

How difficult can reading be?

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How many times have parents of young children with learning difficulties been told "He'll grow out of it"?

It seems that this is still a common piece of advice given to parents of children with learning difficulties. Yet today we have a whole generation of learning disabled adults who were children twenty years ago, and they have not "grown out of it".

Conservative estimates put the number of learning disabled in the population at 10% or more. Most of these have reading difficulties.

There are no easy solutions. If there were, teachers would have solved the problems long ago. The most widely accepted definition of learning difficulties calls them 'a heterogeneous group of disorders', and diagnostic treatment procedures are usually directed to the symptoms rather than to any known causes. In many cases, all we can do is suggest continued intensive remedial treatment. At the Evelyn McCloughan Children's Centre, we have seen children who have had eight or more years of continuous remedial instruction, which has cost the parents in excess of ten thousand dollars. The result, in most cases, is a child who still reads poorly.

To have a generation of learning disabled children who have grown up to adulthood and are still learning disabled does have one advantage for those of us working in the field: we can ask the adults to tell us about their experiences. Many of them have had sufficient time and intelligence to enable them to understand the nature of their difficulties.

Adults with Learning Disabilities

Listening to adults with learning disabilities is what psychologist Helen Irlen did in her Adult Learning Disabilities Clinic at California State University at Long Beach. She discovered that many of her adult clients had symptoms which had not been taken seriously before. They told her that many of their problems seemed to be visual; perhaps the kind of thing that we call "visual perceptual problems". This was not the only kind of problem they told her about, but it was significant, because generally it had been considered that vision did not have anything to do with reading problems.

Irlen knew, too, that programs in visual perception training are notoriously unsuccessful at improving reading skills, and so it was interesting to hear of so many visual symptoms. Those who have taught children with reading problems will recognize many of the following:

- They skip lines unintentionally.
- They skip words unintentionally.
- They repeat the same line.

- They exhibit eyestrain symptoms; headaches, red and sore eyes, watery or sandy eyes, etc.
- They move their head across the page as they read.
- They use their finger to keep the place.
- They confuse similar letters like m/n, n/h, i/l, p/b, d/q, and so on.
- They read word by word, or even smaller units if the words are long words.

In addition, these adults spoke of difficulties when trying to work or read under fluorescent light, of a need to wear sunglasses outdoors (and even indoors in some cases), of being bothered by lights when driving at night, of having trouble adjusting from bright light to darkness, or from darkness to bright light.

Putting these and other symptoms together, it was clear that there was a group of people with visually-based problems in reading. Their eyes had been checked by optometrists or ophthalmologists, and their eyesight was either good, or corrected. What was the problem?

Aspects of the Problem

Probing further, five areas of difficulty were revealed. Not all the learning disabled adults exhibited all these symptoms, but most exhibited more than one, and some exhibited all of them:

Sensitivity to Brightness

Photophobia refers to the inability of the person to tolerate bright light. These people dislike bright sunlight, dislike fluorescent light if it is too bright (especially the "cool white" type), they also find reading black lettering on white paper difficult. The white seems to distract their attention from the black, making reading a laborious task. It is difficult to find reference to this problem in the literature on reading and learning difficulties. The earliest reference to it is in a duplicated paper distributed by Olive Meares in 1972, and published in its final form in 1980 (1). In her paper Meares gave an account which included many of the symptoms that we will describe in this paper. Among them, was the difficulty that some children were having with the white of the page. In questioning children about the way they saw the page, Meares asked one child,

"When I want to read a word, I look at the black marks. What about you?"

"Oh yes, I do too. But you've got to keep putting the white away. It stands out a lot."

Later on, she asked the child about whether it would be better to have white words on a black page. The child answered,

"That would be better, but I'd rather not have any black or white at all. It's too dazzling."

Later she added, "You don't want too much difference between the words and the paper."

Another child in Meares' study answered more emotionally when asked,

"Peter, do you like the way books are printed? You know, black words on white paper". He shook his head vigorously but didn't speak.

The head shaking was an answer, so I asked, "Why not?"

"It's all the little white rivers . . .". Then a flood of tears came.

