00
Z	-2.27	-.95	-1.47	-1.76
Asymp. Sig. (2-tailed)	.02	.35	.14	.08

Table 12. Mann-Whitney U Test for DES questions 25-28.

Chapter 4 Endnotes:

¹ E. L. Shostrom, *The Personal Orientation Inventory Manual: An Inventory for the Measure of Self-Actualization* (California: Educational and Industrial Testing Service, 1966), 17.

² Ibid.

³ Ibid.

⁴ Ibid.

⁵ Ibid., 18.

⁶ Ibid.

⁷ Raw scores for group means were plotted on the “Profile Sheet for the Personal Orientation Inventory” and standard scores were obtained as instructed in *The Personal Orientation Inventory Manual: An Inventory for the Measure of Self-Actualization* (California: Educational and Industrial Testing Service, 1966), 7.

⁸ V. J. Easton and John H. McColl, “Statistics Glossary: Wilcoxon Mann-Whitney Test,” http://www.cas.lancs.ac.uk/glossary_v1.1/nonparam.html#wmwt (accessed on November 24, 2007).

CHAPTER 5: DISCUSSION, SUGGESTIONS, AND CONCLUSION

The following section contains a summary of the findings, review of the research questions, as well as implications and conclusions drawn from the results. Limitations of the current study are outlined and suggestions for further research are presented.

Summary of Findings

It is difficult to make one general statement to describe the findings; it seems we are left with more questions than answers. Although there was no statistical difference found between groups on the DES there was a group difference found on the POI. Results of the Nc subscale of the POI indicated that nearsighted subjects generally viewed the inherent nature of humankind in a more negative way than those with normal vision. Further examination of this relationship demonstrated a reciprocal correlation between degree of nearsightedness and Nc scores; this suggests that the higher the myopia the more negative or evil people tend to perceive the nature of humankind.

The results also demonstrated other correlations. Subjects with higher myopia tended to score lower on the Self-Actualizing Value (SAV), Spontaneity (S), Self-Regard (Sr), Nature of Man, Constructive (Nc), and Synergy (Sy) subscales of the POI. These correlations suggest that the more nearsighted people are:

1. the less they tend to have and live by the values of self-actualized people
2. the less able they are to express themselves behaviorally
3. the lower their self-esteem tends to be
4. the less positive their perception of humankind tends to be

5. the less synergistic they tend to be

Although the correlations were shown to have varying degrees of strength each warrant further consideration.

Review of Purpose and Research Questions

This study was designed to seek alternative links to nearsightedness. The central research questions of the present study are:

1. Is there a relationship between myopia and level of self-awareness?
2. Do individuals with myopia dissociate more frequently than those with normal, 20/20 vision?

Hypothesis One

- Research results will demonstrate a relationship between self-awareness and nearsightedness.

Hypothesis Two

- Research results will yield a reciprocal correlation between self-awareness and myopia suggesting that a decreased level of self-awareness is related to higher myopia.

Hypothesis Three

- Research findings will suggest that nearsighted individuals dissociate more than those with normal, 20/20 vision.

Discussion

Support for Hypotheses One and Two

Although Hypothesis One cannot be completely accepted, it cannot be fully rejected either. Despite the fact that mean scores were higher on nearly all the scales of the POI for the control group, suggesting that those with normal, 20/20 vision are slightly more self-actualized (or self-aware) than those with myopic vision, the differences between groups were not statistically significant on most of the scales and subscales. On one subscale, however, a significant difference was found, where nearsighted subjects scored significantly lower than the control group. The ANCOVA revealed a statistically significant difference between groups on the Nature of Man, Constructive (Nc) subscale of the POI ($P = .004$). This suggests that nearsighted people may tend to view the inherent nature of people as more negative than those with normal vision.

This leaves us with some interesting possibilities. What does this relationship really imply? Could it mean that myopic people tend to trust humankind less because they are not able to see them as clearly? Or might it be the other way around, where people who see others as inherently evil tend to blur them out, thus creating a myopic state? And of course, there may be third possibility, that these two variables simply coexist but have no influence or interaction with one another.

What can be stated regarding analysis of the Nc subscale is that there is some relationship between nearsightedness and this variable. But what exactly is this variable? If one was to consider *how one views the inherent nature of people* as analogous to self-awareness, then we might consider accepting Hypothesis One. This, however, seems a bit of a stretch. What it does demonstrate is simply that a relationship may exist between these two variables.

Correlations within the Nearsighted Group

Correlations within the nearsighted group lend support to both Hypothesis One and Hypothesis Two. We can consider partially accepting Hypotheses One and Two based on five of the ten subscales of the POI; though it is with some limitation due to the restriction of the inclusion criteria (as detailed in Chapter 4). Within the nearsighted group a statistically significant correlation was found between the degree of myopia (diopter) and scores on the Self-Actualizing Value (SAV), Spontaneity (S), Self-Regard (Sr), Synergy (Sy), and Nature of Man, Constructive (Nc) subscales of the POI. It was found that the higher the subject's diopter, the lower they tended to score on each of these subscales. This reciprocal correlation suggests that the more nearsighted a person is the less self-aware they may be. With an *increase* in the severity of myopia, there may tend to be a *decrease* in the individual's level of self-actualization (SAV), ability to express themselves behaviorally (S), self-esteem (Sr), ability to be synergistic (Sy), as well as a *decrease* in one's tendency to positively view the inherent nature of humankind (Nc).

After reviewing these correlations is it then possible to partially accept Hypothesis Two. The strength of the correlations vary from weak to moderate, as presented in Chapter 4, and correlations with diopter were not found on all twelve of the scales and subscales of the POI. The acceptance of Hypothesis Two is made only partially for these reasons.

Lack of Support for Hypothesis Three

Statistical analysis did not yield a significant difference between groups on the overall scores of the DES. So we must accept the null hypothesis for Hypothesis Three because research findings did not suggest that nearsighted individuals dissociate more

than those with normal, 20/20 vision. Possible reasons for lack of difference may include: subjects' tendency toward more socially desirable responses, lack of personal insight, and possibly the choice of measure (as will be discussed further under Limitations).

A closer inspection of the DES by way of an item analysis, further supported the acceptance of the null hypothesis for Hypothesis Three. The item analysis did reveal a statistically significant difference between groups on three of the twenty-eight questions. These questions are as follows:

- Question 9: Some people find that they have no memory for some important events in their lives (for example, a wedding or graduation). Circle a number to show what percentage of the time this happens to you.
- Question 12: Some people have the experience of feeling that other people, objects, and the world around them are not real. Circle a number to show what percentage of the time this happens to you.
- Question 25: Some people find evidence that they have done things that they do not remember doing. Circle a number to show what percentage of the time this happens to you.

The normal vision group responded significantly lower than the myopic group on these questions. As mentioned in Chapter 4, questions 9 and 25 measure the frequency of amnesic dissociation (where an individual has no memory of an event) and question 12 assesses the frequency of depersonalization/derealization (where an individual perceives the self or the external world as strange or unreal). In order to imply that these types of dissociation occur more frequently in people with myopia than in those with normal vision, further research is needed. Overall the difference on these three questions was not enough to have a statistically significant impact on the overall group means of DES scores.

Limitations

Limitations of Study Design

It is important to note that a major weakness of correlational research is that correlation is not equivalent to causation. The present study demonstrates that there may be a relationship between myopia and several components of self-awareness but by no means indicates that one's lack of self-awareness *caused* the myopia. It is not possible to discern which came first in correlational research. Perhaps myopia lead subjects to avoid developing improved self-awareness not the other way around or perhaps the two variables coexist but do not have any influence upon each other. Cross-sectional studies are useful for suggesting associations between variables and that was the goal of the present project.

According to Kazdin, in his book, *Research Designs in Clinical Psychology*, “Case control studies can provide critical insights about the nature of a problem, characteristic, or experience...”¹ So despite the limitations of this research design, it does have value. “Cross-sectional designs are commonly used and have generated provocative findings, theories, and further research.”² The findings of the present project are certainly provocative and do warrant further investigation.

