

1

The slide has a light blue background with a green gradient on the left. In the top left corner, there is a logo for the British Association of Behavioural Optometrists (BABO), which includes a stylized eye icon and the text "BRITISH ASSOCIATION OF BEHAVIOURAL OPTOMETRISTS". Below the logo, the following text is listed:

**IRFAAN ADAMALLY, BSC
MCOPTOM DIPTP(IP) MBCLA,
MBABO**

**CHAIRMAN BRITISH ASSOCIATION
OF BEHAVIOURAL OPTOMETRISTS**

IRFAAN@ADAMALLY.COM

NO FINANCIAL DECLARATIONS

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On the right side of the slide, there is a portrait photograph of a man with a shaved head, smiling, wearing a light-colored shirt.

2

AIMS

- UNDERSTAND THE DIFFERENCE BETWEEN ACUITY/SIGHT AND VISION
- BE AWARE OF THE CONFLICTING RESEARCH WITHIN OPHTHALMOLOGY / OPTOMETRY
- BE AWARE OF THE INCIDENCE OF VISUAL DIFFICULTIES IN PATIENTS WITH SPECIFIC LEARNING DIFFICULTIES
- UNDERSTAND THE POTENTIAL IMPACT OF VISUAL DIFFICULTIES ON PATIENTS WITH READING DIFFICULTIES
- UNDERSTAND WHEN TO REFER PATIENTS FOR ADDITIONAL VISUAL TESTING

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WHAT IS 20/20 SIGHT?

20/20? - THE ABILITY TO SEE A HIGH CONTRAST SINGLE OPTOTYPE TARGET AT 20 FEET THAT MOST PEOPLE WOULD SEE AT 20 FEET

6/6? - SAME THING EXCEPT WE ARE NOW WORKING IN METRES

6/9 – 6/5? – WHICH ONE IS BETTER OR WORSE?

MEANS YOU CAN SEE AT 6M WHAT AN AVERAGE PERSON WOULD SEE AT 5M

THIS IS A MEASUREMENT OF VISUAL FUNCTION AT DISTANCE!

SIGHT IMPAIRMENT IS 6/18 WITH DAMAGED PERIPHERY OR 3/60 WITHOUT

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HOW ABOUT CLOSE UP?

BECAUSE IT IS A RATIO YOU CAN USE 20/20 OR 6/6 AT NEAR (40CM)

$$6/6 = N3$$

$$6/9 = N5$$

$$6/12 = N6$$

BUT ... IT DEPENDS ON THE FONT AND THE DISTANCE TO THE TARGET

$$N5 @20CM = 6/18$$

IS IT USEFUL – YES IN SIGHT IMPAIRED PATIENTS

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SIGHT TEST?

1989 OPTICIANS ACT

HAS TO BE CARRIED OUT BY A REGISTERED MEDICAL PRACTITIONER OR A REGISTERED OPTOMETRIST

REGULATED BY THE GENERAL OPTICAL COUNCIL

OPTOMETRISTS=OPHTHALMIC OPTICIAN

OPTOMETRIST ≠ DISPENSING OPTICIAN

OPTOMETRIST =?= OPTICIAN

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SIGHT TEST?

“TO PERFORM SUCH EXAMINATIONS OF THE EYE FOR THE PURPOSE OF DETECTING INJURY, DISEASE OR ABNORMALITY IN THE EYE OR ELSEWHERE AS THE REGULATIONS MAY REQUIRE”

ARE THE EYES HEALTHY?

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SIGHT TEST?

““TESTING SIGHT WITH THE OBJECT OF DETERMINING WHETHER THERE IS ANY AND, IF SO, WHAT DEFECT OF SIGHT AND OF CORRECTING, REMEDYING OR RELIEVING ANY SUCH DEFECT OF AN ANATOMICAL OR PHYSIOLOGICAL NATURE BY MEANS OF AN OPTICAL APPLIANCE PRESCRIBED ON THE BASIS OF THE DETERMINATION”

DOES THE PATIENT NEED GLASSES TO SEE BETTER?

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SIGHT TEST?