It is clear from the above examples, that the problem of white/black contrast in the normal print of books has been observed, but most of us have not taken them seriously. The adults were now telling Irlen that white/black contrast was a serious problem and a barrier to reading. From what they told her, the effect may be like a normally-sighted person trying to look at an object at night, when a bright light is shining beside the object and pointing towards the viewer. The bright light intrudes on the outline of the object, making it difficult to see and even causing its shape to appear to distort. Subsequent research has confirmed that brightness contrast is a problem for many readers. Such readers far prefer grey, or some other colour of paper to white.

Visual Resolution

When shapes appear to distort the problem is one of visual resolution. Many of the adults described the difficulty they had in keeping the image of the print stable. Again, there have been rare accounts of these phenomena in the literature. Jordan (2) lists the following in addition to those mentioned above:

Seeing double images, words appearing to spread apart, letters or symbols appearing to move about, and symbols blinking on and off.

Meares quotes her discussion with one boy, who indicated that for him, the words moved when printed on white paper. This boy insisted that it was the white that made the words move, and added, "they move a lot worse if you stop to work out a word". Another child in

Meares' clinic reported that for him, the words "jump about" on the page. Some complained of letters appearing to get thinner and fade away. This phenomenon had been known for some time, from studies on traffic signs carried out in New Zealand. The New Zealand Road Signs Committee had found that for night visibility, road signs had to be light on dark (not dark on light) because, when illuminated by headlights, black symbols on a white background appear to become thinner, and even, for some people, disappear.

Irlen found that for many adults black print on white paper was unstable in similar ways. Letters appeared to move about, or in some cases, the print on the page appeared to swirl, double, blur or "white out". An example of one pattern of distortion is shown in figure 1. How difficult will reading be when print looks like this?

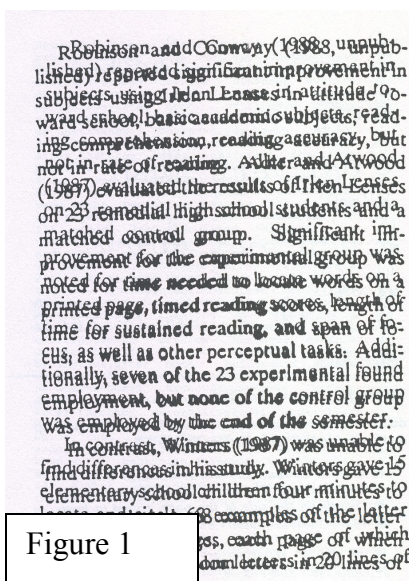


Figure 1

Sustained Focus

Many children and adults report their difficulties in keeping words in focus. This has always been assumed to be due to a visual defect which could be corrected by appropriate lenses. We have been dealing with a group of children and adults who have appropriate lenses, but who still have difficulty in keeping words in focus. There is another group of people who do not realize that they are having difficulty in keeping the words in focus, but who find that even after a short time of reading they are tired, their eyes hurt, itch, water or burn, or they just need to have a break from reading. These people are compensating automatically for

their eyes' tendency to lose focus. Clearly, there is some visual problem here which is not being detected by conventional eyesight tests.

Width (Span) of Focus

All those conversant with reading theory, will know the advantage of a broad span of focus for efficient reading. Speed reading courses direct a good deal of their attention to broadening the span of focus of the reader, so that in one fixation the eye takes in as much of the print as possible. The best speed-readers are able to maximise their use of the print cues so that the eye makes as few movements as possible. Poor readers are well known to make many fixations and regressive eye movements. What causes them to make so many fixations and regressive eye movements is not known, but remedial teaching practice has often endeavoured to provide compensatory techniques to allow poor readers to minimise the difficulties caused by these problems.

When we measure the span of focus of learning disabled adults, we find that it tends to be restricted, and in some cases extremely restricted. Some of the learning disabled are able to see only three or four letters clearly at a time. This means that word attack skills become impossibly difficult, and as readers they tend to leave off the end of words, reverse words, begin in the middle of words, or not even be able to attempt longer words. In addition, important items such as small words, full stops, and other punctuation may not be observed at all. Reading, if it can be done at all, will be laboriously slow.