Limitations of Instrumentation

When assessing the vision of subjects who reported normal, 20/20 vision, there may have been some unintended variation. Three different Registered Nurses verified potential subjects' normal vision. This was done at different locations in well lit areas. Although all three RNs used the same protocol, identical eye charts, and pre-measured

string for vision assessment, it is possible that furniture, patterns, or colors present in the different rooms may have affected some subjects' visual acuity.

Limitations of Measure Administration

Study participants were not supervised when completing the surveys. It is possible that variations in subjects' environment may have influenced their answers. Participants were asked to complete the measures in a quiet, undisturbed location but it cannot be known to the PI if this actually occurred.

It was expected that measures be completed consecutively, all at one time versus sporadically over the course of a few days. It is unknown to the PI if variations of this occurred or how such variation may have affected the overall data. Also unknown, is the order in which participants filled out the tests. The measures were labeled "Survey 1" and "Survey 2" but this did not guarantee that the tests were completed in this order. It is possible that the order of administration could have affected subject responses.

Limitations of Measures

As with most surveys, those specifically chosen for this study were not without limitations. It is always the hope of the researcher that subjects are honest when answering questions on psychometric measures but there is no guarantee that this will occur. Confidentiality was stressed to help subjects feel more comfortable providing accurate responses but there still remains a potential for subjects to choose more "socially desirable" answers.

Limitations of the Dissociative Experiences Scale (DES)

The DES was originally designed to detect dissociative psychopathology in the clinical setting. The creators of the instrument state, “Though the scale has been used to measure dissociation in non-clinical (normal) populations, this was not its intended purpose and users should be aware of this. Since non-clinical subjects typically score in a fairly narrow range at the low end of the scale on the DES, small differences among these subjects may not be meaningful.”³

The use of self-report measures rely on the accuracy of subject responses. Although the specific construct under investigation in “Survey 2” (the Dissociative Experiences Scale) was not disclosed to subjects, it is highly likely that the nature of the questions may have had some affect on the way some subjects responded. (See appendix M for the measure). In order to not “appear crazy” it is possible that some participants minimized the percentage of time the experiences occurred in their lives.

Limitations of the Personal Orientation Inventory (POI)

There is no existing measure specifically for self-awareness. The POI was chosen because it measures many aspects of self-awareness such as time competence, feeling reactivity, self-regard, etc. (see Chapter 3). This limitation was considered when interpreting results.

Other Limitations of this Study

Outside of the aforementioned limitations of the present project, there are other factors that may have affected research findings. Although all extraneous variables

cannot be controlled for it is well worth acknowledging their presence and potential for impact on study results.

Subject selection is a variable that could not be fully controlled for in the present project. Subjects self-selected based on their personal desire to participate in the study. Volunteers may not be representative of the larger population. The Principal Investigator made extensive efforts to reach a wide variety of participants through a variety of recruiting efforts (as detailed in Chapter 3), however demographic information revealed under-representation of minority populations.

Offering financial incentives can potentially affect subject selection. This study promised at least a 1 in 25 chance of winning a \$50.00 Visa gift card as incentive to participate. It is possible that some subjects carelessly filled out the surveys simply to be part of the drawing.

Randomization did not occur in this study because in correlational research, subject groups are divided based on the presence or absence of the variable under investigation. Therefore, obtaining a representative control group posed a challenge. Controls may have differed from cases in other, unknown ways besides visual acuity.

Also worth noting is the final return rate of subject materials. A total of 196 packets were distributed to (allegedly) willing participants and only 112 were returned. Of the total number returned, 100 subjects fully met the inclusion criteria. It is unknown why so many volunteers chose not to participate after receiving packets.

There are limitations to any research project. The use of a correlational research design brings with it limitations of its own. Although causal inferences could not be made due to the choice of design, a relationship was demonstrated. “Findings that

compare intact groups are very useful in generating theory and concrete hypotheses to analyze further the reasons for these relations and the conditions under which they do and do not operate.”⁴

Final Thoughts

Thoughts on Stress and Myopia

As detailed in the Literature Review, stress may impact visual acuity and prolonged stress may result in a diagnosable refractive error. One’s perception of the nature of humankind, if negative, might be considered a stressor. If an individual, even unconsciously, felt that others tend to be inherently evil (to some degree), than there may be an element of fear or need to protect the self from others. Perhaps (unconsciously) creating a state of myopia is a form of avoidance, (*flight* when *fight* is not an option). The results from this study seem to support the theory that stress may be linked to myopia. Is it possible that one’s increase in myopia is related to the strain produced by fear when one assumes others are fundamentally evil? This possibility would support Bates’ theory. Of course, future research is required to more fully substantiate such a claim.

Thoughts on Perception and Myopia

Perhaps it is a question of perception. As Drs. Kaplan and Liberman (and others) theorize, the way we perceive the world around us is related to the eye’s refractive state. The results of the present study suggest that there is indeed a link between perception and myopia.

The Nature of Man, Constructive (Nc) and Self-Regard (Sr) subscales of the POI reflect perception. The Nc measures the way one perceives others and the Sr assesses the

way one perceives themselves. Maslow felt that outside perception is intimately related to internal or self-perception.⁵ Both of these subscales were shown to have correlations with the degree of diopter, the more nearsighted the subject, the lower they tended to score on the Nc and Sr subscales. These findings suggest that perception may be related to degree of myopia. If higher myopia is related to a lower or decreased level of self-perception and perception of others, treatments involving the improvement of self-esteem warrant further investigation.

Suggestions for Future Research

The following is a list of suggested improvements for the current study followed by suggestions for further research on the topic.

Suggestions for Improvement of the Current Study

1. The use of a different measure for dissociation is recommended; one that is designed specifically as a state (versus a trait) measure. Although the questions on the DES all referred to the frequency of various dissociative experiences it was not created specifically to measure one's state of dissociation as much as it was designed to identify the existence of a dissociative trait.⁶ A measure that might be useful for this purpose is the Dissociative Processes Scale (DPS). The DPS is designed to measure dissociative tendencies within the normal range as apposed to detecting dissociative pathology.⁷
2. Another suggestion is to conduct the research in a controlled environment. Subjects were asked to complete the measures in a quiet, undisturbed location but unless this is actually supervised by the PI, it cannot be known if this has occurred.

3. It is recommended that in the future, one optometrist conduct all vision screenings in one location with all the same charts and equipment.
4. Vision screening should include a measurement of refractive error in all participants so there is no question of any inadvertently missed refractive error in the normal vision group.
5. Further research should include larger sample size as well as increased ethnic diversity of participants. This would improve the generality of the findings.
6. The use of a more specific measure for self-awareness is also suggested, despite the fact that this may entail creating a measure since one does not currently exist.

Suggestions for Future Studies

The findings of this research demonstrated a potential link between self-awareness and nearsightedness, pursuing this relationship further is necessary to establish a fuller understanding of its implications. Some suggestions for future research are as follows.

1. Replication of the current study, considering the suggested improvements, is recommended.
2. Conducting a study involving self-awareness workshops or techniques is suggested. Using a pretest-posttest control group design, subjects could be assessed using the POI, a measure of dissociation, and measurement of refractive error.
3. Research employing various energy healing modalities is also suggested. Modalities specifically intended to improve self-awareness might be utilized to investigate the same constructs as the current project.

4. The study of meditation practices, for example mindfulness training, in relation to refractive error may also produce valuable insight into the nature of the relationships suggested by the current research.

Conclusion

This research study was designed to examine potential alternative links to nearsightedness. Although a clear connection could not be established between myopia and self-awareness, interesting correlations between these variables were revealed. Findings from this study suggest that nearsighted people tend to perceive the inherent nature of people as more negative than do those with normal vision. And correlations found within the nearsighted group suggest that higher degrees of nearsightedness may be related to lower levels of some aspects of self-awareness. Although further research is necessary to develop a deeper understanding of these phenomena, the present research findings are certainly a worthy beginning. If how we perceive our internal and external worlds has a measurable effect on the refractive state of our eyes, than a potential for healing does exist. A cure, it could then be argued, is in the *mind* of the beholder and not so much in the eye.

Chapter 5 Endnotes:

¹ A. Kazdin, *Research Design in Clinical Psychology* (Boston, MA: Allyn and Bacon, 2003), 138.

