Specific Learning Difficulties (SpLDs) and Visual Difficulties

Executive Summary

This document presents an update to the previous guidance on visual difficulties, introduced in 2018, and it is important that we reiterate here the rationale for introduction of that guidance.

This was to address a position that had arisen over many years in which awareness of visual difficulties that can affect learning, and which may be experienced by individuals with specific learning difficulty (SpLD), came to be dominated by the idea of 'visual stress' and its remediation by coloured filters, to such an extent that SpLD practitioners had incorporated visual stress assessment and its management with coloured overlays into their SpLD assessment practice.

SASC expressed its concerns over this situation as follows:

> *"A range of practices regarding screening and assessment for visual stress has developed within the diagnostic screening and assessment process for a specific learning difficulty. These practices have been developed in good faith by assessors keen to do the best for their clients and they have been guided by previous advice and training provided by the professional bodies in this field. However, many of these assessment practices have tended to be used uncritically and unreflectively and this has led to 'X has visual stress' becoming a ubiquitous conclusion reached in many diagnostic assessment reports without adequate evidence and interpretation, and with recommendations regarding visual stress tending to suggest use of coloured overlays / filters as the only possible form of remediation."*

We also reassert the key messages and advice from the 2018 guidance which, in updated form, are as follows:

Key messages:

- There are many types of visual difficulty that may result in symptoms of discomfort and visual disturbance and which may have an adverse effect on the ability to read, study and learn.
- Visual difficulties of all types occur in individuals with and without SpLD. There is evidence that some types of visual difficulty are more prevalent in individuals with SpLD, but this does not mean that there is an inevitable association between any particular visual difficulty and any particular SpLD.
- The term 'visual stress' refers to a specific condition that should be considered in context along with other types of visual difficulty — it must not be used as a catch-all term for any or every type of visual difficulty.
- In relation to 'visual stress' itself, this is the established and most widely accepted term to describe the condition. The following terminology that has been popular historically — scotopic sensitivity, Irlen syndrome, Meares-Irlen syndrome — is inappropriate and should not be used.
- Symptoms that SpLD practitioners might think of as indicating 'visual stress' are often the result of uncorrected refractive error and/or ocular motor and binocular vision anomalies. SpLD practitioners, specialist teachers, and psychologists cannot assess for these.
- Some visual difficulties are caused by disease so, for safe practice, visual discomfort and disturbance MUST be investigated by a vision professional qualified to identify and manage possible pathological and other causes of difficulty.
- There is widespread concern among clinical vision professionals about dramatic increase in prevalence of two conditions in children in recent years — dry eye disease and myopia.
- The common factor in many visual difficulties in children, including dry eye disease and myopia, is excessive screen-time — i.e. time spent on electronic devices at close working distances. Professionals are united on the need to reduce children's screen-time and encourage outdoor activity to reduce the risks to ocular and visual health. SpLD practitioners may have a valuable role in communicating this message when assessing children and advising their parents.

- SpLD professionals and vision professionals have much to learn from each other and efforts should continue to encourage better communication and cooperative working relationships between them.
- It must be emphasised that treatment of visual difficulties in people with dyslexia and other SpLDs is not for the purpose of remediating SpLD but is to alleviate symptoms of visual discomfort and disturbance that may impair an individual's learning, day-to-day performance, and wellbeing.

Assessors:

- Be aware of the wide range of visual difficulties which may impact reading and other forms of near work, which includes but is by no means limited to 'visual stress'.
- Use the Visual Difficulties Screening Protocol (VDSP) presented in this guidance, as early as possible in the SpLD assessment process. The VDSP involves: checking that there has been a standard eye test (*aka* 'sight test') within the past two years, asking questions about specific visual symptoms & signs of difficulty, and using a simple criterion to decide on the need for referral to an optometrist for further vision assessment.
- Avoid undertaking any structured form of assessment using coloured overlays and/or measurement of visual task performance that might be construed by a student/client as being either a 'vision test', or 'visual stress test', or as being part of the process for assessment of dyslexia/SpLD. Likewise, avoid any communication with a student/client that could be interpreted as suggestive of a 'diagnosis' of visual stress or any other condition affecting vision.
- Carefully consider conclusions relating to SpLD diagnosis — where there is clear evidence of visual difficulty but no substantive evidence of SpLD, then await the outcome of further visual assessment rather than conclude SpLD.

Introduction

The purpose of this guidance is to help SpLD practitioners **understand and recognise the types of visual difficulty** that may occur in individuals with SpLD, dyslexia in particular, and to provide guidance on screening and referral of individuals with visual difficulties for assessment by qualified eye-vision professionals.

The ability to read is fundamental to learning, and (for the vast majority of individuals, who are not blind) reading primarily involves interpretation of visual information. For this reason we naturally expect to pay particular attention to the association between visual difficulties and reading difficulty / dyslexia.

Assessment and identification of dyslexia is especially prominent in the workload of SpLD assessors, and SASC Partner organisations are principally concerned with dyslexia [https://sasc.org.uk/about-sasc/].

However, as we shall see, there is much evidence that dyslexia co-occurs with other SpLDs, and also that various forms of visual difficulty are often reported in different SpLDs, so awareness of the co-occurrence of SpLDs and visual difficulties is an important element in providing support for people with learning difficulties.

The remainder of this guidance provides: 1) a brief overview of SpLDs, 2) a comprehensive research-based overview of types of visual difficulty and their reported associations with SpLDs, 3) explanation of the types of vision professional and 'who does what', 4) a protocol for screening and referral of visual difficulties, which assessors should incorporate into their SpLD assessment procedure, 5) standards of practice in relation to visual stress, and 6) responses to some frequently asked questions (FAQ).

1. Specific Learning Difficulties

1.1. Specific Learning Difficulties (SpLDs) are generally understood to be conditions in which individuals are atypical in some specific aspects of cognitive ability and/or behaviour, which adversely affect their ability to learn [Carroll, 2020].

1.2. The following conditions are identified as SpLDs:

- Dyslexia, defined as "a set of processing difficulties that affect the acquisition of reading and spelling." [Carroll et al., 2025]
- Dyscalculia, defined as "a pronounced and persistent difficulty with numerical magnitude processing and understanding that presents in age-related difficulties with naming, ordering and comparing physical quantities and numbers, estimating and place value." [SASC Guidance, 2025 — available at SASC Downloads]
- Developmental Language Disorder (DLD), described as "language difficulties that create obstacles to communication or learning in everyday life, which have not resolved by five years of age, and are not associated with a known biomedical condition such as hearing loss or autism" [Bishop et al., 2017]
- Developmental Coordination Disorder (DCD), the preferred term for what is otherwise called Dyspraxia, is characterised by "long-standing non-progressive problems of specific motor skill performance, not attributable to any other known medical or psychosocial condition" [Blank et al., 2019]

and the following are related developmental disorders that commonly co-occur with and are included in much of the literature on SpLDs.

- Attention Deficit Hyperactivity Disorder (ADHD), characterised by "the presence of developmentally inappropriate levels of hyperactive-impulsive and/or inattentive symptoms … occurring in different settings (e.g., home and school)" [Faraone et al., 2021]
- Autism / Autistic Spectrum Conditions (ASC), characterised by "deficits in social communication and the presence of restricted, repetitive behaviours or interests" [Hirota & King, 2023, Lord et al., 2018]

1.3. SASC has developed guidance on the assessment and identification of Dyslexia (2025), Dyscalculia (2025), DCD (2020), ADHD (2021) and ASC (2022) — all guidance documents are available from SASC Downloads.

1.4. In relation to dyslexia, in 2021 SASC initiated a major process of review and consultation, to re-examine 1) the concept and definition of dyslexia and 2) the practice of dyslexia assessment and identification. This involved a consultation paper and online SASC member survey in 2022, followed in 2023 by a Delphi process aimed at achieving consensus of academics, researchers and practitioners on these issues. The conclusions of the review are available in the following two publications: *Toward a consensus on dyslexia: findings from a Delphi study* [Carroll et al., 2025], and *Towards a consensus for dyslexia practice: findings of a Delphi study on assessment and identification* [Holden et al., 2025].

1.5. Notwithstanding the fact that debate on the definition of dyslexia is ongoing [e.g. Snowling & Hulme, 2024; Elliott & Grigorenko, 2024], the results of the Delphi Study will naturally inform the SASC approach to its guidance in the area of dyslexia henceforth. Therefore we include below the definition from Carroll et al., 2025, Table 2 which should now provide the perspective from which we approach our consideration of various difficulties, including visual difficulties, that might be experienced in dyslexia.

1.6. It is notable that the new Delphi Definition of Dyslexia explicitly recognises co-occurrence of difficulties, reflecting the evidence from a growing body of literature — e.g. see Grigorenko et al. [2020] for an overview of this from a US perspective, and Van Bergen et al. [2023] who studied a large sample of children with dyslexia, dyscalculia, and ADHD in the Netherlands. This is relevant in the context of this guidance, which draws attention to the association of visual difficulties with various SpLDs, not only dyslexia.

📌 Delphi Definition of Dyslexia [Carroll et al., 2025]

- Dyslexia is a set of processing difficulties that affect the acquisition of reading and spelling.
- In dyslexia, some or all aspects of literacy attainment are weak in relation to age, standard teaching and instruction, and level of other attainments.
- Across languages and age groups, difficulties in reading fluency and spelling are a key marker of dyslexia.
- Dyslexic difficulties exist on a continuum and can be experienced to various degrees of severity.
- The nature and developmental trajectory of dyslexia depends on multiple genetic and environmental influences.
- Dyslexia can affect the acquisition of other skills, such as mathematics, reading comprehension or learning another language.
- The most commonly observed cognitive impairment in dyslexia is a difficulty in phonological processing (i.e. in phonological awareness, phonological processing speed or phonological memory). However, phonological difficulties do not fully explain the variability that is observed.
- Working memory, processing speed and orthographic skills can contribute to the impact of dyslexia.
- Dyslexia frequently co-occurs with one or more other developmental difficulties, including developmental language disorder, dyscalculia, ADHD, and developmental coordination disorder.

1.7. There is a need for all professionals with knowledge of this area to promote a clear distinction between ’reading difficulty’ and ‘dyslexia’. The importance of this cannot be emphasised too strongly — the looseness with which many people use the term dyslexia has even prompted leading authorities in the field to assert “the term dyslexia should not be used as a shorthand for reading disorder” [Snowling et al., 2020, p507].

1.8. Addressing a visual problem in order to reduce or overcome a visual difficulty that affects reading should in no way imply ‘treatment of dyslexia’, but the failure to make this distinction has led to much unnecessary confusion, controversy and mis-representation. Therefore, a major goal of this guidance is to provide SpLD professionals with a comprehensive overview of visual difficulties and their association with dyslexia and other SpLDs, so that they may be well-placed to disseminate a better understanding through their advice to clients/students, parents, teachers and other relevant professionals.

2. Visual Difficulties

2.1. Many learning activities involve study of visual material, to such an extent that it has been argued that, in general, ‘learning is visual’ and that teachers (and other professionals) should have a better understanding of the importance of students having clear and comfortable vision [Wilhelmsen & Fender, 2021].

2.2. Students who experience problems with their vision are likely to face difficulties in the learning environment, whether or not they are identified as having an SpLD. Students identified as having an SpLD may present with visual difficulties which exacerbate their difficulty with learning from visual material, even if these difficulties are not necessarily associated with the condition defining their SpLD.

2.3. The main responsibility of SpLD Assessors is to identify SpLD and to provide guidance on the support required. The SpLD assessment model typically involves a single assessor carrying out a diagnostic interview, administering a range of tests and reaching a diagnostic conclusion. However, assessors are also advised to consider, where appropriate, referral to a range of educational and health-related professionals who, together, can provide the necessary expertise to reach a correct diagnosis and offer appropriate support.

2.4. SpLD Assessors therefore need to be aware that difficulties with study and learning in some students with SpLD may be exacerbated, or caused, by a vision-related problem. In such cases assessors should be able to recognise the presence of a visual difficulty, so that the student can be referred to a professional qualified to diagnose and manage conditions affecting the eyes and vision.

2.5. The purpose of this guidance is to provide a comprehensive overview of visual difficulties and their association (in some cases) with SpLDs, and a protocol for assessors to undertake screening for visual difficulties and refer clients to a qualified professional for further investigation if necessary.

Presentation and Prevalence

2.6. Visual difficulties that overtly affect an individual's performance will typically give rise to symptoms of discomfort and/or visual disturbance that are usually, though not always, associated with the activity of reading or sustained study of visual material at near working distances.

2.7. Such visual discomfort and disturbance is generally called *eyestrain* or *asthenopia*, and is a long-recognised problem. Take, for example, the following description by Derby [1862]:

> *" … reading, writing, or any other employment requiring near objects to be viewed, induces fatigue; objects become confused and indistinct, and a sense of tension is felt above the eyes. Such a height does this reach, that temporary relinquishment of the employment is rendered necessary. After resting a few moments, vision becomes again distinct, but the same symptoms develop themselves again sooner than before. As long as the eyes are not employed on near objects vision appears normal, and no disagreeable sensation is experienced. No sooner, however, does the patient … attempt to continue his previous occupation, than the symptoms become more and more pronounced; … Has too persistent an effort been made, all work on near objects must be given up for a considerable period."*

The term *asthenopia* covers both 'internal' vision-related symptoms of the sort described above (fatigue, headache, perceptual confusion and blurred, unstable or double vision) and 'external' ocular symptoms (general eye ache or specific sensations of dry, watery, burning or itchy eyes). The extract above specifically describes asthenopia associated with concentrated near work; that is, work at a viewing distance of 40cm or less. It is in this context that many schoolchildren, students, and workers experience visual discomfort and disturbance.

2.8. A number of studies provide estimates of asthenopia prevalence in schoolchildren. Vilela et al. (2015a) conducted a systematic review and meta-analysis to estimate asthenopia prevalence in children aged 0-18 years. From five eligible studies involving 2465 children, the pooled prevalence of asthenopia was 19.7%**.**

2.9. Older children (10-18 years old) are more likely to report asthenopia than younger children (under 10 years old), as they are likely to be more aware of the symptoms associated with asthenopia and spend longer hours studying and using digital devices [Vilela et al., 2015b; Hashemi et al., 2017; Junghans et al., 2020].

However, awareness of visual difficulties in younger children may be poor. Children themselves are often unable to recognise their own difficulty, as they have no other visual experience with which to compare it, and parents and teachers may also be unable to recognise problems.

A study by Hanks & Chapman [1988] found that 30% of 151 children examined had significant visual problems, and that almost half of those with a visual problem were unaware of it, as were their parents and teachers. More recently, in one area of the UK, there has been an effort to increase teachers' knowledge of childhood vision problems and their awareness of the effect of these on children's progress and behaviour [McClelland et al., 2018], but overall the problem of awareness remains relatively unaddressed. There is therefore an important role for SpLD assessors working with children to help ensure that visual difficulties affecting these children are not overlooked.

2.10. A study of asthenopia prevalence for students in further/higher education, whose study activities are defined by the requirement for intensive near work, reports similar findings [Hashemi et al., 2019]. Most if not all students now engage in intensive near work persistently through use of computers and portable devices, and a number of studies draw attention to the prevalence of asthenopia in this context. Vilela et al, [2015c] conducted a systematic review and meta-analysis to estimate asthenopia prevalence and risk factors associated with use of computers by adults. From 22 eligible studies the pooled prevalence of asthenopia was 40.4%. Other, more recent, studies specifically discuss the visual implications of electronic device usage by schoolchildren [e.g. Ichhpujani et al., 2019; Hamburger et al., 2022].

2.11. Results cited above indicate that **a large proportion of children and adults undertaking intensive near work**, **which includes reading along with a wide range of computer-based tasks, will experience symptoms of visual discomfort and disturbance**.

