

# Helping to dispel the misery of dyslexia

*Research by Professor John Stein at the University of Oxford has shown that the simple solution of using yellow or blue filters can significantly improve many dyslexic children's reading*



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Testing a dyslexic child with blue filters. Courtesy of the Dyslexia Research Trust and Professor John Stein

Dyslexia is the most common cause of childhood loss of self-esteem, affecting 1 in 10 of the population. Children with dyslexia are often unable to learn to read and write despite normal or above normal intelligence, good health, good teaching and family support. As a result they have greatly restricted life chances and cannot always contribute to society in the way they would like. Sometimes this can lead to criminal behaviour: 50% of those in prison are thought to be dyslexic. Dyslexia costs the UK an estimated £2 billion per year in terms of additional teaching, school exclusion, unemployment and crime.

Effective strategies to help people with dyslexia do exist, but they are often time-consuming, costly and require long-term specialist input. Professor John Stein, however, has found that simple yellow or blue filters can provide an effective and inexpensive solution for the dyslexic people who suffer from visual disturbances. For up to two

thirds of young dyslexics, letters and words appear to blur and move around on the page, making learning to read and write highly problematic. Their crucial weakness seems to be lower sensitivity to image movements. These occur whenever the eyes move, as in reading. The movements need to be sensed accurately in order to compensate for them by negative feedback and to perceptually stabilise the letters being read.

Professor Stein's key insight was to suggest that these difficulties were the result of abnormalities in magnocellular neurones, a key component of the brain's visual processing system. The magnocellular system specialises in tracking rapid changes in light, sound and position, enabling the eyes and ears to focus attention stably in the right direction. Professor Stein's studies showed that people with dyslexia are less sensitive to visual motion stimuli than non-dyslexics (for example, it is harder for them to identify coherent movement

in a pattern of random moving dots). He went on to demonstrate for the first time that they are also less sensitive to dynamic auditory stimuli. There was a high correlation between this lack of sensitivity and poor performance in standard reading tests.

This research prompted Professor Stein to experiment with coloured filters. Although the magnocellular system does not contribute to colour vision, it is most sensitive to long wavelength light, particularly yellow. Professor Stein predicted that wearing yellow-tinted glasses could improve magnocellular function, leading to better visual motion sensitivity and eye control, and hence improvements in reading. A major study carried out in 2005 confirmed this prediction. Further research established that another group of children responded extremely well to deep blue filters. Professor Stein theorised that these may enhance the function of the brain's 'biological clock'; this controls the body's daily rhythms, in particular switching on magnocellular systems at daybreak. Blue filters can thus help to sharpen the action of the magnocellular system, and improve reading ability.

In the last 15 years, with the help of Dr Sue Fowler at the University of Reading and funding from the Dyslexia Research Trust, clinics in Oxford and Reading have carried out free visual assessments in over 10,000 children who have reading problems. Around two thirds have been found to experience visual disturbances. The majority of this group (over 5,000 children in all) have benefited from the use of either yellow or blue filters for reading, reporting that they improve or even completely eliminate the visual disturbances that make learning to read so difficult for them, and enabling them to make rapid improvements in reading skills. It can be a life-changing experience.

The reading clinics continue to take about 500 referrals a year, with the same rate of success. Professor Stein's research into blue and yellow filters provides a simple, inexpensive and effective solution for many dyslexic children and adults, without the need for specialist input beyond the initial assessment.

***'Now in the Upper Sixth, [my daughter] is at the top of her year group and she has now won a place at the University of Oxford to read Philosophy, Politics and Economics. Words can't explain how grateful I am to the Dyslexia Research Trust and what you have done for my daughter.'***

Parent of a child who was originally 3 years behind her reading age when assessed at age 10