

## VISION AND LEARNING

An introduction by Keith Holland BSc, FBCO DCLP

VISION: the act or power of sensing with the eyes

Of all our senses, that which is the most important in the learning process is vision. Over 85 percent of all we ever learn is thought to have been received by sight. Yet the least investigated and most overlooked sense when the child demonstrates learning difficulties is often the same sense - vision!

Many children who are diagnosed as dyslexic, or who are underachieving at school, can in fact show simple vision problems that prevent them from obtaining their true potential in the classroom, and sadly, many will have "passed" simple eye tests which only test distance vision. This creates a false sense of security amidst parents, who no longer suspect or look for visual difficulties.

So How Does Vision Affect Learning?

Reading, writing and spelling are also skills fundamentally dependent on vision, and since reading is the first of the building blocks to be acquired, it is usually the first place to look for difficulties.

Three main vision skills are needed for a child to reading efficiently:

Firstly, he needs to be able to use his eyes as a team: both eyes must be directed towards the same point on the page, and this CONVERGENCE must be maintained without effort as the eyes along lines of letters. This ensures the brain received a single unified picture of the print.

Secondly, the picture seen by each eye must be sharp and correctly focused. This skill is known as ACCOMMODATION and the child must be able to rapidly and effortlessly adjust accommodation to cope with changing eye to print distances.

These two skills, focusing and convergence, are closely linked, and children showing problems with one are probably going to show some difficulties with the other.

Some Signs of Convergence/Accommodation Difficulty

Complaints of blurred or doubled print - often momentarily.  
Reduced span of regard - only a small area of print is perceived at a time.

Variations in "Blackness" of print noted - often clearing with a blink.  
Complaints of tiredness and fatigue with close work.  
Complaints of headaches after-school and homework.  
Complaints of stiff neck after-school and homework.  
Poor coordination in small ball games such as rounders and tennis.  
Deteriorating quality in written work.  
Variations in working distance - often becoming very short after quite brief period of close work.  
A tendency to blink, screw up the eyes or rub the eyes - usually during or after close work.  
Complaints of "rivers of white" on page of print.  
Complaints of print appearing "spotchy".  
Reading tests produce accuracy and speed scores that are below comprehension level.

The third major skill required when reading is to be able to scan, or TRACK along the line of print, so that the brain is able to receive an orderly and correctly sequenced pattern of information. Not only must we be able to scan from word to word, but also to make the larger movement from one line to another without losing place.

#### Signs of Tracking Difficulties

A tendency to lose place or line whilst reading.  
A need to use the finger or marker to keep place.  
Tendency to miss out letters or words.  
Tendency to mis-order letters within words, for example "from read as "for".  
Tendency to confuse order of numbers when working on columns of figures.  
Confusion between hundreds, tens and units.

In addition to these three major skills, it is important for the child to have a good directional awareness, so that he is able to link visual signals with an understanding of the direction of movement.

This allows the child to distinguish similar appearing but directionally specific letters such as "b/d.", and words such as "on/no". It also allows for better control of the tracking movements described already.

#### Pointers to Directional Problems

Letter reversals eg: b/d/q/p, m/w/n, s/z.  
Difficulty with early alphabet recognition - particularly lower case letters.  
Mirror writing.  
Difficulty with early sequencing.

Confusion with left and right past the age of seven.

A family history of mixed laterality is also often found with directional difficulties.

Not only do visual difficulties affect reading, but they can also affect:

- . Handwriting, sport and spelling.
- . Writing, by leading support visual-motor control - as well as the difficulties inherent in reading what has been written.
- . Sport, by affecting visual-motor abilities of, hand/eye coordination and "body awareness" (known as spatial awareness).

Spelling at first is not seen to be a visual skill, rather it is seen as a phonetic skill - learning letter/sound codes. However, this only explains part of the process. Perhaps the most important part is the ability to recall word "pictures" - in the same way as one recalls memory pictures of life important events. This skill is called visual imagery or VISUALISATION, and its development is heavily dependent on good physical visual skills. Thus a child with convergence/accommodation/tracking difficulties is also likely to have visualisation difficulties.