2.12. Note that the studies cited above did not include individuals with learning difficulties. However, Evans et al. [1999] reviewed the management of 323 consecutive patients attending a learning difficulties clinic. The sample involved both children and adults (age range 4-73 years), 69% of whom had been diagnosed as having specific learning difficulty, and 48% of these individuals reported more than two symptoms of visual discomfort and/or disturbance, while 19% reported more than four. A more recent study by Raghuram et al. [2019] used a symptom questionnaire and other measures to assess children aged 7-11 years (33 typical readers, 28 with dyslexia) and found vision-related symptoms to be more frequent in the children with dyslexia.

2.13. Taken together, the studies cited indicate that prevalence of visual difficulties in the general population — both children and adults — is high, and we can safely assume that it is at least as high in those who have specific learning difficulties.

2.14. It must be emphasised that **the finding of visual difficulties in people with specific learning difficulties does not imply that visual difficulty causes learning difficulty, or that treatment of visual difficulty is treatment of learning difficulty**. However, if people with SpLD also have visual symptoms then it follows that these are likely to exacerbate their difficulty with learning from visual material.

2.15. Recognition of visual symptoms is the starting point for identification of difficulties that may require treatment. The purpose of this guidance is both to inform — so that assessors have a better understanding of the types of visual difficulty that may affect people with SpLD — and to provide a framework for assessors to investigate the occurrence of visual symptoms in their clients, and to refer clients as necessary to a qualified vision professional.

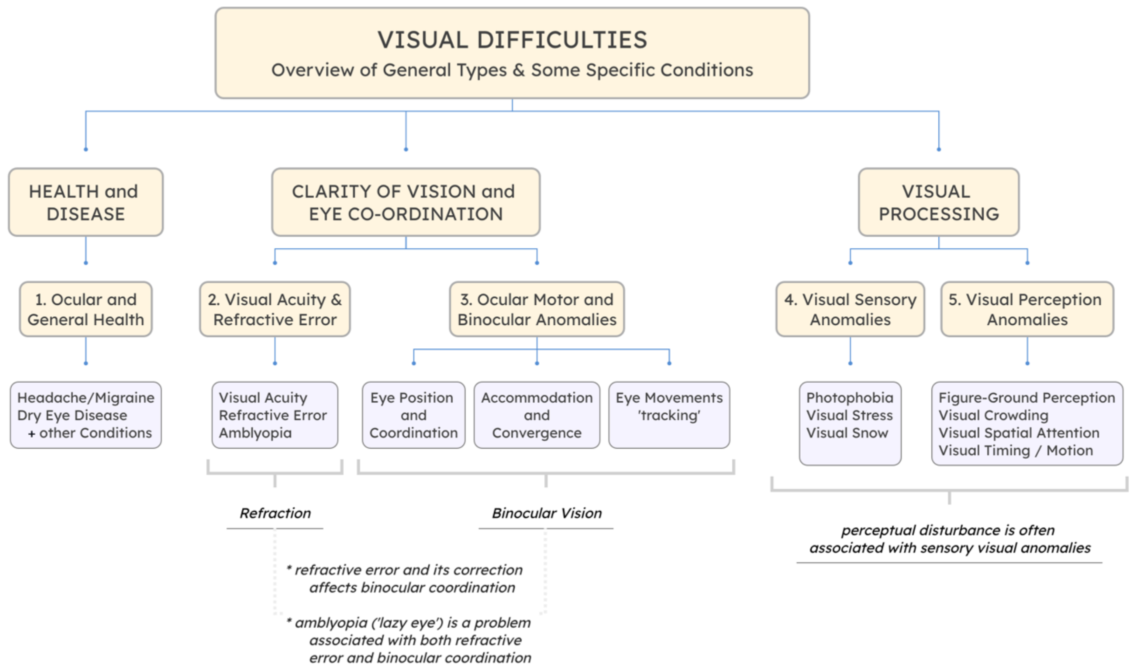


FIGURE 1. Overview of Visual Difficulties

2.16. FIGURE 1 shows a graphical overview of general types of visual difficulty and some specific conditions of importance in the context of SpLDs. A comprehensive elaboration of this figure is provided in APPENDIX 1.

3. Vision Professionals — who does what?

3.1. Individuals identified by SpLD Assessors as having significant visual symptoms should be referred to a qualified, registered eye-vision professional. For clarification:

- Qualified means having undertaken an approved course of study resulting (typically) in the award of a university degree meeting the standard required for membership of a professional body.
- Registered means registered with, and therefore required to adhere to the standards set by, a Professional, Statutory and Regulatory Body (PSRB). These bodies act in the public interest to regulate the professions, and have the statutory authority to define and regulate the standard of practice of the profession as a whole, and of individual registrants. As part of this authority, PSRBs also accredit the university courses that lead to professional qualifications.

3.2. Referral to a qualified, registered professional assures that the practitioner has appropriate knowledge and expertise in the area, and also that there is a mechanism for public protection via the relevant PSRB should a registered practitioner fail to uphold standards of practice. This is important, as no such safeguard exists for unregistered providers of services who may offer assessment and treatment on issues such as visual stress and visual processing difficulties.

3.3. In the UK there are four regulated professions with qualifications relating specifically to eyes and vision (FIGURE 2).

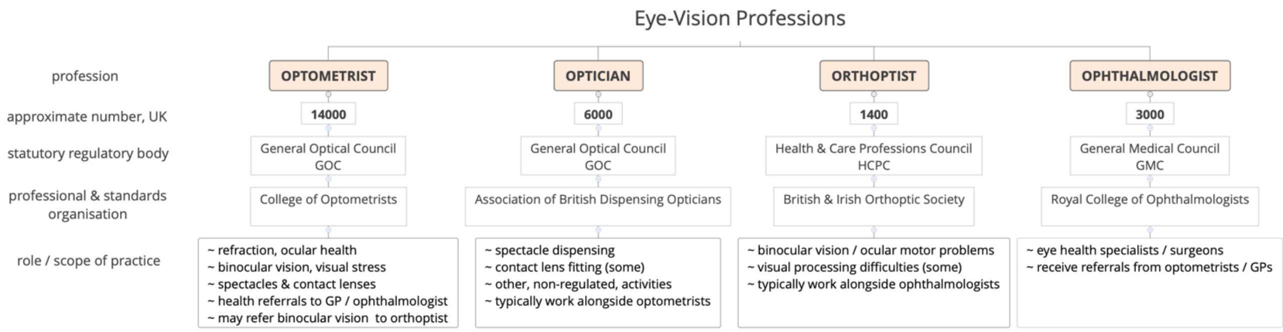


FIGURE 2. Regulated Eye-Vision Professions in the UK

Optometrists work principally in primary/community care in 'high-street' practices, and some work in secondary care in hospitals. All optometrists provide **sight tests**, which involve refraction and assessment of the health of the eyes and visual system, including assessment of any ocular or visual conditions that may be indicative of general health problems such as diabetes. As optometrists are non-medical practitioners, almost all cases of disease are referred to an ophthalmologist, though an increasing number of optometrists now hold additional qualifications as 'independent prescribers' that enable them to treat some types of eye disease. All optometrists are trained and qualified in assessment and treatment of ocular motor / binocular vision dysfunction, but many choose not to apply their expertise in these areas of practice.

Note that, under UK law [Opticians Act, 1989] the term **sight test** is legally defined and restricted, which means that prescribing for correction of refractive error may only be undertaken by either qualified medical practitioners or optometrists. In practice, however, few medical practitioners have the expertise to undertake such work, so it can be assumed that almost all sight tests ('eye tests') are carried out by optometrists.

Behavioural (Developmental) Optometrists

The term behavioural, or developmental, optometrist describes an optometrist who practises with specialist interest and additional training in vision development and visual processing difficulties, and in how vision affects the performance of tasks in everyday life.

In case of doubt, note that 'optometrist' is a legally protected title [Opticians Act, 1989, paragraph 28]. Therefore, anyone using the title 'behavioural optometrist' must be a qualified, registered optometrist. In the UK, optometrists who practise as behavioural optometrists are represented by the British Association of Behavioural Optometrists (BABO) — they are very few in number (< 100).

See further discussion of the role of behavioural optometrists in FAQs (Section 6 of this document).

Opticians (*aka* Dispensing Opticians) principally supply spectacles to prescriptions provided by optometrists. Some opticians have additional qualifications that allow them to fit and supply contact lenses. They may in some cases also undertake assessment and treatment of visual stress using colour, because this activity is not regulated under law. However, opticians cannot legally undertake a sight test (see above), nor are they qualified to assess or manage binocular vision and ocular motor dysfunctions. Opticians typically work alongside optometrists in community ('high-street') practices. As their expertise relates principally to provision of optical appliances, rather than assessment, diagnosis or treatment of visual difficulties, we will exclude them from further discussion here.

Orthoptists are experts in diagnosing and treating defects in eye movement and problems with how the eyes work together (binocular vision). Some orthoptists with specialist expertise also undertake assessment and treatment of visual stress and other visual processing difficulties, but this provision is not universal. Most orthoptists are employed by the NHS in hospitals or community eye services, and many also work in rehabilitation centres and special schools. They may also work in multidisciplinary hospital teams, alongside ophthalmologists and optometrists.

Ophthalmologists are medically qualified and deal with the diagnosis, treatment and prevention of diseases of the eye and visual system. Their expertise is in medical and surgical treatment of conditions involving the eyes, and generally they do not undertake assessment and management of visual difficulties. Ophthalmologists work typically in NHS hospitals and/or private eye clinics, often in multidisciplinary teams that include other eye-vision professionals.

FIGURE 3 shows how the scope of practice of each eye-vision profession maps (approximately) onto the overview of visual difficulties described in APPENDIX 1.

3.4. With reference to FIGURE 3:

- NHS Sight Test indicates the aspects that must be covered in a legally-defined sight test.
- Optometrists are responsible for almost all sight tests, so we see that the solid line for the optometrist's scope of practice corresponds to the sight test requirement. This constitutes a minimum within which we rely upon the sight test to detect and correct all forms of visual difficulty that result from refractive error, and to identify the need for additional investigation or treatment, whether in relation to eye health or binocular vision. The dashed line for the optometrist's scope of practice indicates that some but not all optometrists undertake full assessment and management of binocular vision and visual stress beyond the requirement of the sight test.
- Behavioural Optometrists have scope of practice that extends over the whole range of visual difficulties represented by the overview in FIGURE 3.
- Orthoptists are primarily concerned with assessment and management of binocular ocular-motor anomalies affecting eye coordination and movement. A minority of orthoptists with special interest in visual processing difficulties have a broader scope of practice extending to the areas of sensory anomalies and, in some instances, aspects of visual perception.

- The expertise of orthoptists is principally in assessment and management of ocular motor anomalies, an area in which many optometrists do not practise, so there are referrals from optometrists in primary care to orthoptists in secondary care (hospitals) to address such difficulties.
- Ophthalmologists' medical qualifications permit them to practise in all areas of visual difficulty. Although some do extend their scope of practice into the areas covered by optometrists and orthoptists, the majority are almost exclusively concerned with ocular health and disease, with a number of areas of sub-speciality including cataract, glaucoma, retinal disease and degeneration.

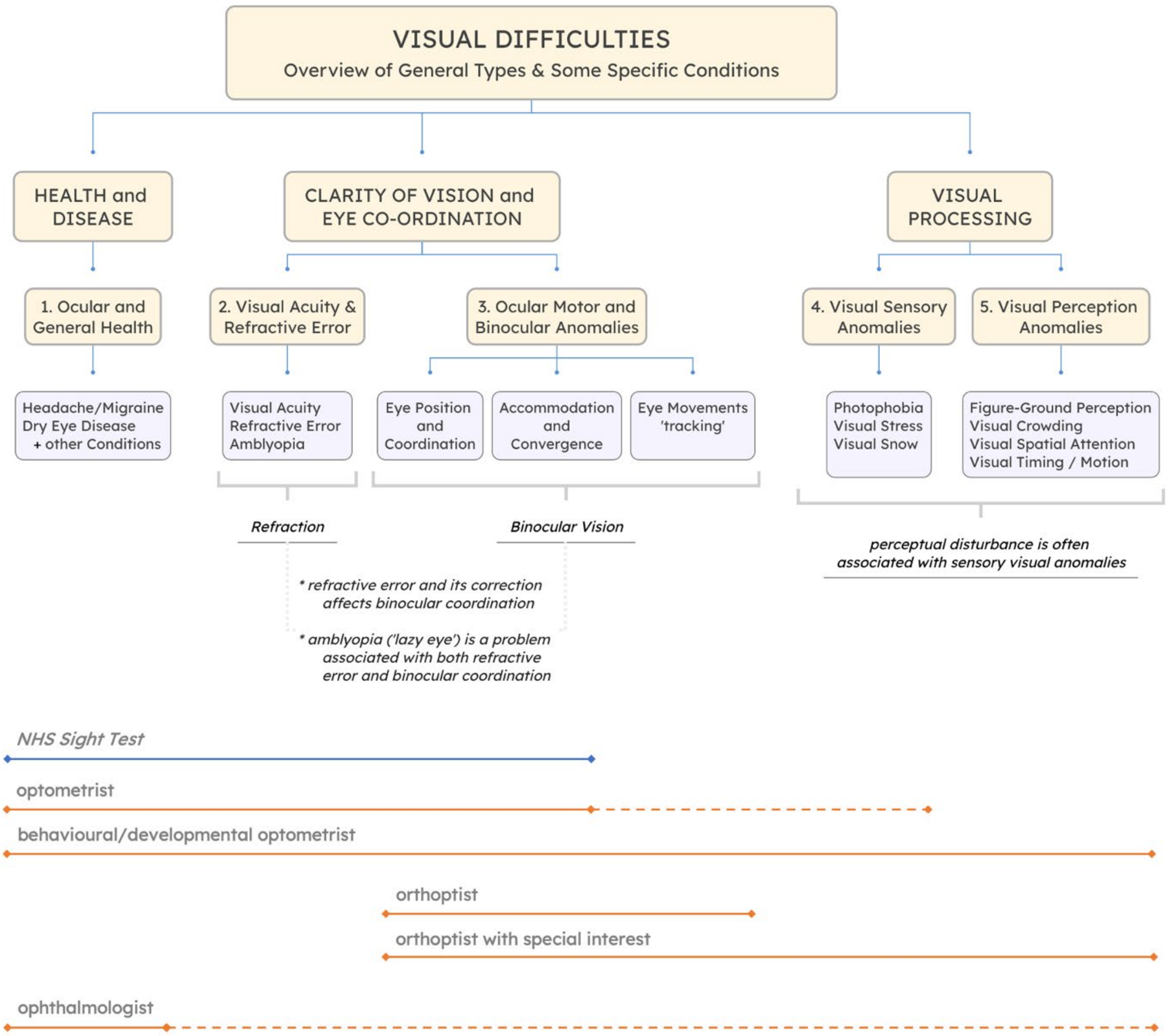


FIGURE 3. The scope of practice of eye-vision professions

3.5. The following section describes a framework and protocol for SpLD practitioners to screen individuals for visual difficulties and, if necessary, refer them for further assessment and management by an optometrist.

4. Visual Difficulties Screening Protocol

4.1. As described above, visual difficulties that affect an individual's performance will typically give rise to **symptoms** of discomfort and visual disturbance, which may result in changes in behaviour as an effect of the symptoms, or as a strategy to cope with the difficulty. These behavioural changes are often helpful **signs** that the individual is experiencing visual difficulty. Often, though not always, visual difficulties will be exacerbated by tasks involving sustained and intensive reading or studying of visual material.

4.2. The role of the SpLD practitioner is to undertake visual difficulties screening (if it is feasible to do so) and refer the individual for professional assessment, if necessary, on the basis of this screening.

4.3. The screening protocol described below provides two short questionnaires, which assessors should use to gather information on an individual's visual history and any symptoms and signs of visual difficulty, and a template letter for referral to an optometrist if required on the basis of the questionnaire responses.

4.4. **It must be emphasised that assessment of visual difficulties by an SpLD practitioner is to be limited to recording of reported symptoms and signs — there must be no attempt to suggest a diagnosis or propose a treatment, for the following reasons:**

- In some cases there may be ocular or visual system pathology, so symptoms MUST be investigated by a qualified professional.
- Refractive problems are a very common cause of symptoms, but assessment and management of these can only legally be undertaken by suitably qualified, registered professionals.
- Similar symptoms, especially involving headache and eyestrain, may have very different causes and so a variety of assessments and professional knowledge may be required to reach a correct diagnosis.