² *Ibid.*, 236.

³ E. B. Carlson and F. Putnam, "An Update on the Dissociative Experiences Scale," *Dissociation* VI, no.1 (1993), 16.

⁴ A. Kazdin, *Research Design in Clinical Psychology* (Boston, MA: Allyn and Bacon, 2003), 237.

⁵ A. Maslow, *Toward a Psychology of Being* (New York: Van Nostrand Reinhold, 1968), 60.

⁶ E. B. Carlson and F. Putnam, "An Update on the Dissociative Experiences Scale," *Dissociation* VI, no.1 (1993): 16.

⁷ University of California, Berkeley, "Measures of Dissociation," <http://socrates.berkeley.edu/~kihlstrm/Dissociation.htm> (accessed on January 16, 2008).

REFERENCES AND BIBLIOGRAPHY

- Anisman, H. and Z. Merali. "Understanding Stress: Characteristics and Caveats." *Alcohol Research & Health* 23, no. 4 (1999): 241-249.
- Anshel, J. *Smart Medicine for your Eyes*. New York: Avery Publishing Group, 1999.
- Ballentine, R. *Radical Healing*. New York: Harmony Books, 1999.
- Balliet, R., A. Clay, and K. Blood, "The Training of Visual Acuity in Myopia." *Journal of the American Optometric Association* 53, no. 9 (Sept. 1982): 719-724.
- Bambridge A. "Approaching Myopia Holistically: A Case Study and Theoretical Exploration." *Journal of Alternative & Complementary Medicine* 8, no. 3 (2002): 371-377.
- Bates, W. *The Bates Method for Better Eyesight Without Glasses*. New York: Henry Holt and Company, 1981.
- Beetle, S. L. and F. A. Young. "Values, Personality, Physical Characteristics, and Refractive Error." *American Journal of Physiological Optometry* 53, no. 11 (1976).
- Beresford, S., D. Muris, M. Allen, and F. A. Young. *Improve Your Vision Without Glasses or Contact Lenses: A New Program of Therapeutic Eye Exercises*. New York: Simon & Schuster, 1996.
- Bernstein, E. and F. Putnam. "Development, Reliability, and Validity of a Dissociative Scale." *The Journal of Nervous and Mental Disease* 174, no. 12 (1986): 727-735.
- Brofman, M. "Vision as a Metaphor: The Relationship Between Eyesight and Consciousness." 1990. http://healing.about.com/library/uc_vision_0201.htm (accessed August 15, 2006).
- Cagnoli , M "Working with People 's Eyes... Means Changing their Points of View." <http://www.iblindness.org/articles/cagnoli-working.html#anchor-12> (accessed September 11, 2006).
- Carlson, E. B. and F. Putnam. "An Update on the Dissociative Experiences Scale." *Dissociation* VI, no.1 (1993): 16-27.
- Chopra, D. *Quantum Healing*. New York: Bantam Books, 1989.
- Chou, B. "Exposing the Secrets of Fringe Eye Care." *Review of Optometry* 141, no. 9 (September 2004): 63-70.

- Congdon, N. and K. West. "Nutrition and the Eye." *Current Opinion in Ophthalmology* 10 (1999): 464-473.
- Cooper, J. "Summary of Research on the Efficacy of Vision Therapy for Specific Visual Dysfunctions." http://www.visiontherapy.org/vision-therapy/pdfs/03_sum_vt_research_Cooper.pdf (accessed August 15, 2006)
- Corbett, M. *Help yourself to better sight*. California: Wilshire Book Company, 1949.
- Cortese, B. and T. Uhde. "Immobilization Panic." *American Journal of Psychiatry* 163, no. 8 (2006): 1453.
- Cross, W. and L. Lynn. *Your Vision: All About Modern Eye Care*. New York: MasterMedia Limited, 1994.
- D'Alonzo, T. *Your Eyes!: A Comprehensive Look at the Understanding and Treatment of Vision Problems*. Clifton Heights, PA: Avanti Publishing, 1954.
- Davis, J. "The Model Underlying Correlational Research Methods." <http://clem.mscd.edu/~davisj/prm2/correl1.html> (accessed on January 18, 2007).
- Dotevall, G. "Involvement of Cardiac, Respiratory and Gastrointestinal Functions in Neural Responses to Stress Events." *Integrative Physiological & Behavioral Science* 29, no. 4 (Oct-Dec 1994): 374-382.
- Easton, V. J. and J. H. McColl. "Statistics Glossary: Wilcoxon Mann-Whitney Test." http://www.cas.lancs.ac.uk/glossary_v1.1/nonparam.html#wmwt (accessed on November 24, 2007).
- eMedicineHealth. "Long-Term Results With LASIK Good." 2008. <http://www.emedicinehealth.com/script/main/art.asp?articlekey=86167> (accessed on February 6, 2008).
- Eulenberg, A. "The case for the preventability of myopia." 1996. http://www.i-see.org/prevent_myopia.html (accessed on September 11, 2006).
- Fekrat, S., and J. Weizer (Eds.). *All About Your Eyes: A Practical Guide in Plain English from the Physicians at the Duke University Eye Center*. North Carolina: Duke University Press, 2006.
- Fredrick, D. "Myopia." *British Medical Journal* 324, (May 2002): 1195-1199.
- Gazzaniga, M. *The Mind's Past*. California: University of California Press, 1998.
- Gerber, R. *Vibrational Medicine for the 21st Century*. New York: Eagle Brook, 2000.

- Getman, G. "A Commentary on Vision Training." *Journal of Learning Disabilities* 18, no. 9 (Nov 1985): 505-512.
- Gordon, R. "The Reptilian Brain, Dissociation and Seeing from the Core." Paper presented at The 17th Annual International Conference for Holistic Vision, Paris France, October 2002. <http://www.visioneducators.com> (accessed on August 14, 2006).
- Gordon, R. "The Bates Method of Vision Improvement." 1995. <http://www.visioneducators.com> (accessed on August 14, 2006).
- Gordon, R. and E. Abraham. "Improving Vision through Inner Awareness: Focusing and Seeing from the Core." <http://www.visioneducators.com> (accessed on August 14, 2006).
- Gottlieb, R. "The Psychophysiology of Nearsightedness." Doctoral dissertation, 1978. <http://www.iblindness.org/articles/gottlieb-psych/> (accessed on September 11, 2006).
- Grossman, M. *Greater Vision: A Comprehensive Program for Physical, Emotional, and Spiritual Clarity*. California: Keats Publishing, 2001.
- Hattie, J., P. Hancock, and K. Brereton. "The Relationship Between Two Measures of Self-Actualization." *Journal of Personal Assessment* 48, no. 1 (1984): 17-25.
- Hay, L. *Heal Your Body*. California: Hay House, Inc, 1982.
- Hersh, P., K. Fry, and D. Bishop. "Incidence and Associations of Retreatment After LASIK." *Ophthalmology* 110, no. 4, (April 2003): 748-754.
- Hilton, P. *Statistics Explained*. New York: Routledge, 1995.
- Hoffman, D. *Visual Intelligence: How We Create What We See*. New York: W. W. Norton & Company, 1998.
- Hubel, D. *Eye, Brain, and Vision*. New York: Scientific American Library, 1988.
- Ibay, G., B. Doan, L. Reider, D. Dana, M. Schlifka, H. Hu, T. Holmes, J. O'Neill, R. Owens, E. Ciner, J. Bailey-Wilson, and D. Stambolian. "Candidate High Myopia Loci on Chromosomes 18p and 12q Do Not Play a Major Role in Susceptibility to Common Myopia." *BMC Medical Genetics* 5, no. 20 (2004).
- Important Dates in Vision Science. "A Chronological History of Vision Research: 1600-1960." http://www.cogsci.uci.edu/vision/yellott_dates.html (accessed on November 29, 2006).

