



4th ASEAN Optometric Conference

Kuala Lumpur, Malaysia - 1 October 2012

Association of Malaysian Optometrists & Malaysian Academy of Optometry

PRESCRIBING COLOUR **COLOURED OVERLAYS AND** **INTUITIVE COLORIMETRY**

“Tinted lenses can have therapeutic potential for dyslexia, photosensitive epilepsy, photosensitive migraine, multiple sclerosis and acquired colour vision deficits”

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PRESCRIBING COLOUR WORKSHOP

Jointly presented by: Professor Stephen Dain & Yap Tiong Peng

- Visual Stress and Perceptual Distortion
- Meares-Irlen Syndrome
- Photosensitive Migraine
- Other Neurological Conditions
- Procedure for Prescribing Colour
- Neale Analysis of Reading Ability
- Ravens Progressive Matrices
- Overlay Assessment
- Wilkins Rate of Reading Test
- Intuitive Colorimetry



PRESCRIBING COLOUR

The Singapore Experience – Yap Tiong Peng

- There is renewed interest in Early Childhood Education and Special Needs in Singapore
 - People’s Association Workshop for Parents and Educators entitled Vision and Learning, 3 March 2012
 - Singapore Continuing Education for Optometrists – focus on children with learning difficulties (Prof Bruce Evans & Yap Tiong Peng)
 - Numerous news reports locally
- 3 – 10% Prevalence (Dyslexia Association of Singapore)
- Colour benefits about 40-50% of Dyslexic children: 2-3 times more common in Dyslexic children than Non-Dyslexic (Kriss & Evans 2005)





Reading can be tiring

VISUAL STRESS & PERCEPTUAL DISTORTION

- Meares-Irlen Syndrome
- Irlen Syndrome (USA)
- Scotopic Sensitivity Syndrome (Former Name)

What is VISUAL STRESS?

Visual Stress refers to reading difficulties, light sensitivity and headaches from exposure to disturbing visual patterns. It can be responsible for poor attention and rapid fatigue when reading. The symptoms can occur despite normal vision and can often be reduced by coloured filters (overlays or lenses).