MYOPIA

HYPEROPIA

ASTIGMATISM

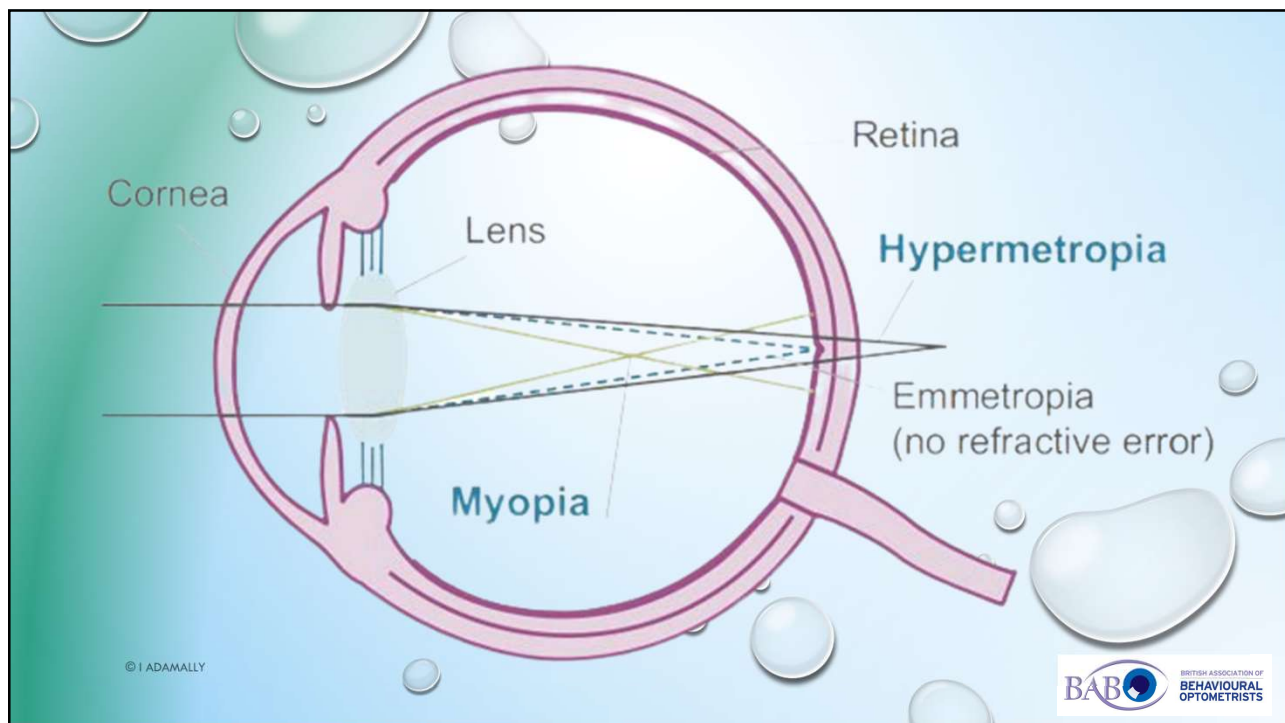
ANISOMETROPIA

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MYOPIA

CANNOT SEE WELL FAR AWAY

DOES NOT APPEAR TO IMPACT ON LEARNING SKILLS

EXCEPT WHEN THERE ARE CO-EXISTING BINOCULAR VISUAL OR PERCEPTUAL DISORDERS

GENETIC AND ENVIRONMENTAL FACTORS

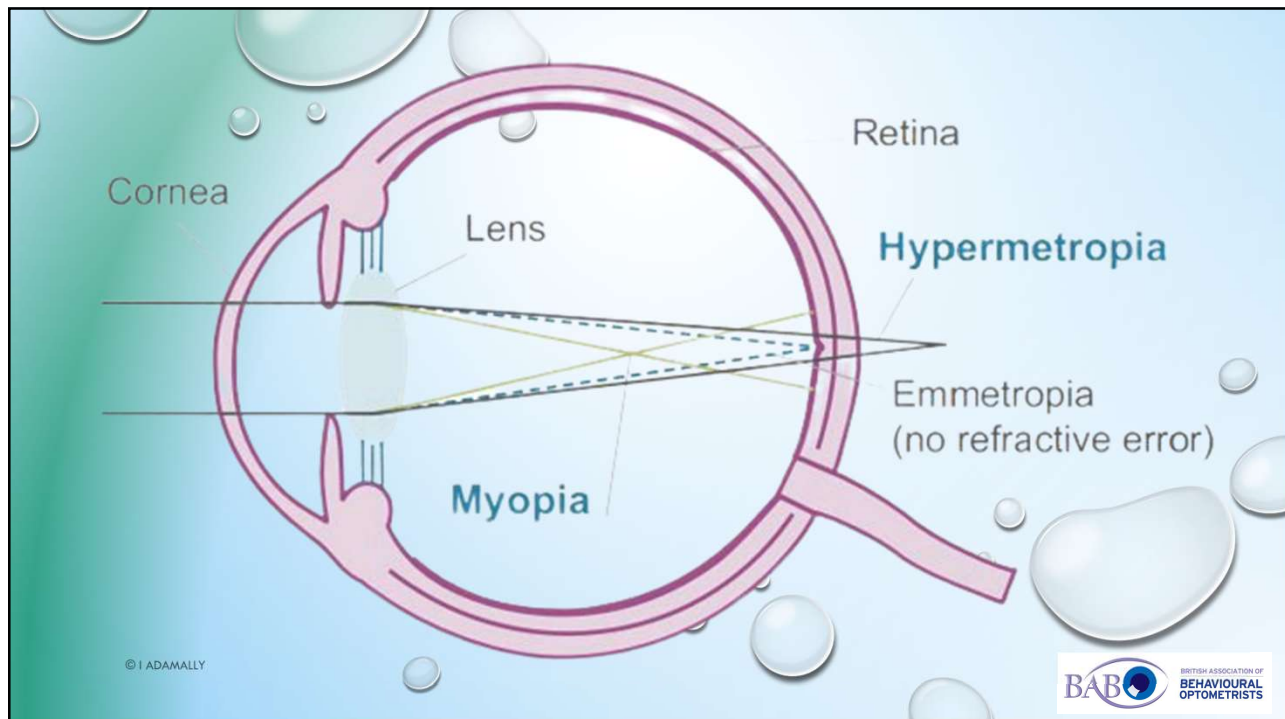
INCREASED INCIDENCE – GENETIC / ENVIRONMENTAL

INDOOR TIME / NEAR WORK / SMARTPHONE USE

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HYPEROPIA

NORMAL FOR CHILDREN TO HAVE SOME HYPEROPIA

MODERATE AMOUNTS MAKE IT HARDER FOR SOMEONE TO SEE AT NEAR

HIGH AMOUNTS AFFECT DISTANCE VISION

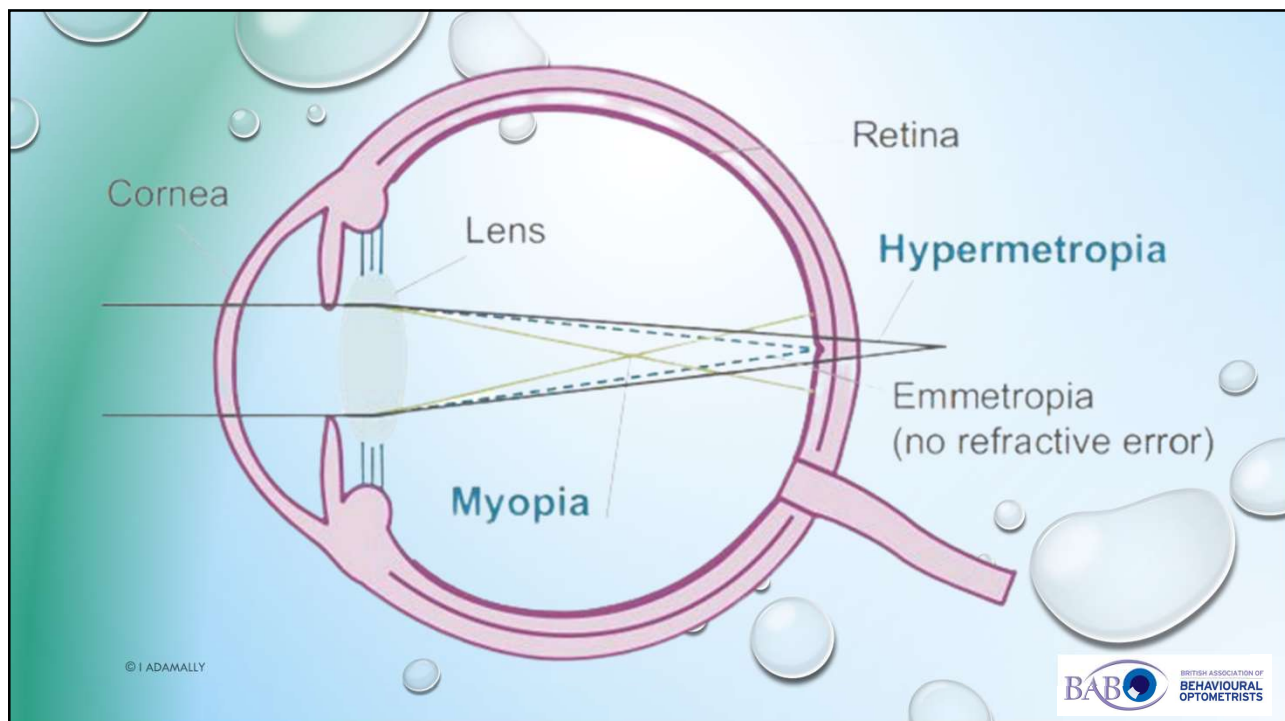
BUT... DEPENDS ON HOW GOOD THE ACCOMMODATION (FOCUSING) SYSTEM IS, IF POOR SMALL AMOUNTS CAN CAUSE DIFFICULTIES

OLDER PEOPLE GET PRESBYOPIA (LOSS OF FOCUS AT NEAR)

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ASTIGMATISM

THE CURVATURE OF THE EYE IS ASYMMETRIC
SMALL AMOUNTS ARE COMMON
THE ANGLE AND AMOUNT OF ASTIGMATISM INFLUENCE ITS IMPACT
LIGHT FOCUSES ON TWO POINTS IN THE Z AXIS
BLUR THROUGH THE X/Y AXIS
OCCURS IN COMBINATION WITH HYPEROPIA / MYOPIA
POSTURAL COMPONENT?