Depth Perception

The fifth area of difficulty which adults indicated was not immediately related to reading at all. Yet it follows that if many of the problems are visually based, then some adults at least should have visual difficulties apart from reading. Many of the adults reported a difficulty with catching balls; unsteadiness going down staircases; difficulty getting on to or leaving escalators; uncertainty judging the distance of oncoming traffic, and other distance-related problems.

The Differential Perceptual Schedule

Thus, five groups of symptoms were discovered among these learning disabled adults. They have since been identified among children as well.

Based on these findings, Irlen developed what she called a "Differential Perceptual Schedule" (IDPS). The IDPS consists of questions that related to six general categories: visual perception, depth perception, sustained focus, span of focus, sensitivity to brightness, and eye strain symptoms.

This perceptual schedule enabled Irlen to identify those clients who would fit the category which she came to call "Scotopic Sensitivity Syndrome". The name was chosen because of the assumption that there was some retinal difference responsible for this extreme sensitivity to certain kinds of light. (Some studies at the Massachusetts Institute of Technology have since provided some supporting evidence for this hypothesis). However, because there is still uncertainty about the cause of the problem, the preferred term is simply "Irlen Syndrome".

Treatment

Irlen developed a procedure for filtering parts of the light spectrum which appeared to be responsible for the visual difficulties experienced by these readers. The idea was to admit

as much of the light spectrum as possible, while excluding those parts of the spectrum that seemed to be causing the problems. The difficulty was that the part of the spectrum causing problems varied from one individual to another. It therefore became necessary to develop a range of visual filters that would be suitable for many different individuals. For many people, a similar improvement could be obtained by using a coloured plastic sheet placed on the white paper, but not all subjects indicated a marked improvement with overlays. Printing on coloured paper also helped, apparently by reducing the contrast between the black print and the white paper. Again, it was found that different colours improved the visual image for different individuals, while some colours made the distortions appear worse.

Even when improvement could be obtained with coloured overlays, there was obviously no help in the area of handwriting and spelling, because a plastic overlay cannot be used while writing. Here, the use of coloured paper assisted some people, but the optimum effect was obviously to be obtained by having the coloured filter interposed between the eye and the page at a place closer to the eye than to the page. In this way, improvement might be obtained while writing, as well as during reading.

So a series of coloured filters to be mounted in spectacle frames and worn by the client was developed. At present some 150 colours are used, and the selection of the correct tint is usually critical.

The result of using the correct filters is that clients report a marked lessening or complete absence of headaches, increased or normal reading concentration and endurance, improved depth perception, loss of associated physical symptoms previously experienced (nausea, dizziness), reduced irritability, improved handwriting, and most important of all, increased comprehension in reading.

In a paper delivered to the American Psychological Association (3) Irlen reported the results of observations on 37 students at California State University at Long Beach. These students were all referred to the Adult Learning Disability Programme, and identified as learning disabled under US Law. The age range was from 18 to 49 years. An additional population of 70 clients referred for perceptual impairments, ages ranging from 9 to 54 years, was observed.

All subjects received an ophthalmological examination, and had any necessary lenses prescribed. After that, they were screened using the Irlen Differential Perceptual Schedule, and where appropriate given filters, either by tinting their existing lenses, or alone where no prescription lenses were needed.

After the subjects had worn the glasses for one month, they were interviewed to determine whether changes in performance levels in reading, writing, eye strain, attention and concentration, and eye-hand co-ordination had occurred. Of the original population, 74% qualified for treatment with the lenses. Prior to treatment, most of these subjects experienced eye strain and frustration after a maximum of 15 to 20 minutes of sustained reading. After wearing the lenses, the reading period was extended to 2 to 3 hours. Most symptoms of eye strain such as headache and red or watery eyes had disappeared.

For all subjects visual resolution improved and distortions in the letters were eliminated. This resulted in an improvement in reading rate. In the case of one subject, the reading rate

increased from 63 words per minute to 117 words per minute with no additional remediation.

The most important improvement however, was in comprehension. All subjects reported that prior to treatment they were unable to comprehend textbook material unless they read it three to five times. After treatment, however, they were able to comprehend material on the first or second reading.

A large number of subjects also reported improvements in depth perception. They were able to see the outline of objects clearly, or were able simultaneously to see objects close and far away. As a result, eye-hand co-ordination improved for sports involving balls, and especially catching.