4.5. Note specifically that, in keeping with advice in the previous paragraph (4.4), SpLD practitioners, specialist teachers, and others involved in providing support to individuals with SpLD should not undertake assessment aimed at identification and treatment of 'visual stress'.

Symptoms and Signs

4.6. An individual will generally present symptoms and signs of visual difficulty in one or more of three ways, according to i) what s/he FEELS (visual discomfort), ii) SEES (visual disturbance), and/or iii) DOES (behaviour — voluntary or involuntary reactions or coping strategies). Each of these will have its own degree of intricacy.

4.7. For example, visual discomfort may present as feelings of eyestrain with aching, painful or gritty eyes, or as feelings associated with or induced by the visual discomfort itself, such as headache and nausea. Feelings of visual discomfort may be brought on by either a single factor or a combination of factors such as the task, the environment and the individual's threshold for reporting the problem. The degree of visual discomfort experienced and the point at which it becomes troublesome will vary on an individual basis. This introduces a level of complexity for the SpLD practitioner when trying to decide on an appropriate course of action to help the individual reporting visual difficulties.

4.8. An indication of types of experience commonly presented in each of these categories is:

- FEELS (symptoms) — Visual Discomfort: headache; eyestrain; tired eyes; gritty eyes; sore eyes; general fatigue.
- SEES (symptoms) — Visual Disturbance: blurred vision at distance and/or near; text/objects go in and out of focus; double vision at distance and/or near; text/objects alternate between single and double; words jump or move on the page; missing words or lines when reading; seeing patterns, shimmer, flicker, colours, and/or illusions when reading.
- DOES (signs) — Behavioural Response / Coping Strategies: holding reading material closer or farther away than normal; screwing eyes up to see more clearly; frequently rubbing the eyes; pointing with a finger to keep place when reading; looking around or blinking to alleviate discomfort, avoiding reading; turning away or aversion to viewing some types of pattern.

FIGURE 4 shows how these examples of symptoms and signs may relate selectively to different types of visual difficulty. Note: this list is by no means exhaustive, but indicates the most common signs and symptoms of visual difficulty that should alert SpLD practitioners to consider a referral.

	Symptom or Sign	MYOPIA	HYPEROPIA	ASTIGMATISM	ACCOMMODATION DYSFUNCTION	CONVERGENCE DYSFUNCTION	OTHER OCULAR MOTOR	OTHER
FEELS Discomfort	Headache	x	x	x	x	x	x	x
	Eyestrain	x	x	x	x	x	x	
	Tired eyes	x	x	x	x	x	x	
	Gritty eyes	x	x	x	x	x		x
	Sore eyes						x	
SEES Disturbance	Blurry when reading		x	x	x	x		
	Blurry at distance	x		x				
	Double vision		x	x	x	x	x	x
	In and out of focus			x	x			
	Unstable image					x	x	x
	Moving text					x	x	x
	Patterns seen							x
DOES Behaviour	Screw up eyes when reading		x	x				
	Screw up eyes when looking at distance	x						
	Hold objects up close	x						
	Move objects away		x	x	x	x		
	Rub eyes	x	x	x	x	x	x	x
	Skip words / lines					x	x	x

FIGURE 4. Frequently-reported symptoms & signs, related to some common conditions that cause them.

Screening Protocol

4.9. FIGURE 5 shows a flowchart of the visual difficulties screening protocol, with explanation of details in paragraphs below.

4.10. The flowchart in FIGURE 5 can be read from left to right. The panel on the left is a summary representation of a proposed model for dyslexia assessment, from the recent (SASC-supported) Delphi Study on Assessment and Identification of Dyslexia [Holden et al., 2025, p13, Figures 1 & 2]. For simplicity and generality here we label this 'SpLD Assessment' with no distinction between whether assessment relates to a child or an adult — but we outline the three key stages of the assessment model to show that explicit consideration of the possibility of problems affecting vision should occur at the first stage of SpLD assessment. Thus, the arrowhead located here is routed to the start of the Visual Difficulties Screening Protocol (VDSP Start).

4.11. From VDSP Start we move to collection of information on visual difficulties and visual history using questionnaires. The + sign indicates that both questionnaires must be completed, but the order in which they are completed does not matter. The responses given on these questionnaires lead to one of 3 decisions on action to be taken, indicated here using a 'traffic-light' (red, amber, green) colour scheme:

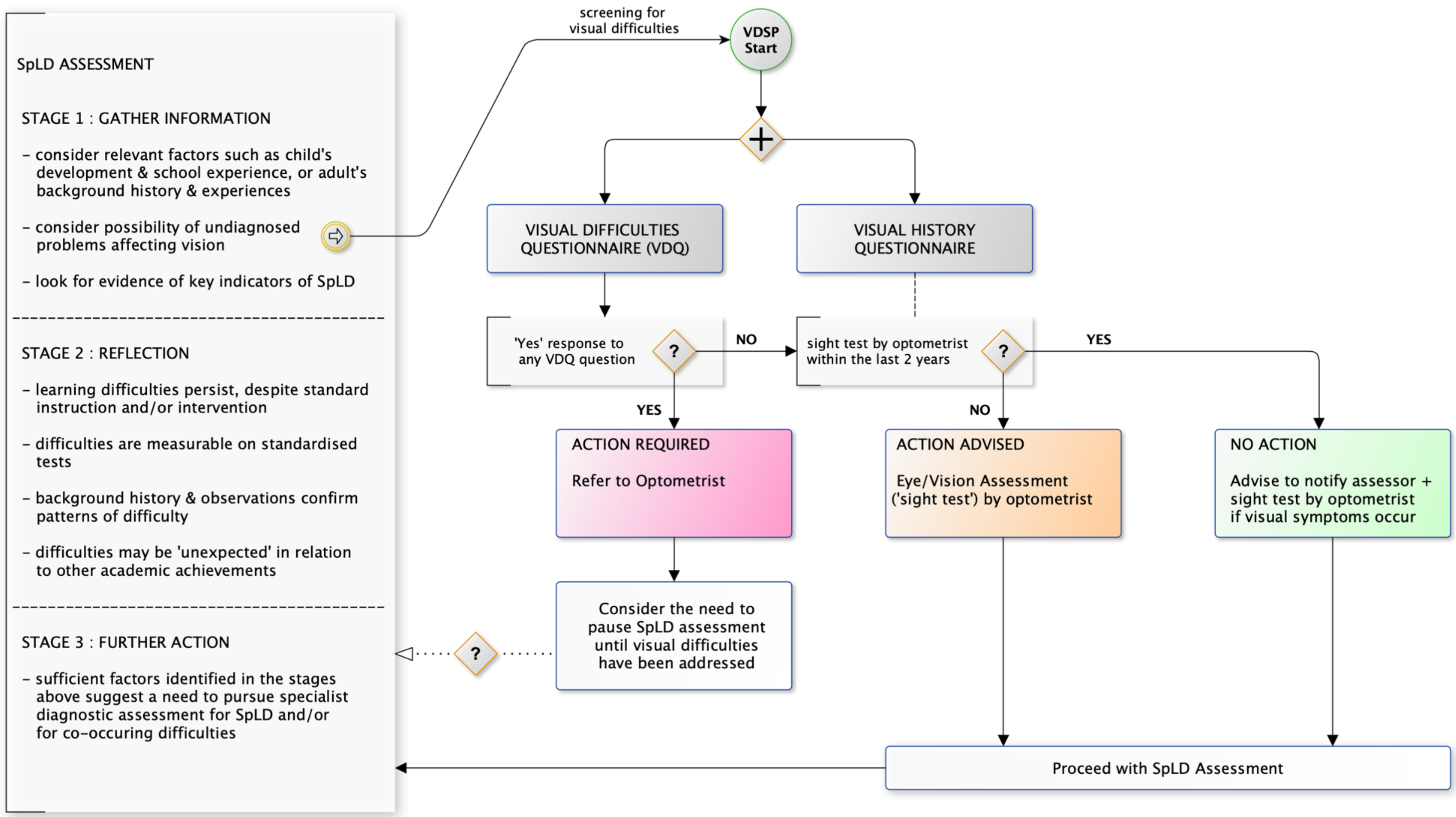
- **RED** — If the individual answers YES to any question on the Visual Difficulties Questionnaire, then referral to an optometrist for further assessment is required, regardless of whether there is any recent history of a sight test.

If all questions on visual difficulties symptoms & signs are answered NO, then action depends on sight-test history …

- **AMBER** — if the individual has NOT had a sight test by an optometrist within the last 2 years, then a sight-test at this stage is advisable.
- **GREEN** — if the individual has had a sight test within the last 2 years then no action is required now, but general advice may be given to consult an optometrist if they experience any persistent symptoms of the sort indicated.

4.12. For cases having no visual difficulties requiring referral (i.e. AMBER & GREEN outcomes) the SpLD assessment may of course proceed uninterrupted. However, for cases requiring referral (RED) the SpLD practitioner will need to consider whether the visual difficulties reported are likely to have such an adverse effect on other tests that there should be a pause in the assessment process until visual difficulties have been addressed. This may not be clear-cut but, as a general guide, symptoms of frequent and/or severe visual disturbance (e.g. words moving, print going double, or going in and out of focus, etc.) are likely to have an adverse effect on performance in measures of reading rate, orthographic skills and rapid automatized naming.

FIGURE 5. Visual Difficulties Screening Protocol (VDSP) as part of SpLD Assessment



Visual History Questionnaire

4.13. The following questions provide information on visual history, which helps in putting any reports of current visual difficulties into context.

QUESTIONS	RESPONSES	NOTES
1. Have you been prescribed and advised to wear any optical prescription lenses (i.e. glasses or contact lenses)? if YES then: 1a. Are these required for distance vision (e.g. television), near vision (e.g. reading), or both? 1b. Do you wear your glasses / contact lenses as advised? 1c. Do you have your glasses / contact lenses with you today?	Yes / No Dist / Near / Both Yes / No Yes / No	 If correction prescribed and normally worn for near work, then it should be worn for SpLD assessment
2. How long ago was your last sight test or eye test by an optometrist ("optician") — less than two years ago, more than two years, or NEVER?	< 2 years > 2 years Never	see Screening Protocol above for use of the response to this question
3. Have you ever used coloured overlays or precision-tinted lenses? if YES then: 3a. Who recommended and provided these? 3b. Why were they recommended? 3c. Did they help? — if YES, in what way? 3d. Do you still use them? — if NO, why not?	Yes / No	
4. Have you ever had hospital treatment for a problem with your eyes or vision? for example ... — wearing a patch for a 'lazy eye' (amblyopia)? or — wearing glasses or having exercises to help correct a 'turn' in your eye (squint)? or — any other condition?	Yes / No	

Visual Difficulties Questionnaire (VDQ)

4.14. The VDQ requests simple yes/no answers to a few questions about symptoms and signs involving FEEL (visual discomfort, Q1-3), SEE (visual disturbance Q4-7), DO (behaviour Q8-9), and one general question (10) about any other experience.

QUESTIONS	NO	YES
often = persistent, occurring several times a week, though not necessarily every day 1. Do you often get headaches when you read or study? 2. Do your eyes often feel sore, or gritty, or watery? 3. Does reading from white paper or from a bright screen often feel uncomfortable? 4. Does print often appear blurred, or go in and out of focus, when you are reading? 5. Does the print, or book, or screen, often appear double when you are reading? 6. Do words often seem to move or merge together when you are reading? 7. Do objects in the distance often appear more blurred after you have been reading? 8. Do you often have to screw up your eyes to see more clearly when you are reading? 9. Do you often move your eyes around or blink to make things clearer or more comfortable when you are reading? 10. Do you experience any other problems with your vision that interfere with your ability to read or study? If YES then describe:		

4.15. Note the emphasis on the word **often** in questions 1-9, which is deliberately intended to identify when a symptom occurs frequently. Therefore, the individual should be advised to answer NO if reported symptoms would be considered infrequent (e.g. rarely, occasionally, sometimes, <2-3 times per month).

Referral Letter Template

4.16. The following is a suggested template for a referral letter to an optometrist. Copies of the completed Visual History and Visual Difficulties Questionnaires must be sent with this letter.

To Whom It May Concern

(cc. as relevant)

Re: Name of child/young person/adult

DOB:

XXX was recently referred to me for an assessment to investigate the possibility of a specific learning difficulty / because of concerns about ....

Delete as appropriate ...

- A diagnosis of .... was given.
- A diagnosis of specific learning difficulty was not given.
- Assessment not yet completed due to reported visual difficulties.

Information about XXX's visual history was gathered before the assessment, and (XXX, teacher, family etc) reported symptoms and/or signs of visual difficulties (see enclosed).

These difficulties seem to be having an impact on XXX's ability to ....

I am writing to support a request that XXX be referred to an optometrist for further investigation, which should include a sight-test, a detailed assessment of binocular vision function, and any other tests deemed necessary in relation to reported history and symptoms.

The optometrist may choose to refer the individual named above for further specialist investigation as deemed appropriate.

A report of the findings and outcome should be provided by the optometrist or other eyecare practitioner involved in the investigation.

Yours etc

Your name, qualifications and contact details.

Date:

4.17. Note that the referral letter includes an option to indicate whether the SpLD Assessment has been paused due to the visual difficulties reported (see paragraph 4.12 above). An ideal scenario is generally that screening, referral, and subsequent management of any visual difficulties would be carried out before SpLD assessment, but in practice this may result in time delays and related difficulties for the individual concerned. The SpLD practitioner must consider whether resolution of the optometry assessment is required before the SpLD diagnosis can be reached, or whether the investigations may run concurrently, bearing in mind that other agencies / healthcare professions may also be involved in the assessment process.

5. Standards of Practice in relation to Visual Stress

Previous sections of this guidance have reasserted the recommendation that SpLD practitioners should not undertake assessment, identification ('diagnosis') or treatment of visual stress.

This section presents an updated view of a summary, provided originally as an extension to the guidance in 2018, of what may be regarded as Good, Acceptable, and Problematic practices on the issue of visual stress assessment within SpLD assessments.

Standards of practice may be guided by at least two principles:

1. Include only those tests and procedures that are *necessary and sufficient* for identification of SpLD. By this principle, the inclusion of visual stress within SpLD assessment is unnecessary, inappropriate, and potentially misleading for the client, as visual stress is not recognised as a defining or identifying characteristic of dyslexia or other SpLD [Carroll et al., 2025; Holden et al., 2025].
2. Recognise professional boundaries and work within the limits of your competence.
   By this principle, assessment and treatment of visual stress by an SpLD practitioner can be problematic when an individual presents with a different or more complex visual difficulty, requiring a different form of assessment and treatment, but fails to have this professionally investigated on the basis that coloured overlays given for apparent visual stress provide some relief of symptoms.

The extent to which these two principles apply is the basis for the following description of SpLD assessment practices:

Good practice

- Practitioner administers the visual difficulties screening protocol (VDSP) comprising: i) questions on visual and sight test history, and ii) symptoms & signs of visual difficulty.
- There is no attempted assessment or 'diagnosis' of visual stress but, if necessary, based on the screening criteria, referral to an optometrist to investigate the visual difficulties reported.
- If requested or initiated by the client, discussion of the *possible* benefits of coloured filters (overlays or lenses) to alleviate some symptoms of visual difficulty, but advise that symptoms may have a number of causes that should be properly investigated before considering that visual stress is the problem and coloured filters the solution. This advice may be usefully supplemented by providing a copy of the information in APPENDIX 2 of this guidance.

Why is this Good?

This approach ensures that the SpLD practitioner observes professional boundaries and is aware of the limitations of their knowledge and expertise.

The practitioner acknowledges that their primary role is SpLD assessment and that, regardless of their training and expertise, selective inclusion of visual stress assessment within SpLD assessment is unnecessary, inappropriate, and potentially misleading for the client, as visual stress is not an identifying characteristic of dyslexia or other SpLD.