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ANISOMETROPIA

THERE IS A CLINICALLY SIGNIFICANT DIFFERENCE IN PRESCRIPTION BETWEEN THE TWO EYES
SMALL DIFFERENCES ARE COMMON AND CAN USUALLY BE TOLERATED
VERY LARGE DIFFERENCES CAN RESULT IN A LAZY EYE BUT DON'T NECESSARILY CAUSE SYMPTOMS
MODERATE DIFFERENCES CAN CAUSE CONFUSION OR DEGRADATION OF THE IMAGE

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NORMAL

BLURRED

ASTIGMATIC

**DOUBLE /
UNSTABLE**

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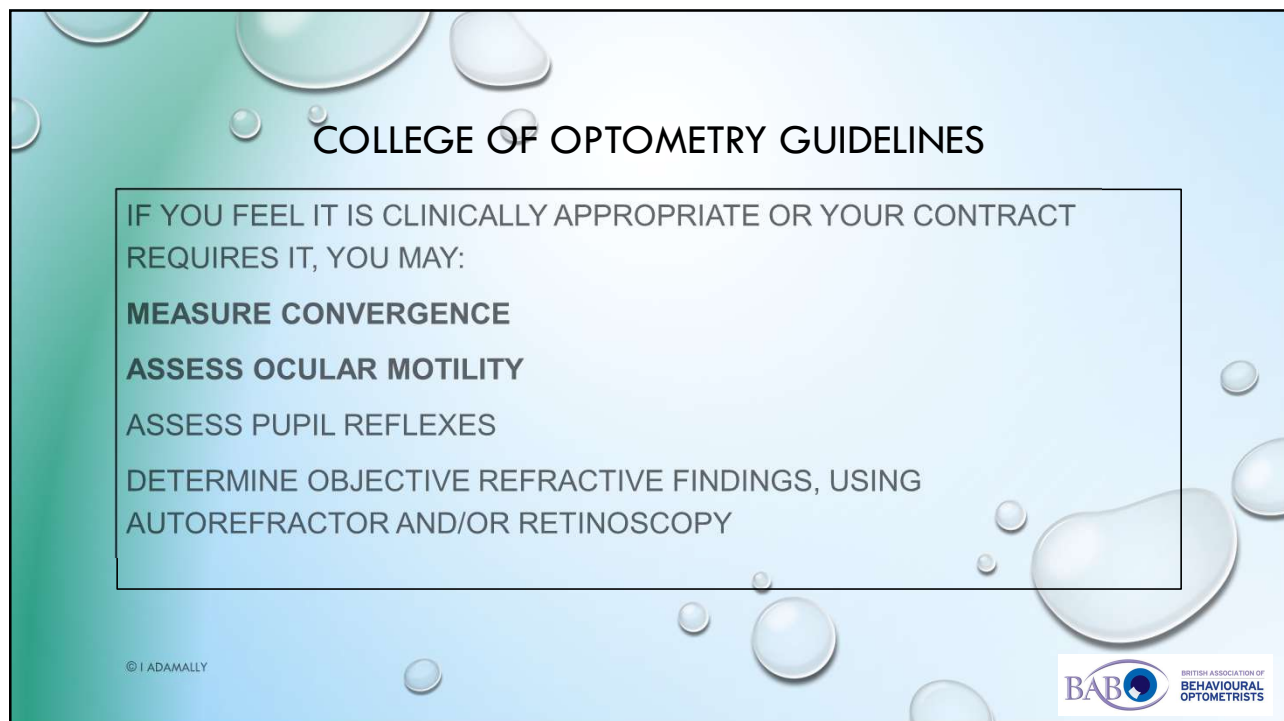
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COLLEGE OF OPTOMETRY GUIDELINES

IF YOU FEEL IT IS CLINICALLY APPROPRIATE OR YOUR CONTRACT REQUIRES IT, YOU MAY:

- MEASURE CONVERGENCE**
- ASSESS OCULAR MOTILITY**
- ASSESS PUPIL REFLEXES
- DETERMINE OBJECTIVE REFRACTIVE FINDINGS, USING AUTOREFRACTOR AND/OR RETINOSCOPY

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COLLEGE OF OPTOMETRY GUIDELINES

PERFORM BINOCULAR BALANCING AND MEASURE BINOCULAR VISUAL ACUITY

ASSESS FIXATION DISPARITY, FOR EXAMPLE IF THE PATIENT HAS SYMPTOMS OR SHOWS A DEVIATION ON COVER TEST

ASSESS ACCOMMODATION, FOR EXAMPLE TO DETERMINE ANY READING ADDITIONS FOR INTERMEDIATE AND/OR NEAR TASKS.

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NHS SIGHT TESTS

LIMITED FUNDING

MOST OPTOMETRISTS WILL INCLUDE **LIMITED** ASSESSMENTS OF **ACCOMMODATION AND CONVERGENCE** IN THE SIGHT TEST, ESPECIALLY WHEN PATIENTS REPORT SYMPTOMS OF VISUAL DISCOMFORT OR DISTURBANCE CONSISTENT WITH OCULOMOTOR DYSFUNCTIONS.

HOWEVER, THE FEE PAID TO OPTOMETRISTS FOR THE SIGHT TEST IS LOW, AND DOES NOT COVER FULL ASSESSMENT AND TREATMENT OF OCULOMOTOR PROBLEMS OR VISUAL STRESS. FOR THIS REASON, MANY OPTOMETRISTS CHOOSE NOT TO OFFER SUCH ASSESSMENTS, AND THOSE WHO DO OFFER THEM MUST CHARGE ADDITIONAL FEES. SUCH FEES ARE NORMALLY COMPARABLE TO FEES CHARGED BY OTHER HIGHLY QUALIFIED AND REGULATED PROFESSIONALS, SUCH AS VETS AND SOLICITORS FOR EXAMPLE.

