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Scotopic Sensitivity/Irlen Syndrome
and the Adult Graduate Student

by
Patricia Haas Berry

A Thesis

Submitted in partial fulfillment of the requirements of the
Master of Arts Degree in the Special Education
of Rowan University
May 4, 1998

Approved by

Professor

Date Approved 5/18/98

Abstract

Patricia Haas Berry

Scotopic Sensitivity/Irlen Syndrome and the Adult Graduate Student

1998

Dr. S. Jay Kuder

Special Education

The purpose of this study is to establish the prevalence of SS/Irlen Syndrome in adult graduate students. SS/Irlen Syndrome is a perceptual dysfunction that causes 14 to 16 percent of the general population physical discomfort such as headache, eye strain and blurry vision and academic difficulties such as poor background accommodations and print resolution resulting in inefficient reading (Irlen, 1997).

The 16 subjects were adult graduate students in a university program. Data collection was achieved through the utilization of questionnaires. The first questionnaire, the Irlen Observation Form, surveyed the subjects for characteristics of SS/Irlen Syndrome. The second questionnaire, Parts A and B of the Reading Strategies Questionnaire, rated the severity of the subjects' symptoms. The Compensatory Strategies section surveyed the use of strategies by the subjects. The final section, the Participants' Characteristics, provided information on education, vision, and academic difficulties.

The results of this study indicate that 10 of the 16 adult graduate students were identified as having SS/Irlen Syndrome. Three of these students admitted having academic problems. Nine students acknowledged that they used specific compensatory strategies. Seven students acknowledged they had difficulty in judging distance while driving and nine students admitted to driving fatigue. Five students experienced sports performance difficulties.

Mini - Abstract

Patricia Haas Berry

Scotopic Sensitivity/Irlen Syndrome and the Adult Graduate Student

1998

Dr. S. Jay Kuder

Special Education

The purpose of this study was to examine a population other than learning disabled for the presence of SS/Irlen Syndrome. Sixteen adult graduate students in a university program were studied. Fourteen students were identified as having characteristics of SS/Irlen Syndrome. Ten (63%) of the 14 students were found to have SS/Irlen Syndrome; three of these students had previous academic problems; nine students acknowledged using compensatory strategies; seven had difficulty in judging distance while driving; nine experienced driving fatigue and five admitted having difficulty in sports performance.

Acknowledgments

The progression to completion of my graduate work was not accomplished by my efforts alone. I would like to express my gratitude to:

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Light even in her sleep of death.

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Abstract

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Introduction

The sense of vision involves more than seeing the greens of the grass, the blues of the sky, the browns of the earth; the rainbows of the world. Vision is also perceiving the light and dark contrast of the printed page. This perceptual processing of print is a highly individualized phenomenon that determines reading proficiency. It involves transforming graphemes (letters) perceived on the page into their corresponding phonemes (sounds) (Shaywitz, 1996). If the reader cannot see the letter as it is printed on the page, the phonological processing cannot begin. The end result is a reading disability, which is most devastating in terms of the reader's academic, occupational and vocational success (Lyon and Alexander, 1997).

Since the first reading disability was diagnosed in England by W. Pringle Morgan over a century ago, the number of those afflicted has continued to rise. Twenty percent of school age children as well as adults are plagued with reading problems (Shaywitz, 1996).

A perceptual dysfunction known as Scotopic Sensitivity/Irlen Syndrome has been the cause of specific reading problems in approximately 12-14% of the general population (Irlen, 1996). The symptoms include light sensitivity, poor depth perception, fatigue, headache, fidgetiness, distractibility, hyperactivity, attention span deficits, contrast and color sensitivity, restricted span of recognition of words or objects in groups,

interference from the background of the page and print resolution problems such as moving, fading, disappearing and shimmering prints (Irlen, 1997).

Although Scotopic Sensitivity/Irlen Syndrome causes vision problems, its presence cannot be determined by ophthalmologic, optometric, psychological or educational testing (Irlen, 1991). The concern is that if not diagnosed and remediated, the symptoms continue into adult life.

Research Questions

Given the complexity of SS/Irlen Syndrome and incidence in the general population, this research study will examine several questions related to the Syndrome. Specifically these as follows:

1. What is the prevalence of SS/Irlen Syndrome in adult graduate students in a university program?
2. Does their previous and contemporary school history indicate the presence of SS/Irlen Syndrome in graduate students?
3. Have they developed compensatory strategies to function with SS/Irlen Syndrome?
4. Do problems incurred by SS/Irlen Syndrome in graduate students exist relative to their daily living activities?

Hypotheses

1. The prevalence of SS/Irlen Syndrome in graduate students is 10-14%.
2. Past and present school histories are indicative of the presence of SS/Irlen Syndrome in graduate students.

3. Compensatory strategies are developed by graduate students with SS/Irlen Syndrome.
4. SS/Irlen Syndrome symptoms cause problems relative to driving and sports.

Significance of Study

This study will examine the prevalence of SS/Irlen Syndrome in a population other than learning disabled, reinforcing the concept that early screening of the general population would prevent unnecessary spending of educational monies for special education. If school districts started screening elementary grade levels, this early screening and remediation would also allay feelings of inferiority and low self esteem that accompany academic failures.

For the adult population with SS/Irlen Syndrome, it would provide proof of the existence of such a syndrome and offer remediation to alleviate physical as well as emotional symptoms that have occurred due to the lack of diagnosis. Identification in the adult population would also augment safety factors in the workplace as well as in private homes. Remediation while driving would also reinforce driving safety.