These preliminary results have since been replicated in studies in Sydney, Sydney and Newcastle, Canberra, and a long-term follow-up of people in Sydney and Newcastle. These studies involved people who had worn Irlen filters for minimum periods of 6 months, one year, and seven years respectively. In all studies, large improvements in three or more areas associated with reading were experienced by more than 50% of those who wore the lenses, and 93% maintained that they experienced definite improvement from the lenses, most having large improvements in at least one area of reading. Of the 7% who experienced no help at all, a number did not ever wear the filters. Peer pressure is a powerful demotivator! (4)

Conclusion

Over the last 10 years, many thousands of people have been treated at clinics in USA, UK, Europe and New Zealand, and in all states of Australia. The first clinic in Australia was established in Sydney at the Evelyn McCloughan Children's Centre in 1985, and clinical trials have proceeded since that time. Currently, it appears that about half of the learning disabled population may receive help from Irlen filters, though many of these people have other difficulties as well. It is often much easier to address these other needs once visual difficulties have been overcome. Research has also demonstrated empirically that improvements do occur in reading comprehension, accuracy and fluency, as well as in handwriting and spelling, confidence and persistence. (5)

For teachers, the development raises important questions about our understanding of how learning disabled children may see the work they are required to do at school. It should be emphasised that the vast majority of these children work very hard, but fail consistently. The experience of repeated failure means that in the end they rebel or give up. That is a behaviour typical of all human beings, when placed in a situation of continued and inescapable frustration. It should also be remarked that these people are not helped by "trying harder". For many of them, the harder they try the more impossible the task becomes. They will find that if they stop at a word and look at it closely, puzzling over it to decode it, the word may go blurry, become lighter, begin to vibrate, or disappear completely. It is therefore an impossible task for them to decode words. But they are no better off if they try to minimise their use of visual cues. For many of them will see only parts of the word, and in trying to identify the word as a whole, will miss the ending, or the beginning, and generally find it impossible to attack long or difficult words. "Trying harder" seems to increase stress, but does not help them.

The degree of effort these people require for any level of success is indicated by the speed with which they exhibit eye strain symptoms, and their general tiredness at the end of a day's work which involves much close visual attention. Students in the senior school may even find that they need to sleep at the end of a day at school, before being able to attempt homework or study. The successful application of Irlen filters has been shown to eliminate this need. These observations add an important new dimension to our understanding of the reading process, and how we need to work to assist those who are learning disabled in reading.

Finally, these new observations may bear on the question of the reading process itself, and the degree of visual information which is necessary for success in reading. Where visual information is minimised, for some people reading becomes an impossibility. Only when we maximise the amount of visual information available to them does reading become fluent, and comprehension easy.

Notes:

1. Meares, O. (1980) Figure/ground brightness contrast, and reading disabilities. *Visible Language*, XIV, 1, 13-29.
2. Jordan, D.R. (1972) *Dyslexia in the Classroom*. Chicago, Bell and Howell. Also in *Overcoming Dyslexia*, Pro Ed, 1989.
3. Irlen, H. (1983) Successful treatment of learning disabilities. Paper presented at the 91st Annual Conference of the American Psychological Association, Anaheim, Calif.
4. See, e.g., Whiting, P.R. (1988) Improvements in reading and other skills using Irlen coloured lenses. *Australian Journal of Remedial Education*. 20,1, 13-15, and Whiting, P.R. & Robinson, G.L.W., (1988) Using Irlen coloured lenses for reading. *The Australian Educational and Developmental Psychologist*. 5, 2, 7-10.
5. See, for example, Robinson, G.L.W & Conway, R.N.F. (1990) The effects of Irlen coloured lenses on students' specific reading skills and their perception of ability: a 12-month validity study. *Journal of Learning Disabilities*, 23, 10, 589-596.

Figure 1. One of a number of different patterns of print distortion described by learning disabled adults. Here, the print "swirls" around the point of eye-fixation (the centre of the figure in this case). In other cases, the print appears to double, letters merge together, blur, or parts of the letters disappear altogether. The last mentioned phenomenon explains why such readers confuse b and d, n and h, m and n, etc.

http://www.dyslexiaservices.com.au/Reading_Difficulty.htm