

# Scotopic Sensitivity/Irlen Syndrome

## Background

In 1877, a researcher in Europe described a reading phenomenon in oral reading where the reader constantly skipped over many of the short words. When the skipped words were pointed out to the reader, he would see them and say the words. But as he continued to read, he also continued to skip over the short, two- and three-letter words. This reading behavior was dubbed "word blindness". This was the first reporting of perceptual distortions on the printed page that described one facet of Irlen Syndrome.

In 1973, a reading instructor in New Zealand named Olive Meares wrote an article for a local journal about a group of symptoms her students had reported over the years, many of which were also symptoms of Irlen Syndrome. Meares reported a few of her students found some relief while reading by overlaying the print with exposed X-ray films, but she had no idea what was causing the problems nor how to help those students.

In 1981, Helen Irlen was working as director of a research project in Long Beach, California trying to determine what was causing severe reading problems among college students of normal intelligence. Independently, she identified the same set of issues Olive Meares had discovered ten years prior; Irlen was able to identify the causes of the problems and how to overcome those issues through the use of color. Irlen published a study describing her findings in 1983. She called her discovery "Scotopic Sensitivity Syndrome". Scotopic is a term that refers to low or dim light levels. Irlen's contention was, as the intensity of light increases, some people experienced stress and distortions on the page when they read. And, if the intensity and frequencies of the lighting can be controlled, the stress and distortions are not experienced. She went on to say that the syndrome is a perceptual issue affecting the visual system. It is not an eye problem. It is

an issue with how the brain interprets what the eye sees or how the brain responds to visual stimuli. Thus, it is not an issue that will typically be identified by an eye-care professional. There is a lot of information in this one paragraph. In breaking it down, consider first the stress.

Observe some children read in bright light and you will see them shield their eyes from the light. They squint and frown. They rub their eyes and around their eyes. In some, tears roll down the cheeks as they read. They move the book to eliminate brightness and glare on the page. Within a few minutes, they stop reading—physically unable to continue. This is the stress-side of Irlen Syndrome.

Some children with 20/20 vision report that the print becomes blurry after a few minutes, or the letters seem to shake, vibrate or move on the page. To others, the print seems to double, letters reverse or seem to jump all over the page. This is the "distortion" side of the syndrome.

For some children, just by reducing the amount of light hitting the printed page, the stress and distortions can be reduced. For others, certain frequencies of light entering the eye cause stress on the brain. To relieve the problems, those frequencies of light must be filtered out before the light enters the eye.

Light frequencies dictate color. Higher frequencies make up colors such as violet and blue. Lower frequencies make up the reds, oranges and yellows. Helen Irlen's theories and practical applications suggest that colored, transparent acetate sheets placed over the printed page, or colored lenses placed over the eyes in glasses (called Irlen Spectral Filters) can filter out the frequencies of light that are causing the stress and distortions. The intensity of the light can also be controlled by the density of

the color used. Ms. Irlen's work also indicated that there is no one color that solves the problems for all people. Each person needs to be carefully tested to select the mix of colors and densities that benefit them the most.

## **Causes**

Irlen Syndrome is not always present in the environment. It is caused by brightness and glare. Brightness on the page might be fluorescent lights in the classroom shining down on shiny textbook pages. It is also caused by high contrast material such as black print on a white page or black markers on a whiteboard; and it is caused by some types of lighting. Note that the environment described above is found in almost all classrooms in the United States.

Research at the Naval Research Center in China Lake, California indicates Irlen Syndrome is a problem that originates in the retina of the eye and the visual pathways leading to the visual cortex. That research was confirmed at the University of Medina, Italy in 2008.

## **Symptoms**

The environmental factors mentioned above can cause the following symptoms:

**Light Sensitivity.** The subject has difficulty concentrating or experiences discomfort under fluorescent lighting, sunlight, under bright lights, or even at night when looking at oncoming car headlights. Glare off shiny textbook pages, off whiteboards, off overhead projectors and PowerPoint presentations can also be a significant problem.

**Migraines or Headaches.** Bright lights indoors or outdoors and fluorescent lights can induce headaches or migraines.

**Fatigue and Strain.** Bright lighting can cause tiredness, hyperactivity or distraction. These are the children who put their heads down in the classroom, fall asleep or

complain of headaches—or those who seem to become more hyperactive as the school day proceeds.

**Depth Perception.** Some people have an inability to judge distances. They bump into tables and door jams. They cannot catch a ball. They may seem to have fine motor issues. To some, their world seems to be very “flat”. Picture frames do not seem to project out from the wall. Objects appear further away than they are, so they knock things over as they reach for them.

**Contrast Sensitivity.** Black on white objects are uncomfortable to look at or they cause distortions to appear.

**Color Sensitivity.** Some people's brain cells are so sensitive to light that they see colors on a white piece of paper that most people would say are not there. The black print might appear blue or purple. The paper might seem to be tinted pink or green. Some see a rainbow of colors on a white piece of paper when they read.

**Distortions.** Pages seem so bright-white that the person cannot focus on the black print. Print seems to vibrate, shake, pulsates up and down on the page, slides to one side, swirls around, print doubles or triples, print seems to fade away or disappear, sparkling or glary pages—the list goes on and on. These are some of the typical distortions reported by many with Irlen Syndrome.