Literature Review

During a 10 year period when Helen Irlen worked as a school psychologist, she watched a population evolve from her caseload of students with learning problems who did not progress in spite of individualized remedial and tutorial instruction. This same group grew into adulthood without overcoming their academic difficulties.

In 1981, Irlen became coordinator of an adult learning disabilities program funded by the federal government at California State University at Long Beach. While working with students with reading difficulties due to perceptual distortion, a red overlay (sheet of

colored plastic that is placed over the printed page) used in a visual training exercise was inadvertently placed on top of a printed page. This resulted in immediate clarification of the distortion for one of the students. Other students used the red overlay, but did not enjoy the same success. After experimenting with several colors, it became evident that when a student was afforded a decrease in perceptual distortion it was due to that particular student's choice of his/her own optimal color without intervention from other students or personnel, thus the color choice is idiosyncratic (Irlen, 1991).

Studies were conducted at California State University at Long Beach to investigate this visual perceptual dysfunction Irlen called Scotopic Sensitivity/Irlen Syndrome. Thirty-seven students ranging in age from 18 to 49 years were given a preliminary screening for SS/Irlen Syndrome. Subjects showing a tendency for SS/Irlen Syndrome were required to have an ophthalmologic examination to rule out refractive errors or diseases of the eye. Results determined that 31 students were affected by SS/Irlen Syndrome. Symptoms included eyestrain and frustration after 15 to 20 minutes of sustained reading; poor print resolution, distortions, blinking, squinting, slow reading rate and poor comprehension. Treatment included glasses tinted the color preferred by the individual subjects. With the use of the Irlen filters, the reading period was extended 2 to 3 hours, print resolution was improved, distortions were eliminated, blinking and squinting responses were reduced and reading rate and comprehension increased (Irlen, 1983).

Research on SS/Irlen Syndrome continued with Robinson and Conway (1990) studying 49 children from the Special Education Center at the University of New Castle ranging from 9 years 1 month to 15 years 11 months. Subjects identified as having

symptoms of SS/Irlen Syndrome showed significant improvement at 3, 6, and 12 months in reading comprehension and reading accuracy after being fitted with Irlen filters. In another study, 67 out of 92 children nominated by teachers as reading at least 18 months below grade level and ranging in ages 8 years to 12 years improved reading performance (rate, accuracy, and comprehension) when reading with the preferred colored overlay placed on white paper (O'Connor, Sofo, Kendall, Olsen, 1990).

In a study by Kyd, Sutherland and McGettrick (1992), 75 children with specific learning difficulties were assessed for SS/Irlen Syndrome. Thirty-four were suspected of having SS/Irlen Syndrome tendencies. These subjects demonstrated an improvement in reading rates using self-selected colored overlays.

Wilkins, Evans, Brown, Busby, Wingfield, Jeanes, and Bald (1994) conducted a double-masked placebo controlled study of 68 children who were failing in reading or reported eye strain, headache and print distortion. Ages ranged from 9 to 15 years. The subjects chose the color of their experimental lenses. They also received control lenses. The glasses were used 1 month at a time in random sequence. The subjects could not determine which glasses were the control and which were the experimental. However, they reported that they experienced less symptoms while using the experimental lenses.

Research by Tyrrell, Holland, Dennis and Wilkins (1995) studied 46 children and the effects of color on reading. The results of the study indicated that the use of overlays reduced distortion of print, and relief of discomfort while reading.

In a study of 3 elementary school students aged 10 to 11 years with learning disabilities and attention deficit/hyperactivity disorder, the findings indicated that adding a nonspecific color later on in a lengthy non-repetitive task but having the color remain

visible throughout the entire task may help these students maintain their attention (Belfiore, Grskovic, Murphy and Zentall, 1996).

In other research on the effects of color (wavelengths) and attention, 14 students classified as normal participated as subjects. Ages ranged from 8 to 12 years. In this study, the Wisconsin Card Sorting Test which measures attentional functions was presented to the subjects covered in clear and colored plastic. The results determined that color affects attentional processing. Blue (short wavelength) stimuli were found to enhance attention in both the attention-disordered and normal subjects (Williams, Littell, Reinoso and Greve, 1994).

Additional research by Robinson and Conway (1994) found that 4 months after the initial screening of 29 scotopic subjects using Irlen filters, reading rate and comprehension showed a significant improvement. Ages ranged from 9.1 years to 14.7 years.

The cause of reading problems has also been the subject of research. Livingstone, Rosen, Drislane, and Galaburda (1991) in a study of 5 dyslexic subjects found abnormalities in the magnocellular pathway. The researchers examined autopsy material from 5 dyslexics and 5 nondyslexics brains and found abnormalities in the magnocellular pathway.

The magnocellular pathway or transient (motion) system directs the eye to a particular location on a page. Once the eye is at a fixed location, the sustained (pattern) system or parvocellular pathway focuses on the detail of the print. The magnocellular pathway inhibits the parvocellular pathway from lingering into the next point of focus preventing word or letter overlapping (Hobbs, Robinson, and Whiting, 1997).

Research by Lehmkuhle, Garzia, Turner, Hash, and Baro (1993) also suggested a slow response of the magnocellular pathway in children with reading disabilities.

Changing the speed of the magnocellular pathway by the application of a colored plastic overlay on printed text or wearing tinted filters offers the user comfort and clarify of print (Robinson, 1994; Williams, Lecluyse and Roch-Faucheux, 1992).

In summary, the research literature reviewed in this study deals with children and adults experiencing symptoms and the accompanying challenges that hinder academic success.