#### Pointers Suggesting Visualisation Difficulties

Spelling shows tendency for phonetic type errors.

May be able to learn spellings "by rote" and achieve in tests, but be unable to spell correctly in free writing.

Has difficulties with visual recall and short-term memory.

May find it hard to record detail of past events or describe places visited.

May have difficulties in understanding patterns and geometrical transformations in maths.

The child experiencing visual difficulties is initially likely to be very keen to learn to read, and with the fairly large print of early readers may not have too many difficulties at first. However, with the increasing complexity of print as demands increased, he is going to start falling behind his peers, and what may have started as a positive attitude may soon be replaced with a reluctance that is hard for parents and teachers to understand.

He is likely to have difficulty concentrating for very long, although he may verbally be an excellent communicator. He may respond in one of several ways. Avoidance of any near task is perhaps the commonest response, any excuse being found to minimise the amount of close work undertaken. (Today's class structures with much work being done in

group settings allows ample scope for this). Conversely, the child may struggle to cope at near focus, despite the difficulties he experiences.

He is likely to develop headaches and showed general visual discomfort, appearing tired and uncomfortable by the end of any protracted period of close work. At this stage, it is not uncommon for behaviour problems to be manifested as frustrations and resentment built up, particularly where difficulties are met by confrontation rather than by sympathy and understanding.

The child with difficulties may have complained of vision problems and an eye examination may have been carried out. However, simple clinic tests of distance vision will not reveal any problems and even many routine optometric and orthoptic examinations may not isolate the real difficulty unless the examiner is well versed in, and confident at dealing with reading difficulties.

The details of vision and analysis should investigate each of the basic skills, both in isolation and in conjunction with each other. The effects of fatigue on vision and the dynamic aspects of reading all need to be studied before a considered diagnosis can be made.

#### Following Diagnosis of Difficulties, What Then?

Spectacles may be used to compensate for difficulties, easing symptoms and increasing concentration span. This in turn allows teaching to be more effective and often leads to a rapid increase in self-confidence. Often the child will report that reading material appears bigger - even though the spectacles used to may have no magnifying effect! This signals a perceptual change as the child interacts more with the text.

He may report seeing more of the page at a glance as his perceptual span increases, and almost always can be heard to read with better intonation and greater fluency. Often too, handwriting becomes more fluent and appears less stressful.

Vision Therapy may be prescribed either in isolation, or in conjunction with spectacles as a means to improve visual abilities, enhancing near vision skills and increasing perceptual awareness. Activities need to be done regularly and conscientiously, and the therapy programme has to be tailored to the individual's abilities and circumstances. Even quite young children can be guided into activities that promote vision development, progressing into more concrete and advanced activities as

they become older and better able to cope.

Guidance is needed on posture and working methods to ensure that visual stress is minimised, and that correct techniques are learned. Children often develop bad posture or habits as a means of minimising vision problems such as the child who lays his head on the desk to write. As the underlying vision problems are cleared, he must be guided back to normal and more efficient patterns of behaviour.

The child who experiences vision problems is handicapped as surely as the child with hearing impairment. His impairment is not immediately apparent however and is easily mistaken for laziness or lack of ability. He needs to be let free from the problems of his difficulty and be allowed to flourish and develop without effort and discomfort.

This leaflet has, I hope, given you some idea of the nature of vision related learning difficulties, and has perhaps alerted you to problems amongst your own family, or amongst children you teach. Assessment and treatment is possible that any age and is not confined to children; the sooner problems are spotted and tackled however the less misery for the individual and the better their quality of life. Keith Holland

Notes from Philippa Bodien: many of the signs above are also indicative of dyslexia. Dyslexic students displaying some of the signs have been assessed for vision difficulties by Keith Holland and found to be free of visual difficulty. Other dyslexic students have not necessarily displayed noticeable signs of visual difficulties but their progress in literacy has stagnated despite good quality teaching from the dyslexia unit and excellent support from their parents. When referred for vision testing some of the students have been found to have significant visual difficulties.

It is not, therefore, easy to decide who might need referring for detailed vision testing. In an ideal world, all children who are showing signs of reading and or spelling difficulties should have a full vision test.