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RECOMMENDATION

ALL CHILDREN REGARDLESS OF SYMPTOMS SHOULD HAVE A ROUTINE SIGHT TEST PRIOR TO AN ASSESSMENT FOR SPECIFIC LEARNING DIFFICULTIES

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CONFLICTING DATA - PAEDIATRICS

“FOUR OF EVERY 5 CHILDREN WITH SRI (SIGNIFICANT READING IMPAIRMENT) HAD NORMAL OPHTHALMIC FUNCTION IN EACH TEST USED”

“ABNORMALITIES IN SENSORY FUSION AT NEAR WERE MILDLY HIGHER IN CHILDREN WITH SRI COMPARED WITH THEIR PEERS (1 IN 6 VS 1 IN 10, $P = .08$), AS WERE CHILDREN WITH STEREOACUITY WORSE THAN 60 SECONDS/ARC (1 IN 6 VS 1 IN 10, $P = .001$)”

“NO EVIDENCE THAT VISION-BASED TREATMENTS WOULD BE USEFUL TO HELP CHILDREN WITH SRI”

<https://doi.org/10.1542/peds.2014-3622>

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CONFLICTING DATA - OPTOMETRY

CONSIDERING THE COARSE TESTS THAT THE AUTHORS USED, IT IS NOTEWORTHY THAT THEY FOUND ABNORMAL OPHTHALMIC FUNCTION IN 1 IN 5 CHILDREN WITH RI. FOR EXAMPLE, THE RI GROUP WERE 3 TIMES MORE LIKELY TO "FAIL" THE STEREOTEST, EVEN WITH THE CUT-OFF THAT THE AUTHORS USED

THE PAPER DID NOT LOOK AT TREATMENT

<https://doi.org/10.1542/peds.2014-3622>

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HYPEROPIA

THE IMPACT OF HYPEROPIA ON ACADEMIC PERFORMANCE AMONG CHILDREN: A SYSTEMATIC REVIEW

TWENTY-FIVE STUDIES (21 OBSERVATIONAL AND 4 INTERVENTIONAL) OUT OF 3415 MET THE INCLUSION CRITERIA. NO FULL-SCALE RANDOMIZED TRIALS WERE IDENTIFIED.

META-ANALYSES OF THE 5 STUDIES REVEALED A SMALL BUT SIGNIFICANT ADVERSE EFFECT ON EDUCATIONAL PERFORMANCE IN UNCORRECTED HYPEROPIC COMPARED TO EMMETROPIC CHILDREN (SMD -0.18 [95% CONFIDENCE INTERVAL (CI), -0.27 TO -0.09]; $P < 0.001$, 4 STUDIES) AND A MODERATE NEGATIVE EFFECT ON READING SKILLS IN UNCORRECTED HYPEROPIC COMPARED TO EMMETROPIC CHILDREN (SMD -0.46 (95% CI, -0.90 TO -0.03); $P = 0.036$, 3 STUDIES).

READING SKILLS WERE SIGNIFICANTLY WORSE IN HYPEROPIC THAN MYOPIC CHILDREN (SMD -0.29 (95% CI, -0.43 TO -0.15); $P < 0.001$, 1 STUDY). QUALITATIVE ANALYSIS ON 10 (52.6%) OF 19 STUDIES EXCLUDED FROM META-ANALYSIS FOUND A SIGNIFICANT ($P < 0.05$) ASSOCIATION BETWEEN UNCORRECTED HYPEROPIA AND IMPAIRED ACADEMIC PERFORMANCE. TWO INTERVENTIONAL STUDIES FOUND HYPEROPIC SPECTACLE CORRECTION SIGNIFICANTLY IMPROVED READING SPEED ($P < 0.05$).

Asia-Pacific Journal of Ophthalmology: January-February 2022 - Volume 11 - Issue 1 - p 36-51

doi: 10.1097/APO.0000000000000049

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HYPEROPIA/ASTIGMATISM

THE EFFECT OF ADHERENCE TO SPECTACLE WEAR ON EARLY DEVELOPING LITERACY: A LONGITUDINAL STUDY BASED IN A LARGE MULTIETHNIC CITY, BRADFORD, UK

OBSERVATION OF 944 CHILDREN: 432 HAD FAILED VISION SCREENING AND WERE REFERRED (TREATMENT GROUP) AND 512 RANDOMLY SELECTED (COMPARISON GROUP) WHO HAD PASSED (<0.20 LOGARITHM OF THE MINIMUM ANGLE OF RESOLUTION (LOGMAR) IN BOTH EYES). SPECTACLE WEAR WAS OBSERVED IN SCHOOL FOR 2 YEARS

THE VA OF ALL CHILDREN IMPROVED WITH INCREASING AGE, -0.009 LOG UNITS PER MONTH (95% CI -0.011 TO -0.007) (WORSE EYE). THE VA OF THE ADHERENT GROUP IMPROVED SIGNIFICANTLY MORE THAN THE COMPARISON GROUP, BY AN ADDITIONAL -0.008 LOG UNITS PER MONTH (95% CI -0.009 TO -0.007) (WORSE EYE) AND -0.004 LOG UNITS PER MONTH (95% CI -0.005 TO -0.003) IN THE BETTER EYE. LITERACY WAS ASSOCIATED WITH THE VA, LETTER IDENTIFICATION (ID) REDUCED BY -0.9 (95% CI -1.15 TO -0.64) FOR EVERY ONE LINE (0.10 LOGMAR) FALL IN VA (BETTER EYE). THIS ASSOCIATION REMAINED AFTER ADJUSTMENT FOR SOCIOECONOMIC AND DEMOGRAPHIC FACTORS (-0.33 , 95% CI -0.54 TO -0.12). THE ADHERENT GROUP CONSISTENTLY DEMONSTRATED HIGHER LETTER-ID SCORES COMPARED WITH THE NON-ADHERENT GROUP, WITH THE GREATEST EFFECT SIZE (0.11) IN YEAR 3.