- Josephson, E. *Nearsightedness is Preventable*. New York: Chedney Press, 1939, as cited in A. Eulenberg, "The Case for the Preventability of Myopia." 1996. http://www.i-see.org/prevent_myopia.html (accessed on September 11, 2006).
- Kaplan, R. *Seeing Without Glasses* (3rd ed.). Oregon: Beyond Words Publishing, Inc., 2003.
- Kaplan, R. "Nearsightedness: Seeing Beyond the Obvious - Part 2." *Journal of Optometric Vision Development* 34, no. 2 (2003). <http://www.beyond2020vision.com/lightlensesmind1> (accessed on August 14, 2006).
- Kaplan, R. "Nearsightedness: Seeing Beyond the Obvious - Part 1." *Journal of Optometric Vision Development* 34, no. 1 (2002). <http://www.beyond2020vision.com/lightlensesmind1> (accessed on August 14, 2006).
- Kaplan, R. "Light, Lenses, and the Mind: The Potent Medicine of Optometry." *Journal of Optometric Vision Development* 22, no. 4 (2002). <http://www.beyond2020vision.com/lightlensesmind> (accessed on August 14, 2006).
- Kaplan, R. *Conscious Seeing: Transforming your Life through Your Eyes*. Oregon: Beyond Words Publishing, Inc., 2002.
- Kaplan, R. *The Power Behind Your Eyes*. Vermont: Healing Arts Press, 1995.
- Kazdin, A. *Research Design in Clinical Psychology*, (4th Edition). MA: Allyn and Bacon, 2003.
- Keogh, B. and M. Pelland. "Vision Training Revisited." *Journal of Learning Disabilities* 18, no. 4 (Apr 1985): 228-236.
- Knapp, R. *Handbook for the POI*. San Diego, CA: EdITS Publishers, 1976.
- Lam, C., E. Goldschmidt, and M Edwards. "Prevalence of Myopia in Local and International Schools in Hong Kong." *Optometry and Vision Science* 81, no. 5, (May 2005).
- Leak, G. "A Multidimensional Assessment of the Validity of the Personal Orientation Inventory." *Journal of Personality Assessment* 48, no. 1, (1984).
- Lee, H., H. Park, S. Kim, H. Lee, M. Kim, C. Kim, J. Chung, and H. Lee. "Acupuncture Stimulation of the Vision-Related Acupoint (Bl-67) Increases c-Fos Expression in the Visual Cortex of Binocularly Deprived Rat Pups." *American Journal of Chinese Medicine* 30, no. 2-3 (2002): 379-385.

- Levine, P. *Waking the Tiger: Healing Trauma*. California: North Atlantic Books, 1997.
- Liberman, J. *Take Off Your Glasses and See: A Mind/Body Approach to Expanding Your Eyesight and Insight*. New York: Three Rivers Press, 1995.
- Liberman, J. *Light: Medicine of the Future*. Vermont: Bear & Company, 1991.
- Lieberman, L. "Visual Perception versus Visual Function." *Journal of Learning Disabilities* 17, no. 3 (Mar 1984): 182-185.
- Lipton, B. *The Biology of Belief: Unleashing the Power of Consciousness, Matter, and Miracles*. California: Elite Books, 2005.
- Luskin, F. and K. Pelletier. *Stress Free for Good: 10 Scientifically Proven Life Skills for Health and Happiness*. New York: HarperSanFrancisco, 2005.
- MacCracken, W.B. "Use your Own Eyes." <http://www.iblindness.org/books/maccracken/> (accessed on September 11, 2006).
- Maslow, A. *Toward a Psychology of Being*. New York: Van Nostrand Reinhold, 1968.
- McEwen, B. and E. N. Lasley. *The End of Stress as We Know It*. Washington, D.C.: Joseph Henry Press, 2002.
- Miller, S. "Optical Differences in Cases of Multiple Personality Disorder." *The Journal of Nervous and Mental Disease* 177, no. 8 (1989): 480-486.
- Miller, S, T. Blackburn, G. Scholes, G. White, and N. Mamalis. "Optical Differences in Multiple Personality Disorder: A Second Look." *The Journal of Nervous and Mental Disease* 179, no. 3 (1991): 132-135.
- Mosby's Medical, Nursing, and Allied Health Dictionary, 4th Edition. MO: Mosby – Year Book, Inc., 1994.
- Myss, C. *Anatomy of the Spirit: The Seven Stages of Power and Healing*. New York: Three Rivers Press, 1996.
- Myss, C. and C. N. Shealy. *The Creation of Health*. New York: Three Rivers Press, 1993.
- Nichols, J., M. Marsich, M. Nguyen, J. Barr, and M. Bullimore. "Overnight Orthokeratology." *Optometry and Visual Science* 77, no. 5 (May 2000): 251-259.
- Orthokeratology Society of Australia. "Eye Infections and Orthokeratology." 2006. http://www.osa.net.au/infection_control.htm (accessed on January 8, 2008).

- Parssinen, O. and A. Lyyra. "Myopia and Myopic Progression Among Schoolchildren: A Three-Year Follow-Up Study." *Investigative Ophthalmology & Visual Science* 34, no. 9 (Aug 1993): 2794-2802.
- Pert, C. *Molecules of Emotion: The Science Behind Mind-Body Medicine*. New York: Simon & Schuster, 1997.
- Potter, A. "Reducing Vitamin A Deficiency: Could Save the Eyesight and Lives of Countless Children." *British Medical Journal* 314, (Feb 97): 317-318.
- Quackenbush, T. (Ed.). *Better Eyesight: The Complete Magazines of William H. Bates*. California: North Atlantic Books, 2001.
- Quackenbush, T. *Relearning to See: Improve your Eyesight Naturally*. California: North Atlantic Books, 1997.
- Rados, C. "A Focus on Vision." *FDA Consumer* 40, no. 4 (Jul/Aug2006): 10-17.
- Rahmani Eye Institute. "Corneal Rings." 2006.
http://www.rahmani.com/procedures_cornealrings.html (accessed on October 12, 2006).
- Rehm, D. *The Myopia Myth: The Truth About Nearsightedness and How to Prevent It*. Pennsylvania: International Myopia Prevention Association, 1981.
- Rochat, P. "Five Levels of Self-Awareness as they Unfold in Early Life." *Consciousness and Cognition* 12 (2003): 717-731.
- Rogers, T., B. Alderman, and D. Landers. "Effects of Life-Event Stress and Hardiness on Peripheral Vision in a Real-Life Stress Situation." *Behavioral Medicine* 29, no.1 (2003): 21-26.
- Ross, C., J. Ellason, G. Anderson. "A Factor Analysis of the Dissociative Experiences Scale (DES) in Dissociative Identity Disorder." *Dissociation* VII, no. 1 (1995): 229-235.
- Sakimoto T., M. Rosenblatt, and D. Azar. "Laser Eye Surgery for Refractive Errors." *Lancet* 367 (Apr 2006): 1432-1447.
- Salkind, N. *Statistics for People who (Think They) Hate Statistics*. California: Sage Publications Inc., 2000.
- Saw, S., J. Katz, O. Schein, S. Chew, and T. Chan. "Epidemiology of Myopia." *Epidemiologic Reviews* 18, no. 2 (1996).

