

Parent & Teacher Useful Information

Look for signs of difficulty in any pupil who is not meeting expectations.

Know whom you can refer to, and how to go about this.

In class:

- If spectacles are used, ensure you know when they should be used - and see they are!
- Minimise board copying work.
- Position pupils square on to the board if it is being used.
- Make good use of colour to delineate information.
- Be sensitive to fatigue and visual stress - give breaks (non-visual).
- Allow use of marker when appropriate (finger or bookmark - or both).
- Coloured paper may assist some children - let them choose.
- If possible use sloping surfaces for working.
- Ensure good posture for both reading and writing, including appropriate turning of writing material, and early attention to grip problems.
- Check homework and spellings are correctly copied before being sent home.
- Use multi-sensory approaches, majoring on visual recall, and not rote learning.
- In maths, make good use of concrete aids such as blocks, rods and real experience until numbers are "seen" and "felt".
- Teach mind mapping skills.
- Traditional games (hopscotch, skipping, etc.) may help with co-ordination development.
- Plenty of basic movement and rhythm work is vital from an early stage.

Visual Skills for Learning

Research has shown that in every class there are at least five children with visually related learning difficulties. Keith Holland sheds light on the possible causes of such problems, explains how to recognise their symptoms, and outlines the means to overcome them.

The classroom teacher standing before a room of bright, young children assumes for the most part of those children are fully equipped with the tools needed to help them learn. The child with the broken arm stands out from the rest, and receives the sympathy that is their due; the deaf child is likely to be seen and helped; and the child with partial sight is also likely to be noted, and helped. There is, however, a group of children thought to be far larger than any of the preceding groups who are rarely noticed, yet who are likely to be penalised for their very real but unrecognised handicaps; they are the children with visually related learning difficulties.

Exploration of population studies suggests that in every class there are at least five children with such difficulties. Unless their difficulties are recognised and addressed, they may eventually exit from the educational system having seriously underachieved relative to their potential, and may have suffered much distress as a result. This blow of confidence may remain with them throughout their adult life, affecting many apparently unrelated areas of their lives. As teachers, you have the opportunity and responsibility to recognise such individuals, and try to guide them towards appropriate help and relief. This short article is aimed at helping the classroom teacher understand the possible visual causes of such problems, together with their symptoms and the means available to overcome them.

Before looking at the visual skills needed for learning, it is worth understanding something of the terminology used.

Vision refers to the total system that allows an individual to see, and to experience objects and images in space. A small part of this system is the eye, the rest includes all of the complex neurological processes that go to convert light impulse reaching the eye into a meaningful mental image of the world we are in. Many make the mistake of saying a child's vision is all right when they really mean that the child's eyes have normal optics, and can receive a sharply focused image.

Refractive Error refers to the lens power required to produce a perfectly focused image on the retina of the eye. This is normally what is assessed in a routine eyesight test, and corrected by means of spectacles.

There are three components to stable vision that together produce a mental "space map" of the world we see, whether it be the world of the sports pitch or the world of the novel. Those three processes are: **Vergence**, **focus**, and **eye movement** (sometimes erroneously called "tracking").

Vergence is the term referring to the movements of the eyes relative to each other, that ensure they are always looking at the same point in space. In particular, convergence refers to the turning of the eyes towards each other as they look at an object that is near to them. Difficulties may exist with the vergence system making it difficult for the eyes to converge adequately. A child with these difficulties may well experience dull headaches, become very tired with quite short periods of close work and may quickly lose concentration on the task in hand, often being easily distracted by movement around them, and looking up from the task. They may day-dream a great deal, and may have difficulty in completing work on time.

Children who over-converge may show a tendency to move in towards their work, perhaps laying their head on their arm, their eyes sometimes being only a few inches away from the page. These children may experience migraine, often nauseous. They may be oblivious to distractions around, preferring to plod sequentially through an activity, even though they may be doing the wrong task to begin with, having misread the question and not seen the detail of the question in relation to the whole problem. Often their handwriting will be very small and precise, although not necessarily tidy. They may well press very hard, and imprint several pages on their books.