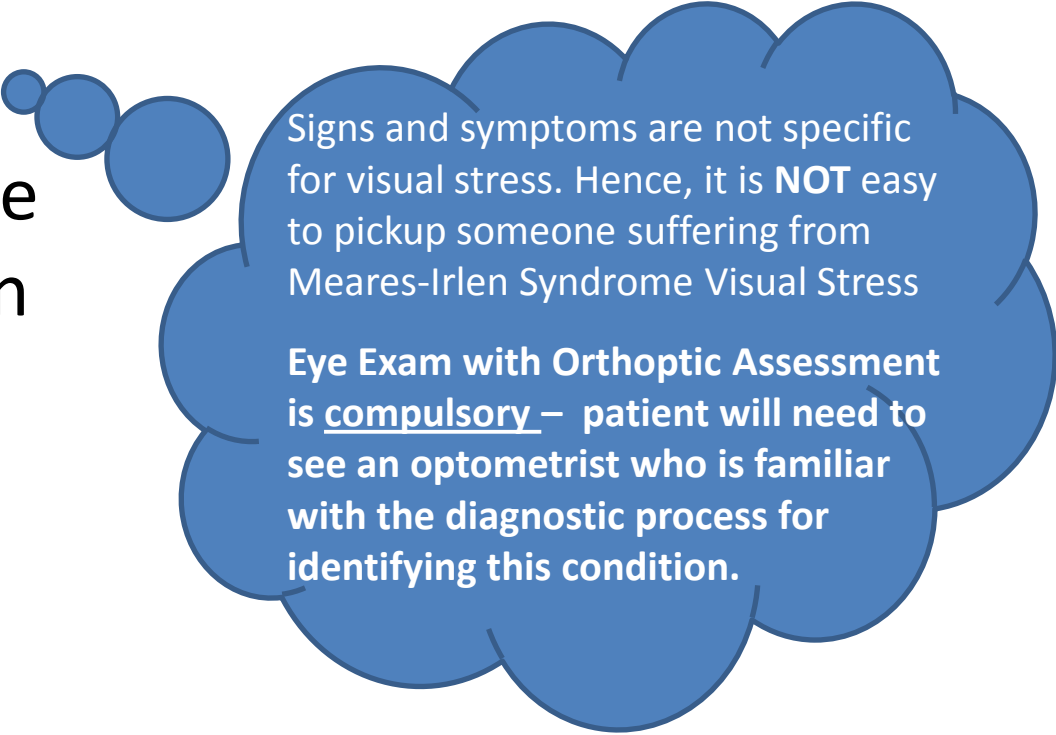
SYMPTOMS OF VISUAL STRESS

- “words moving on the page”
- “when I read I get a headache”
- “reading hurts my eyes”
- “my eyes get tired quickly when reading”
- “see rivers/worms running through the words”
- “I can see colours around letters”
- “the page is too bright”



SIGNS OF VISUAL STRESS

- rubbing eyes
- increased blink rate
- poor concentration
- red/watery eyes
- low self-esteem



Signs and symptoms are not specific for visual stress. Hence, it is **NOT** easy to pickup someone suffering from Meares-Irlen Syndrome Visual Stress

Eye Exam with Orthoptic Assessment is compulsory – patient will need to see an optometrist who is familiar with the diagnostic process for identifying this condition.

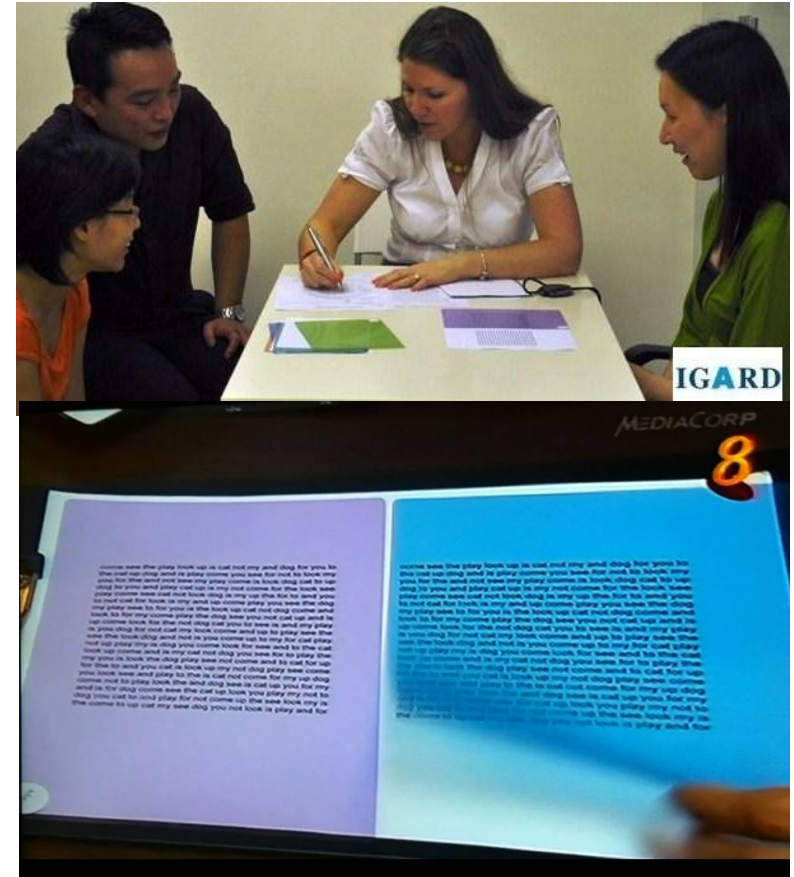
At age 7, text in most literature will become smaller and more crowded. This is therefore often a common age for symptoms to start

VISUAL STRESS IS NOT DYSLEXIA

- 5% of population severely affected and 20% to a lesser degree
- Condition relating to reading difficulties, headaches and light sensitivity when looking at disturbing visual patterns
- Responsible for print distortion and rapid fatigue when reading
- Symptoms can occur despite normal vision