Design Methodology

Subjects

The 16 female subjects are adult graduate students in a university program. They are all students in a Foundations of Learning Disabilities class.

Instrument

All subjects were requested to complete the Irlen Observation Form. This form is composed of a demographic section requesting name, address, phone number, age and level of education and a section of questions pertaining to fourteen characteristics dealing with perceptual dysfunction and physical complaints. These characteristics include having problems with light sensitivity, reading difficulties, problems while using a computer, suffering from fatigue, strain, headaches, difficulties in handwriting, attention and concentration, copying, writing, mathematics, music, depth perception, driving, sport performance, and experiencing driving fatigue. An accumulation of three affirmative answers about dysfunction or complaints in any of these fourteen sections qualified the

subject to continue with testing and answer Parts A and B of the Reading Strategies Questionnaire, the Compensatory Strategies Section, and Participant Characteristics Section. Part A questions the subject about using such strategies as using a finger as a marker, looking away from the reading material or unintentionally skipping words, misreading words or skipping lines or sentences when they reached the point of fatigue when reading. The answer choices were “often”, “sometimes”, “never” and “don’t know”. “Often and sometimes” answers are assigned points. Part B questions the subject about physical symptoms such as having watery eyes, squinting, blinking frequently, feeling nauseated, tired or drowsy, bothered by fluorescent lights and experiencing headaches that occur when they reached the point of fatigue. Answer choices and scoring procedure of Part B are identical to Part A. The Compensatory Strategies ask questions about the use of such specific strategies as reading aloud or mumbling to yourself when reading and reading beginnings or endings of paragraphs or chapters instead of the entire chapter. These could be answered “yes” or “no”.

The final section, Participant Characteristics, ask the subjects the total number of credits they have accumulated beyond an undergraduate degree; if their eyes have been examined recently and by whom; did they wear glasses and in the last question they were asked to discuss any academic difficulties they may have experienced in their past or present school history.

Procedure

The researcher contacted the subjects’ professor and received permission to meet with the 16 subjects before their class and distribute the Irlen Observation Form to them. The completed questionnaires were then collected and scored. The researcher again

received permission from the professor to meet with the fourteen subjects who qualified to continue with the study. Parts A and B, the Compensatory Strategies and the Participant Characteristics Sections were completed during this second meeting and collected. Two students who qualified to continue with the second part of the study were absent at the second meeting. Their questionnaires were mailed to them with a self-addressed stamped envelope to be returned to the researcher. Both students completed their questionnaires and returned them.

After the questionnaires were completed during the second meeting, the subjects were given information concerning Scotopic Sensitivity/Irlen Syndrome. They were also given access to information from the researcher in the event that additional testing and remediation with overlays were requested.

Results

Sixteen adult graduate students were surveyed using two questionnaires to establish the prevalence of Scotopic Sensitivity/Irlen Syndrome in graduate students in a university program; to establish if a graduate student's previous and current academic history indicated the presence of SS/Irlen Syndrome; to establish if the graduate students utilized strategies to compensate for SS/Irlen Syndrome; to establish if problems attributed to SS/Irlen Syndrome exist in the graduate students daily living activities such as driving and sport activities.

After completing the Irlen Observation Form, 14 of the students described themselves as exhibiting at least 1 to a maximum of 9 of the 14 characteristics of SS/Irlen Syndrome listed on the form. By having at least three or more affirmative answers

concerning a specific characteristic, the student was identified as fulfilling the criterion for possessing that particular characteristic and qualifying to continue with Parts A and B of the Reading Strategies Questionnaire (Section I of the diagnostic tool, Irlen Reading Perceptual Scale), the Compensatory Strategies Questionnaire and the Participant Characteristics section.

Table 1 presents the results of the Irlen Observation Form as well as the number of checks which signify the criterion of having at least 3 or more affirmative answers; the total number of affirmative answers, and the frequency of citation of specific characteristics.

The top four characteristics that were cited most frequently are: “problems while reading or using a computer” which was cited 42 times; “strain, fatigue, tired and headache” cited 36 times; “light sensitivity” cited 35 times and “driving fatigue” cited 32 times. “Writing”, “music”, and “mathematic” difficulties were cited by 9, 8 and 6 students respectively.

The questions in Part A and Part B provide information as to whether the student has SS/Irlen Syndrome. They pertain to involuntary behavior the students demonstrate when experiencing perceptual difficulties which makes reading inefficient. The score signifies the severity. Any score of 4 to 7 which is moderate or 8 to 17 which is high designates the student as a candidate for additional screening and remediation (Irlen, 1987). Ten students received a score of 4 or more. An asterisk after the subject number represents this on all tables.

Among the 10 students (63%) recommended for continued diagnostic testing, all admitted light sensitivity; 9 admitted strain, fatigue and headaches; 7 admitted difficulty