<https://bmjopen.bmj.com/content/8/6/e021277>

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CONFLICTING DATA - AAPOS

“VISUAL CHARACTERISTICS ARE NOT THE MAJOR AETIOLOGICAL FACTORS IN SPECIFIC READING DIFFICULTY”

“RESEARCH HAS SHOWN THAT MOST READING DISABILITIES ARE NOT CAUSED BY ALTERED VISUAL FUNCTION”

<https://www.aao.org/Assets/c1788b54-c9d1-4f76-86e8-256da8a04841/634965436411730000/learning-disabilities-dyslexia-and-vision-2009.pdf>

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CONFLICTING DATA - OPTOMETRY

“FOUND DYSLEXIA TO BE ASSOCIATED WITH BINOCULAR INSTABILITY, REDUCED AMPLITUDE OF ACCOMMODATION, AND REDUCED CONTRAST SENSITIVITY FOR BOTH LOW SPATIAL FREQUENCIES AND UNIFORM FIELD FLICKER”

WE REPORT A SIGNIFICANT CORRELATION BETWEEN FLICKER THRESHOLD AND BINOCULAR INSTABILITY, THUS LINKING SENSORY AND MOTOR VISUAL CORRELATES OF DYSLEXIA

“VISUAL CHARACTERISTICS ARE NOT THE MAJOR AETIOLOGICAL FACTORS IN SPECIFIC READING DIFFICULTY”

[https://doi.org/10.1016/0275-5408\(95\)00021-6](https://doi.org/10.1016/0275-5408(95)00021-6)

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CONFLICTING DATA - AAPOS

SHORT-DURATION, HIGH-VELOCITY, SMALL JUMPING EYE MOVEMENTS CALLED SACCADES ARE USED FOR READING. READERS WITH DYSLEXIA CHARACTERISTICALLY HAVE SACCADIC EYE MOVEMENTS AND FIXATIONS SIMILAR TO THE BEGINNING READER BUT SHOW NORMAL SACCADIC EYE MOVEMENTS WHEN CONTENT IS CORRECTED FOR ABILITY.

<https://www.aao.org/Assets/c1788b54-c9d1-4f76-86e8-256da8a04841/634965436411730000/learning-disabilities-dyslexia-and-vision-2009.pdf>

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CONFLICTING DATA - OTONEUROLOGY

THE STUDY REVEALED THAT CHILDREN WITH DYSLEXIA HAVE LONGER DURATION OF FIXATION AND FEWER SACCADDES DURING OCULAR MOVEMENTS ON VECTOELECTRO-NYSTAGMOGRAPHY AND VIDEO-NYSTAGMOGRAPHY WHEN COMPARED TO CHILDREN WITHOUT DYSLEXIA.

<https://doi.org/10.1016/j.bjorl.2021.10.006>

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CONFLICTING DATA - AAPOS

IT HAS BEEN PROPOSED THAT A MAGNOCELLULAR SYSTEM DEFICIT PRODUCES A VISUAL TRACE OF ABNORMAL LONGEVITY THAT CREATES A MASKING EFFECT AND CAUSES VISUAL ACUITY BLURRING WHEN READING CONNECTED TEXT IN SOME CHILDREN WITH DYSLEXIA.

THERE ARE STUDY RESULTS THAT SUPPORT THIS THEORY AND OTHERS THAT REFUTE IT. AT THE PRESENT, THERE IS INSUFFICIENT EVIDENCE TO BASE ANY TREATMENT ON THIS POSSIBLE DEFICIT.

<https://www.aao.org/Assets/c1788b54-c9d1-4f76-86e8-256da8a04841/634965436411730000/learning-disabilities-dyslexia-and-vision-2009.pdf>

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CONFLICTING DATA - AAPOS

TINTED LENSES AND FILTERS HAVE BEEN SUGGESTED TO TREAT VISUAL PERCEPTUAL DYSFUNCTIONS THAT LEAD TO VISUAL DISTORTION CAUSED BY SENSITIVITIES TO PARTICULAR WAVELENGTHS OF LIGHT BUT NOT TO TREAT LANGUAGE-BASED DYSLEXIA. SCRUTINY OF PUBLISHED STUDY RESULTS THAT ADVOCATED THE USE OF THESE THERAPIES TO TREAT DYSLEXIA HAVE SHOWN SERIOUS FLAWS IN THEIR METHODS AND HAVE NOT BEEN SUFFICIENTLY WELL CONTROLLED TO SUPPORT THIS ASSERTION

MANY OF THE STUDIES THAT HAVE BEEN CITED AS PROOF OF IRLLEN-LENS EFFICIENCY HAVE ACTUALLY BEEN INCONCLUSIVE AFTER DEEPER ANALYSIS.

<https://www.aao.org/Assets/c1788b54-c9d1-4f76-86e8-256da8a04841/634965436411730000/learning-disabilities-dyslexia-and-vision-2009-2011>

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CONFLICTING DATA – SASC

THE TERM VISUAL STRESS DESCRIBES A HYPERSENSITIVE RESPONSE TO HIGH-CONTRAST PATTERN (WILKINS, 1995). DUE TO ITS ASSOCIATION WITH PATTERNED STIMULI, VISUAL STRESS MAY ALSO SOMETIMES BE CALLED PATTERN GLARE OR PATTERN-RELATED VISUAL STRESS.

THE USE OF IRLLEN-RELATED TERMINOLOGY IS NOW STRONGLY DISCOURAGED

NOTWITHSTANDING THE DIFFICULTY WITH DEFINITIONS AND DIAGNOSTIC CRITERIA FOR DYSLEXIA AND VISUAL STRESS, A RECENT STUDY SUPPORTS THE EXISTENCE OF VISUAL STRESS AS A CO-OCCURRING FACTOR IN AROUND 20% OF PEOPLE WITH DYSLEXIA (EVANS AND ALLEN, 2016).

SIMILAR LEVELS IN PATIENTS WITHOUT DYSLEXIA!

<https://doi.org/10.1542/peds.2009-1445>

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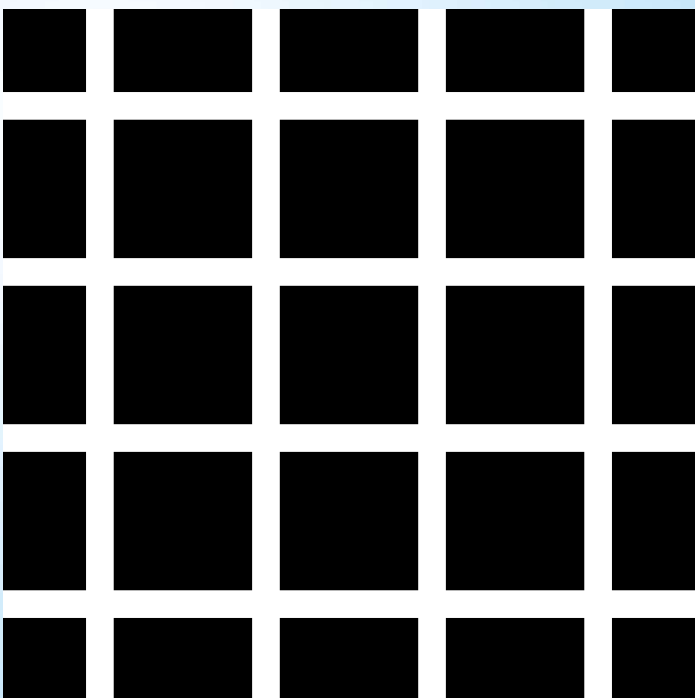


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PATTERN GLARE IS NORMAL

“VISUAL STRESS” IS AN EXCESSIVE
AVERSION RESPONSE TO PATTERN
GLARE

DO YOU HAVE TO BENEFIT FROM A
TINT TO HAVE “VISUAL STRESS”