Some children will show evidence of both problems at different times, initially starting off with poor convergence, but making so much effort to "get things together" that they end up over-converging.

Closely linked to the vergence system is the focus (or accommodation) system. This serves to adjust the focus of the lens inside the eye to give a sharp picture of the subject that we are looking at. Two properties of the focus system can break down. First, the eye may simply not focus closely enough: this lack of focus amplitude means that we may be working close to the limits of our focus system, and we will have difficulty maintaining this for sustained close work. Without fatiguing, yawning and becoming sleepy.

Second, there may be difficulty in switching focus from one distance to another - the focus facility may be slow. This may lead to difficulties in copying materials off blackboards or overhead projectors. A child who additionally has short-term visual memory difficulties may be particularly vulnerable to this type of problem. As the eye adjusts focus, it automatically adjusts convergence, and if the relationship between the two systems is not working well, there may be increasing stress, leading to difficulties in keeping clear focus at any distance. The child with these difficulties will again have problems with concentration, will be distractible, and may suffer from fatigue & headaches.

There are three aspects to **eye movements** skills to be considered.

First, can the child keep its eyes still long enough to take in information; in other words, can he or she **fixate** properly? Problems here can lead to distractible behaviour, inattentiveness to near tasks, and hyperactive-like behaviour (although this behaviour should not be confused with true attention deficit disorders, which have a quite separate pathogenesis).

In developmental terms, once a child can fixate, s/he learns to maintain fixation on a moving target - to track or pursue it. These pursuit movements are essential for keeping control of our hand whilst writing, and are a prerequisite for developing the saccadic eye movements needed for reading. During the reading process, the eyes move along a line in a series of separate jumps, or saccades, pausing on average every nine letters in an adult reader to take in information. These separate fixation fields overlap, and should be received sequentially to provide a coherent and orderly representation of the material being read. Where problems exist with the saccadic movements, the eyes are likely to move erratically, and show a higher than normal frequency of regressive, or backward, eye movements - sometimes as many as 30 percent of the eye movements made when reading can be regressive. In this situation, the child may have difficulty in keeping his/her place or line, finding it essential to use a finger or card as a marker. Comprehension may well suffer, so much energy going on place-keeping that little cognitive effort goes into understanding the text itself. Needless to say, the individual with these difficulties will find reading a chore that is reluctantly engaged in, and produces little personal reward.

Not only do problems with these physical visual skills affect reading, but they may also affect the development of a child's visual imagery abilities (or visualisation skills). The late Professor Elliot Forrester has described four basic systems used for spelling; **rote learning**, **rules of language**, **phonetic images** and **visual images**.

When a child is engaged in free writing, s/he will find it difficult to relate to lists of words learnt by rote. S/he may use language rules or mnemonics, but will often be so engrossed in the "plot" that they fail to register.

S/he will always have an auditory or phonetic impression of the word s/he is trying to spell, but s/he may not have the visual image available, and in this situation is likely to rely on the phonetic spelling, even though when held up and asked to spell the word, s/he may correctly recall the true non-phonetic spelling.

An individual child may show more than one problem area, even though s/he may have normal visual acuity, and be able to "pass" a simple eye test. The classroom teacher is the most likely individual to spot these difficulties, since these children are often reluctant readers at home, and not seen by parents engaged in sustained nearpoint activities. The teacher should be able to spot the basic symptoms of visual difficulties.

Understanding on the part of the teacher, with simple modifications to teaching techniques, may go some way to reducing difficulties experienced by the child. Furthermore the teacher should be able to recommend to parents referral on to appropriate agencies for further investigation

Signs and Symptoms

Focus & Convergence Difficulties

- Transient blurring (or double vision) of print.
- Fatigue and tiredness after quite short periods of close work.
- Short concentration spans.
- Variable working distance - often very short.
- Observations of rubbing of the eyes, excessive blinking, grimacing or other facial strain.
- Headaches, usually associated with periods of close work and study, and therefore often towards the end of the school day.