- Seet, B, T. Wong, D. Tan, S. Saw, V. Balakrishnan, L. Lee, and A. Lim. "Myopia in Singapore: Taking a Public Health Approach." *British Journal of Ophthalmology* 85 (2001): 521-526.
- Seiderman, A. and S. Marcus. *20/20 is Not Enough: The New World of Vision*. New York: Alfred A. Knopf, Inc., 1989.
- Selye, H. *The Stress of Life*, (revised edition). New York: McGraw-Hill Book Co., 1984.
- Selye, H. *Stress Without Distress*. New York: New American Library, 1974.
- Shealy, C. N. *Sacred Healing*. Massachusetts: Element Books, Inc., 1999.
- Shostrom, Everett L., *The Personal Orientation Inventory Manual: An Inventory for the Measure of Self-Actualization*. California: Educational and Industrial Testing Service, 1966.
- Smith, A. *The Body*. New York: Viking Penguin Inc., 1985.
- Somer, E. "Posttraumatic Dissociation as a Mediator of the Effects of Trauma on Distressful Introspectiveness." *Social Behavior and Personality* 30, no. 7 (2002): 671-682.
- Sound Medicine. "Fight or Flight." University of Indiana University School of Medicine. 2006. <http://soundmedicine.iu.edu/segment.php4?seg=224> (accessed on November 19, 2006).
- Stuss, D., T. Picton, and M. Alexander. "Consciousness, Self-Awareness, and the Frontal Lobes." <http://www.psych.utoronto.ca/~pgsa/Course%20Readings/Frontal%20Lobes/Stuss,%20Picton,%20&%20Alexander.pdf> (accessed on August 15, 2006).
- The 1986/87 Future of Visual Development/Performance Task Force. "The Efficacy of Optometric Vision Therapy." *Journal of the American Optometric Association* 59, no. 2 (Feb 1988). <http://www.oep.org/Reference/01.%20The%20Efficacy%20of%20Optometric%20Vision%20Therapy,%20AOA.pdf> (accessed on September 8, 2006).
- The Eyes Have It. University of Michigan Kellogg Eye Center. "The Visual Pathway." <http://www.kellogg.umich.edu/theeyeshaveit/anatomy/visual-pathway.html> (accessed on November 29, 2006).
- Thibodeau, G. and K. Patton. *Structure & Function of the Body*. Missouri: Mosby, Inc., 2002.

- Thorn, F., A. Cruz, A. Machado, and R. Carvalho. "Refractive Status of Indigenous People in the Northwestern Amazon Region of Brazil." *Optometry and Vision Science* 82, no. 4 (2005): 267-272.
- Tortora, G. and N. Anagnostakos. *Principles of Anatomy and Physiology*, 6th Edition. New York: HarperCollins Publishers, 1990.
- Tosi, D. and C. Lindamood. "The Measurement of Self-Actualization: A Critical Review of the Personal Orientation Inventory." *Journal of Personality Assessment* 39, no. 3, (1975): 215-224.
- U.S. Census Bureau. "2005 American Community Survey: Asheville, North Carolina." http://factfinder.census.gov/servlet/ACSSAFFacts?_event=&geo_id=16000US3702140&_geoContext=01000US%7C04000US37%7C16000US3702140&_street=&_county=Asheville&_cityTown=Asheville&_state=04000US37&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgsl=160&_submenuId=factsheet_1&ds_name=DEC_2000_SAFF&_ci_nbr=null&qr_name=null®=null%3Anull&_keyword=&_industry (accessed on September 9, 2006).
- U.S. Food and Drug Administration, Department of Health and Human Services. "LASIK Eye Surgery: When is LASIK not for Me?" June 12, 2007. <http://www.fda.gov/cdrh/lasik/when.htm> (accessed on February 6, 2008).
- Van der Kolk, B., A. McFarlane, and L. Weisaeth (Eds). *Traumatic Stress: The Effects of Overwhelming Experience on Mind, Body, and Society*. New York: Guilford Press, 1996.
- Waites, E. *Trauma and Survival: Post-Traumatic and Dissociative Disorders in Women*. New York, NY: W. W. Norton & Company, Inc., 1993.
- WebMD. "Mental Health: Dissociative Identity Disorder (Multiple Personality Disorder)." 2005-2006. <http://www.webmd.com/content/article/118/112901.htm> (accessed on November 17, 2006).
- Webster's Universal Encyclopedic Dictionary. New York: Barnes and Noble Books, 2002.
- Webvision. Moran Eye Center. Gross Anatomy of the Eye, "Sagittal Section of the Adult Human Eye." <http://webvision.med.utah.edu/anatomy.html> (accessed on November 29, 2006).
- Whitfield, P. (Ed.). *The Human Body Explained*. New York: Henry Holt & Company, 1995.
- Wikipedia. "LASIK." February 5, 2008. <http://en.wikipedia.org/wiki/LASIK> (accessed on February 6, 2008).

Wikipedia. "Orthokeratology." 2006. <http://en.wikipedia.org/wiki/Orthokeratology> (accessed on January 7, 2008).

Worp, E. and D. Ruston, "Orthokeratology: An Update." *Optometry in Practice* 7 (2006): 47-58.

Wu, H., B. Seet, E. Yap, S. Saw, T. Lim, and K. Chia. "Does Education Explain Differences in Myopia Prevalence? A Population-Based Study of Young Adult Males in Singapore." *Optometry and Vision Science* 78, no. 4, (April 2001): 233-239.

APPENDIX A
Flyer for Recruiting

VOLUNTEERS NEEDED
for
STUDY ON EYESIGHT

Do you have 20/20 (normal) vision?

OR

Trouble seeing at a distance (nearsighted)?

And...

- 18-65 years of age
- Never had eye surgery
- Not wear bifocal, trifocal or progressive lenses?

Why? To be part of a research study on eyesight.

What? Simply fill out two multiple choice surveys. **Takes less than 45 minutes!**

Where? **In your own home!** All materials mailed to your home.

When? Now through **June 15th, 2007**

Cost? **NONE** - other than under 45 minutes of your time.

Your name will be entered into a drawing for a **\$50.00 Visa gift card.**

Guaranteed at least a 1 in 25 chance of winning!

Just a *little* of your time could help to advance research on vision and may

help to improve current treatments for nearsightedness. Final results of this study will be mailed to all participants.

If you are interested in participating or have any questions about this study, please contact

[Katherine Yarboro](#), Doctoral Candidate, Holos University Graduate Seminary.

Phone: **828-230-1925** Email: vision4holos@yahoo.com

Thank you for your consideration. I look forward to hearing from you soon.

Katherine Yarboro

(Tear-off strips with PI's name, telephone number, and email address located here on posted flyers. Flyer margins were adjusted to fit flyer on one 8.5 x 11 inch sheet of paper).

APPENDIX B

Advertisements for Study

1.) The following advertisement was posted in May 2007 in the *Mountain Xpress*. This is a free, local newspaper distributed throughout Asheville, North Carolina and neighboring towns. It read as follows:

“A local grad student is seeking volunteers for research. Is your vision 20/20 or nearsighted? If interested in participating, email vision4holos@yahoo.com.”

2.) The following advertisement was posted in May and June 2007 in the *Iwanna* in Asheville and Hickory, NC, Greenville-Spartanburg, SC, and Columbia and Knoxville, TN.

“Do you have normal (20/20) vision? Grad student seeking volunteers for a research study. NO cost to you. Surveys sent to your home. Great incentives. Call (828)230-1925.”

3.) The following advertisement was posted in May 2007 in the Charlotte, North Carolina *Iwanna*.

“Win a \$50.00 Visa gift card! Fill out 2 surveys at home. Grad student seeking volunteers for research. If your vision is 20/20 or nearsighted call 828-230-1925.”

4.) The following announcement was posted from May to June 2007. It was printed in *The Scope*, a hospital wide newsletter for Mission Hospital employees in Asheville, NC:

“Win a \$50.00 Visa gift card! Grad student seeking volunteers for a research project on eyesight. If you have normal (20/20) vision and can verify it, you may be eligible. You will be asked to fill out 2 multiple choice surveys sent to your home. It takes under 45 minutes to complete all materials. There is NO cost to you for being in the study. Participants will be entered into a drawing for one of several \$50.00 Visa gift cards – the odds of winning are guaranteed to be *at least* 1 in 25. Contact Kat Yarboro at vision4holos@yahoo.com or (828)230-1925 for more information.”

All of the above advertisements were placed free of charge.

APPENDIX C

Example of Online Message Board Announcement

I am a grad student seeking volunteers for my doctoral research project. The study is on nearsightedness and different states of mind. It involves filling out 2 multiple choice surveys, mailed to your home. There is NO cost to you for participating. (See announcement below).

Please contact me with questions.

Blessings,
Katherine Yarboro
Doctoral Candidate,
Holos University
www.holosuniversity.org

VOLUNTEERS NEEDED for STUDY ON EYESIGHT

Do you have 20/20 (normal) vision?
OR

Trouble seeing at a distance (nearsighted)?

And...

- 18-65 years of age
- Never had eye surgery
- Not wear bifocal/trifocal or progressive lenses?

Why? To be part of a research study on eyesight.

What? Simply fill out two multiple choice surveys.
Takes less than 45 minutes!