MEARES-IRLEN SYNDROME

- Neurologist MacDonald Critchley (1964) noted a dyslexic child find easier reading on colour paper
- Olive Meares (1980) & Helen Irlen (1983) claimed that reading difficulties can sometimes be reduced by wearing coloured glasses
- U.K. Medical Research Council / Arnold Wilkins developed Intuitive Colorimeter (1980s) and conducted double-masked RCT (Wilkins et al 1992, 1994)
- Australian RCT showed similar results (Robinson and Foreman 1999)



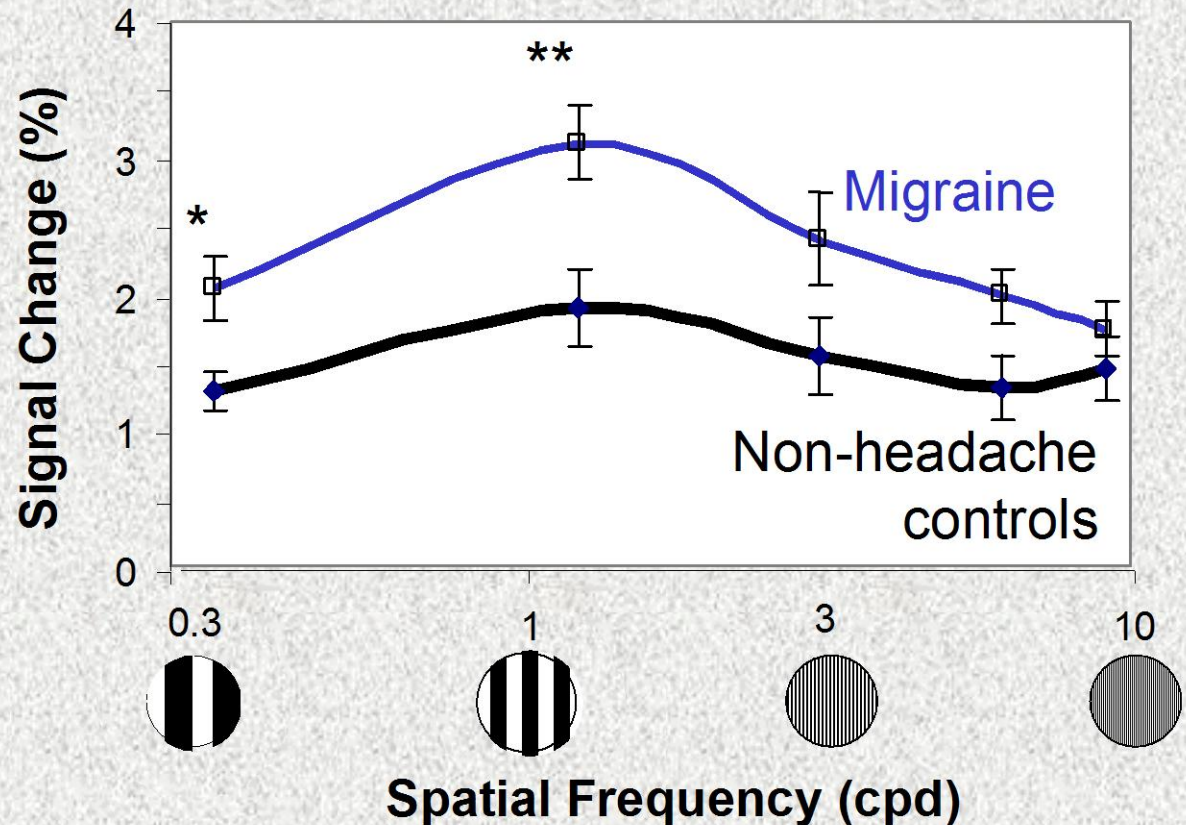
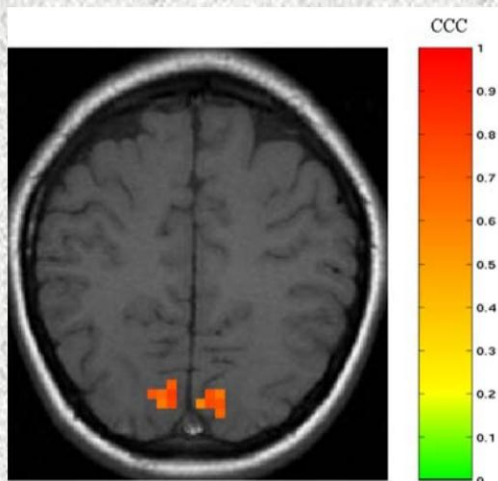
PHOTOSENSITIVE MIGRAINE