The practitioner prioritises client safety by recognising and advising assessment by another professional having the necessary expertise and qualifications.

Acceptable practice

- Client requests the use of a coloured overlay or lenses, during reading or other tests, on the basis that this is their normal way of working.

Why is this Acceptable?

If the individual has a known history of visual stress and requests the use of a coloured overlay or lenses during an assessment this should not be refused. It may be regarded in the same way as ophthalmic prescription lenses (glasses or contact lenses) that the individual relies upon to correct or alleviate a recognised difficulty. In such cases the assessor should note the use of the overlay (and the history of its use) in the report.

If the person assessed has already been using overlays / lenses and wishes to continue using these in tests and examinations, whether or not a SpLD is identified or confirmed, there should be a recommendation that this provision should continue since the use of the overlay / lenses can confer no unfair advantage. Once again, this is analogous to use of prescription lenses — if the use of coloured overlays or lenses is established and the client relies upon this to alleviate visual symptoms, then permit their use as if they have been prescribed as part of the management of a recognised difficulty.

With this approach there is no implication that the SpLD practitioner is taking any position on assessment of visual stress within the SpLD assessment, but is simply acknowledging the right of the individual to use whatever aids (coloured overlay, precision-tinted lenses, prescription lenses) are already recognised as being necessary to alleviate a visual difficulty.

Problematic practice

- An assessor incorporates a formal assessment of visual stress within the SpLD assessment. Such assessment would typically involve: a) administration of reading rate, and/or other tests, with and without coloured overlays (such as *Crossbow Visual Stress Assessment Pack or Institute of Optometry Intuitive Overlays*) to obtain qualitative and/or quantitative evidence of an improvement in the skill tested, or b) administration of an *Irlen* assessment, if the assessor has undertaken training in this method.

Why is this Problematic?

These approaches violate the two principles outlined above by incorporating an assessment that is unnecessary for the purpose of identifying dyslexia (but may reinforce the misleading idea that visual stress does have a defining association with dyslexia), and by attempting to selectively address one aspect of visual function without the expertise to put this into context, running the risk that an individual with other visual difficulties will fail to have these fully investigated by a qualified professional.

6. Frequently-Asked Questions (FAQs)

Since introduction of the previous guidance in 2018, a number of practitioners have written to SASC with questions on the rationale and implementation of various aspects of that guidance. Many of these have been taken into account and answered in the text above and/or Appendices. However, a number of issues remain. This final section presents some FAQs under a variety of sub-headings:

Visual Difficulties Screening Protocol, and Referral to Optometrist

Q1. At what point in the assessment process should I screen for visual difficulties?

See the protocol flowchart in Section 4 above — visual difficulties screening should occur as early as possible in the SpLD assessment process.

Q2. To whom should I refer individuals with visual difficulties?

In almost all cases, referrals should go to a community ('high-street') optometrist — this is the default position. Optometrists should normally be the first point of contact for assessment of any form of visual difficulty — their role is essentially that of 'GP for eyes and vision' in the sense that they are readily accessible in primary-care settings, they can assess and treat a wide range of conditions, and will refer on to specialists in secondary-care settings if necessary.

The only exception to this would be the case of an established local arrangement for referral of individuals with SpLD directly to a specialist clinic. Such clinics will usually be optometry-led, for example, at the Institute of Optometry (London) or at University Schools of Optometry in various locations across the UK, but in some areas there may also be arrangements to refer to orthoptics-led clinics such as the Dyslexia Research Trust or hospital-based orthoptics clinics in various locations.

Q3. Is an optometrist the same as an optician?

No. Optometrists and opticians are different professions, having different programmes of education and training, and different qualifications — see Section 3 above.

Opticians, *aka* dispensing opticians, are qualified to supply appliances having optical prescription lenses (i.e. glasses and, with a higher qualification, contact lenses), but they are not permitted to conduct sight tests or eye examinations to determine the optical prescription required — this is the domain of the optometrist. Confusion arises because the majority of optometrists are employed by well-known high-street businesses that described themselves as 'opticians'. However, anyone going to the 'optician' with an eye/vision problem must be assessed by an optometrist, not by an optician.

It is important that SpLD practitioners should be aware of differences in the qualifications and roles of eye/vision professionals so as to be able to advise clients appropriately.

Q4. What is a behavioural optometrist?

Behavioural optometrists (sometimes called developmental optometrists, neuro-optometrists, or neurodevelopmental optometrists) are optometrists who have undergone additional training to specialise in aspects of binocular vision and visual sensory and perceptual processing, areas of practice that may be more often associated with orthoptists and occupational therapists. This broad scope of practice of behavioural optometrists enables them to assess and manage some types of visual difficulty that are more prevalent in individuals with neurodevelopmental conditions (see FIGURE 1 and APPENDIX 1).

Q5. Can anyone offering vision 'therapy' call themselves a behavioural optometrist?

No. 'Optometrist' is a legally-protected title — anyone who presents using the title 'optometrist' must be qualified and registered. In the UK, details of all optometrists (and opticians) may be found on the register maintained by the regulatory body, the General Optical Council.

Q6. Is it necessary that SpLD practitioners should refer clients to a behavioural optometrist?

No. Clients should be advised to consult an optometrist of their choice which, if they have a history of assessment / treatment for visual difficulty, may be any practitioner that they have seen previously. Individuals with no previous history may choose to see a behavioural optometrist on first referral, but this is not essential. The majority of visual difficulties can be managed by any optometrist, and if there is any requirement that lies outside the scope of practice of that optometrist then there are routes of referral from the optometrist to a suitable specialist, which may be a behavioural or other optometrist with specialist expertise, an orthoptist, or an ophthalmologist if there are eye-health concerns.

Note that many optometrists have a broad scope of practice covering visual difficulties relating to binocular vision and aspects of 'visual processing', but they do not describe or present themselves as behavioural optometrists — such optometrists are more often to be found in independent practices (i.e. not the prominent high-street 'opticians').

Q7. Why do behavioural optometrists charge for their services? — I don't feel that I can refer my clients to them because of this.

The reason is that — similar to dentistry — the only eye-vision services that are available at no cost to clients (patients) are those provided by the NHS. Almost all optometry practices provide NHS services, but the scope of NHS provision is generally limited to the 'sight test' — that is, a check on ocular health, assessment and correction of refractive error, and a check (but not treatment) of binocular vision function. For this reason, many optometrists do not offer services beyond the scope of the sight test, but instead refer issues of concern to secondary care (hospitals) where visual difficulties relating to ocular motor and binocular vision anomalies can be assessed and managed under the NHS by orthoptists.

Furthermore, NHS sight tests by optometrists are only available to children, students (in full-time education) and adults in certain categories (e.g. low income, some types of recognised eye disease or disability, etc.). This means that many adults have to pay a fee for their sight test in primary care, but if they need to be referred to hospital for secondary care this will be provided under the NHS.

So, for people who are unable or unwilling to pay for services, there is an established pathway for visual difficulties in categories 1 to 3 (FIGURE 1) to be managed by optometrists and orthoptists at no cost or minimal cost under the NHS. However, visual sensory and perceptual processing difficulties (FIGURE 1, categories 4 & 5), including assessment and management of visual stress, are generally excluded from NHS provision in both primary and secondary care (though some specialist hospital-based orthoptics clinics may include these aspects in their NHS provision).

The overall picture of free, NHS provision of eye-vision services is that it is limited in scope and rather fragmented. Although it is possible for many (if not all) visual difficulties affecting individuals with dyslexia and other SpLDs to be managed on the NHS at no monetary cost to the client, a hidden cost is that this may involve seeing different professionals (optometrists & orthoptists) in different care settings and locations, and can sometimes involve long waits between hospital appointments due to high demand for services and lack of capacity.

These are the reasons why some practitioners, including behavioural optometrists and some specialist orthoptics-led clinics, must charge fees for their services — it is the only way in which care can be provided across the full range of difficulties, in one setting and location, and by the same practitioner.

A final observation on the matter of fees and costs — when optometry practices or orthoptist-led clinics charge fees, these will generally be comparable to and often lower than the level of professional fee charged for other non-NHS health services, for example by dentists and medical specialists.

Q8. If an individual with visual difficulties wants to be assessed and treated under the NHS, should I advise them to go to their GP and ask for referral to a hospital eye department or a specialist eye hospital?

No, this is a very bad idea. GPs are medical practitioners — in general they do not have the expertise to undertake sight tests or to assess and treat other non-medical visual problems, nor is it their role to do so. Furthermore, hospital eye departments will not welcome referrals of individuals having no need for medical treatment. Within the NHS it is the role of the optometrist to manage non-medical eye-vision problems and to refer to GP or hospital only those who need medical care.

Therefore, please adhere to the response given to Q2 above — always refer clients to an optometrist, unless you have an established alternative referral pathway for individuals with eye-vision problems. If an individual is concerned that they should only have NHS care then this should be communicated to the optometrist who will advise accordingly.

Q9. I am considering referring a primary age child — their assessment findings show a profile of dyslexia, but they also reported 'often' using a finger to keep their place and 'sometimes' losing their place when reading. However, the child did have a standard eye test the month before the assessment and no prescription was issued. What should I do?

Losing the place when reading, and using a finger to help with this, may be a consequence of some type of visual difficulty that presents with other symptoms — for example, a binocular vision anomaly that results in words appearing to move, drift or go double — or it may simply reflect the need for help in directing and maintaining visual attention to words and the letters within words (see discussion of visual attention and dyslexia in APPENDIX 1), with no evidence of any other significant visual difficulty.

In this case, a judgement by the SpLD practitioner is required. If the individual's behaviour in needing help to control their attention to letters and words is, in the assessor's experience, typical or expected reading behaviour of a child of that age with dyslexia then, if this is the only reported symptom (and given that there has been a recent sight test), it may be prudent not to refer the child back to the optometrist at this stage but rather to monitor progress over a period of time.

However, if the degree to which the child loses their place in reading seems excessive, and in particular if other visual symptoms are also reported, then referral would be advisable. In such a case the referral letter should emphasise the persistence of visual symptoms even though there has been a recent sight test, and here the assessor might also ask specifically that the sight test should include assessment to rule out the possibility of a binocular vision disorder.

Assessment of Visual Stress, and Use of Coloured Filters

Q10. Why can't SpLD assessors continue to screen/assess for visual stress if they are already trained to do so? I have been administering colour screenings for visual stress for many years and / or have undergone training to do so. Does the new advice mean that I cannot continue to screen for coloured overlays?

These questions are addressed specifically in sections of this document above. The overall thrust of this guidance is that it is important that assessors recognise when a client has symptoms that may indicate a substantive visual difficulty, and give appropriate advice to have these fully investigated. From this perspective it is (at best) unhelpful for an assessor to potentially bias the client's understanding and actions by selective focus on a visual stress assessment at this stage.

Many symptoms that have been regarded as indicative of visual stress often have other causes. In a minority of cases they are symptoms of pathology that may be sight-threatening or even life threatening. More often they are symptoms of refractive and/or ocular motor and binocular vision problems that can only be properly assessed and managed by qualified professionals. While visual stress may be present in some who report visual symptoms, it is inappropriate, and some would say unethical, to screen for this condition in isolation without taking account of other possibilities.

More specifically (see Section 5 above), the assessment of visual stress is not necessary for the purpose of identifying dyslexia or other SpLD, and so it is preferable to adopt a safe approach — recognising the complexity of some types of visual difficulty, and the lack of qualification and expertise of the SpLD assessor in this area — to direct any concerns about vision to a qualified professional.

NOTE: Emphasis here is on what the practitioner should / should not do in assessment and identification of dyslexia (or other SpLD). The position of this guidance is that visual stress assessment is unnecessary and inappropriate here. **There is, however, a need to make a clear distinction between the process of SpLD *assessment* (identification), and that of providing *support* to someone *already identified* with dyslexia or other SpLD**. In the context of *support* there may be a role for SpLD practitioners to use their expertise on evaluating the potential benefit of coloured filters — see next question.

Q11. I know from personal experience and/or my professional experience that students/clients do sometimes find that coloured filters, overlays or glasses make a difference to their reading comfort. If I do not administer colour screening, isn't there a chance that students/clients will miss out on the potential benefits of the use of colour?

Comfort and performance of many visual tasks can be improved by adjusting various aspects of the visual stimulus — increasing or decreasing the level of illumination, or the contrast, size, or spacing of text on the page or screen, etc. From this perspective, changing the background colour / using an overlay is essentially the same; colour is simply another aspect of the stimulus.

Practitioners might move forward on this as follows, **for SpLD support, not assessment**:

1. All stimulus adjustments are ergonomic — that is, they will work to varying degrees for everyone, and the fact that someone feels more comfortable or performs better under one level of illumination or colour, rather than another, does not in itself indicate that the person suffers from 'visual stress' or any other atypical or anomalous condition (see also APPENDIX 1, which explains that even the perception of considerable visual disturbance in some types of stimuli is not an indication of visual stress).
2. When viewed as in the previous paragraph, there is no reason why an SpLD practitioner should not explore the benefits of colour alongside other ergonomic stimulus adjustments that a student/client may find helpful for reading and other visual tasks — an approach related (in some cases) to that of occupational therapy or, more generally, the application of 'assistive technology'.
3. A shift in focus towards evaluating and advising on the potential benefit of colour and other stimulus adjustments requires no assessment or diagnosis of visual stress.

This approach would not disadvantage individuals with substantive and debilitating visual hypersensitivity (photophobia or visual stress), who should have this identified and managed in the context of comprehensive assessment of vision by a qualified professional, but it would retain the opportunity for SpLD practitioners to apply their expertise in the context of support, with an important advantage of avoiding the need for practitioners to make judgements on identification or diagnosis of visual stress (outside their expertise), and the concomitant long-standing problem of clients' (mis-)understanding of the nature of their visual difficulty and its association with dyslexia.

Q12. Why the position on Irlen terminology, and what is the role of Irlen screeners?

This has been elaborated in detail within the broad discussion on Visual Stress in APPENDIX 1. In essence, the position on terminology concerns the fact that Irlen-related terminology is either technically incorrect or represents an attempt to 'brand' a physiological condition (visual stress) in a manner that ties it preferentially to a particular organisation (Irlen).

The role of Irlen screeners is in some sense analogous to that of SpLD practitioners or others who undertake assessment and treatment of visual stress with limited knowledge and expertise in the area of visual difficulties — that is, lack of any recognised qualification, and no regulatory control over standards of practice in this area.

That is not to denigrate the work of Irlen screeners, many of whom no doubt practise conscientiously and ethically within the scope of their expertise, but it is important that individuals with visual difficulties and/or SpLD should be aware of the distinction between qualified and unqualified, regulated and unregulated providers of health-related assessments and treatments. As discussed in Section 3 above, there are only four types of regulated professional whose qualifications and specialist expertise relate to conditions affecting the eyes and/or vision.

Q13. Can you advise on the use of coloured overlays in exams?

See comment on this on 'Acceptable practice' in Section 5 above. More broadly …

A recommendation for the use of a coloured overlay in examinations is a cheap and easy way for an organisation to demonstrate support for a student with reading difficulties. However, that should *never* be the reason to make overlays available. At worst, such a policy will encourage misdiagnosis, lack of sustained use of the resource and an unproven but assumed association between visual stress and dyslexia.

The response to a previous question outlines the distinction between use of overlays as an ergonomic adjustment versus their use as a 'treatment' for the relatively atypical hypersensitivity we define as visual stress. This distinction is fundamental. There may be many students who find use of an overlay to be preferable, helpful or desirable, but the threshold for use in exams should be set at the higher level of 'essential'.

Current regulations (JCQ, Access Arrangements and Reasonable Adjustments 2024/25), though relatively relaxed on the need for evidence to support use of coloured overlays in exams, state that the member of staff responsible for agreeing the access arrangements *must* make their decision based on "whether the **candidate has a substantial and long-term impairment which has an adverse effect** *and* **the candidates normal way of working**".

From the perspective of this guidance, candidates who meet the criterion of 'substantial and long-term impairment' (due to visual stress) should only have been identified as such through assessment of their visual difficulties by a qualified professional.