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CONFLICTING DATA - STEIN

DYSLEXIA IS MORE THAN JUST DIFFICULTY WITH TRANSLATING LETTERS INTO SOUNDS. MANY DYSLEXICS HAVE PROBLEMS WITH CLEARLY SEEING LETTERS AND THEIR ORDER. THESE DIFFICULTIES MAY BE CAUSED BY ABNORMAL DEVELOPMENT OF THEIR VISUAL “MAGNOCELLULAR” (M) NERVE CELLS; THESE MEDIATE THE ABILITY TO RAPIDLY IDENTIFY LETTERS AND THEIR ORDER BECAUSE THEY CONTROL VISUAL GUIDANCE OF ATTENTION AND OF EYE FIXATIONS. EVIDENCE FOR M CELL IMPAIRMENT HAS BEEN DEMONSTRATED AT ALL LEVELS OF THE VISUAL SYSTEM: IN THE RETINA, IN THE LATERAL GENICULATE NUCLEUS, IN THE PRIMARY VISUAL CORTEX AND THROUGHOUT THE DORSAL VISUOMOTOR “WHERE” PATHWAY FORWARD FROM THE VISUAL CORTEX TO THE POSTERIOR PARIETAL AND PREFRONTAL CORTICES. THIS ABNORMALITY DESTABILISES VISUAL PERCEPTION; HENCE, ITS SEVERITY IN INDIVIDUALS CORRELATES WITH THEIR READING DEFICIT. TREATMENTS THAT FACILITATE M FUNCTION, SUCH AS VIEWING TEXT THROUGH YELLOW OR BLUE FILTERS, CAN GREATLY INCREASE READING PROGRESS IN CHILDREN WITH VISUAL READING PROBLEMS.

<https://doi.org/10.1007/s40474-014-0030-6>

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CONFLICTING DATA - AAPOS

CONVERGENCE INSUFFICIENCY AND POOR ACCOMMODATION, BOTH OF WHICH ARE UNCOMMON IN CHILDREN, CAN INTERFERE WITH THE PHYSICAL ACT OF READING BUT NOT WITH DECODING.

CONVERGENCE AND ACCOMMODATION ARE ALSO REQUIRED FOR HANDHELD GAMES. THUS, IF VISUAL DEFICITS WERE A MAJOR CAUSE OF READING DISABILITIES, CHILDREN WITH SUCH DISABILITIES WOULD REJECT THIS VISION-INTENSIVE ACTIVITY.

<https://www.aao.org/Assets/c1788b54-c9d1-4f76-86e8-256da8a04841/634965436411730000/learning-disabilities-dyslexia-and-vision-2009.pdf>

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SMARTPHONE USAGE

ULTRASOUND BIOMICROSCOPY STUDY OF ACCOMMODATIVE STATE IN SMARTPHONE ABUSERS

WHILE THERE WAS A STATISTICALLY SIGNIFICANT DIFFERENCE IN PRECYCLOPLEGIC REFRACTION, THE POSTCYCLOPLEGIC REFRACTION SHOWED NON-STATISTICALLY SIGNIFICANT DIFFERENCE BETWEEN THE 2 GROUPS. THIS REVEALS PSEUDOMYOPIA AND EXCESSIVE ACCOMMODATION IN SMARTPHONE ABUSERS.

IN THE PRESENT STUDY, THE SUPERIOR ANTERIOR CHAMBER ANGLE (ACA) SHOWED STATISTICALLY SIGNIFICANT DIFFERENCE IN PRECYCLOPLEGIA BETWEEN THE SMARTPHONE ABUSERS AND THE NON-USERS WHILE THE POSTCYCLOPLEGIC SUPERIOR ACA DID NOT VARY SIGNIFICANTLY. THIS INDICATES SPASM OF ACCOMMODATION COMPLETELY RELIEVED BY COMPLETE CYCLOPLEGIA. MOREOVER, BOTH THE NASAL ACA AND THE LENS THICKNESS VARIED SIGNIFICANTLY IN PRECYCLOPLEGIA AND POSTCYCLOPLEGIA BETWEEN THE TWO GROUPS.

<https://doi.org/10.1186/s12886-022-02557-x>

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CONFLICTING DATA - SASC

PROBLEMS WITH ACCOMMODATION AND CONVERGENCE ARE COMMON IN CHILDREN AND STUDENTS WHO EXPERIENCE DIFFICULTIES WITH READING AND ACADEMIC PERFORMANCE. FOR EXAMPLE, GRISHAM ET AL., (2007) ASSESSED 461 CHILDREN, AVERAGE AGE 15 YEARS, WHO HAD BEEN 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.

https://sasc.org.uk/media/fmpassi3/splds-and-visual-difficulties_guidance-for-spld-practitioners-june-2018.pdf

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CONFLICTING DATA - AAPOS

DIAGNOSTIC AND TREATMENT APPROACHES THAT LACK SCIENTIFIC EVIDENCE OF EFFICACY, INCLUDING EYE EXERCISES, BEHAVIORAL VISION THERAPY, OR SPECIAL TINTED FILTERS OR LENSES, ARE NOT ENDORSED AND SHOULD NOT BE RECOMMENDED

MOST OF THESE EXERCISES CAN BE PERFORMED AT HOME, AND EXTENSIVE IN-OFFICE VISION THERAPY IS NOT REQUIRED.

<https://doi.org/10.1542/peds.2009-1445>

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CONVERGENCE

ABILITY TO BRING THE EYES IN
WORKS IN A TRIAD WITH:
 PUPIL SIZE CHANGE
 ACCOMMODATION (FOCUSING SYSTEM)

PERCEPTUAL SKILLS INCLUDING:
AWARENESS ON THE X / Y / Z AXIS
ATTENTION

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CONVERGENCE

ABILITY TO BRING THE EYES IN
WORKS IN A TRIAD WITH:
 PUPIL SIZE CHANGE
 ACCOMMODATION (FOCUSING SYSTEM)

PERCEPTUAL SKILLS INCLUDING:
AWARENESS ON THE X / Y / Z AXIS
ATTENTION

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CONVERGENCE (ACCOMMODATION)

INTERVENTIONS FOR CONVERGENCE INSUFFICIENCY: A NETWORK META-ANALYSIS

WE INCLUDED 12 TRIALS (SIX IN CHILDREN AND SIX IN ADULTS) WITH A TOTAL OF 1289 PARTICIPANTS. TRIALS EVALUATED SEVEN INTERVENTIONS:

- 1) OFFICE-BASED VERGENCE/ACCOMMODATIVE THERAPY WITH HOME REINFORCEMENT;
- 2) HOME-BASED PENCIL/TARGET PUSH-UPS;
- 3) HOME-BASED COMPUTER VERGENCE/ACCOMMODATIVE THERAPY;
- 4) OFFICE-BASED VERGENCE/ACCOMMODATIVE THERAPY ALONE;
- 5) PLACEBO VERGENCE/ACCOMMODATIVE THERAPY OR OTHER PLACEBO INTERVENTION;
- 6) PRISM READING GLASSES; AND
- 7) PLACEBO READING GLASSES.