- Migraine affects 10-12 % of the population
- More common in females
- Bolder striped patterns aversive especially with epileptogenic spatial frequencies
- Especially up to 24 hours before an attack
- 40% of migraine attacks are thought to be a result of a visual stimuli e.g. flickering lights
- These attacks can also be helped with the use of a precise colour
- fMRI scans



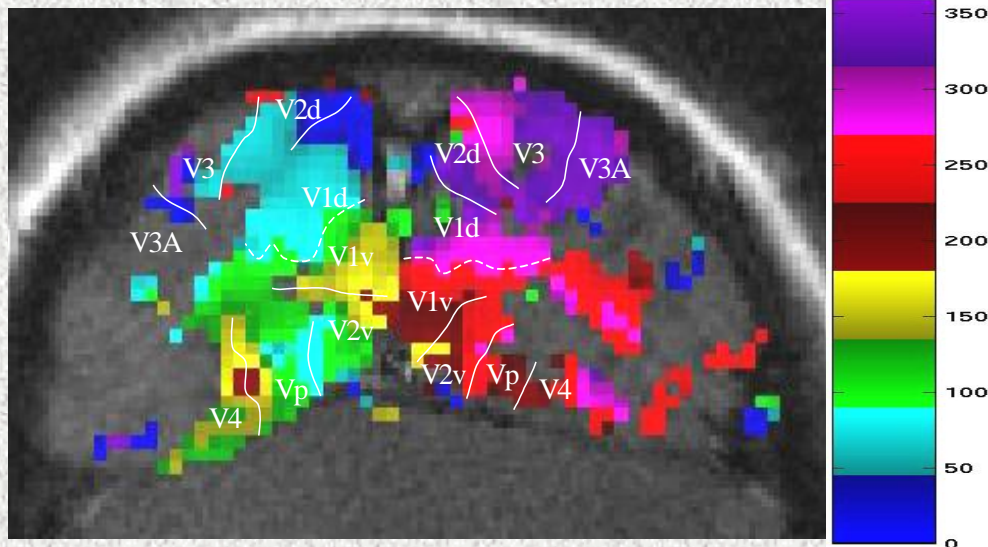
PATTERN GLARE TEST

fMRI BOLD response in migraine

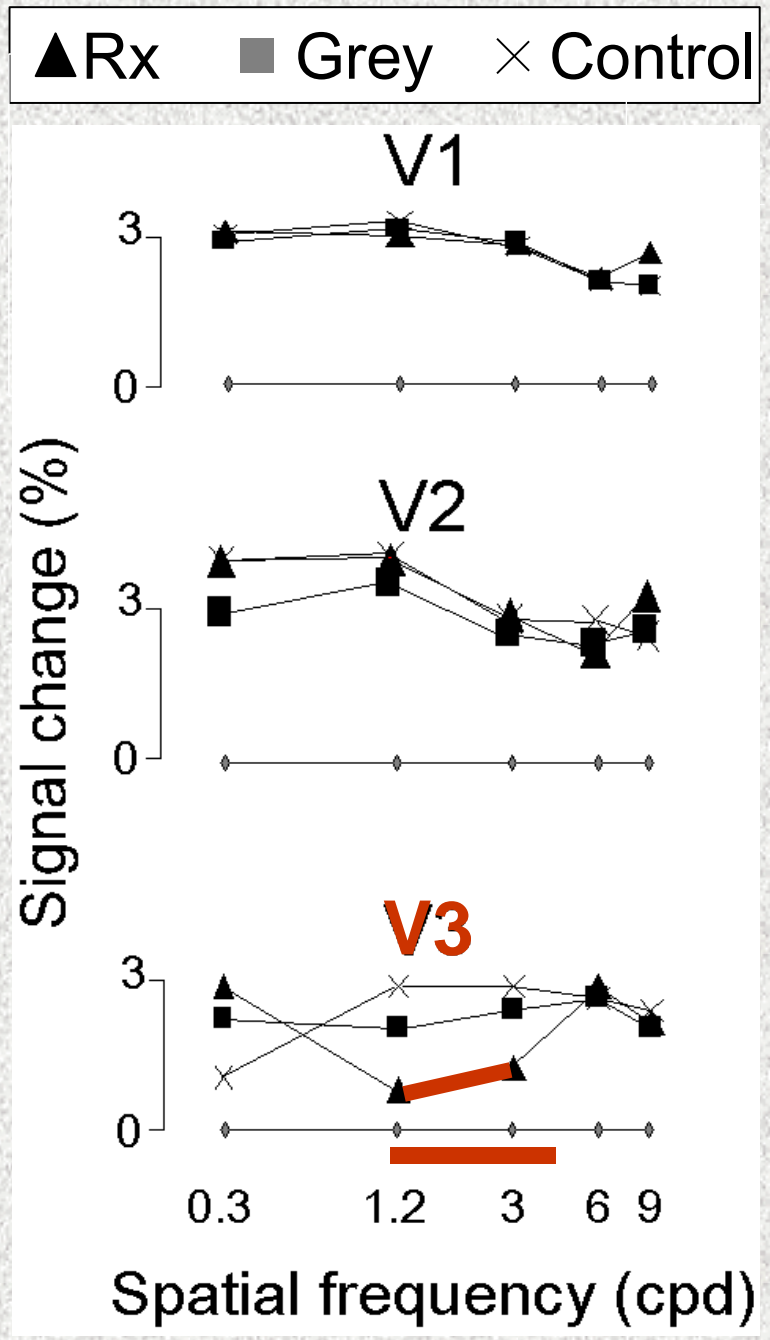


J. Huang, T. G. Cooper, B. Satana, D. I. Kaufman, Y. Cao. Visual distortion associated with hyper visual neuronal activity in migraine. *Headache*, 2003 (in press)

BOLD response selectively reduced by ophthalmic tint-data from one subject



Cao, Y. Huang, J and Wilkins A.J
 Michigan State University and Essex University