APPENDIX 1 Overview of Visual Difficulties

Symptoms of visual discomfort and disturbance are the starting point for investigation of potential visual difficulties. There are three very broad categories overarching five types of condition that can give rise to symptoms of visual discomfort and disturbance which may adversely affect performance of visual tasks, including learning from visual material.

These conditions, which may occur separately or together, are summarised in FIGURE 1 and discussed in sections 1 to 5 below:

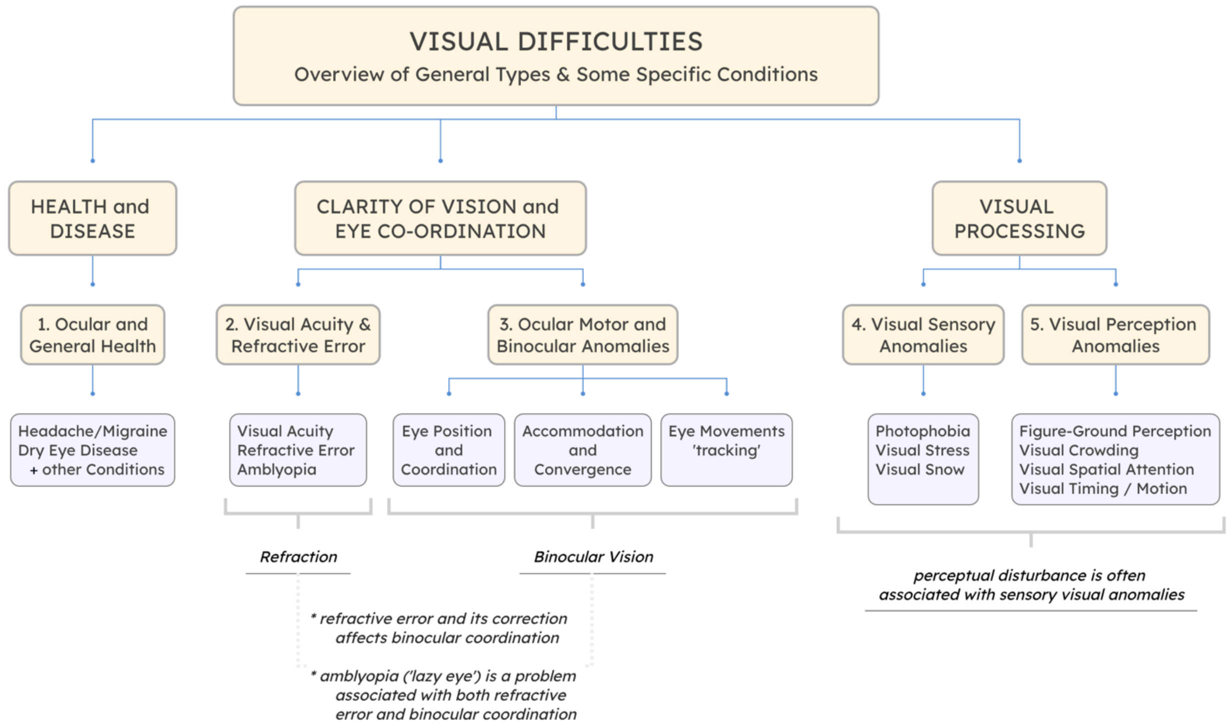


FIGURE 1. Overview of Visual Difficulties - general types and some specific conditions

[A1] 1. Ocular and General Health

[A1] 1.1. In a minority of cases, visual discomfort and disturbance may have a pathological cause.

For this reason alone, it is essential that all assessment and diagnosis should be undertaken by professionals who are not only qualified to assess and treat conditions affecting vision, but also qualified to recognise pathologies of the eyes and the visual system, and their effects.

[A1] 1.2. Pathological conditions affecting vision which may be encountered in children and young adults include those involving the optical media of the eye, such as keratoconus [Buzzonetti et al., 2020] and cataract [Sheeladevi et al., 2016]; ocular inflammatory conditions, such as uveitis [Cunningham et al., 2016; Maleki et al., 2022]; and pressure-related conditions, such as glaucoma [Shen et al., 2023] and intracranial hypertension [Aylward & Way, 2018]. Vision may also be affected by systemic conditions, such as diabetes [Geloneck et al., 2015]; myalgic encephalomyelitis [Wilson et al., 2018]; or multiple sclerosis [Banwell, 2013; Wang & Greenberg, 2018]. The prevalence of pathologies affecting vision in children and young adults is relatively low, but the possibility must not be overlooked.

[A1] 1.3. Headaches are common in children and adolescents, and may be indicative of ocular or visual problems even if they are not accompanied by specific reports of visual discomfort or disturbance. There are many ocular or vision-related causes of headache in young people [Nguyen et al., 2021; Lin et al., 2023; Kurent, 2024]. Most but not all headaches in young people are benign [Karimaghaei & Rook, 2023].

[A1] 1.4. A common cause of visual discomfort and disturbance is *dry eye disease*, a condition that affects the surface of the eye and is characterised by instability of the tear film and inflammation of the ocular tissues. The visual discomfort and disturbance from dry eye can interfere significantly with visual activities including reading and study. The discomfort and pain of dry eye is such that, if it occurs chronically, it can adversely affect quality of life and mental health. The prevalence of dry eye disease is increasing globally in all age groups, but most notably in children and adolescents, to such an extent that the condition is now described as a global epidemic that requires a strategic approach to its prevention and treatment [Donthineni et al., 2021].

[A1] 1.5. Dry eye disease has many causes, which may include diverse factors such as ageing, menopause, vitamin deficiency, side-effects of some medications, and some autoimmune diseases, but extrinsic factors may also be responsible if they disrupt the pattern of normal blinking of the eyelids, the role of which is to maintain the integrity of the ocular surface by distributing the tear film at frequent, regular intervals. This appears to be the major factor in the increased prevalence of dry eye in young people, and there is broad agreement that it is largely attributable to the amount of time spent looking at digital (electronic) devices. Thus, the academic literature is now awash with reports of increased dry eye disease associated with increased 'screen time', [e.g. Al-Mohtaseb et al., 2021; Mineshita et al., 2021; Muntz et al., 2022; Chidi-Egboka et al., 2023], and this includes many articles drawing attention to how the incidence of dry eye disease increased during the COVID-19 pandemic due to the dramatic increase in online schooling [e.g. Elhusseiny et al., 2021].

[A1] 2. Visual Acuity and Refractive Error

[A1] 2.1. Uncorrected refractive error is the most common cause of poor vision (i.e. reduced visual acuity) and visual discomfort, and in most cases it is easily corrected with spectacles or contact lenses.

[A1] 2.2. There are three types of refractive error:

- myopia (short-sight) in which vision is typically poor in the distance but clear when the object of interest is sufficiently close to the eyes,
- hypermetropia (long-sight) in which vision may be good or poor for distant and/or near objects,
- astigmatism in which, once again, vision may be good or poor at different distances.

[A1] 2.3. Myopia, and astigmatism associated with myopia, typically results in reduced visual acuity for distance vision, but is generally not associated with visual discomfort unless it occurs in conjunction with an ocular motor and/or visual sensory anomaly.

[A1] 2.4. Hypermetropia, and astigmatism associated with hypermetropia, may result in reduced visual acuity and/or visual discomfort. This is because the eyes are able to change focus (accommodate) to maintain clear vision in these conditions, but this requires sustained muscular effort which may result in discomfort, typically in the form of headache and eyestrain. **This problem is especially important in education, because the effort required to maintain clear vision increases as objects come nearer to the eyes**. Students with uncorrected hypermetropia or hypermetropic astigmatism, who may spend many hours each day on intensive close work, are at high risk of experiencing visual discomfort from the effort of having to accommodate more than normal over long periods. In addition, difficulty in sustaining the required level of accommodation will often result in objects appearing to go in and out of focus, so students with this condition may report visual disturbance and/or visual discomfort depending on how well they are able to sustain the effort required to keep near objects in focus.

[A1] 2.5. For the reasons given above, **it must not be assumed that people only need spectacles if they have poor vision, or that the purpose of spectacles is always to make vision clearer.** Very often, spectacles are required for people who have good visual acuity but who have difficulty with focusing and/or coordinating the two eyes to maintain clear and comfortable vision when working at near distances over a sustained period of time.

[A1] 2.6. Recent studies, using lenses to create refractive errors in 10 year-old children, have shown significant impairment in reading, visual information processing and reading-related eye movement performance with both hyperopia [Narayanasamy et al., 2015a] and astigmatism [Narayanasamy et al., 2015b].

[A1] 2.7. There is evidence that reduced visual acuity and uncorrected refractive error are associated with reduced academic performance [Bruce et al., 2016; Hopkins et al., 2020] and there is evidence from a systematic review that uncorrected hypermetropia (long-sightedness) in particular is associated with poor academic performance [Mavi et al., 2022].

[A1] 2.8 There is also evidence that correction of refractive error (”provision of eyeglasses”) in schoolchildren can result in improved reading and literacy [Bruce et al., 2018; Slavin et al., 2018; Nietzel et al., 2021], though it is important to note that the primary purpose of refractive correction is not to improve academic performance, it is to alleviate visual symptoms and ensure that the child has clear and comfortable vision for all visual activities.

[A1] 2.9. There is evidence of high prevalence of hypermetropia (but not myopia) in a small sample of children identified as having dyslexia [Vikesdal et al., 2020], while a large epidemiological study has shown a significant association between ADHD and the refractive errors hypermetropia and astigmatism (but not myopia) [Reimelt et al., 2021, see also Ho et al., 2020]. Similarly, a systematic review and meta-analysis of studies involving a total of more than three million participants [Bellato et al., 2023] confirmed evidence of increased prevalence of hypermetropia and astigmatism in ADHD.

[A1] 2.10. Although visual discomfort and disturbance associated with near visual tasks, including reading, is more likely to occur with hypermetropia than with myopia, the latter is nowadays of concern because its prevalence is increasing. Recent analysis of data from 276 published studies in 50 countries shows that the pooled prevalence of myopia increased from 24% to 36% in the years 1990 to 2023, and projections suggest that this will increase to 40% in 2050 [Liang et al., 2024]. However, there is much variation between countries and demographics. The same study indicates that adolescents and “high school students” exhibit higher myopia prevalence of around 46%, while a review on epidemiology of myopia in children indicates a prevalence of 40% in Europe [Grzybowski et al., 2020]. Examination of over 1000 children in the UK showed that myopia prevalence increased dramatically between the ages of 6-7 years (2%) and 12-13 years (16%), the latter figure being significantly higher than that reported in the 1960s for children aged 10-16 years (7%) [McCullough et al., 2016].

This dramatic increase in myopia prevalence is of great concern, as myopia is known to be associated with a variety of ocular health complications which increase the long-term risk of visual impairment and blindness, and there are now many calls for public health policy to be aimed at myopia prevention and treatment [Haarman et al., 2020; Bourke et al., 2023].

As has always naturally been the case, children are at risk of developing myopia if one or both parents are myopic, but the main risk factor associated with the recent increase in myopia prevalence is environmental — specifically, it is the result of children doing more near work (typically using electronic devices at short working distances) and spending less time on outdoor activities [Grzybowski et al., 2020; Martínez-Albert et al., 2023; Biswas et al., 2024].

[A1] 2.11. Presbyopia is an age-related impairment of near vision, which results from a progressive decline in the eyes' ability to accommodate (focus) and typically becomes noticeable to adults after the age of 40 years.

An increase in life expectancy has led to a greater prevalence of age-related ocular pathologies, including presbyopia, which has been estimated to affect 1.8 billion people worldwide. Studies estimate that uncorrected or under-corrected presbyopia could account for productivity losses among the working-age population worth up to $54 billion (USD) and may be also associated with dementia and cognitive decline in older adults. These examples emphasise the importance of accessible preventative measures, such as prescription glasses to address all types of refractive errors as a way of improving health and wellbeing in the older population [Bastawrous et al., 2024; Ma et al., 2022; Nagarajan et al., 2022; Fricke et al., 2018].

[A1] 2.12. As uncorrected refractive error is prevalent, can result in both visual discomfort and disturbance, and may cause or exacerbate difficulties with academic performance, **the assessment and appropriate correction of refractive error should always be the first priority in helping people with visual difficulties that affect their ability to study and learn.**

[A1] 3. Ocular Motor and Binocular Vision Anomalies

[A1] 3.1. Ocular motor problems are, most commonly, problems with the ability to focus on near objects (accommodation) and with coordination of the positions of the two eyes in binocular vision (convergence). These functions rely upon the actions of muscles that are located, respectively, inside and outside the eye.

[A1] 3.2. Anomalies of accommodation and convergence are common and, in almost all cases, result in visual discomfort in the form of headaches and eyestrain, and visual disturbance typically in the form of objects appearing blurred or going in and out of focus and/or moving, drifting or appearing double.

[A1] 3.3. There is a close physiological relationship between accommodation and convergence, such that change in one necessarily influences the other, and this relationship is affected by refractive error. Therefore it makes no sense to assess any one of these functions without also assessing the others. Often the treatment of ocular motor anomalies involves refractive correction so, once again, the assessment and management of these problems needs to be undertaken by vision professionals who understand their complexity and are qualified to treat them.

[A1] 3.4. Accommodation and convergence insufficiency are common causes of asthenopia in children [Nunes et al., 2019], and such anomalies appear to be prevalent in students with reading difficulty and dyslexia. For example, Grisham et al. [2007] assessed 461 children, average age 15 years, identified by their schools as poor readers, and found that 80% of the sample had clinically significant weaknesses in accommodation, convergence and/or binocular fusion abilities. Christian et al. [2018] also reported binocular vision anomalies in some children with reading difficulties at primary-school, while Migrants et al. [2019] report an association between attention, dyslexia and convergence insufficiency in a sample of young adults. It has been estimated that about 15% of people with dyslexia experience binocular instability, a form of dysfunction in the stability of how accommodation and convergence work together, but the condition is unlikely to require treatment in every case as it will not necessarily be associated with symptoms [Jainta & Kapoula, 2011].

[A1] 3.5. A systematic review by Bilbao & Piñero [2020a] reported that all the studies reviewed concluded that a pattern of ocular motor anomalies exists in children with learning disorders dyslexia, DCD and ADHD. These anomalies include problems with accommodation, convergence and the relationship between them, as well as issues with eye movement control, the latter often manifesting as problems with 'tracking' from word-to-word across lines of text when reading [see also Bucci et al., 2008; Bilbao & Piñero, 2020b], while Parmar et al. [2024] found a high prevalence of ocular motor anomalies requiring treatment in a small sample of autistic adults. A study cited previously in relation to hypermetropia [Vikesdal et al., 2020] also found a high prevalence of accommodative insufficiency in children with dyslexia. Similarly, Raghuram et al. [2018] reported higher incidence of accommodation and vergence dysfunction, and impaired ocular motor tracking, in children aged 9-10 years with dyslexia compared to typical readers.

[A1] 3.6. The recent marked increase in screen time in children and young adults, for both learning and leisure, has not only given rise to an increase in the specifically ocular condition of dry eye disease (see paragraph [A1] 1.5 above), but it also appears to be responsible for an increase in the more general condition of **digital eye strain** [Kaur et al., 2022; Mataftsi et al., 2023; Mylona et al., 2023]. The symptoms of digital eye strain are numerous; the most common include headache and eyestrain that have an ocular motor basis, as well as the ocular symptoms of discomfort and pain associated with dry eye. General musculoskeletal-related symptoms such as neck and shoulder pain are also common [Pucker et al., 2024].

[A1] 3.7. Regarding treatment for ocular motor anomalies, some specific forms of accommodation and/or convergence dysfunction can be successfully treated by what is widely known as **vision therapy** [Ciuffreda, 2002]. This is essentially a combination of appropriate refractive correction along with physiotherapy to strengthen and improve coordination of the ocular motor functions of accommodation and convergence.