Cochrane 2020: <https://doi.org/10.1002/14651858.CD006768.pub3>

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CONVERGENCE (ACCOMMODATION)

INTERVENTIONS FOR CONVERGENCE INSUFFICIENCY: A NETWORK META-ANALYSIS

- WHEN TREATMENT SUCCESS WAS DEFINED BY A COMPOSITE OUTCOME REQUIRING BOTH CLINICAL MEASURES OF CONVERGENCE TO BE NORMAL, AND ALSO SHOW A PRE-SPECIFIED MAGNITUDE OF IMPROVEMENT, WE FOUND HIGH-CERTAINTY EVIDENCE THAT OFFICE-BASED VERGENCE/ACCOMMODATIVE THERAPY WITH HOME REINFORCEMENT INCREASES THE CHANCE OF A SUCCESSFUL OUTCOME, COMPARED WITH HOME-BASED COMPUTER VERGENCE/ACCOMMODATIVE THERAPY (RISK RATIO (RR) 1.96, 95% CONFIDENCE INTERVAL (CI) 1.32 TO 2.94), HOME-BASED PENCIL/TARGET PUSH-UPS (RR 2.86, 95% CI 1.82 TO 4.35); AND PLACEBO (RR 3.04, 95% CI 2.32 TO 3.98)..
- HOWEVER, THERE MAY BE NO EVIDENCE OF ANY TREATMENT DIFFERENCE BETWEEN HOME-BASED COMPUTER VERGENCE/ACCOMMODATIVE THERAPY AND HOME-BASED PENCIL/TARGET PUSH-UPS (RR 1.44, 95% CI 0.93 TO 2.24; LOW-CERTAINTY EVIDENCE), OR BETWEEN EITHER OF THE TWO HOME-BASED THERAPIES AND PLACEBO THERAPY, FOR THE OUTCOME OF TREATMENT SUCCESS

Cochrane 2020: <https://doi.org/10.1002/14651858.CD006768.pub3>

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VISION TRAINING FOR CONVERGENCE/ACCOMMODATION

TREATMENT OF SYMPTOMATIC CONVERGENCE INSUFFICIENCY IN CHILDREN ENROLLED IN THE CONVERGENCE INSUFFICIENCY TREATMENT TRIAL-ATTENTION & READING TRIAL: A RANDOMIZED CLINICAL TRIAL

THREE HUNDRED ELEVEN CHILDREN AGED 9 TO 14 YEARS WITH SYMPTOMATIC CONVERGENCE INSUFFICIENCY WERE RANDOMLY ASSIGNED TO 16 WEEKS OF OFFICE-BASED VERGENCE/ACCOMMODATIVE THERAPY OR TO PLACEBO THERAPY (ATTENTION BASED VISION TRAINING)

MEAN NPC IMPROVED 10.4 CM IN THE VERGENCE/ACCOMMODATIVE AND 6.2 CM IN THE PLACEBO THERAPY GROUP (MEAN DIFFERENCE OF -4.2 CM [95% CONFIDENCE INTERVAL {CI}, -5.2 TO -3.2 CM; $P < .001$]); MEAN PFV INCREASED 23.2 AND 8.8Δ IN THE VERGENCE/ACCOMMODATIVE AND PLACEBO THERAPY GROUPS, RESPECTIVELY (MEAN DIFFERENCE OF 14.4Δ [95% CI, 12.1 TO 16.8Δ; $P < .001$]).

THE MEAN CISS SCORE IMPROVED 11.8 AND 10.4 POINTS IN THE VERGENCE/ACCOMMODATIVE AND PLACEBO THERAPY GROUPS, RESPECTIVELY (MEAN DIFFERENCE OF 1.5 POINTS [95% CI, -3.8 TO +0.8 POINTS; $P = .21$]).

ALL CHILDREN SHOWED IMPROVED READING COMPREHENSION ON THE WIAT AFTER 16 WEEKS

<https://doi.org/10.1097/oxp.0000000000001443>

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CONFLICTING DATA - DYSLEXIA

FOLLOWING A LITERATURE SEARCH AND SELECTION PROCESS, 25 PAPERS WERE INCLUDED. STUDIES USING BINOCULAR EYE TRACKING DURING LINGUISTIC AND NONLINGUISTIC TASKS IN CHILDREN WITH DYSLEXIA AND TYPICAL DEVELOPMENT 5–17 YEARS OF AGE ARE REVIEWED. THE STUDIES REVIEWED PROVIDED CONSISTENT EVIDENCE OF POOR BINOCULAR COORDINATION IN CHILDREN WITH DYSLEXIA, BUT THE RESULTS ASSOCIATED WITH DIFFERENT TASK CHARACTERISTICS WERE LESS CONSISTENT.

<https://doi.org/10.1007/s11881-022-00256-2>

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FROM FIVE ELIGIBLE STUDIES INVOLVING 2465 CHILDREN, THE POOLED PREVALENCE OF ASTHENOPIA WAS **19.7%**.

VILELA ET AL. (2015B) CONDUCTED A SYSTEMATIC REVIEW AND METAANALYSIS 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%**.

IN LEARNING DIFFICULTIES: 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.

https://sasc.org.uk/media/fmpassi3/splds-and-visual-difficulties_guidance-for-spld-practitioners-june-2018.pdf

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[HTTPS://WWW.SASC.ORG.UK/MEDIA/NARLOKRX/VISUAL-DIFFICULTIES-SCREENING-PROTOCOL-V2-JUNE-2019.PDF](https://www.sasc.org.uk/media/narlokrx/visual-difficulties-screening-protocol-v2-june-2019.pdf)

https://sasc.org.uk/media/fmpassi3/splds-and-visual-difficulties_guidance-for-spld-practitioners-june-2018.pdf

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| | | Never | Rarely | Sometimes | Often | Always |
|----|--|-------|--------|-----------|-------|--------|
| 1 | Do you get headaches when you read? | | | | | |
| 2 | Does reading make your eyes feel sore, gritty or watery? | | | | | |
| 3 | Does reading make you feel tired or sleepy? | | | | | |
| 4 | Do you become restless or fidgety or distracted when reading? | | | | | |
| 5 | Do you become less comfortable the longer you read? | | | | | |
| 6 | Do you prefer dim light to bright light for reading? | | | | | |
| 7 | Does reading from white paper seem too bright or glaring? | | | | | |
| 8 | Do parts of the white page between the words form patterns when you read? | | | | | |
| 9 | Does the print or background shimmer or appear coloured as you read? | | | | | |
| 10 | Does print appear to jitter or move on the page as you read? | | | | | |
| 11 | Do you screw your eyes up when reading? | | | | | |
| 12 | Do you rub your eyes to relieve the strain when you are reading? | | | | | |
| 13 | Does text appear blurred, or go in and out of focus, when you read? | | | | | |
| 14 | Do you move your eyes around or blink to keep text clear when you are reading? | | | | | |
| 15 | Do objects in the distance appear more blurred after you have been reading? | | | | | |
| 16 | Do you lose your place when reading? | | | | | |
| 17 | Do you re-read or skip words or lines when reading? | | | | | |
| 18 | Do you use a marker or your finger to stop you losing the place when you read? | | | | | |
| 19 | Do you cover or close one eye when reading? | | | | | |
| 20 | Do the words, page or book appear double when you are reading? | | | | | |

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OBSERVE VISUAL PERFORMANCE

DO THEY RUB THEIR EYES A LOT?