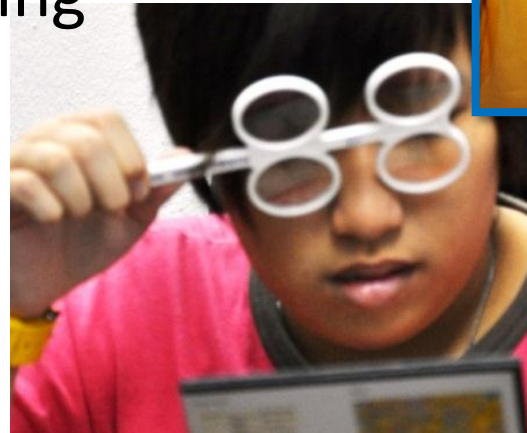
NEUROLOGICAL CONDITIONS

- Colour appears to be of benefit in several other neurological conditions:
 - Autism
 - Aspergers
 - Closed head injury
 - Myalgic encephalomyelitis
 - Multiple sclerosis
- Photosensitive Epilepsy has been proven to be due to a hyperexcitability in the visual cortex

Ludlow, A.K. and Wilkins, A.J. (2009). Color as a therapeutic intervention. *Journal of Autism and Developmental Disorders*, **39**(5), 815-818

PROCEDURE FOR PRESCRIBING COLOUR IN CHILDREN WITH LEARNING DIFFICULTIES

- Eye Examination with Orthoptic Assessment
- Neale Analysis of Reading Ability
- Ravens Progressive Matrices
- Colour Overlay Assessment
- Wilkins Rate of Reading
- Intuitive Colorimetry



Reference: British College of Optometrists
Guidelines for prescribing Precision Tinted
Lenses in Dyslexic children.