Eye Movement Difficulties

- Difficulty in keeping place and / or line whilst reading.
- Improvement in reading fluency if a marker is used (either a finger or card, or both).
- A particular dislike of reading aloud - individuals feeling that they read better silently.
- Poor handwriting (may have many other causes).

Visualisation

- Probably the most common sign of visualisation difficulties is a strongly phonetic approach to spelling, with an absence of clear visual thinking.
- Sometimes difficulties in recalling detail of past events is evident, affecting the acquisition of general knowledge.

The Teacher's Role

As already mentioned, the teacher is a key member of the team responsible for recognising children with visual difficulties, and use of the symptom lists above will aid in spotting children who need further investigation. But what then? Teachers should be aware of the appropriate referral channels in their locality. This may be through the school eye service, to a local optometrist or to the child's general practitioner. In either case, a short note to the parent highlighting the reason for your concern can greatly aid the professional in knowing what to look for. Many of the signs and symptoms described may not show outside the classroom, especially if the child is reluctant to engage in any close work tasks (such as reading) at home.

Within my practice a checklist is used (as enclosed in this pack). This allows teachers to communicate rapidly their observations to others - without offence! Although this is a highly subjective approach, it does allow parents and teachers to focus their thoughts on this area of function and is a screening technique in widespread use by behavioural optometrists around the world. Most of the observations asked for have been shown to correlate to identifiable dysfunctions.

Practical Suggestions

But what can be done to help these children in the classroom? It has been suggested by several authorities that simple modification of the daily routine may help children cope better, increase concentration span and allow for greater teachability, by reducing the aggravating factors that precipitate binocular vision breakdown (for a more detailed argument, see Wachs and Furth (1975)).

Where possible lighting should be natural, and not contain a predominance of fluorescent; children are often unduly sensitive to flicker, particularly if it is in their mid-periphery and, again this can cause difficulties with peripheral/central integration.

The work of Helen Irlen and others has suggested the use of coloured overlays or spectacles as an aid for children with visual perceptual difficulties. Research into the so-called Scotopic Sensitivity Syndrome is controversial, and at the present time no clear explanation for the efficacy of these aids has emerged. Research carried out by myself has shown that children who benefit from such aids are very likely to show clear patterns of binocular vision difficulties, such as described in this article, and it is my own view that they are better helped by referral to an optometric practitioner who is skilled in these areas.

Many optometrists incorporate visual and perceptual training into their care regimes, and a considerable body of evidence exists that this vision therapy can be of considerable benefit to many children suffering from visually related learning difficulties.

Programming of vision therapy activities is a professional function, best left to suitably trained personnel; but none the less, there are numerous simple exercises that can be safely carried out by teachers within the classroom setting as part of routine physical movement sessions. Examples of which can be found on the next page.

Research has shown that children have an optimal working distance, correlating with the distance between the middle knuckle of the third finger and the elbow. This distance is quite critical, and a shortening of this distance has been shown significantly to increase the muscular effort applied to close work. It follows, then, that the maintenance of good posture in the classroom is more than a reactionary throwback to Victorian behaviour! It is likely to improve individual efficiency. It is also important to encourage the student to maintain an erect posture, working straight on and not leaning the head too far to one side; this is often a sign that attempts are being made to suppress one eye, usually to minimise symptoms of visual difficulty.

A particularly weak area in modern classroom design is seen where children are working in groups around a table. Two difficulties arise from this.

First, for children with difficulties in integrating central and peripheral information there is likely to be an undue problem with distractibility;

and second, three sides around a table are going to have to turn around in order to be able to see material written up on the board. The child with visually related learning difficulties may well be the one with his or her back to the board, increasing the likelihood of difficulties with this copying task and negating the positive effects of copying as an aid to learning!

- 1) Looking up, down, left and right with the eyes only, and no head movement - possibly to the four corners of a room, and in time to a beat, may help stimulate simple tracking skills. Repeat this ten times at the start of a lesson.