[A1] 4. Visual Sensory Anomalies

[A1] 4.1. The occurrence of sensory symptoms in children, both without and with SpLD, has long been recognised [e.g. Emmons & Anderson, 2005; Critz et al., 2015]. Here, the term **sensory symptoms** refers to "observable behaviours that indicate unusual or dysfunctional responses to daily sensory stimuli" [Lane, 2020]. Prevalence of such symptoms is high — research suggests that they manifest in 10%-55% of children without any diagnosed condition, and in 40% to 88% of children with various SpLD diagnoses [Pfeiffer et al., 2018].

[A1] 4.2. Sensory symptoms take many forms and affect all sensory domains. All senses require the stimulus level to exceed some threshold level in order to evoke a response — some people are hypersensitive / over-responsive, implying an atypically low sensory threshold, or hyposensitive / under-responsive, implying that the sensory threshold is atypically high. This aspect may be described generally as **reactivity** — "difficulties associated with sensory reactivity are expressed as a misalignment of the intensity of the response to a sensory stimulus" [Lane, 2020]. Reactivity is perhaps the primary consideration relating to 'processing' of sensory information within each sensory domain, while secondary considerations concern the integration of sensory responses across difference domains, and integration of sensory and motor activities.

[A1] 4.3. There is a large body of literature on problems with sensory processing and their association with SpLDs, detailed consideration of which is beyond the scope of this document, but see the following for some recent discussions highlighting the significance of sensory difficulties in neurodevelopmental disorders [Galiana-Simal et al, 2020; Meilleur et al., 2020; Siemann et al, 2020; Goswami et al., 2021; Keating et al., 2022].

[A1] 4.4. The purpose of the previous paragraphs, [A1] 4.1 to 4.3, is to draw attention to the context within which we must conclude that the existence of *visual* sensory anomalies should come as no surprise. Indeed, an unusually high degree of sensitivity to aspects of the visual stimulus such as overall light level (photophobia), flicker, or pattern and contrast (visual stress) is found in individuals without and with SpLD.

Photophobia (light sensitivity)

[A1] 4.5. *Photophobia* is common, and is associated with a wide range of conditions, some of which are pathological [Digre & Brennan, 2012; Katz & Digre, 2016]. A recent review of cases presenting in an eye clinic reported the most frequent causes of photophobia to be migraine headache (54%) and dry eye disease (36%), both of which affect many children, with adverse consequences for visual comfort and learning [Buchanan et al. 2022].

[A1] 4.6. There are no specific associations noted between photophobia and SpLDs, but photophobia may be a common symptom of some conditions, such as migraine, that are comorbid with SpLD [Arruda et al., 2020]. **Individuals having or being assessed for SpLD who experience persistent and/or debilitating photophobia should always be referred for professional clinical assessment.**

[A1] 4.7. Of practical value in the context of learning, a recent review by Sproul et al. [2021] draws attention to the problem of light sensitivity as an 'invisible' disability that has been generally overlooked in education, particularly in relation to use of digital media. The authors offer a number of recommendations for adjusting visual stimuli in schools and classrooms to support light-sensitive children and teachers.

Importance of Migraine

[A1] 4.8. Some further discussion of migraine is of specific importance here because of its well-documented association with sensory anomalies in general and, in the context of this guidance, with visual sensory anomalies in particular. Migraine is common in children, with an overall estimated prevalence of 5% in children aged 5-10 years increasing to ~15% in teenagers, and its effects can be debilitating, resulting in absence from school, impaired learning, and other difficulties [Greene et al., 2019]. A review of the effect of light in migraine indicates that the most common photophobia symptoms in migraine are exacerbation of headache by light and abnormal sensitivity to light [Artemenko et al., 2022], and the relation of photophobia to migraine is widely recognised [e.g. Hayne & Martin, 2019; Zou et al., 2024]. A recent review on photophobia in migraine discusses the relationship between traditional photophobia (light sensitivity and aversion) and discomfort from flicker, patterns, and colour that are also common in migraine, and that all these visual hypersensitivities can be interpreted as reflecting the hyperexcitability of the visual cortex of the brain with which migraine is associated [Wilkins et al., 2021]. This argument is especially important for our understanding of **visual stress**, to be discussed below. Note also, as suggested above (paragraph [A1] 4.2), that hypersensitivity in migraine is not limited to visual stimuli but may also involve hypersensitivities to somatosensory, olfactory and auditory stimuli [Schwedt, 2013].

Visual Stress

[A1] 4.9. By far the most comprehensive and significant body of research on visual hypersensitivity over a number of decades is that by Arnold Wilkins in Cambridge, UK. Further to his work on photosensitive epilepsy, in which seizures may be provoked by flicker and pattern [Wilkins et al., 1980], Wilkins and colleagues conducted a detailed study of visual discomfort and perceptual disturbance provoked by patterns of stripes [Wilkins et al., 1984], and showed how hypersensitivity to the striped pattern characteristics of printed text may provoke symptoms of asthenopia ('eyestrain'), headache, and visual perceptual disturbance when reading [Wilkins & Nimmo-Smith, 1987, Wilkins, 1993]. In his book describing this early work on visual pattern hypersensitivity, Wilkins refers to the condition as **visual stress** [Wilkins, 1995], and in a later article presents a theory of visual stress and its specific application to reading and reading tests [Wilkins et al., 2004], pointing out that the potential for visual stress in children to be associated with reading is exacerbated by the poor design of text (size and spacing) in reading material and in reading tests.

[A1] 4.10. Wilkins and others have shown that regular striped patterns (including text), which can provoke a visual stress response in susceptible individuals, have spatial characteristics that are typical of a wide range of image types that many people find are uncomfortable to look at [Fernandez & Wilkins, 2008; Juricevic et al., 2010; Penacchio & Wilkins, 2015].

[A1] 4.11. At this point, it is important to appreciate that seemingly unusual or disconcerting responses to certain patterned stimuli are typical in normal vision. FIGURE 2a, for example, shows a classic visual effect in which illusory grey spots are seen at the white intersections in a grid pattern, and the spots appear and disappear as we move our eyes around the stimulus, while FIGURE 2b shows an example of how static patterns can give rise to the perception of illusory motion. Effects such as these may lead some who do not understand vision to conclude that they indicate the presence of 'visual stress', when in fact they are perfectly normal consequences of how the visual system responds to contrast in certain types of pattern. There is a substantial literature on such illusions — for discussions of some contrast and motion illusions from the perspective of visual perceptual processing see Spillmann [1993; 1994, and 2013].

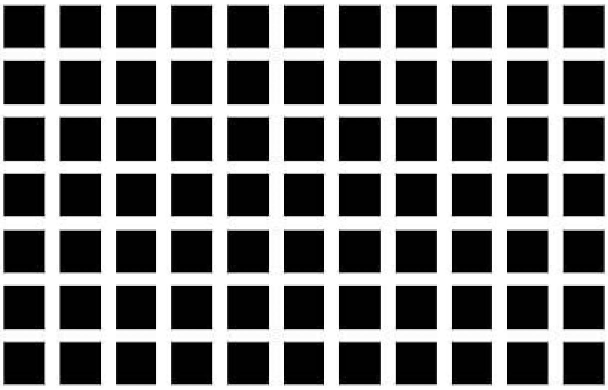


FIGURE 2a. Seeing illusory spots in some patterns is normal

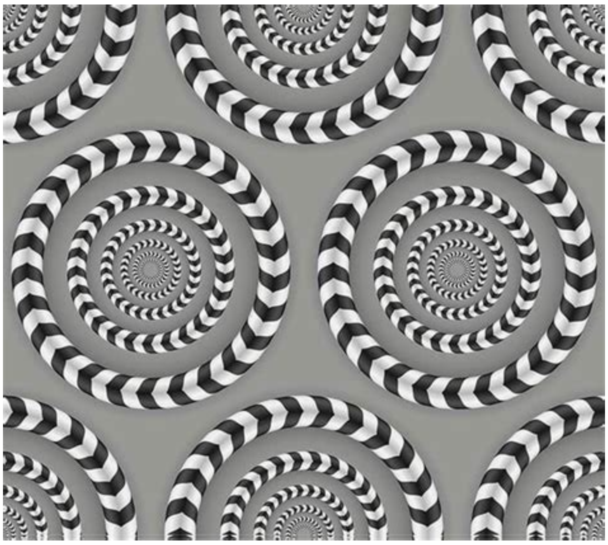


FIGURE 2b. Seeing illusory motion in some static patterns is normal

The occurrence of such visual disturbance should not automatically be interpreted as visual stress. However, when viewing patterns has a significant adverse impact with symptoms such as visual disturbance, discomfort, headache, aversion to viewing the stimulus, sensation of nausea, and impaired task performance (e.g. when reading), then the response may be considered atypical and the observer may be considered as being susceptible to visual stress — Evans et al., [2017] describe a systematic approach to identification of visual stress based on reported symptoms.

[A1] 4.12. The work of Wilkins has also been prominent in bringing scientific rigour to the idea that discomfort and perceptual disturbance associated with hypersensitivity (or hyper-responsivity) to visual stimuli may be alleviated through use of appropriate spectral (i.e. coloured) filters. This was examined initially in relation to migraine [Chronicle & Wilkins, 1991, see also Good et al., 1991], and to eyestrain associated with flicker from fluorescent lighting [Wilkins & Wilkinson, 1991]. This was followed by design of a colorimeter for the systematic identification of appropriate spectral filters [Wilkins, Nimmo-Smith, & Jansons, 1992; Wilkins et al., 1992], and this approach to alleviation of visual symptoms has been explored in a variety of conditions including photosensitive epilepsy [Wilkins et al., 1999], reading [Wilkins et al., 2001], and visually sensitive migraine [Wilkins et al., 2002]. Wilkins [2018] discusses the theoretical basis for the beneficial effect of certain colours in these conditions, and for the alleviation of visual stress in reading, which is that the visual cortex of the brain is hyperexcitable when stimulated by certain provocative images and patterns, but that particular colours can act to redistribute the neural excitation thereby reducing visual discomfort and disturbance.

[A1] 4.13. The disruptive effect of **visual stress** on reading, and its management with coloured overlays and precision-tinted lenses, has long been of special interest in relation to SpLD, from the perspective of its apparent association with reading difficulties and dyslexia. Perhaps the most valuable source of information and guidance on this topic currently is the recent text *Vision, Reading Difficulties, and Visual Stress* [Wilkins & Evans, 2022], which examines visual stress in the context of a range of visual difficulties (a view also presented here in Sections 1 to 3 above) and discusses the principles, pros and cons of using coloured filters to alleviate the effects of visual stress on reading.

[A1] 4.14. Unfortunately, this important issue of **visual stress** and its association with reading difficulty has, for many years, been plagued by controversy to such an extent that the role of this condition in SpLD — dyslexia in particular — is widely misunderstood and misrepresented, not only by lay people but also by many professionals. The need for elucidation and clarification here is of such importance that we highlight our discussion of it in the following box …

📌 Visual Stress and Dyslexia — two controversies and their resolutions

Two major areas of controversy have brought confusion and polarised opinion on the topic of 'visual stress and dyslexia'. This controversy reflects a strong and persistent scepticism in some quarters over the ideas: i) that visual stress exists, and ii) that treatment of visual stress using coloured overlays or lenses can improve reading ability in individuals with dyslexia.

Both controversies can be seen to have derived from the same source, a conference presentation by US school psychologist Helen Irlen in 1983 entitled "Successful Treatment of Learning Disabilities", which proposed "a specific visual dysfunction as a major factor in dyslexia", and presented evidence that "photopic transmittance lenses" (characteristics unspecified) were effective in reducing symptoms of headache, visual discomfort and disturbance, and also improved reading rate and comprehension in a sample of individuals who had been referred to a Learning Disability Clinic [Irlen, 1983]. Subsequent promotion of this interesting finding by Irlen has fuelled controversy from two perspectives, one deriving from Irlen's use of terminology and the other from her promotion of the idea that this use of coloured lenses constitutes a treatment for reading disability (dyslexia).

1. The Terminology Problem — scotopic sensitivity, Irlen Syndrome, Visual Stress

Irlen introduced the term 'scotopic sensitivity syndrome' to refer to the visual dysfunction described in her 1983 talk. Unfortunately, as vision professionals are aware, this term is meaningless in the context described because 'scotopic' relates to vision at very low levels of illumination. Later, Irlen introduced the alternative term 'Irlen Syndrome' [Irlen, 1994] which, although it could not be criticised as being technically incorrect, was divisive in that (along with her references to 'Irlen filters' and the 'Irlen method of treatment') such terminology serves the purpose of seeking to claim ownership or 'branding', rather than maintaining a scientifically neutral position as exemplified by the work of Wilkins around the same period — see paragraph [A1]4.9ff above. The consequence of this is that by 1995 we find three different terms in use: 1) Irlen Syndrome, 2) Meares-Irlen Syndrome [e.g. Evans et al., 1995] in which the inclusion of Meares acknowledges her report of visual sensory difficulties in a reading context [Meares, 1980] which were similar to but earlier than those of [Irlen, 1983], and 3) Visual Stress [Wilkins, 1995].

There is no doubt that Irlen, and the Irlen Institute that she founded in 1983, recognise that the terms Irlen Syndrome and Visual Stress relate to the same condition, but they persist with use of Irlen-centred terminology, even though their website presents a bibliography of peer-reviewed research in which much of the work cited is by Wilkins and others who use the term Visual Stress [https://irlen.com/bibliography-of-research/].

An unfortunate consequence of this 'own-brand' approach, together with the fact that Irlen herself has published little and has never opened her 'Irlen Method' to scientific scrutiny, is that 'Irlen Syndrome' and the therapeutic use of coloured filters has attracted scepticism and disdain from many in the scientific and clinical communities. In the field of clinical ophthalmology, for example, a prominent professional body [RANZCO, 2018] stated "Despite Irlen Syndrome being first described in the early 1980's there is still no sound theoretical basis or evidence that the condition actually exists. A diagnosis of Irlen Syndrome is based solely on symptoms with no quantitative physiological correlation".

It is notable, however, that the RANZCO position made no attempt to recognise the correspondence between Irlen Syndrome and Visual Stress, and cited none of the work on visual stress that confirms its existence beyond any doubt, with clear evidence of physiological correlation — see, for example, Wilkins [1995] for detailed discussion of work showing how visual perceptual illusions in normal observers are induced by patterns similar to those that evoke epileptiform EEG activity (i.e. a physiological response) in patients with photosensitive epilepsy, and Adjamian et al. [2004] who conclude "We have demonstrated that static stimuli known to be most likely to provoke symptoms of visual stress also generate the maximal gamma oscillations in V1" (i.e. physiological activity in the primary visual cortex of the brain).

In our view a resolution of this problem requires a robust approach to appropriate use of terminology. In a field of scientific and clinical endeavour it is essential that we reject 'brand' terminology that seeks to narrow the scope to the owner of the brand, in favour of a neutral approach that encourages open science, not only in use of terminology but also in sharing of methods and results, so as to improve scientific understanding and clinical practice. Hence we strongly discourage use of the terms Irlen Syndrome, Meares-Irlen Syndrome, and all other Irlen-related terminology, and advise that professionals adhere to the term Visual Stress, or other neutral terms that have been recognised as equivalent to visual stress (i.e. pattern glare, pattern-related visual stress).

2. The 'Coloured Filters for Reading Difficulty / Dyslexia' Problem

The RANZCO denial of the existence of Irlen Syndrome / Visual Stress went hand-in-hand with denial that use of coloured filters could benefit some people with reading difficulty, including those with dyslexia — "no scientific basis for the benefit of tinted lenses in reading disorders" [RANZCO, 2018]. This statement aligns to a long-running position of professional medical bodies, principally in the US, which asserts that "Visual problems do not cause dyslexia. Scientific evidence does not support the efficacy of eye exercises, behavioral/perceptual vision therapy, training glasses, or special tinted filters or lenses in improving the long-term educational performance in (dyslexia)" [Handler et al., 2011]. This argument, which is reiterated every few years — "dyslexia is not a vision-based learning disorder" and "many non-evidence-based vision approaches for the remediation of reading difficulties exist … (including) … tinted lenses and filters" [Handler & Fierson, 2017, see also Handler, 2024] — has widespread support. Given the view, now well-established, that dyslexia is as a language-based disorder, involving "difficulties in phonological awareness, verbal memory, and verbal processing speed" [see Rose, 2009], there seems to be no basis upon which we should consider visual difficulties to be instrumental in causing dyslexia, or expect treatment of visual difficulties to be helpful in remediation of dyslexia.