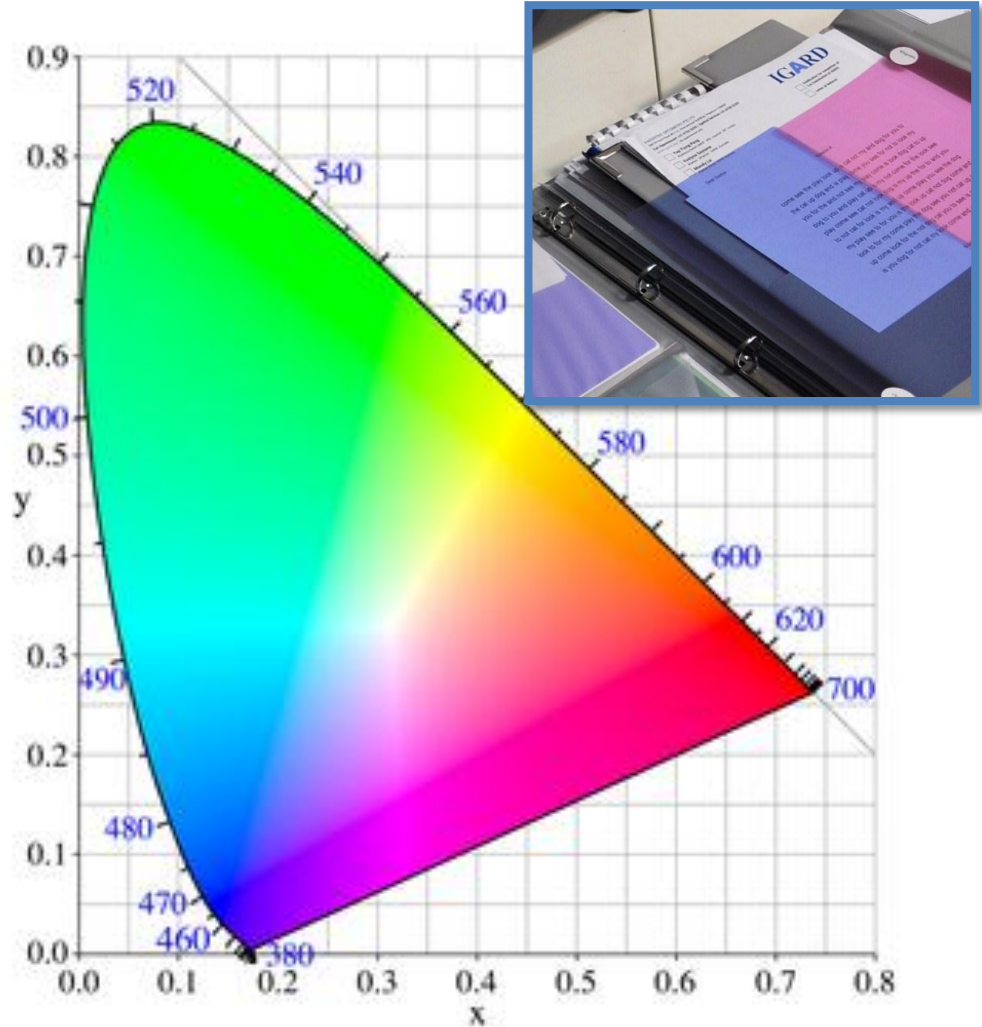
*Do they really
need Colour?*

NOT ALL!