- 2) Drawing numbers at random over a blackboard and having a child draw a continuous line to connect them, again trying to avoid head movements. This can also be used to help develop sequencing skills.
- 3) Reading the first and last letters on every line down a page of text, without using fingers to keep place or reading the first letter of every word, can help develop better saccadic eye movements.
- 4) Having two people throwing partially inflated balloons across the line of sight of a third, who has to track the balloon, possibly shining a torch on to it as it arcs through the air.
- 5) Drawing a maze on to thin card, placing a small metal object at the start, and trying to pull along the course from underneath with a magnet may assist in the development of hand / eye skills.
- 6) Having a child read (if not fluent reader, reading single letters) whilst moving the material in and out, and in circles, can help develop stable focus skills. It also encourages near/far refocusing between targets placed three inches away and targets at a distance. This should only be performed for short periods as fatigue can result.
- 7) Encourage pattern-copying, using increasingly complex shapes as an aid to the development of visual analysis skills. Numerous programmes exist based on the early work of Marianne Frostig; whilst the transfer of these skills was first thought to be limited, more recent research has proven the value of these techniques.
- 8) Word searches are useful ways of helping children learn to spot embedded detail (commercial computer software is available to allow rapid generation of "tailor made" word searches directly applicable to current topic work.)
- 9) Pattern games such as "Battleships" are excellent ways of encouraging visual analysis - and they may help with National Curriculum map work as well!
- 10) When teaching spelling, do not rely on simple look-and-say approaches. Try to encourage visualisation by looking, covering, closed-eye picturing, saying or writing down, re-covering, re-drawing and looking again. It sounds a mouthful, but works!
- 11) Encourage day-dreaming! But only if followed by exercises in describing the dreams with as much sensory detail as possible.
- 12) Listen to music with eyes closed, trying to picture the scenes being portrayed. Good pieces for this include: Carnival of the Animals, Peter and the Wolf, Pictures at an Exhibition and Beethoven's Pastoral Symphony.

Children with visually related learning difficulties are in perhaps the worst position in the class: theirs is truly a hidden handicap. Empathy, understanding and accommodation are all crucial if they are to achieve their true potential.

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Additional Information Sources

Very little has been published within educational journals about these areas in this country (the United Kingdom); the most useful text available, containing a great detail of background theory, and many practical activities for the classroom teacher, is: Wachs, H., & Furth, H. (1975). *Thinking goes to school*. New York: Oxford University Press.

For a full review of the current state of research in these fields, a useful text is: Willows, D., Kruk, R., & Corcos, E. (Eds.). (1993). *Visual processes in reading and reading disabilities*. London: Lawrence Earlbaum Associates

Also of value to teachers is the following reference file for classroom use: *Building auditory and visual perceptual skills*. Wisbech, Cambridgeshire: Learning Development Aids (LDA) (out of print)

That there are at least five children with visually related learning difficulties in each class is from: Sherman, A. (1973). *Relating vision disorders to learning disability*. *Journal of the American Optometric Association*, 44, 140 - 141.

That children who over-converge may show a tendency to move in towards their work is reported by Cohen, L.A. (1960). *Mechanisms in body balance and coordination*. *Connecticut Medicine*, 24, 500 - 503.

Basic systems used for spelling have been described in: Forrest, E. (1980). *Visual imagery - an optometric approach*. Santa Anna, Calif.: Optometric Extension Program Foundation.

For further information on the common signs of visualisation see: Wachs, H., & Furth, H. (1975), *see above*.

That the correlations between the observations for the checklist of visual signs correlate to identifiable visual dysfunctions is supported by chapter 9 of: Willows, D., Kruk, R., & Corcos, E. (Eds.). (1993), *see above*.

Research that children have an optimal working distance is noted by: Cohen, L.A. (1960). *Mechanisms in body balance and coordination*. *Connecticut Medicine*, 24, 500-503. American Optometric Association (1976). *Harmon vision-environment-body mechanics: Their role on learning disability*. In T. Greenstein (Ed.), *Vision and learning disability: Proceedings of conference on vision and learning disabilities*. St Louis: American Optometric Association