Where? In your own home! All materials mailed to your home.
(U.S. residents only please)

When? Now through June 15th, 2007

Cost? NONE - other than under 45 minutes of your time.

Your name will be entered into a drawing for a
* * * \$50.00 VISA GIFT CARD * * *
Guaranteed at least a 1 in 25 chance of winning!

Just a little of your time could help to advance research on vision and may help to improve current treatments for nearsightedness. Final results of this study will be mailed to all participants.

If you are interested in participating or have any questions about this study, please contact Katherine Yarboro, Doctoral Candidate, Holos University Graduate Seminary.
Email: vision4holos@yahoo.com

An announcement similar to the one above was posted on:

<http://health.groups.yahoo.com/group/i-see/message/15414>
on May 2, 2007, and

<http://groups.yahoo.com/group/visionforlife/message/944>
on May12, 2007.

APPENDIX D
Letter to Optometrists/Vision Care Specialists

May 1, 2007

Dear (Optometrist/Vision Care Specialist's name),

Research Study on Nearsightedness and States of Mind

I am writing to request your assistance with providing participants for a research project. I am a candidate working on my Doctorate of Theology in Energetic & Spiritual Healing at Holos University Graduate Seminary (www.HolosUniversity.org). As part of the requirements to fulfill my degree, I am conducting original research in the field.

I am comparing different states of mind and their relationship to eyesight. The project asks participants to fill out two multiple choice surveys mailed to their home. It takes approximately 45 minutes to complete all materials. All postage is paid by me, the Principal Investigator. There is no cost to participants for being in this study.

Are you willing to help recruit participants by posting the enclosed posters in your office? I need **75 subjects with normal vision** and **75 subjects who are nearsighted** by **June 15th, 2007**. I would be most appreciative of your very kind assistance.

Recruiting participants for this study is a way of increasing the amount of scientific research on nearsightedness from an alternative and holistic perspective. Your assistance may help to deepen the understanding of the condition and potentially improve current treatments.

If you are willing to assist in recruiting participants, simply:

- fill out and return the enclosed self-addressed, stamped postcard and
- post the enclosed flyers in a visible location in your office **now thru June 15th**.

Upon completion of this study, the **results will be mailed to your office** and you will receive a **\$20.00 Visa gift card** as a small token of appreciation.

Feel free to contact me or Karin Cremasco, Committee Chair, with any questions. Thank you so much for your interest and assistance with this study.

Sincerely,

Katherine Yarboro

<p>Principal Investigator: Katherine Yarboro 28 Grey River Run Asheville, NC 28804 Email: vision4holos@yahoo.com Phone: 828-230-1925</p>

<p>Faculty Supervisor: Karin Cremasco, Ph.D., Th.D., C.C.I. Committee Chair and Associate Professor Holos University Graduate Seminary Email: kcremasco@EarthLink.net Phone: 519-823-1469</p>

APPENDIX E

Information Given to Prospective Subjects

This study is designed to look at nearsightedness and different states of mind.
It asks participants to fill out two multiple choice surveys.
I pay all postage. There is no cost to you for being in this study.
It takes approximately 45 minutes of your time to complete.

Inclusion Criteria

To be a participant in the study you **must**:

- be **nearsighted** (have trouble seeing at a distance) with a prescription of -0.50 or more in each eye (this number is the Sph or Sphere on your prescription)

OR

- have **normal vision** (not use reading glasses and have 20/20 vision or better in each eye as declared by a doctor or other examiner within the last two years)

Verification of your eyesight can be made by one of the following:

- a.) a copy of the prescription for your eye glasses or contact lenses dated within the last two years
- b.) a copy of or actual piece of the packaging that contains the prescription for your contact lenses purchased within the last two years
- c.) evidence from a doctor or other examiner indicating that your vision is 20/20 dated within the last two years

(Verification of your vision can be mailed to you by your eye doctor's office upon your request).

To be included in the present study you **must**:

- be able and willing to participate in the research
- be between 18 and 65 years of age
- verify your current eyesight
- have approximately 45 minutes of quiet, undisturbed time to complete the surveys

To be included you must:

- Not** be farsighted
- Not** have cataracts
- Not** have glaucoma
- Not** have double vision
- Not** have presbyopia ("old age vision" with a need for reading prescription)
- Not** use bifocal, trifocal, or progressive lenses
- Not** use over-the-counter or prescription reading glasses
- Not** currently have other eye diseases or infections

- Not** have a history of eye surgery
- Not** currently be taking eye medications (other than for dry eyes)
- Not** currently be taking psychiatric medications
- Not** currently be taking any medications for anxiety or nervousness

You may participate if you have astigmatism in one or both eyes if you are nearsighted.

If you meet the above stated criteria and wish to participate please reply by emailing your regular mailing address to me and indicating that you meet all the inclusion criteria. (Please note: Self-addressed, postage-paid envelopes will be provided. There is no cost to you for participating).

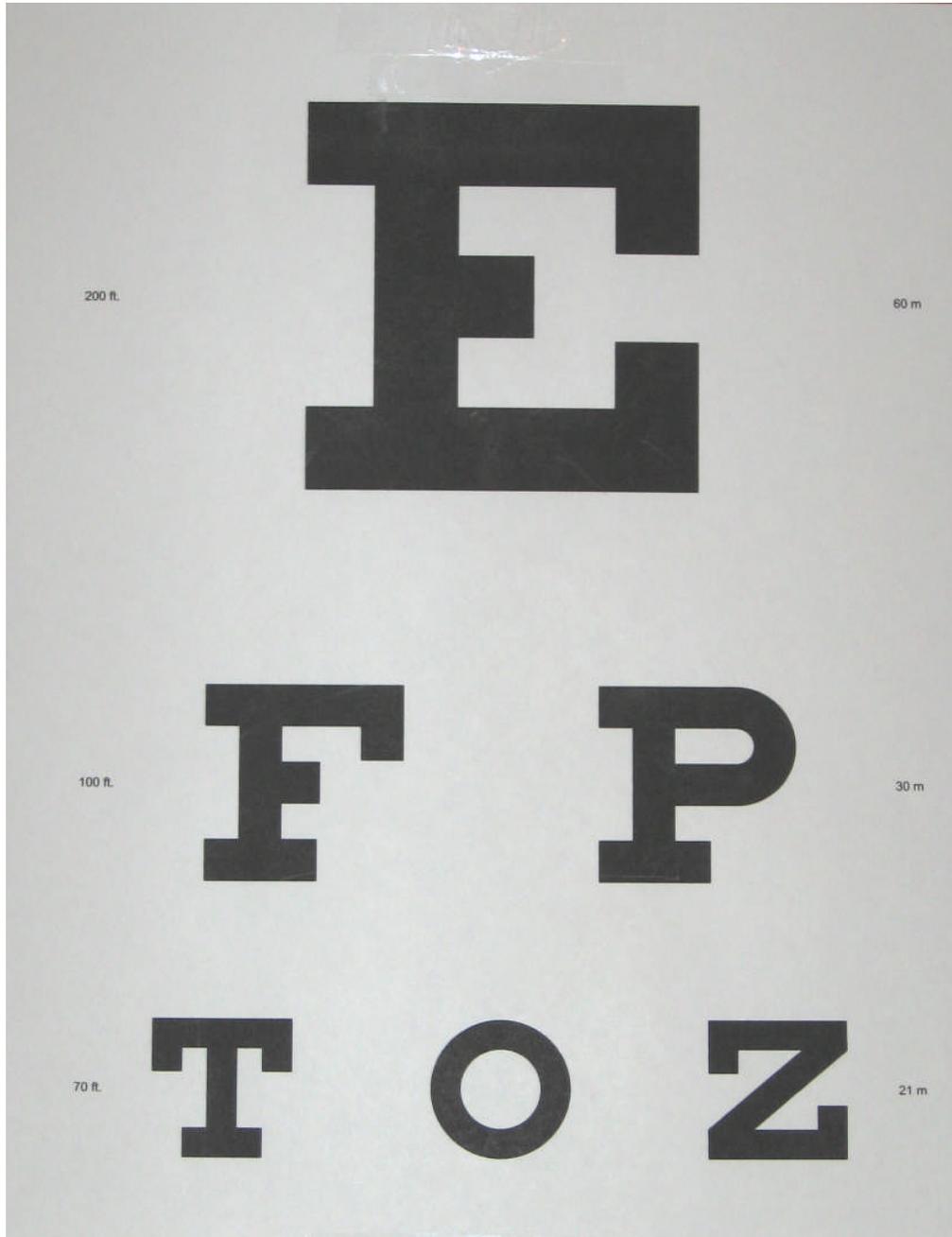
If you have any questions, feel free to contact me by email (**vision4holos@yahoo.com**) or by phone **(828)230-1925**.

