What is Scotopic Sensitivity Syndrome?
Meares (1980) and later Irlen (1983) described a syndrome of visual symptoms and distortion that can be alleviated with colored filters. This syndrome has been referred to as "scotopic sensitivity syndrome" or the Irlen Syndrome. Irlen Syndrome or Scotopic Sensitivity Syndrome (SSS) is a perceptual dysfunction affecting principally reading- and writing-based activities. Individuals with SSS put more effort and energy into the reading process because they are inefficient readers who "see" the printed page differently from the proficient reader. Constant adaptation to distortions from print or from the white background causes fatigue and discomfort, headaches, and more importantly, limits the length of time these individuals can read and maintain concentration. SSS can affect reading, attention span, energy level, motivation, or work production. In addition, problems with handwriting and depth perception may also be the result of this syndrome. When SSS goes undetected, those individuals with this syndrome might be viewed as underachievers with behavioral, attitudinal, or motivational problems. They often appear bright but fail to produce to a level considered appropriate. Some individuals diagnosed as having specific learning difficulties, dyslexia, reading problems, or various developmental delays may also be suffering from this syndrome. Symptoms of SSS remain undetected by standard visual, medical, psychological, and educational evaluations.

What are the symptoms?
Light Sensitivity – a sensitivity to glare, brightness, and intensity of various lighting conditions especially fluorescent lighting. Reactions may include discomfort, headaches, and difficulty concentrating while reading or working under fluorescent lights and driving at night.
Difficulty with Print Resolution – the inability to read print easily and free from perceptual distortions, whether involving words, numbers, or musical notes. Problems include, but are not limited to, print that shifts, moves or disappears.
Difficulty with Sustained Attention – limited concentration while reading, writing, or working on a computer. Problems reported include frequent breaks, drowsiness, or restlessness.
Restricted Span of Recognition – the inability to read groups of letters, notes, numbers, or words at the same time. Difficulties include an inability to track, identify words, skim, or speed read. Comprehension can also be affected.
Poor Depth Perception – the inability to judge distances accurately. Problems can include difficulty getting on and off escalators, judging distances when driving, playing ball sports, and going up and down stairs.

What is the treatment?
The treatment for SSS was developed by Helen Irlen and consists of altering the entering light waves through the use of colored overlays or filters worn as glasses. These colored filters modify the light which minimizes or eliminates the distortions and allows improved reading rate, comprehension, and sustained attention. Treatment with colored filters will not teach someone to read but may rectify a situation that has prevented reading progress. Worldwide clinical evidence has demonstrated that for nearly one half of those with reading problems, Scotopic Sensitivity Syndrome is one piece of the puzzle. Those treated for SSS may experience a high success rate including such benefits as improved reading accuracy, speed and comprehension, increased attention span and reduced fatigue, headaches and strain. Additional benefits may include improved self-esteem and improved academic and work performance.
The Use of Tinted Lenses and Colored Overlays for the Treatment of Dyslexia and Other Related Reading and Learning Disorders

Over the past two decades the use of tinted lenses and colored overlays to improve reading comfort and performance has been presented in both the popular media and professional literature. With increasing frequency, patients and parents consult optometrists about the value of colored overlays and tinted lenses. Meares and later Irlen described a syndrome of visual symptoms and distortion that can be alleviated with colored filters. This syndrome has been referred to as "scotopic sensitivity syndrome" or the Irlen Syndrome. Colored overlays and tinted lenses are purported to improve reading ability and visual perception, increase sustained reading time, and eliminate symptoms associated with reading such as light sensitivity, eyestrain, headaches, blurring of print, loss of place, and watery eyes.

A comprehensive review of the available scientific literature regarding the effectiveness of tinted lenses or filters revealed the following:

There is evidence that the underlying symptoms associated with the Irlen Syndrome are related to identifiable vision anomalies, e.g., accommodative, binocular, and ocular motor dysfunctions, in many patients seeking help from colored lenses. Furthermore, such conditions return to normal function when appropriately treated with lenses, prisms, or vision therapy. When patients exhibiting the Irlen Syndrome were treated with vision therapy, their symptoms were relieved. These patients were no longer classified as exhibiting this syndrome, and therefore did not demonstrate a need for the colored overlays or tinted lenses.

Most investigators have not controlled for the presence of vision anomalies, e.g., accommodative, binocular, and ocular motor dysfunctions. In most cases, researchers have simply assumed that a history of a previous eye examination ruled out any significant vision problem. Others have developed a protocol to screen for vision problems but have not included an adequate battery of tests to eliminate common accommodative, binocular, and ocular motor dysfunctions.

The results of prospective, controlled research on the effectiveness of tinted lenses or colored overlays vary. One randomized, controlled trial demonstrated that children with reading difficulties, who were prescribed filters based on colored overlays, experienced reduced symptoms of asthenopia. While this study suggests the color may need to be individually and precisely prescribed, another study demonstrated significantly improved eye movements among reading disabled children when reading through blue filters. Other researchers failed to find improvement in comprehension scores in readers using tinted lenses.

Results of testing utilized to determine the most appropriate color are not repeatable. There are numerous variables within the individual and the
environment (such as differences in lighting between the home and various classrooms) that can influence the effectiveness of assigned overlays. It has been reported that up to twenty-five percent of the time, children who receive tinted lenses need to have their tints adjusted within the first year. The effect of spectral filters and colored overlays is not solely a placebo. Colored overlays and tinted lenses are not cures for dyslexia, but may be useful reading aids for some individuals with reading difficulty.

The underlying physiological mechanism for the Irlen Syndrome is still not known. While some argue that a magnocellular deficit exists in these individuals, others suggest the problem is pattern glare.

There is lack of agreement about the best way to evaluate patients for the presence of the Irlen Syndrome. Some suggest the use of the Irlen 2-part evaluation system, while others promote the use of the Intuitive Colorimeter. Both systems require additional research.

Visual processing is a fundamental part of the reading process. Future research must address the issue of underlying vision anomalies, sub-typing of reading disabilities and the differential response to different treatments. Controlled clinical research will allow reading and learning disabled individuals, their parents, and the professionals who work with them, to better evaluate the effectiveness of available treatments for each individual.

Therefore, it is the position of the American Optometric Association that:

1. Undetected vision problems may be a factor in individuals who exhibit the symptoms of the Irlen Syndrome. A comprehensive eye/vision examination with particular emphasis on accommodation, binocular vision, and ocular motor function is recommended for all individuals experiencing reading or learning difficulties, as well as those showing signs and symptoms of visual efficiency problems.

2. The American Optometric Association encourages further research to investigate the effect that specifically tinted lenses and colored overlays have on visual function related to reading performance.

3. Vision problems are a frequent factor in reading difficulties. Ignoring the role of vision or inadequately evaluating the vision of individuals with reading problems is a disservice which may prevent the person from receiving appropriate care.

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