

# 30+ years of Irlen and Research Milestones

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# Visual Symptoms of Dyslexics (1)

## Jordan, 1972

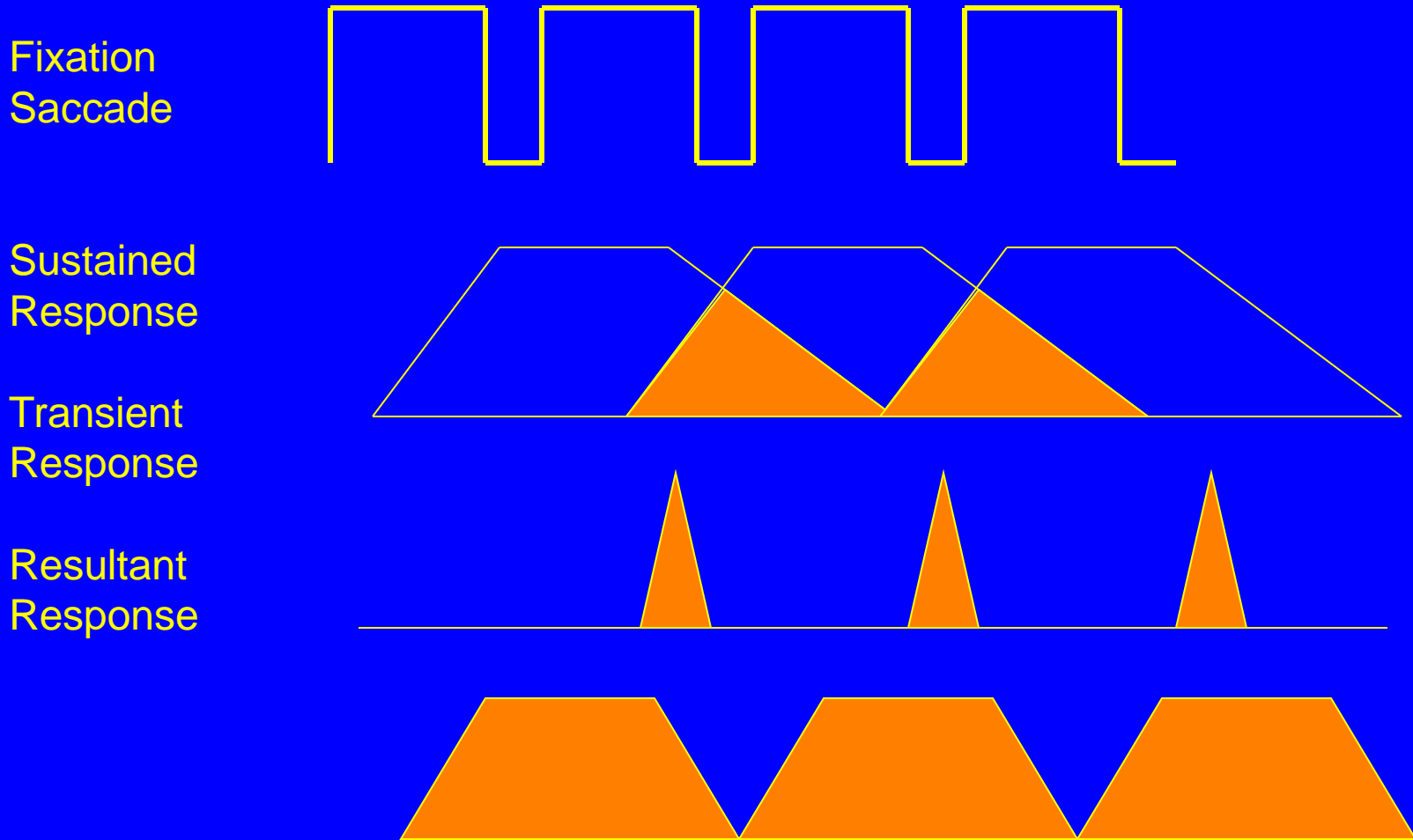
- Reverses letters/ words
- Substitutes similar letters
- Loses place
- Words spread apart
- Letters seem to move
- Parts of words come & go
- Needs to rest eyes
- Difficulty catching a ball
- Perceives symbols upside down
- Perceives symbols backward