**Restricted Span.** Difficulty in seeing wide sections of the lines of print; rereading lines or skipping lines.

**Attention Deficit.** Children who can only read for a minute or two before the stress or distortions drive them away from reading are often diagnosed with ADD or ADHD—an inability to stay focused on the printed page. About 1/3 of these subjects are believed to have Irlen Syndrome instead.

**Auto-Immune Issues.** Extreme light sensitivity can induce severe migraine



headaches. In some subjects, these severe headaches come one after another—sensitizing the brain to even small amounts of light. Migraine after migraine creates great stress on the body and induces the auto-immune reaction.

## **Who Is Affected**

Irlen Syndrome affects 12-14% of the general population. It affects some mildly, some moderately and some severely. Studies done in six prison populations in Colorado indicated 85% of the prisoners were affected with Irlen Syndrome. Studies also indicate that as many as 46% of all special education students may be affected by Irlen Syndrome—either having just Irlen Syndrome or as one of many layers affecting the individual. Each person may be affected with one or several of the symptoms previously mentioned.

The syndrome is most often identified in the population of students having reading deficits, but it can also affect straight-A students who struggle under a great deal of stress or with distortions. They find success, but at a high price in stress and discomfort.

## **Heredity**

Irlen Syndrome is a hereditary condition. It runs through families, though it may be difficult to identify because various family members may display different symptoms. If one family member is diagnosed with the Irlen Syndrome, it is a good idea to check other family members for symptoms. The pre-screening test is a good way to identify other candidates for testing.

## **The Testing**

We encourage people to take a free pre-test to make sure the person is a good candidate for the test. The initial overlay testing for Irlen Syndrome takes about 90 minutes. The testing identifies issues caused by the syndrome. That list of symptoms is then reviewed at the end of testing to make sure that, with the overlays over the text, those issues are resolved. The client is then given

a packet of colored overlays that meet that person's specific color needs. The overlays are then used when the client reads.

## **Overlays or Irlen Spectral Filter**

Irlen testing is a 2-step process. The client is first tested with the colored acetate sheets—called overlays. If the client tests at the moderate or severe level for Irlen Syndrome in the overlay testing, the client is encouraged to go on to the second level of testing which is called Irlen Spectral Filter Testing. This second level of testing takes another hour or two. Rarely are the colors of the lenses identical to the colors selected in the acetate sheets. Clients are strongly discouraged from tinting their own glasses outside of the Irlen system because they will rarely see the results they want.

For extremely light-sensitive individuals, tinted contacts can also be used. Only certain types of contacts will properly absorb the coloring dyes, so check with your Irlen Diagnostician for all the paperwork before purchasing contacts for tinting.

## **Coping with Irlen Syndrome**

Irlen Syndrome is a life-long issue. But just understanding what causes it can help a person modify the environment to make for more success. Irlen Syndrome is caused by light—the brightness of the light and certain frequencies of light. It is caused by brightness, glare, high contrast and some light frequencies. When these issues are reduced or removed from the environment, the affects of the syndrome are also reduced. Here are some recommendations for modifying the environment:

- Use dull-finish, colored paper when reading or writing if possible—use a color similar to the selected overlay colors. This helps remove brightness, glare and high contrast. Have the teacher run off handouts using unlined colored paper.

- Avoid black ink. Use blue or some other color of ink to reduce the high contrast. Pencils are acceptable.
- Ask teachers to use colored chalk on black boards rather than white chalk. This reduces high contrast on the board. Sometimes yellow chalk will work fine. Experiment a bit to find the best color for the majority of students.
- Ask teachers to use colored markers on white boards to reduce contrast. If possible, turn out lights over the white boards to reduce brightness.
- Place a transparent, gray or light blue acetate book report cover or an Irlen overlay on the overhead projector surface; then the instructor can place transparencies on top of the acetate sheet. This reduces brightness and glare on the screen.
- Avoid fluorescent lights as much as possible. Sit between fluorescent lights rather than directly under them. Sit closer to the window to mix the light. Twist out a few fluorescent tubes in one part of the classroom to make it more comfortable for those that are light sensitive. The unique way that fluorescent lights create light is very uncomfortable for many students with Irlen Syndrome.
- Use incandescent or quartz halogen lights to study. A 25-to-40-watt bulb may be all that is needed. For those that are extremely light sensitive, a dimmer switch is recommended so the light can be controlled. As long as the subject is reading at normal reading distance without strain or squinting, the eyes will not be stressed—no matter how dim the light.
- Consider using a ball cap or visor in the classroom to keep fluorescent lighting from going directly into the eyes. The underside of the bill should be a dark color—never white or yellow.
- Use the Irlen Overlays whenever you read to reduce stress and distortions until the Spectral Filter Testing can be done.
- Tilt the reading material. Don't lay it flat on a table. This will reduce brightness and glare.
- When taking bubble tests (scantron tests) use a short ruler to keep your place on the bubble page and use your overlays on the test questions.
- Tape the overlays over a computer monitor to reduce brightness and offensive light frequencies. Sometimes it takes a different mix of overlay colors to help on the computer monitor.
- The 2007 energy bill dictates energy standards for light bulbs. Incandescent bulbs do not meet that standard and will be unavailable in the United States in a few years. The replacement is those "twisty" bulbs that are taking over the store shelves. They are fluorescent bulbs and are not good for those with Irlen. We recommend stockpiling incandescent bulbs for home use—enough to last 2-3 years until the new LED light bulbs hit the market.

Questions? Call the Irlen® Center—Albuquerque at 268-4731. Cheryle and Rick Harbaugh will be happy to help.