SOME PATIENTS ONLY
NEED EYE EXERCISES
(ORTHOPTIC VISION THERAPY)

COLOUR OVERLAY ASSESSMENT

- Patient's Symptoms
 - General appearance
 - Letters/Words
Moving? Doubling?
Blurring?
 - Seeing patterns?
Colours on paper?
 - Glare?
- Demonstration



WILKINS RATE OF READING TEST

- Objective way of assessing benefit
- Simple words used in random sequence
- Record Words/min & Error
- Confidence & Fluency noted
- If 10% or more increase in ROR with chosen overlay, the patient can go direct to colorimetry without the trial period of overlay



SOME INTERESTING FACTS

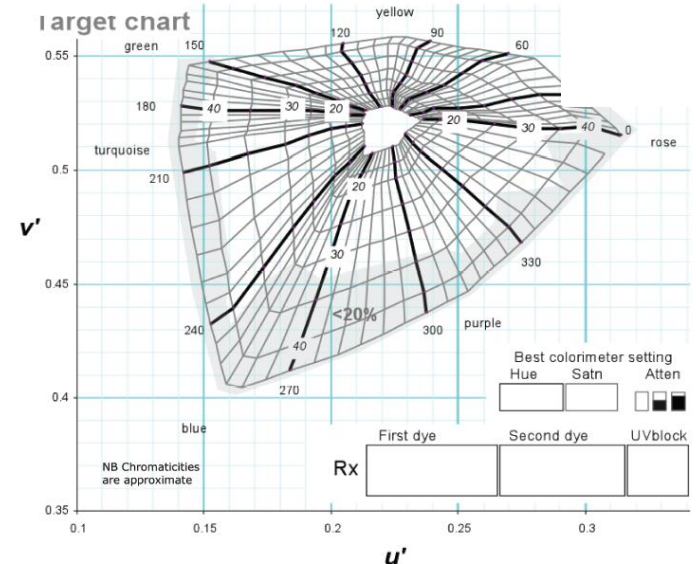
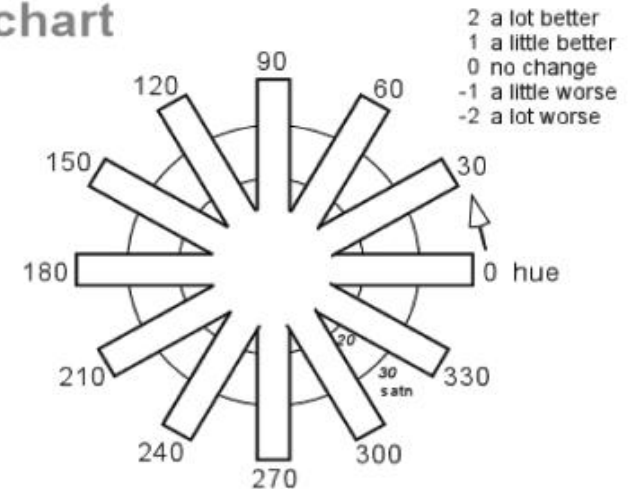
- More than 80% of people prescribed PTL are still using after 1 year (Evans, Patel, Wilkins et al 1999)
- Overlay colour cannot be used to predict lens colour (Lightstone, Lightstone, Wilkins 1999)
- MISVIS is nearly as common in adults as children (Joseph & Evans 1999)
- MISVIS is about 2-3 times more common in Dyslexic children than Non-Dyslexic (Kriss & Evans 2005)



INTUITIVE COLORIMETRY

- Patient's symptoms
- Explain Procedure
- Control Hue (30deg interval) and Saturation
- Successive comparison (2AFC)
- Control Luminance
- Trial
- Considerations – Lighting/UV
- Order Lenses