It is easy to see how this contentious issue of 'coloured filters for dyslexia' also stems from Irlen's initial claim regarding "treatment of learning disabilities" [Irlen, 1983] and, hence, the resolution is clear. The use of coloured filters should never be presented as a 'treatment' for dyslexia, nor are they primarily intended to improve reading ability. Their purpose is specifically to alleviate symptoms of visual stress, i.e. hypersensitivity / hyper-responsivity to visual stimuli, especially patterns. If the patterns that provoke such symptoms are those that are naturally present in printed text, then it follows that the visual symptoms may disrupt the process of reading, and that alleviation of such symptoms may make reading easier by reducing visual disturbance, improving comfort and rate of reading and, thus, fluency [Wilkins et al., 2004]. From this perspective, increase in reading rate simply provides a quantitative measure of the efficacy of the treatment in alleviating the visual difficulty, it does not imply that any underlying reading disability has been overcome.

It is important that we assert this perspective specifically, in relation to use of coloured filters for visual stress, and also more generally in relation to the whole range of visual difficulties discussed in this guidance**. It must be emphasised that treatment of visual difficulties in people with dyslexia and other SpLDs is not for the purpose of remediating SpLD, but is to alleviate symptoms of visual discomfort and disturbance that may impair an individual's learning, day-to-day performance, and wellbeing.** Whatever the visual difficulty or form of treatment, the goal of treatment is always the same, that is to restore clear and comfortable vision.

Finally, however, a caveat on this issue — SpLD practitioners should be aware that, just as the definitions and methods for identification of dyslexia have been questioned and revised, so too has the established view that 'dyslexia is not a visual problem'. A substantial body of literature now exists to challenge this assertion — see for example Werth,[2021; Stein [2022; Kristjánsson & Sigurdardottir [2023]. Other relevant literature will also be cited later in this document. We must be mindful of the possibility that training or treatment of some forms of visual difficulty may indeed prove to be important in prevention or remediation of dyslexia.

Visual Snow

[A1] 4.15. The first distinctive report of the condition now known as ***visual snow syndrome*** is relatively recent [Liu et al., 1995] though it undoubtedly has a long history of occurrence that has hitherto gone unrecognised. It is characterised by the appearance of flickering and moving dots which fill the entire visual field and may persist over months or years — these dots or specks may be black, white, transparent, coloured, or flashing, or a combination of all appearances. There is some evidence that visual snow may be a consequence of hyperexcitability of the visual cortex of the brain (see paragraph 4.14) [Unal-Cevik, 2022]. Although it is often reported in association with migraine, visual snow is now recognised as a distinct condition [Schankin et al., 2014], which occurs in children as well as in adults [Simpson et al, 2013; Santos-Bueso et al., 2017], and may persist from childhood into adulthood [Fraser & White, 2019]. In addition to its association with migraine [Silva & Puledda, 2023], visual snow has also been independently associated with increased light sensitivity (photophobia) [Eren et al., 2020, Thompson et al., 2022], as well as with high rates of anxiety, depression, and other psychiatric symptoms that adversely affect quality of life [Solly et al., 2021a]. A high prevalence of eye movement anomalies has also been reported [Solly et al., 2020; Solly et al., 2021b] and, therefore, reading is adversely affected [Tannen et al., 2024]. Over the past few years an increasing number of clinicians and researchers have reported on the characteristics of ***visual snow syndrome*** and its comorbidities [e.g. Puledda et al., 2020; Mehta et al., 2021]. Treatment of the condition with medication is reported to be generally ineffective, with possible exception of vitamins [Puledda et al., 2022], but treatment with ocular motor training and coloured filters appears promising [Tsang et al., 2022; Tannen et al., 2022; Ciuffreda et al., 2023].

Sensory Anomalies and SpLDs

[A1] 4.16. To conclude this section, we cite additional recent evidence of association between sensory anomalies and some neurodevelopmental disorders.

In relation to ADHD, Panagiotidi et al. [2018] reported positive correlation between ADHD traits and sensitivity across several sensory domains, Kamath et al. [2020] found both hypo- and hyper-sensitivity as features of ADHD in adults, Keating et al [2022] conducted a review of sensory modulation difficulties in children with ADHD noting that prevalence varied with the method by which sensory processing is assessed, and Fabio et al. [2024] confirmed the presence of atypical sensory processing in adolescents with ADHD.

In relation to autism (ASC), a large population-based study in the US, involving more than 25,000 four- or eight-year-old autistic children, found records of atypical sensory responses in 74% of those studied, with particularly high associations between sensory processing and motor development, sleep and eating problems [Kirby et al, 2022]. A review of literature supported the view that autistic children often experience difficulties with sensory integration, and argued that this is the cause of some of the learning difficulties and challenging behaviour that these children present [Vives-Vilarroig et al., 2022], and a comprehensive thesis has examined the impact of sensory processing differences on learning and school life for autistic pupils [Jones, 2021]. The specific issue of visual sensory experience in autistic adults has been examined by Parmar et al. [2021] who found a range of visual hypersensitivities, including to light, motion, patterns, and particular colours, and concluded there is a need for better understanding and management of these difficulties — approaches reported by participants as beneficial included reducing visual clutter in the environment, reducing levels of illumination and using warmer colours, and some individuals reported benefits from using specific coloured overlays and lenses (see also Ludlow et al., 2020).

The need for ergonomic improvements to the classroom environment to help students with sensory processing issues is elaborated by Martin & Wilkins [2022] who, along with many others [e.g. Hanley et al., 2017; De Vries, 2021; Mallory & Keehn, 2021] emphasise the fundamental importance of reducing distracting visual stimuli and clutter in classrooms and workplaces. These last proposals, although written in relation to autism, are of course equally relevant to any condition that brings about the sort of sensory processing difficulties we have described here.

[A1] 5. Visual Perception Anomalies

[A1] 5.1. There is a long history of visual perception difficulties in children with learning difficulties. For example the originator of the Developmental Test of Visual Perception (DTVP), Marianne Frostig, was motivated by awareness of the occurrence of visual perception difficulties in children and lack of a suitable instrument for their detection and diagnosis [Frostig et al., 1963]. In describing the history of this test Maslow et al. [1964, p463-4] commented that “Test construction was preceded and accompanied by several years’ observation of children who were referred … because of learning difficulties” and that “Disturbances in visual perception were by far most frequent symptoms and seemed to contribute to the learning difficulties”. Approaches to characterising visual perception difficulties have changed since then, but the same general observation still appears in recent literature. For example, a community-based study of 4512 children (aged 13 years) found evidence of difficulty with seeing target objects in cluttered scenes, visual guidance of movement, and face recognition, and reported that lower levels of visual perception function were associated with under-achievement in reading and mathematics [Williams et al., 2011].

[A1] 5.2. Given the repeated emphasis in recent literature that dyslexia is “a language-based disorder … involving difficulties in phonological awareness, verbal memory, and verbal processing speed” [Rose, 2009] and “is not a vision-based learning disorder” [Handler & Fierson, 2017], it is then a remarkable irony that so many individuals with reading difficulty, including those identified as dyslexic, consistently seek help in the form of changes to the visual characteristics of reading material, typically involving a preference for ‘readable’ text fonts, and for changes in page colour and layout [Rello & Baeza-Yates, 2017; Yoliando, 2020; British Dyslexia Association, 2023]. We have seen previously how colour change through use of spectral overlays or lenses may be helpful in modifying the sensory response to reading material (pattern) in the context of visual stress. In the following paragraphs we present some aspects of visual perception relevant to the question of why people with dyslexia may seek visual modifications, and the discussion will also highlight some recent thinking that challenges the established view that dyslexia is not a vision-based disorder. The complexity of these aspects is such that we can only introduce the basic principles, but our purpose here is merely to raise awareness of important aspects of visual perception that are central to the ability to interpret (learn from) visual information.

[A1] 5.3. Neural information processing is hierarchical and, in general (though not exclusively), proceeds from sensation → perception → cognition. Thus it follows that anomalies of sensory processing, such as those described in Section 4, might be expected to have consequences for perception and cognition. Consequently, many of the references cited previously, which relate to visual sensory anomalies, describe disturbances of visual perception such as appearance of spots that are characteristic of visual snow, and spatial distortions and illusions of contrast and motion that are characteristic of (pattern-related) visual stress. In this section we briefly describe three other distinctive anomalies of visual perception that are reportedly prevalent in SpLDs, dyslexia in particular. These are: visual crowding, visual spatial attention deficit, and problems with visual neural timing.

Visual Crowding

[A1] 5.4. Letters that appear in our peripheral vision (i.e. we are not looking directly at them) are easy to recognise when presented alone, but more difficult to recognise when surrounded by other letters (FIGURE 3). This normal visual phenomenon is described as *crowding*. It may also be described as the difficulty or inability to recognise an item in the midst of other items (clutter), unless we take the trouble to look at all the items directly. The effect of crowding on letter recognition depends upon the spacing between letters — increasing spacing reduces crowding, making it easier to identify the letters.

FIGURE 3. When looking at (fixing on) the + at the centre, it is easy to recognise the isolated letter N to the right, but difficult to recognise the N to the left which is crowded by other letters.

[A1] 5.5. The crowding phenomenon is important. The number of letters in a line of text that we can read without moving our eyes is called the **visual span**. The width of the visual span in adults with normal vision is typically around 10 letters, about 5 letters either side of whichever letter we are looking at. However, the visual span is limited by crowding — if letters are too close together, or if the reader is atypically disadvantaged by letter crowding, then the width of the visual span will be reduced, and this will have consequences for reading. A study by Pelli et al. [2007], using neurotypical observers and words presented in a scrambled order to remove any potential benefit or variation due to semantic context, showed that reading rate is proportional to the uncrowded visual span (i.e. the number of characters that are not crowded), and when crowding is increased (by reducing the letter spacing) then reading rate decreases, hence the degree of visual crowding is a primary factor in determining reading rate. An obvious implication of this is that reading rate is likely to be impaired in any circumstances involving increased susceptibility to the effects of crowding [see also Chiu & Drieghe, 2023].

[A1] 5.6. Notably, a number of recent studies have shown evidence of increased visual crowding in developmental dyslexia (i.e. dyslexics demonstrate a broader span within which crowding occurs) [Moll & Jones, 2013; Gori & Facoetti, 2015], and dyscalculia [Castaldi et al., 2020], while Liu et al. [2024] have shown increased crowding in foveal (central) as well as in more peripheral vision in children with dyslexia, and also in a separate sample of children identified as having both dyslexia and ADHD. It is sometimes argued that increased crowding in dyslexia might be a consequence rather than a cause, as a result of an impoverished reading experience impaired by other factors. However, from a number of different experiments undertaken with 181 children, Bertoni et al. [2019] have suggested that their results show multiple causal links between visual crowding and learning to read.

[A1] 5.7. Appreciation of the role of visual crowding in reading helps to explain why visual adjustments to layout and spacing of text are so important in reading. Based on the findings cited above, we may understand why these adjustments are of particular importance in dyslexia. Indeed, the very fact that so many people with dyslexia claim to benefit from such adjustments might itself be taken as an indication that visual factors play a significant part in dyslexia, and supports the idea that personalised adjustment of text layout is desirable [Joo et al., 2018]. It also goes some way towards making sense of the appeal of 'dyslexia-friendly' fonts that are so widely promoted and used in dyslexia support — studies of some of these suggest that what matters is not the form or shape of the letters, but the spacing [Marinus et al., 2016; Galliussi et al., 2020].

Visual Spatial Attention

[A1] 5.8. The role of the visual span in reading is described in the previous paragraph in relation to visual crowding. As we have discussed, the visual span relates to the number of individual letters that can be correctly identified either side of the letter we are looking at. A second type of span concerns the number of letters that can identified simultaneously at a glance (i.e. without moving the eyes) — this is known as the **visual attention span**. In adults the visual attention span is about half the size of the visual span — about 5 letters can be identified simultaneously. It is easy to appreciate the importance of the visual attention span in reading, which relies fundamentally upon letter identification — i.e. we do not read by recognising whole words or word shapes, but by individual letters. Indeed Pelli et al. [2003] show that “a word is unreadable unless its letters are separately identifiable”, and that this applies even to the most common and simple three-letter words. This suggests that children who cannot easily identify all the individual letters within words may be disadvantaged in learning how to recognise orthographic components of words (graphemes) and in learning the ‘decoding’ and spelling of whole words.

[A1] 5.9. In recent years the importance of visual attention span in reading difficulty and dyslexia has been acknowledged, and an increasing number of studies in this area now challenge the view that dyslexia is not a visual problem. For example, Bosse et al. [2007] studied two separate samples of dyslexic children (English & French) and showed that visual attention span accounted for unique variance in reading ability, independently of phonological skills, and that most of the children studied exhibited either a selective visual attention or a phonological disorder. A later study by Vidyasagar & Pammer [2010] went further, arguing that emerging evidence supports the view that phonological deficit and reading impairment both arise from poor visual coding due to problems with visual attention. In relation to the development of reading skills, Franceschini et al. [2012] presented results of a three-year longitudinal study on children in Italy, from which they concluded that visual attention abilities in preschool children specifically predict future reading acquisition, and van den Boer et al. [2015] in a study of Dutch children showed that visual attention span was a significant predictor of both beginning and advanced word reading fluency, and a unique predictor of both orthographic knowledge and spelling performance.

[A1] 5.10. Recent studies by researchers well-established in this area further highlight the importance of visual attention in reading and, in particular, its association with reading difficulties and dyslexia [Franceschini et al., 2022; Valdois, 2022]. A meta-analysis of 53 independent studies involving 4149 participants confirmed that visual attention span in dyslexic individuals was significantly poorer than in typically developing individuals [Tang et al., 2023]. A separate meta-analysis of 21 studies involving 2863 unselected participants, and 63 studies involving comparison of dyslexic children and typical readers (3914 participants) concluded that “results confirm a strong association between visual attention and reading development” [Gavril et al., 2021]. The authors of the latter meta-analysis also commented on the potential influence of teaching methods and that “further research on how visual-spatial attention skills evolve during reading acquisition would be useful both when designing efficacious teaching methods as well as for developing approaches for diagnosis and for the treatment of children with reading disorders.”

[A1] 5.11. There have indeed been some explicit attempts to recognise the importance of visual perception in the teaching of children with poor reading skills and dyslexia. For example, McCandliss et al. [2003] introduced a Word Building strategy developed for children with poor decoding skills, using a structured approach to direct visual attention specifically to each grapheme position within a word, and concluding “Gains were observed in decoding, phonemic awareness, and passage comprehension.” — see also McCandliss [2012] who describes the need to recognise the importance of both visual crowding (letter spacing) and visual attention for helping children with dyslexia.

[A1] 5.12. Finally on this topic, a neuroimaging study by Taran et al. [2022] examined children aged 8-12 years (36 typical readers, 39 with dyslexia) and found functional connections between neural networks in the brains of typical readers which were not displayed in the children with dyslexia, concluding that “the synchronized activity of executive, visual attention, and reading-related networks is a pattern of functional integration which children with dyslexia fail to achieve”, pointing to “a critical role of visual attention in dyslexia”.

Visual Neural Timing

[A1] 5.13. The study by Taran et al. [2022] cited in the previous paragraph used the term ‘synchronized activity’, implying that an important aspect of skilled reading is the timing of neural activity (i.e. temporal processing), and a number of studies now support the idea that impaired temporal processing is a major factor in reading difficulty and dyslexia. This general idea is not new — see, for example, Goswami [2011] who discussed the issue of temporal processing in dyslexia, and how it might explain perceptual and phonological difficulties with syllables, rhymes and phonemes, but there is also a parallel body of work examining the role of temporal processing in the visual domain.