TABLE 1

Subjects

Characteristics	1	2*	3*	4	5*	6*	7	8*	9*	10*	11*	13*	14*	15	# of times cited
Light sensitive	2	4✓	1	0	5✓	2	1	3✓	2	2	4✓	2	4✓	3✓	35
Reading difficulties	1	4✓	4✓	1	1	4✓	1	0	3✓	1	1	2	1	1	25
Problems while reading or using a computer	1	2	0	3✓	9✓	1	1	6✓	4✓	2	5✓	4✓	4✓	0	42
Strain, fatigue, tired, headache	2	5✓	2	0	4✓	2	0	2	5✓	0	2	5✓	4✓	3✓	36
Handwriting Difficulties	1	0	0	1	2	0	0	2	0	0	2	0	0	1	9
Attention/concentration Difficulties	2	6✓	3✓	0	3✓	2	0	0	2	1	2	2	4✓	0	27
Copying Difficulties	2	0	2	0	5✓	0	0	0	2	1	1	1	0	1	15
Writing Difficulties	0	0	3✓	0	1	0	0	0	0	0	3✓	1	1	0	9
Mathematics Difficulties	0	0	0	0	3✓	0	0	0	2	0	0	0	1	0	6
Music Difficulties	3✓	0	0	1	0	0	0	3✓	0	1	0	0	0	0	8
Depth perception Difficulties	0	2	2	2	5✓	1	0	4✓	2	5✓	0	1	2	1	27
Driving (judging distance)	0	3✓	0	2	2	1	3✓	1	2	2	1	0	0	2	19
Sports performance difficulty	1	1	0	0	3✓	1	0	4✓	0	1	0	0	0	1	12
Driving fatigue	0	2	0	1	4✓	3✓	0	6✓	3✓	1	3✓	3✓	2	4✓	32
Number of checks	1	5	3	1	9	2	1	6	4	1	4	3	4	3	
<i>Total number of affirmative answers</i>	15	29	17	11	47	17	6	31	27	17	24	21	23	17	

judging distance; 5 admitted difficulties in sports performance and 9 admitted driving fatigue (Refer to Table 1).

In Part A of the Reading Strategies Questionnaire, the students responded to 16 questions which described reading difficulties that occurred after the student had been reading for information for an extended period of time. Responses ranged from 12 difficulties to 2 which converted the score range of 10.5 (high) to 1. Any student with a score of 4 or more is a candidate for continued testing and possible remediation. Table 2 shows scores, total number of affirmative answers (often or sometimes), number of high (1 student), moderate (8 students), and low (5 students) scores.

Table 2 also presents the strategies that were most and least problematic. “Trouble remembering what was read” and “lost place” were cited 12 times; “accidentally skipping lines or sentences” was cited 11 times and “feeling restless, active, fidgety or easily distracted” were cited 10 times. “Blurry words” was least problematic having been cited once, while “slow, choppy reading” was cited twice.

In Part B of the Reading Strategies Questionnaire, students responded to 16 questions concerning strain and fatigue when reading for information for an extended period of time. Responses ranged from 11 symptoms to zero which convert to the score range of six (moderate) to zero. Any student with a score of 4 or more is a candidate for continued testing and possible remediation. Table 3 shows score, total number of affirmative answers (often or sometimes) and number of high (zero students), moderate (6 students) and low (8 students) scores, as well as the strategies that were most and least problematic. “Feeling tired or drowsy” was cited 12 times; “bothered by eyes” was cited

TABLE 2
Reading Strategies Questionnaire
Part A

	Subjects														
	1	2*	3*	4	5*	6*	7	8*	9*	10*	11*	13*	14*	15	# of times cited
When reading for information and you get to the point when you want to stop reading															
Accidentally skip lines or sentences?			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	11
Lose your place?	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	12
Misread words?			✓		✓		✓	✓					✓	✓	6
Unintentionally skip words?		✓	✓		✓	✓		✓					✓		6
Accidentally repeat or reread lines?		✓	✓	✓	✓	✓		✓	✓	✓			✓		9
Insert words from the lines above or below?			✓		✓						✓				3
Avoid reading or reading aloud?		✓			✓	✓	✓					✓	✓	✓	6
Is reading slow and choppy?		✓				✓									2
Bothered by white or glossy pages?	✓				✓				✓		✓		✓		5
Trouble understanding what you read?		✓	✓			✓	✓	✓		✓	✓				7
Look away or take breaks?		✓		✓	✓	✓	✓	✓	✓	✓		✓			10
Restless, active, fidgety or easily distracted?	✓	✓	✓		✓	✓	✓	✓	✓	✓					10
Reading gets harder?		✓		✓	✓			✓			✓	✓			6
Use your finger as a marker?		✓	✓					✓	✓		✓				5
Trouble remembering what you read?	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		12
Words get blurry, move or change?													✓		1
<i>Total checks</i>	4	11	10	5	12	9	7	11	8	7	9	6	10	2	
<i>Score</i>	2	5.5	5	2.5	10.5	4.5	3.5	6.5	4	3.5	4.5	5	5	1	
<i>Part A Score: 5 - Low (L), 8 - Mod (M), 1 - High (H)</i>	L	M	M	L	H	M	L	M	M	L	M	M	M	L	

TABLE 3
Reading Strategies Questionnaire
Part B

Subjects														
When reading for information and you get to the point when you want to stop reading	1	2*	3*	4	5*	6*	7	8*	9*	10*	11*	13*	14*	15
Do eyes bother you?		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	10
Do they get red or watery?			✓					✓		✓	✓			4
Do they hurt, ache or burn?			✓		✓				✓	✓	✓			5
Do they feel dry, sandy, scratchy, or itchy?			✓		✓			✓						3
Do you rub your eyes or around your eyes?	✓		✓		✓	✓	✓		✓	✓	✓	✓	✓	8
Do you feel tired or drowsy?		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	12
Does your head bother you?	✓	✓	✓				✓	✓	✓	✓	✓			8
Do you get a headache?		✓	✓			✓	✓		✓	✓	✓		✓	8
Do you feel nauseated or sick to your stomach?			✓											1
Do you open your eyes wide?			✓		✓			✓			✓	✓		5
Do you squint or frown?	✓				✓	✓		✓	✓					5
Do you find yourself blinking frequently?	✓		✓		✓	✓					✓			5
Do you move closer or further from the page?		✓			✓			✓			✓			4
Does it take effort to stay on the words you are reading?	✓	✓				✓		✓		✓				5
Does it bother you to read under fluorescent lights?	✓				✓			✓	✓				✓	5
Is it harder to read in bright lights?	✓				✓						✓		✓	4
<i>Total Checks</i>	7	6	11	0	10	7	4	10	8	8	11	4	5	1
<i>Score</i>	3.5	3	5.5	0	5	3.5	2	6	4	4	5.5	2	2.5	.5
<i>Part B Score: 5 - Low (L), 8- Mod (M), 1 - High (H)</i>	L	L	M	L	M	L	L	M	M	M	M	L	L	L