DO THEY GET TOO CLOSE TO THE PAGE?


DO THEY READ MORE SLOWLY WITH SMALLER / MORE CROWDED PRINT?

DO THEY RE-READ THINGS?

DO THEY SKIP SMALL WORDS?

DO THEY TILT THEIR HEAD / CLOSE ONE EYE?

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VISION TRAINING FOR OPTOMETRISTS

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VISION TRAINING FOR OPTOMETRISTS?

- ACCOMMODATIVE FACILITY AND LAG
- VERGENCE FACILITY
- FUSIONAL RANGES
- RELATIVE ACCOMMODATION
- VISUAL PERCEPTUAL TESTING
- VISUAL-VESTIBULAR TESTING
- VISUAL-MOTOR TESTING

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EMERGING EVIDENCE - VISUAL ATTENTION SPAN

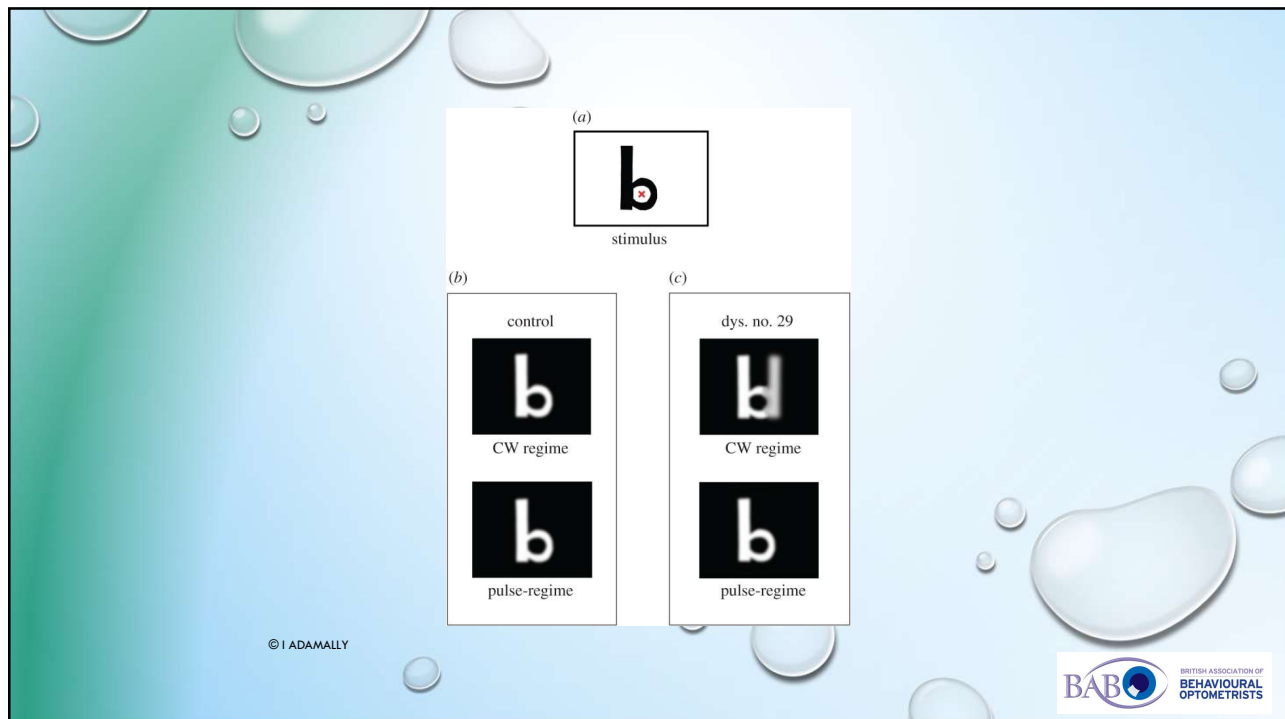
USING A SO-CALLED FOVEASCOPE, WE FOUND THAT FOR A COHORT OF 30 NORMAL ADULTS, THE TWO BLUE CONE-FREE AREAS AT THE CENTRE OF THE FOVEAS ARE ASYMMETRICAL. THE NOISE-STIMULATED AFTERIMAGE DOMINANT EYE INTRODUCED HERE CORRESPONDS TO THE CIRCULAR BLUE CONE-FREE AREA, WHILE THE NON-DOMINANT EYE CORRESPONDS TO THE DIFFUSE AND IRREGULAR ELLIPTICAL OUTLINE. BY CONTRAST, WE FOUND THAT THIS ASYMMETRY IS ABSENT OR FRUSTRATED IN A SIMILAR COHORT OF 30 ADULTS WITH NORMAL OCULAR STATUS, BUT WITH DYSLEXIA, I.E. WITH VISUAL AND PHONOLOGICAL DEFICITS. IN THIS CASE, OUR RESULTS SHOW THAT THE TWO MAXWELL CENTROID OUTLINES ARE BOTH CIRCULAR BUT LEAD TO AN UNDETERMINED AFTERIMAGE DOMINANCE WITH A COEXISTENCE OF PRIMARY AND MIRROR IMAGES.

<https://doi.org/10.1098/rspb.2017.1380>

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EMERGING EVIDENCE – VISUAL ATTENTION SPAN

A GREATER VAS DEFICIT IN DD WAS OBSERVED IN MORE OPAQUE LANGUAGES, WITH A TREND OF DEVELOPMENTAL INCREASE IN [ATTENTION DEFICIT](#), ESPECIALLY AT THE PRIMARY SCHOOL LEVEL. MOREOVER, THIS VAS DEFICIT SEEMED TO BE INDEPENDENT OF THE [PHONOLOGICAL DEFICIT](#) OF DYSLEXIA. THESE FINDINGS TO SOME EXTENT SUPPORTED THE VAS DEFICIT THEORY OF DD AND (PARTIALLY) EXPLAINED THE CONTROVERSIAL RELATIONSHIP BETWEEN VAS IMPAIRMENT AND [READING DISABILITIES](#).

<https://doi.org/10.1016/j.ridd.2023.104465>

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