Thank you for your interest in this study.

Sincerely,
Katherine Yarboro

APPENDIX F
Joel Schneider's 3-page Snellen Chart

The following eye charts are not to scale as they have been photographed and pasted into this manuscript. To retrieve actual eye charts, please visit the website at: http://www.i-see.org/block_letter_eye_chart.pdf





15 ft.

L E F O D P C T

4.5 m

13 ft.

F D P L T C E O

3.9 m

10 ft.

P E Z O L C F T D

3 m

8 ft.

E D L T O Z F C P

2.4 m

6 ft.

L P C F E T O D Z

1.8 m

5 ft.

T F D O P Z L E C

1.5 m

4 ft.

Z C T L O P D F E

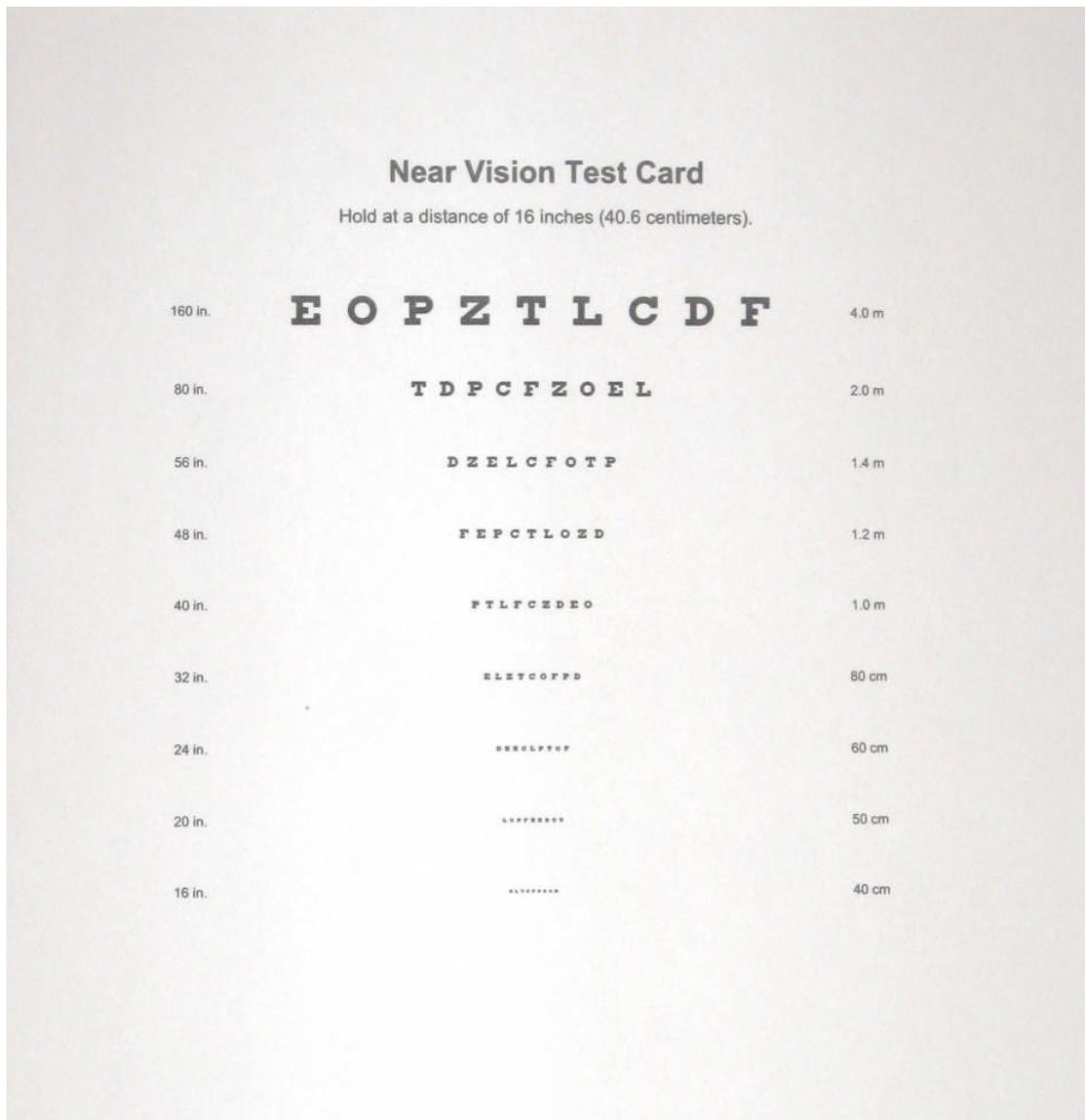
1.2 m

APPENDIX G

Joel Schneider's Near Vision Testing Card

The following eye chart is not to scale as it has been photographed and pasted into this manuscript. To retrieve actual eye charts, please visit the website at:

http://www.i-see.org/block_letter_eye_chart.pdf



APPENDIX H
Normal Vision Verification Slip

Name:

Date:

Distance Right eye: Left eye: Both:

Near Right eye: Left eye: Both:

Initials of examiner:

This may be used in place of a doctor's verification of your normal vision.
(Please return this slip with all other testing materials)

APPENDIX I

Informed Consent Form

Dear Participant,

Please accept my gratitude for your interest in participating in the present research project. This study is being conducted as part of the doctoral research requirements for Holos University Graduate Seminary (www.HolosUniversity.org).

Holos University supports the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish to participate in the present study. All participants enter into this study completely on a voluntary basis and understand that there is no cost to participate. You should be aware that, even if you agree to participate, you are free to withdraw at any time, without penalty of any kind. You also have the option of not participating in this study.

Volunteers are invited to take part in this research study designed to investigate different states of mind and their relationship to eyesight. This research involves filling out two surveys used to assess various states of mind as well as two brief questionnaires to provide background and eye health information. It is estimated that the completion of all written materials will take approximately 45 minutes of your time, completed consecutively.

We assure you that your name or any other identifying information will not be associated in any way with the results of this study. The information will be identified only by a code number. Your participation in this research study will remain confidential.

Participants will be entered into a drawing for a **\$50.00 Visa gift card**. There will be several cards given away and the guaranteed odds of winning will be *at least* 1 in 25.

The benefits of your participation include: a chance to win a \$50.00 Visa gift card, helping to expand the existing body of knowledge on nearsightedness and the potential to help contribute to the development and improvement of future treatment methods. There is no known physical risk to you for participating in this research although it is possible that answering questions on the two surveys could bring up some uncomfortable emotions. If this is to occur you are asked to simply withdraw from this study by notifying the Principle Investigator by phone, email, or mail.

To be a participant in the present study you **must**:

- be nearsighted with a prescription of -0.50 diopters or more in each eye
- OR**
- have normal vision with 20/20 vision or better in each eye

Verification of your eyesight can be made by one of the following:

- a.) a copy of the prescription for your eye glasses or contact lenses (dated within the last two years)
- b.) a copy of or actual piece of the packaging that contains the prescription for your contact lenses (purchased within the last two years)
- c.) evidence from your eye doctor or other examiner indicating that your vision is normal (dated within the last two years)

(Verification of your vision can be mailed to you by your eye doctor's office upon your request).