10 times and “rubbing eyes”, “having a headache” and “bothered by head” were each cited 8 times. “Feeling nauseated” and having “sandy, scratchy eyes” were cited 3 times.

In the Participant Characteristics Section, the number of credits earned beyond an undergraduate degree ranged from 3 graduate credits to 15 credits earned beyond a Master’s degree. Eye examinations occurred from 2 months ago to 5 years ago to date unknown. Nine students were examined by an optometrist; 3 were examined by an ophthalmologist and 2 students did not know their doctors’ educational background. Eleven students wear glasses; 1 wears glasses for reading; 7 wear glasses for distance; 2 students wear glasses for both reading and distance and 1 student did not specify. Three students admitted experiencing academic difficulties. One student designated reading, the second student designated problems in algebra and trigonometry and the third student admitted problems in mathematics that persist today (Refer to Table 4).

In the questionnaire, Compensatory Strategies, the students were asked to respond to 19 questions pertaining to the use of strategies. The number of strategies employed by the students ranged from 9 to zero (Refer to Table 5).

Discussion

The first research question of this study was to establish the prevalence of SS/Irlen Syndrome in adult graduate students. Initially the students were asked to complete the questionnaire, the Irlen Observation Form. Fourteen of the 16 students who answered the questionnaire identified themselves as possessing characteristics of SS/Irlen Syndrome. In order to determine whether these 14 students actually had SS/Irlen Syndrome and their degree of severity, they completed the second questionnaire, Parts A

TABLE 4

Subjects

TABLE 5
Subjects

Compensatory Strategies	1	2*	3*	4	5*	6*	7	8*	9	10	11	13	14*	15
Do you read aloud or mumble to yourself when reading or during lessons?		✓				✓			✓		✓	✓		
Do others read books to you?					✓				✓					
Have you found it impossible to finish reading an entire book?			✓		✓	✓								
Do you dictate reports?									✓					
Do you have others edit reports and written work?		✓	✓	✓				✓			✓			
Must you use a dictionary when reading or writing?		✓	✓								✓			
Do others summarize books or relate information to you?		✓	✓						✓					
Do you use cliff notes, shorter versions of books, or other related information?			✓											
Do you avoid textbook reading?	✓		✓		✓	✓								
Do you read beginnings or endings of paragraphs or chapters rather than the entire chapter?			✓			✓			✓					
Do your parents or friends help you with homework?														
Do you use techniques to avoid schoolwork or just not do it?						✓								
Do you pass your courses by listening in class without doing assigned reading?					✓	✓						✓		
Do you find it easier to learn information through a discussion group rather than by reading?	✓	✓			✓				✓		✓			
Is it difficult to listen and take notes simultaneously?	✓	✓	✓											
Were you told you had behavioral or attitudinal problems in school?		✓												
Were you considered lazy and unmotivated in school?		✓			✓									
Do you think that your learning problem is because you are dumb, stupid or lazy?														
Do you work hard to get your grades, but feel that you are brighter than your grades indicate?	✓	✓			✓	✓						✓		
<i>Number of strategies employed by student</i>	4	9	8	1	7	7	0	1	6	0	4	3	0	0

and B of the Reading Strategies Questionnaire. This resulted in identifying 10 of the 14 students (63%) as having SS/Irlen Syndrome. Irlen (1996) estimates that 10 - 14% of the general population has SS/Irlen Syndrome. It is unclear why the percentage of adult graduate students with SS/Irlen Syndrome is larger than the percentage of the general population.

This study also researches the academic histories of adult graduate students. Did their past and present education histories indicate the presence of SS/Irlen Syndrome in the form of learning difficulties? Three out of the 10 students admitted having difficulties in school. The first student answered by indicating a problem in reading. The second student admitted academic difficulties in the past, specifying in her own words “poor grades and inability to attend to teachers”. She described herself as “lazy about homework, didn’t do it or did it quickly and sloppily and rarely studied” and only performed within courses that interested her. She states that she “has always done extremely poor in math and continues to do poorly in math.” The third student acknowledged difficulties in algebra and trigonometry. The remaining seven students denied any specific academic difficulties. One explanation for the lack of significant problems could be that the question appeared ambiguous and needs clarification.

Another theory might be that the students were not aware of any difficulties because they easily compensated for problems they encountered throughout their academic careers. In future studies, a personal interview with each subject would clarify any misinterpretation of the question and would also provide a more in-depth description of the individual problems.

This research also questions the development of compensatory strategies by the graduate students. Did the graduate students develop strategies out of necessity due to the difficulties caused by SS/Irlen Syndrome? One student denied using compensatory strategies listed on the questionnaire, while the remaining 9 acknowledged their use of strategies. In future research, interviewing the subjects will allow clarification of any misinterpretation of the questions and it will also afford the subjects the opportunity to discuss any methods or strategies they have devised and employed. The student who denied using any strategies may have developed such a refined method of compensation that she may not be aware of using it. If that is the case, perhaps techniques could be developed from this information and utilized in future studies, particularly in teaching students with learning disabilities.