[A1] 5.14. In recent research on visual aspects we see a convergence of evidence on the idea that a number of reading problems involve issues with neural timing caused by impaired development of motion-sensitive nerve cells in the visual system. Interestingly, motion sensitivity in individuals predicts reading skills in both good and poor readers [Witton et al., 1998], but individuals with dyslexia have sluggish motion cells that do not send correct signals to the pattern-sensitive cells used for letter and word recognition, causing difficulties with reading such as identifying the beginnings and ends of words, and the order of letters within words. A study by Manning et al. [2022] involving children aged 6-14 years (50 typical developing, 50 with dyslexia) found that the children with dyslexia were slower to extract information from displays with moving stimuli. A comprehensive account of this aspect of visual processing and the evidence of its role in reading and dyslexia is given by Lawton et al. [2022].

[A1] 5.15. Finally, Stein [2023] presents a recent overview of this area of research, arguing that *"all new theories converge on the idea that developmental dyslexia is fundamentally caused by impaired signalling of the timing of the visual and auditory cues that are essential for readin*g*"* and that "*the evidence for this conclusion is overwhelming"*.

[A1] 6. Conclusion

[A1] 6.1. This overview shows that the topic of visual difficulties is complex. Description of the various types of visual difficulty, their association with dyslexia and other SpLDs, and their implications for reading and learning, has been supported with references to an extensive body of academic research, the majority of which has been published since the previous version of the SASC guidance was introduced in June 2018. However, although much recently-published research has been cited here, this is by no means exhaustive, and there is scope for still further elaboration of some aspects, in particular those relating to the role of visual attention and perception.

[A1] 6.2. Overall the picture is one of steadily increasing recognition of the importance of visual processing in relation to reading and dyslexia, and of the relatively high prevalence of various types of visual difficulty in individuals with dyslexia and other SpLDs. The evidence from research does not, on the whole, support a broad conclusion that visual difficulties cause dyslexia, though recent work in the areas of visual attention and temporal processing do strengthen such an argument, but nor does it support the view that has prevailed for some considerable time that dyslexia is the result of phonological deficit and is 'not a visual problem'.

[A1] 6.3. Whether or not visual factors are involved in causing dyslexia, much of the work cited here shows the influence of visual factors in determining reading ability, and the higher prevalence of certain types of visual difficulty associated with near-work, reading, and dyslexia. Thus we conclude that the role of vision in learning and its importance in individuals with SpLD should not be ignored or dismissed, but that all cases of visual difficulty should be assessed and managed by qualified professionals.

[A1] 6.4. The five types of visual difficulty illustrated in FIGURE 1 (duplicated below for convenience) are presented in a sequence — 1 to 5, left to right — that maps to the following summary:

- All types of difficulty (1 to 5) have the potential to cause symptoms of visual discomfort and/or disturbance that adversely affect ability to read and learn from visual material.
- Difficulties resulting from anomalies 1 to 3 are not considered to be causal factors in dyslexia, but their effects may exacerbate difficulties for individuals with dyslexia — lack of any likely causal association should not be cited as justification for failing to help individuals with dyslexia who experience such difficulties.

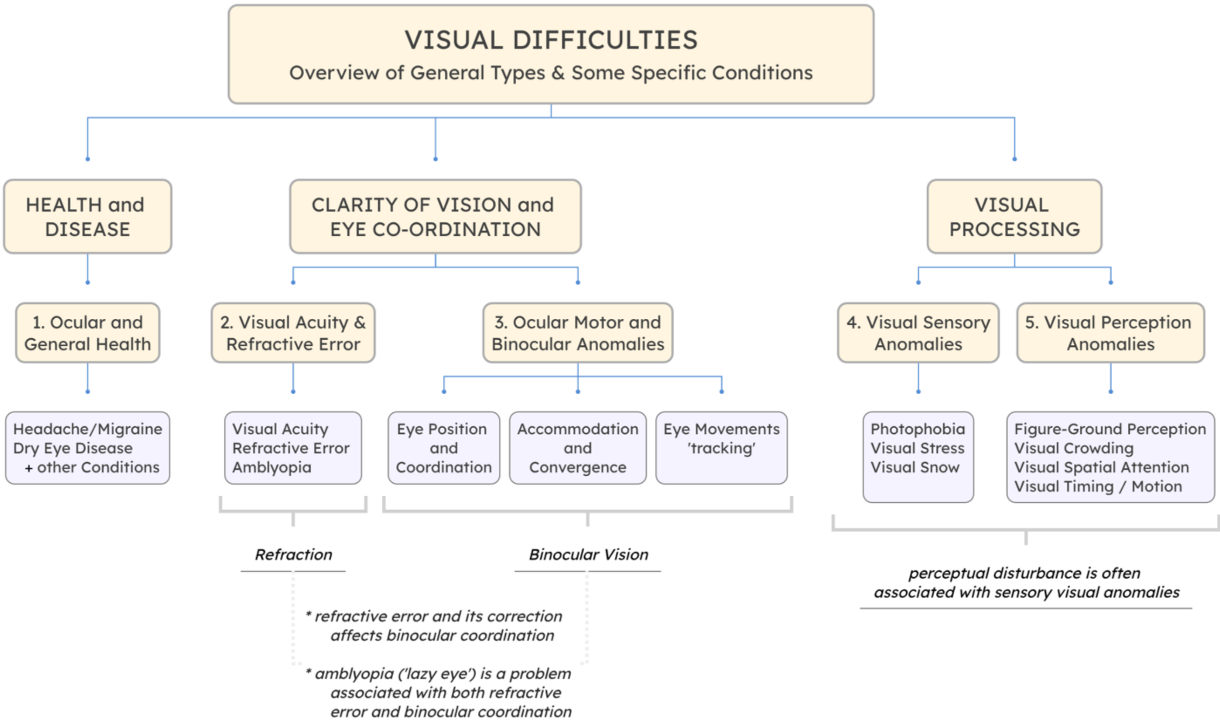


FIGURE 1. Overview of Visual Difficulties

- Difficulties in categories 1 to 3 are those that are routinely assessed and managed by eye-vision professionals (optometrists & orthoptists) — all optometrists assess these three aspects within the standard eye examination ('sight test'), and all optometrists manage issues involving ocular health and refractive error — some optometrists and all orthoptists manage ocular motor and binocular vision anomalies.
- Difficulties in categories 4 and 5 are those involving visual sensory and perceptual processing. Assessment and management of sensory anomalies may be undertaken by some optometrists and orthoptists, particular in relation to 'visual stress'. Some, but relatively few, optometrists and orthoptists undertake assessment or management of visual perceptual anomalies. Fewer professionals are involved in these areas as there is less recognition of these aspects of vision having established assessment protocols or being responsive to effective treatment or training.
- A separate guide to the types of visual difficulty that lie within scope of practice of optometrists (i.e. categories 1 to 3, and visual stress from category 4) is given in APPENDIX 2.

[A1] 6.5. It should be emphasised that not all visual difficulties are necessarily the result of problems with the visual system (anomalies) that require diagnosis and treatment. In performance of demanding visual tasks such as reading there may be a significant influence of ergonomic factors — that is, the individual may not be anomalous but the environment may present sub-optimal or adverse conditions for the task/work being undertaken. This is particularly the case in relation to visual sensory and perceptual difficulties (categories 4 and 5) where difficulties may in some cases be alleviated by ergonomic adjustment of the task and the environment. Such adjustments may require changes to the design of classrooms (e.g. appropriate levels of illumination, reducing glare from windows, reducing visual clutter and excessive pattern and contrast on walls, etc.), or changes to the visual task (e.g. decluttering the presentation of information on screens and workbooks, adjusting the size and spacing of text, adjusting background colour or screen brightness and contrast, etc.).

[A1] 6.6. We reiterate the reminder that treatment of visual difficulties in people with dyslexia and other SpLDs is NOT for the purpose of remediating SpLD, but is to alleviate symptoms of visual discomfort and disturbance that may impair an individual's learning, day-to-day performance, and wellbeing. Whatever the visual difficulty or form of treatment, the goal of treatment is always the same, that is to restore clear and comfortable vision.

APPENDIX 2

Common conditions managed by optometrists: causes, effects and treatments

Studies show that around 20% of children and young adults report symptoms of fatigue, headache, eye ache, and blurred, unstable or double vision associated with reading, writing and other demanding near work. This guide summarises the most common causes of visual discomfort and disturbance. Although fairly comprehensive, this does not cover every type of problem. In particular, it does not describe eye diseases which may produce similar symptoms and which must be ruled out before other causes are considered. Children/students with sore eyes and/or any form of visual discomfort or disturbance should be assessed by a registered optometrist.

Cause of problem	Explanation & Effects	Treatments
1. Ocular Health	The incidence of dry eye disease is increasing significantly in young people due to excessive 'screen time' on electronic devices. Sight-threatening eye diseases are not prevalent in children and young adults, but they do occur, so professional assessment of visual difficulties is essential.	Optometrist can examine the surface of the eye in detail, and give advice and treatment for dry eye problems. Optometrist refers to ophthalmologist if a detected condition requires medical treatment
2. **Refractive Error** The types and effects of refractive error are as follows:	This term means that, when looking into the distance, the image formed in the eye does not fall precisely on the retina. Instead, it falls either in front (myopia) or behind the retina (hyperopia), so it is not in perfect focus.	Refractive errors are corrected with glasses or contact lenses (optical prescription lenses). Small amounts of refractive error in an individual experiencing no symptoms do not need to be corrected. Correction of refractive error should be the first consideration in treatment of sustained visual discomfort and disturbance — optometrist will determine the appropriate prescription.
2.1 Myopia (short-sighted)	Vision is poor (blurred/out of focus) in the distance. As objects come closer they become clearer, so vision may be clear for reading and writing. The amount of blur in distance vision, and the distance at which objects become clear, depends on the amount of myopia. In high myopia, distance vision will be very poor and near vision may be poor at normal reading distances, so a student may hold a book very close to the eyes.	Myopia is corrected with glasses or contact lenses. Some myopes only need to wear their correction for distance vision. Some myopes need to wear their correction all the time, for clear and comfortable at all viewing distances.

2.2 Hyperopia (long-sighted)	The opposite of myopia, so we expect vision to be good in the distance and poor at near. Unlike myopia, the eye is able to compensate for hyperopia and achieve good near vision by changing its focus (accommodating). However, near vision will only be clear if the student is able to sustain the accommodation required to overcome the hyperopia. The greater the amount of hyperopia the harder it is to achieve and maintain clear vision for reading and writing. When a person with hyperopia has difficulty sustaining the accommodation required for clear vision, the effects include fatigue, headache and eye ache, and unstable vision when print appears to go in and out of focus.	Hyperopia is corrected with glasses or contact lenses. Some hyperopes only need to wear their correction for near work (reading, writing and intensive study) Some hyperopes need to wear their correction all the time, for clear and comfortable vision at all viewing distances. Some hyperopes need to wear a correction even if they can see clearly at distance and near, to ensure that their vision remains stable and comfortable for reading, writing and other near work.
2.3 Astigmatism	A common condition in which there are two different refractive errors in the same eye. This may be different amounts of myopia or of hyperopia, or even a mixture of myopia and hyperopia occurring together. The effect is that the eye does not focus everything clearly at any distance. When reading, some parts of the text may be clear while others are blurred. The greater the amount of astigmatism the worse this will be.	Astigmatism is corrected with glasses or contact lenses. As described for myopia and hyperopia, individuals with astigmatism may need to wear their correction some or all of the time, depending on the amount of astigmatism and its effect on their vision and comfort. Many people with astigmatism benefit from wearing their correction all the time.
3. Accommodation (focusing) dysfunction	The eyes have to change focus as the viewing distance changes. The lens inside the eye is flexible and encircled by a small muscle – as the muscle contracts and relaxes the shape of the lens changes. This allows the eye to adjust its focusing power for different viewing distances. The closer the object the more power is required. Some individuals experience accommodation dysfunction, meaning they are unable to adjust their focus effectively to maintain clear and comfortable vision when reading and writing. Effects include fatigue, headache, eye ache, and print going in and out of focus. This problem may be exacerbated by uncorrected refractive error (see above).	Optometrist must assess accommodative function in addition to measuring refractive error. In some cases a refractive correction alone will alleviate the problem. In some cases accommodation dysfunction may require a programme of eye muscle physiotherapy, usually in addition to correction of refractive error.

4. Convergence (eye co-ordination) dysfunction	When two eyes are used, their movements must be co-ordinated to converge and diverge (turn inward or outward) so that both look at exactly the same location. This enables the two separate images from right and left eyes to be combined into one single image. Demands on the convergence system are greater in near vision, so it is quite common to encounter students with convergence dysfunction that may result in double vision. In general, the instability in eye coordination associated with convergence problems can account for symptoms such as double vision, unstable images, skipping words and lines when reading, and words appearing to jump or move around on the page.	Optometrist must assess convergence function in addition to measuring refractive error. In some cases a refractive correction alone will alleviate the problem. In many cases convergence dysfunction requires treatment with a programme of eye muscle physiotherapy, which may be given with or without refractive correction as appropriate, depending on other findings.
5. Interactions (refractive error, accommodation and convergence)	The three conditions described above are usually considered separately. In reality, however, everyday vision involves a complex interaction between them. Difficulties with any one of these can affect the others such that, sometimes, a child will experience visual discomfort and disturbance that is not fully explained by any one of these factors alone but rather arises due to problems of how they work together. Difficulties arising from a combination of refractive error, accommodation and convergence dysfunction may produce all of the following effects: fatigue, headache, eye ache, print appearing blurred or going in and out of focus, print appearing double or changing position on the page.	Optometrist must assess accommodation and convergence, in addition to refraction, in order to evaluate interactions between them and advise on appropriate solutions. Treatment typically involves glasses or contact lenses, and appropriate eye muscle physiotherapy to improve accommodation/convergence interaction.
6. Visual stress (pattern-related)	Refractive error is inaccuracy in the eye's optical system, while accommodation and convergence dysfunction are oculomotor (eye muscle) problems. Visual stress is a sensory condition, in which the visual system appears to be hypersensitive to high contrast regular patterns, including lines of black text against a white background. Alternative names for this condition are pattern glare and pattern-related visual stress. It is also sometimes, inappropriately, called 'Irlen Syndrome' or 'scotopic sensitivity'. Visual stress is associated with a variety of symptoms including aversion, fatigue, headache, discomfort and visual distortions or illusions when viewing bright images and high contrast patterns.	Treatment of visual stress typically involves use of colour in the form of overlays placed over reading material, or lenses worn in spectacle frames. The precise colour required to alleviate visual stress appears to be specific to the individual. Assessment of visual stress should be conducted within a comprehensive investigation covering all the conditions described in these notes, to enable correct differential diagnosis. **Visual stress is NOT dyslexia, and treatment of visual stress is not treatment of dyslexia.**

7. Developmental Disorders	These are conditions which, if not detected and managed correctly, may occur in the early years of a child's visual development. The school vision screening programme for children aged 4 to 5 is principally an effort to detect the following two conditions.	
7.1. Strabismus (squint)	Squint is the condition in which, typically, one eye turns in or out while the other looks straight ahead. Development of squint in children is often associated with uncorrected refractive error. As squint is an eye co-ordination problem, it too may result in symptoms of fatigue, headache, unstable images or double vision. Some children with squint, on the other hand, experience no such symptoms but may still have difficulty with near tasks including reading and writing.	Treatment aimed at correcting a squint typically involves glasses for constant (all day) wear, and may also involve exercises to improve and consolidate correct eye coordination. Some types of squint require surgical treatment, which involves relocating external eye muscles to improve alignment of the eyes. Surgical correction is carried out by ophthalmologists, not by optometrists. Treatment of squint is most usually managed by orthoptists and ophthalmologists, rather than by optometrists.
7.2. Amblyopia (lazy eye)	A condition in which vision in one eye (or, less commonly, both eyes) is poor as a result of impaired development. Amblyopia commonly occurs in association with squint or with anisometropia (a condition in which the two eyes have different refractive errors).	Treatment typically involves glasses for constant wear, sometimes combined with periods of covering (patching) one eye, so as to encourage vision to develop in the other.

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