To be included in the present study you must:

- be able and willing to participate in the research
- understand, sign, and return this Informed Consent Form
- be between 18 and 65 years of age
- verify your current eyesight
- have approximately 45 minutes of quiet, undisturbed time to fully complete the enclosed materials

To be included you must:

- Not** be farsighted
- Not** have cataracts
- Not** have glaucoma
- Not** have double vision
- Not** have presbyopia (“old age vision”)
- Not** use bifocal, trifocal, or progressive lenses
- Not** use over-the-counter or prescription reading glasses
- Not** currently have other eye diseases or infections
- Not** have a history of eye surgery
- Not** currently be taking eye medications (other than for dry eyes)
- Not** currently be taking psychiatric medications
- Not** currently be taking any medications for anxiety or nervousness

You may participate if you have astigmatism in one or both eyes.

Research findings will be mailed by regular mail to all participants at the completion of the study. It is anticipated that results will be available by the end of October 2007.

Thank you kindly for your time and consideration.

With my signature, I affirm that I meet the above criteria, wish to participate in the study, have read, understand, and agree to this consent form, and have received a copy of the same to keep.

(Signature of participant)

(Date)

PRINT YOUR NAME HERE: _____

Your address: _____

If you would like additional information concerning this research study before or after it is complete, please feel free to contact Katherine Yarboro or Karin Cremasco, by phone, mail, or email.

Sincerely,

Katherine I. Yarboro

Principal Investigator:

Katherine Yarboro
28 Grey River Run
Asheville, NC 28804
Email: vision4holos@yahoo.com
Phone: 828-230-1925

Faculty Supervisor:

Karin Cremasco, Ph.D., Th.D., C.C.I.
Committee Chair and Associate Professor
Holos University Graduate Seminary
Email: kcremasco@EarthLink.net
Phone: 519-823-1469

APPENDIX J

Subject Background Questionnaire

Instructions: Please do **not** write your name on this form; it is confidential. Please circle the best response or fill in the blank to best describe yourself.

Gender:

- a.) Male
- b.) Female

Age: _____

Ethnicity:

- a.) Caucasian
- b.) African American
- c.) Hispanic
- d.) Asian
- e.) Other

Please specify: _____

- f.) I choose not to answer this question

Marital status:

- a.) Single
- b.) Married/Cohabiting
- c.) Separated
- d.) Divorced
- e.) Widowed
- f.) Other

Highest level of education completed:

- a.) I did not complete high school
- b.) GED
- c.) High school
- d.) Associate's degree/Technical School
- e.) Bachelor's degree
- f.) Master's degree
- g.) Doctoral degree

How is your vision, according to your eye doctor?

- a.) I am nearsighted in both eyes
- b.) I have 20/20 vision or better in both eyes

Do you use alternative methods or treatments to improve your vision?

- a.) Yes
- b.) No

If you answered yes, please list below:

If you wear **corrective lenses**, please answer the following questions:

Which do you wear?

- a.) Glasses
- b.) Contact lenses
- c.) Both

How many years have you worn them? _____

How many times have you strengthened your prescription since you started wearing corrective lenses?

- a.) Never
- b.) 1-3 times
- c.) 4-6 times
- d.) 7-10 times
- e.) more than 10 times

APPENDIX K Eye Health Questionnaire

Please circle TRUE or FALSE to the following statements to best describe your health.

- TRUE or FALSE I have been told by a licensed optometrist or ophthalmologist, within the last two years, that I have perfect, 20/20 vision (or better) in each eye.
- TRUE or FALSE I have been told by a licensed optometrist or ophthalmologist, within the last two years, that I am nearsighted in both eyes by -0.50 or more.
- TRUE or FALSE I have been diagnosed as farsighted by a licensed optometrist or ophthalmologist.
- TRUE or FALSE I have been diagnosed with cataracts by a licensed optometrist or ophthalmologist.
- TRUE or FALSE I have been diagnosed with glaucoma by a licensed optometrist or ophthalmologist.
- TRUE or FALSE I have been diagnosed with double vision by a licensed optometrist or ophthalmologist.
- TRUE or FALSE I currently have an eye infection as diagnosed by a licensed optometrist, ophthalmologist or other physician.
- TRUE or FALSE I have been diagnosed with an eye disease not mentioned above, by a licensed optometrist, ophthalmologist or other physician.
- TRUE or FALSE I have a history of eye surgery.
- TRUE or FALSE I am currently taking prescription eye medications.
- TRUE or FALSE I am currently being treated for a psychiatric condition.
- TRUE or FALSE I am currently taking psychiatric medications.
- TRUE or FALSE I am currently taking medications for anxiety or for nervousness.

APPENDIX L
Personal Orientation Inventory (POI)

Publisher contact information:

EdITS/Educational and Industrial Testing Service
P. O. Box 7234
San Diego, CA 92167
Phone: 619-222-1666
Toll Free: 800-416-1666
Fax: 619-226-1666
Website: www.edits.net

Date _____ Age _____ Sex: M/F _____

1. Some people have the experience of driving or riding in a car or bus or subway and suddenly realizing that they don't remember what has happened during all or part of the trip. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

2. Some people find that sometimes they are listening to someone talk and they suddenly realize that they did not hear part or all of what was said. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

3. Some people have the experience of finding themselves in a place and having no idea how they got there. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

4. Some people have the experience of finding themselves dressed in clothes that they don't remember putting on. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

5. Some people have the experience of finding new things among their belongings that they do not remember buying. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

6. Some people sometimes find that they are approached by people that they do not know who call them by another name or insist that they have met them before. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

7. Some people sometimes have the experience of feeling as though they are standing next to themselves or watching themselves do something and they actually see themselves as if they were looking at another person. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

8. Some people are told that they sometimes do not recognize friends or family members.

Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

9. Some people find that they have no memory for some important events in their lives (for example, a wedding or graduation). Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

10. Some people have the experience of being accused of lying when they do not think that they have lied. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

11. Some people have the experience of looking in a mirror and not recognizing themselves. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

12. Some people have the experience of feeling that other people, objects, and the world around them are not real. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

13. Some people have the experience of feeling that their body does not seem to belong to them. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

14. Some people have the experience of sometimes remembering a past event so vividly that they feel as if they were reliving that event. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

15. Some people have the experience of not being sure whether things that they remember happening really did happen or whether they just dreamed them.

Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

16. Some people have the experience of being in a familiar place but finding it strange and unfamiliar. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

17. Some people find that when they are watching television or a movie they become so absorbed in the story that they are unaware of other events happening around them. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

18. Some people find that they become so involved in a fantasy or daydream that it feels as though it were really happening to them. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

19. Some people find that they sometimes are able to ignore pain. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

20. Some people find that they sometimes sit staring off into space, thinking of nothing, and are not aware of the passage of time. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

21. Some people sometimes find that when they are alone they talk out loud to themselves. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

22. Some people find that in one situation they may act so differently compared with another situation that they feel almost as if they were two different people. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

23. Some people sometimes find that in certain situations they are able to do things with amazing ease and spontaneity that would usually be difficult for them (for example, sports, work, social situations, etc.). Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

24. Some people sometimes find that they cannot remember whether they have done something or have just thought about doing that thing (for example, not knowing whether they have just mailed a letter or have just thought about mailing it). Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

25. Some people find evidence that they have done things that they do not remember doing. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

26. Some people sometimes find writings, drawings, or notes among their belongings that they must have done but cannot remember doing. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

27. Some people sometimes find that they hear voices inside their head that tell them to do things or comment on things that they are doing. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

28. Some people sometimes feel as if they are looking at the world through a fog so that people and objects appear far away or unclear. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

¹ The title, "Dissociative Experiences Scale," did not appear anywhere on the copy given to subjects.

APPENDIX N
Items Check List

Before returning items please be sure to enclose **all** of the following in the self-addressed, postage-paid envelop to Katherine Yarboro, Principal Investigator.

- ___ One signed Informed Consent Form
- ___ Subject Background Questionnaire
- ___ Eye Health Questionnaire
- ___ Completed Survey 1 (Personal Orientation Inventory) with booklet
- ___ Completed Survey 2
- ___ Verification of your vision (from within the last two years)

If you have **normal vision**, include the following:

- a.) Confirmation of your normal vision

If you are **nearsighted**, include one of the following:

- a.) Copy of your current glasses or contact lens prescription
- b.) Copy of or actual contact lens packaging that contains your current prescription