The fourth and final research question investigates SS/Irlen Syndrome and student problems in driving and in sports endeavors. In referring to Table 1, there are two driving characteristics listed. In the driving characteristic judging distance, 7 of the 10 students who were recommended for further testing responded affirmatively, however, only 2 of the 10 students fulfilled the criterion of having at least three affirmative answers. For the driving characteristic, designating driving fatigue, 9 out of 10 students responded affirmatively with 6 of the 10 students fulfilling the criterion of having at least three affirmative answers for that characteristic. For the characteristic designating sports performance difficulty, 5 of the 10 students responded affirmatively with 2 out of the 5 fulfilling the criterion of having at least three affirmative answers.

In previous research on adults and SS/Irlen Syndrome, the subjects were involved in the studies because they were symptomatic. Blaskey, Scheiman, Parisi, Ciner,

Gallaway and Selznick (1990) found that Irlen filters reduced visual complaints. Fletcher and Martinez (1994) found that parsing was enhanced in scotopic individuals by using colored overlays. In research by MacLachlan, Yale and Wilkins (1993) it was found that tinted lenses alleviate headache and eye strain in adults with reading difficulties. Whiting, Robinson and Parrott (1994) reported continued improvement in visual perception using filters after a 6 year follow-up. In Robinson and Conway's (1996) research, improvement in print clarity occurred using Irlen filters.

In this study, in contrast to the research cited above, the subjects were chosen due to their graduate work status.

In other research on university students and SS/Irlen Syndrome, students halfway through their training in optometry participated in a study investigating the effects of pattern glare (a hypersensitivity to repetitive patterns such as a printed page) and the use of overlays on a reading test. The results indicated that pattern glare occurred in university students and that using colored overlays seemed to improve reading by reducing pattern glare (Evans, Cook, Richards, and Drasdo, 1994).

Limitations

This study provided the data to support the hypotheses, but was limited in that the number of students surveyed was small and all female. The contact time with the class was also limited as the questionnaires were completed on two occasions prior to their graduate class at the university. This might explain why all the participants did not give demographic information and gave a short essay answer or did not respond at all to the question pertaining to academic history. Incorporating an interview into future research may overcome this limitation.

In the graduate students with moderate to high scores on Parts A and B of the Reading Strategies Questionnaire, continued testing would result in remediation with colored overlays and colored lenses or filters. Time constraints in this study did not afford this opportunity. All students, however, were given the option to contact the researcher for additional screening and remediation.

Summary

The results of this research project have indicated that SS/Irlen Syndrome is present in a population very different from the learning disabled population. This study includes adult graduate students in a university program. The results demonstrated that graduate students did have difficulties in their academic careers, but not the majority. It might be expected that if a student has a perceptual dysfunction, the academic history would be significantly impacted, more so than the results of this study. The use of compensatory strategies was also proven by the study as was the effect of SS/Irlen Syndrome on daily living activities such as driving and sports participation.

Implications

Implications of this study are that perhaps more people have SS/Irlen Syndrome than was previously acknowledged. Early screening in elementary school and periodically throughout middle and secondary schools might lessen future adult cases. Post secondary institutions might also have screenings available to first year students or to students in general who are experiencing difficulties in maintaining their work load. These students who were once successful in secondary school may find themselves unable to maintain this success because the strategies they employed then are no longer

applicable to college work. This may be due in part to the increased demand of lengthy reading assignments.

Future Research

The focus of future study includes a more in depth view of academic difficulties and the strategies used and developed by the graduate students for the purpose of generalization to the learning disabled population. Future research will also address remediation to alleviate difficulties in sports and driving performance as well as the resolution of perceptual difficulties caused by SS/Irlen Syndrome while reading and while using a computer (Refer to Table 1).

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Appendix A

Biographical Information

Pat Berry, M.A. is an elementary school nurse employed by the West Deptford Board of Education. She is certified as an Irlen screener, teacher of the handicapped and school nurse.

Address: 1263 Ollerton Road

West Deptford, New Jersey 08066

Appendix B

Irlen Institute

5380 Village Road

Long Beach, California 90808

Telephone: (562) 496-2550

Fax: (562) 429-8699

E-mail: Irlen_Institute@compuserve.com

Reading Strategies Questionnaire

Name: _____

Date: _____

PART B

Directions: When reading for information and you get to the point where you want to stop reading:

	OFTEN	SOME-TIMES	NEVER	D.K.
1. Do your eyes bother you?	☐	☐	☐	☐
2. Do they get red or watery?	☐	☐	☐	☐
3. Do they hurt, ache, or burn?	☐	☐	☐	☐
4. Do they feel dry, sandy, scratchy, or itchy?	☐	☐	☐	☐
5. Do you rub your eyes or around your eyes?	☐	☐	☐	☐
6. Do you feel tired or drowsy?	☐	☐	☐	☐
7. Does your head bother you?	☐	☐	☐	☐
8. Do you get a headache?	☐	☐	☐	☐
9. Do you feel nauseated or sick to your stomach?	☐	☐	☐	☐
10. Do you open your eyes wide?	☐	☐	☐	☐
11. Do you squint or frown?	☐	☐	☐	☐
12. Do you find yourself blinking frequently?	☐	☐	☐	☐
13. Do you move closer or further from the page?	☐	☐	☐	☐
14. Does it take effort to stay on the words you are reading?	☐	☐	☐	☐
15. Does it bother you to read under fluorescent lights?	☐	☐	☐	☐
16. Is it harder to read in bright lights?	☐	☐	☐	☐