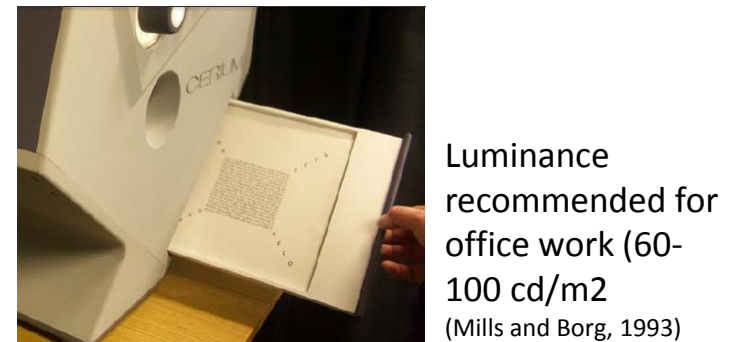
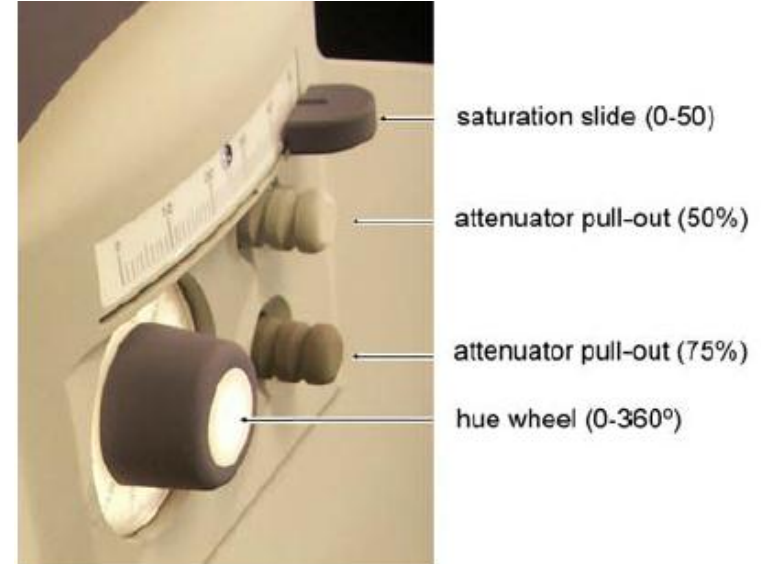
Fan chart



Wilkins et al 1992

PROCEDURE FOR COLORIMETRY (1)

- Colour assessed logically and sequentially
- Spectral power distribution of instrument same as that of lenses
- Separate controls for hue, saturation and luminance



PROCEDURE FOR COLORIMETRY (3)

- Colorimeter entails a small risk of headache or nausea, although risk of a seizure during colorimetry is small
- Those with photosensitive epilepsy should be examined in the presence of a carer who knows what steps to take in the event of a seizure
- Do not allow the patient to come within 20 degrees of any uncomfortable hue



Verify the chromaticity of the spectacle lenses.

(Wilkins et al 1999)

FURTHER INFORMATION

- Institute of Optometry, London
- International Institute of Colorimetry
- British College of Optometrists
- Medical Research Council, U.K.
- Professor Arnold Wilkins,
University of Essex, U.K.

www.essex.ac.uk/psychology/overlays



Upcoming Conferences Near You:

- Hong Kong Optometric Conference
(Nov 2012) - Prof Arnold Wilkins
- Continuing Education in Singapore and Melbourne
(Feb 2013) - Prof Bruce Evans

You will find a list of journal publications on this topic.

THANK YOU!

- **Prof Stephen Dain, University of New South Wales, Australia**
- **Association of Malaysian Optometrists**
- **Malaysian Academy of Optometry**
- **Colleagues and friends who cares for children with dyslexia and special needs**
- **Colleagues from IGARD in Singapore:**
 - **Yap Tiong Peng** BSc(Hons) Optom UMIST
MSc Imperial (London) DIC (London)
 - **Rachel Kelly** BSc(Hons) Optom Glasgow
MSc CityU (London) MCOptom (London)
 - **Evelyne Saysana** BOptom MOptom UNSW
 - **Mandy Lai** BOptom (Hons) UNSW
 - **Monica Lim** BOptom Uni of Melbourne
 - **Andy Teo** BSc Optom MSc Clin Optom PCO, USA



DEMONSTRATION

By Professor Stephen Dain & Yap Tiong Peng

- Neave Analysis of Reading Ability
- Ravens Progressive Matrices
- Colour Overlay Assessment
- Wilkins Rate of Reading
- Intuitive Colorimeter