Reading Strategies Questionnaire

Name: _____

Date: _____

PART A

Directions: When reading for information and you get to the point where you want to stop reading:

	OFTEN	SOME-TIMES	NEVER	D.K.
1. Do you accidentally skip lines or sentences?	☐	☐	☐	☐
2. Do you lose your place?	☐	☐	☐	☐
3. Do you misread words?	☐	☐	☐	☐
4. Do you unintentionally skip words?	☐	☐	☐	☐
5. Do you accidentally repeat or reread lines?	☐	☐	☐	☐
6. Do you insert words from the line above or below?	☐	☐	☐	☐
7. Do you avoid reading or reading aloud?	☐	☐	☐	☐
8. Is your reading slow and choppy?	☐	☐	☐	☐
9. Are you bothered by white or glossy pages?	☐	☐	☐	☐
10. Do you have trouble understanding what you read?	☐	☐	☐	☐
11. Do you look away or take breaks?	☐	☐	☐	☐
12. Are you restless, active, fidgety, or easily distracted?	☐	☐	☐	☐
13. Do you find that reading gets harder?	☐	☐	☐	☐
14. Do you use your finger as a marker?	☐	☐	☐	☐
15. Do you have trouble remembering what you read?	☐	☐	☐	☐
16. Do the words get blurry, move, or change?	☐	☐	☐	☐

Irlen Institute

5380 VILLAGE ROAD LONG BEACH, CA 90808 (562) 496-2550 F AX (562) 429-8699

OBSERVATION FORM

Please complete and bring to your appointment. Please print.

Name _____ Age _____ Grade _____
Address _____ Phone _____
Completed by _____ Date _____

CHARACTERISTICS

Please Circle Answer

Are you light sensitive?

Bothered by sunlight	Yes	No	?
Bothered by glare	Yes	No	?
Bothered by bright or fluorescent lights	Yes	No	?
Tired or drowsy under bright or fluorescent lights	Yes	No	?
Become anxious under bright or fluorescent lights	Yes	No	?
Get a headache from bright or fluorescent lights	Yes	No	?
Feel antsy or fidgety under bright or fluorescent lights	Yes	No	?
Harder to listen under bright or fluorescent lights	Yes	No	?
Performance deteriorates under bright or fluorescent lights	Yes	No	?
Feel like there is not enough light when reading	Yes	No	?
Feel like there is too much light when reading	Yes	No	?
Read in dim light	Yes	No	?
Use fingers or other marker to block out part of the page	Yes	No	?
Shade the page with your hand or body	Yes	No	?

Types of reading difficulties:

Skip words or lines	Yes	No	?
Repeat or reread lines	Yes	No	?
Read for less than one hour	Yes	No	?
Lose place	Yes	No	?
Read in a "stop and go" rhythm	Yes	No	?
Omit small words	Yes	No	?
Poor reading comprehension	Yes	No	?
Read progressively worse as reading continues	Yes	No	?
Avoid reading	Yes	No	?
Avoid reading for pleasure	Yes	No	?

While reading or using a computer, do you:

Rub eyes	Yes	No	?
Move closer to or further away	Yes	No	?
Squint	Yes	No	?
Open eyes wide	Yes	No	?
Incorporate breaks	Yes	No	?
Move around to reduce glare	Yes	No	?
Close or cover one eye	Yes	No	?
Move head	Yes	No	?
Read word by word	Yes	No	?
Unable to skim or speed read	Yes	No	?

Do you feel strain, fatigue, tired, or have headaches when:

Reading	Yes	No	?
Listening	Yes	No	?
Doing paper and pencil tasks	Yes	No	?
Working on the computer	Yes	No	?
Watching TV or movies	Yes	No	?
Copying material	Yes	No	?
Doing math assignments	Yes	No	?
Playing video games	Yes	No	?
Writing long assignments	Yes	No	?
Doing visually intensive activities like needlepoint, sewing, cross stitching, etc.	Yes	No	?
Working under bright or fluorescent lights	Yes	No	?

Handwriting:

Write up or down hill	Yes	No	?
Unequal or no spacing between letters or words	Yes	No	?
Unequal letter size	Yes	No	?
Unable to write on the line	Yes	No	?
Difficulty with scantron answer sheets	Yes	No	?
Leave out words, letters, or punctuation marks	Yes	No	?

Attention/Concentration:

Problems concentrating with reading or writing	Yes	No	?
Easily distracted when reading or writing	Yes	No	?
Easily distracted when listening	Yes	No	?
Daydreams in class	Yes	No	?
Problems staying on task	Yes	No	?
Problems starting tasks	Yes	No	?

Copying:

Lose place (book, chalkboard, whiteboard, overhead)	Yes	No	?
Leave out words (book, chalkboard, whiteboard, overhead)	Yes	No	?
Slow (book, chalkboard, whiteboard, overhead)	Yes	No	?
Incomplete (book, chalkboard, whiteboard, overhead)	Yes	No	?
Careless errors (book, chalkboard, whiteboard, overhead)	Yes	No	?
Blink or squint (book, chalkboard, whiteboard, overhead?)	Yes	No	?
Difficulty refocusing	Yes	No	?
Difficulty copying things onto computer or typewriter	Yes	No	?

Writing:

Disorganized	Yes	No	?
Problems with punctuation	Yes	No	?
Problems proofreading	Yes	No	?
Leave out letters or words	Yes	No	?
Write without rereading	Yes	No	?

Mathematics:

Misalign digits in number columns	Yes	No	?
Difficulty seeing numbers in the correct column	Yes	No	?
Sloppy or careless errors	Yes	No	?
Use finger, graph paper, or other marker when working with columns of numbers	Yes	No	?
Difficulty seeing signs, symbols, numbers, decimal points	Yes	No	?
Reversals of numbers	Yes	No	?

Music:

Problems sight reading the notes	Yes	No	?
Prefer to memorize rather than read music	Yes	No	?
Prefer to play by ear	Yes	No	?
Use finger to track notes	Yes	No	?
Lose your place	Yes	No	?
Trouble reading the notes	Yes	No	?
Difficulty interpreting the music notations	Yes	No	?
Little progress in spite of regular practice	Yes	No	?

Depth Perception:

Difficulty getting on and off escalators	Yes	No	?
Clumsy	Yes	No	?
Bump into table edges or door jams	Yes	No	?
Difficulty walking up and/or down stairs	Yes	No	?
Difficulty judging distances	Yes	No	?
Drop or knock things over	Yes	No	?
As a child, accident prone or have bruises on your shins	Yes	No	?
When walking next to someone, do you drift into the person	Yes	No	?
When walking, do you feel dizzy or light headed	Yes	No	?
Difficulty getting on or off moving objects	Yes	No	?

Driving:

Difficulty parallel parking	Yes	No	?
Do you feel like you will hit the car in front when parking	Yes	No	?
When parking, do you hit the curb or leave too much space	Yes	No	?
Difficulty judging when to turn in front of oncoming traffic	Yes	No	?
Uncertain about making lane changes	Yes	No	?
Extra cautious when making lane changes	Yes	No	?
Are the passengers tense when you make lane changes	Yes	No	?
Do passengers tell you that you tailgate	Yes	No	?
Are you overly cautious, leaving extra room between you and the car ahead	Yes	No	?

Sports Performance:

As a child, problem catching a small fly ball	Yes	No	?
Trouble following the ball when watching sports on TV such as tennis, football or basketball	Yes	No	?
When watching sports on TV, can you follow the ball but not see anything else	Yes	No	?
Difficulty playing pool	Yes	No	?
Difficulty knowing when to hit the ball when playing tennis	Yes	No	?
Trouble learning how to ride a bike	Yes	No	?
Trouble jumping rope? Jump in at the wrong time or jump into the rope	Yes	No	?
Trouble playing games such as volley ball or four square	Yes	No	?
On playground equipment such as rings or bars, was it hard to go from one to the other	Yes	No	?

Driving Fatigue:

Become drowsy when driving	Yes	No	?
Become drowsy when you are a passenger	Yes	No	?
Bothered by chrome on cars	Yes	No	?
Bothered by glare off the windshield of the car in front of you	Yes	No	?
Bothered by headlights and street lights	Yes	No	?
Avoid driving at night	Yes	No	?
Have night blindness	Yes	No	?

If you answered yes to three or more of these questions in any <u>one</u> of the above sections, then you might be experiencing the effects of a perception problem called Scotopic Sensitivity/Irlen Syndrome.
--

COMPENSATORY STRATEGIES (Elementary School)

- | | | |
|---|-----|----|
| *Does anyone read instructions to or work with your child? | Yes | No |
| *Does anyone consistently help your child with homework?. | Yes | No |
| *Does anyone consistently correct or edit your child's work?. | Yes | No |
| *Does your child dictate his/her reports and then recopy them?. | Yes | No |
| *Does your child have difficulty getting ideas down on paper? | Yes | No |
| *Does anyone read the material or assignments to your child?. | Yes | No |

COMPENSATORY STRATEGIES (Junior High / High School / College / Adult)

- | | | |
|--|-----|----|
| *Do you read aloud or mumble to yourself when reading or during lessons? | Yes | No |
| *Do others read books to you? | Yes | No |
| *Have you found it impossible to finish reading an entire book? | Yes | No |
| *Do you dictate reports? | Yes | No |
| *Do you have others edit reports and written work? | Yes | No |
| *Must you use a dictionary when reading or writing? | Yes | No |
| *Do others summarize books or relate information to you? | Yes | No |
| *Do you use Cliff Notes, shorter versions of books, or other
related information? | Yes | No |
| *Do you avoid textbook reading? | Yes | No |
| *Do you read beginnings or endings of paragraphs or chapters rather
than the entire chapter? | Yes | No |
| *Do your parents or friends help you with homework? | Yes | No |
| *Do you use techniques to avoid schoolwork or just not do it? | Yes | No |
| *Did you pass your courses by listening in class without doing
assigned reading? | Yes | No |
| *Do you find it easier to learn information through a discussion group
rather than by reading? | Yes | No |
| *Is it difficult to listen and take notes simultaneously? | Yes | No |
| *Were you told you had behavioral or attitudinal problems in school? | Yes | No |
| *Were you considered lazy or unmotivated in school? | Yes | No |
| *Do you think that your learning problem is because you are dumb,
stupid, or lazy? | Yes | No |
| *Do you work hard to get your grades but feel that you are brighter
than your grades indicated? | Yes | No |

1. How many credits have you accumulated since your undergraduate degree?

2. When was the last time you had your eyes examined ?

By whom ? Please circle one : optometrist
ophthalmologist

3. Do you wear glasses ? Yes -reading or distance. Please circle one.
No

4. Have you had any academic difficulties in your past and/or present school history? Yes /No. Please circle one. Please explain.