# Visual Symptoms of Dyslexics (2)

## Meares, 1972, 1980

- Interference from print
- Print is blurry
- Shadows next to letters
- White glares at you
- White rivers
- White makes words move
- Letters thin / disappear
- Black letters hard to see

# Lovegrove, W. 1985



THREE  
FIXATIONS

Normal fixations like this

TWO  
FIXATIONS

Normal fixations like this

ONE  
FIXATION

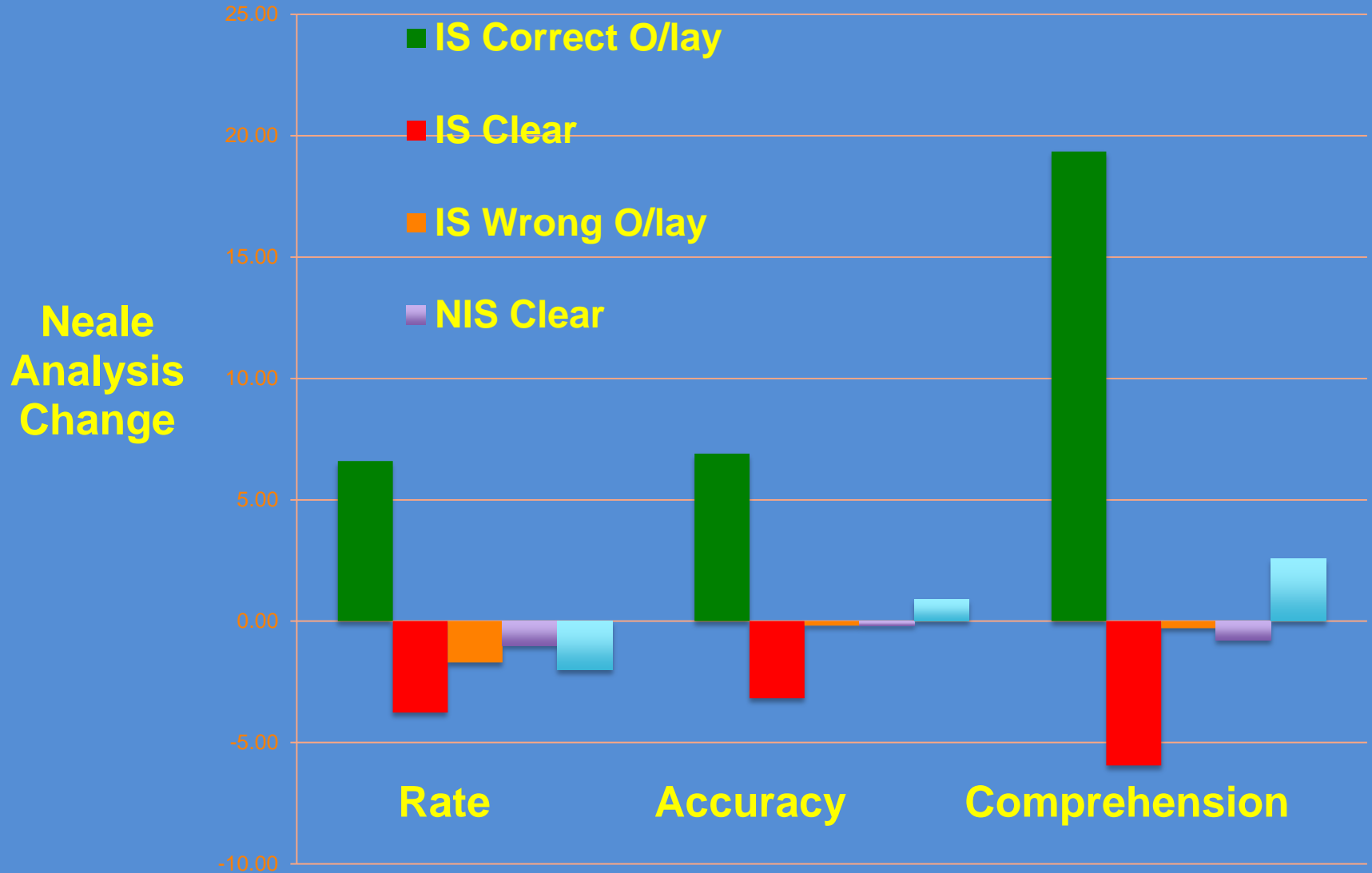
Normal fixations like this

# Three Surveys

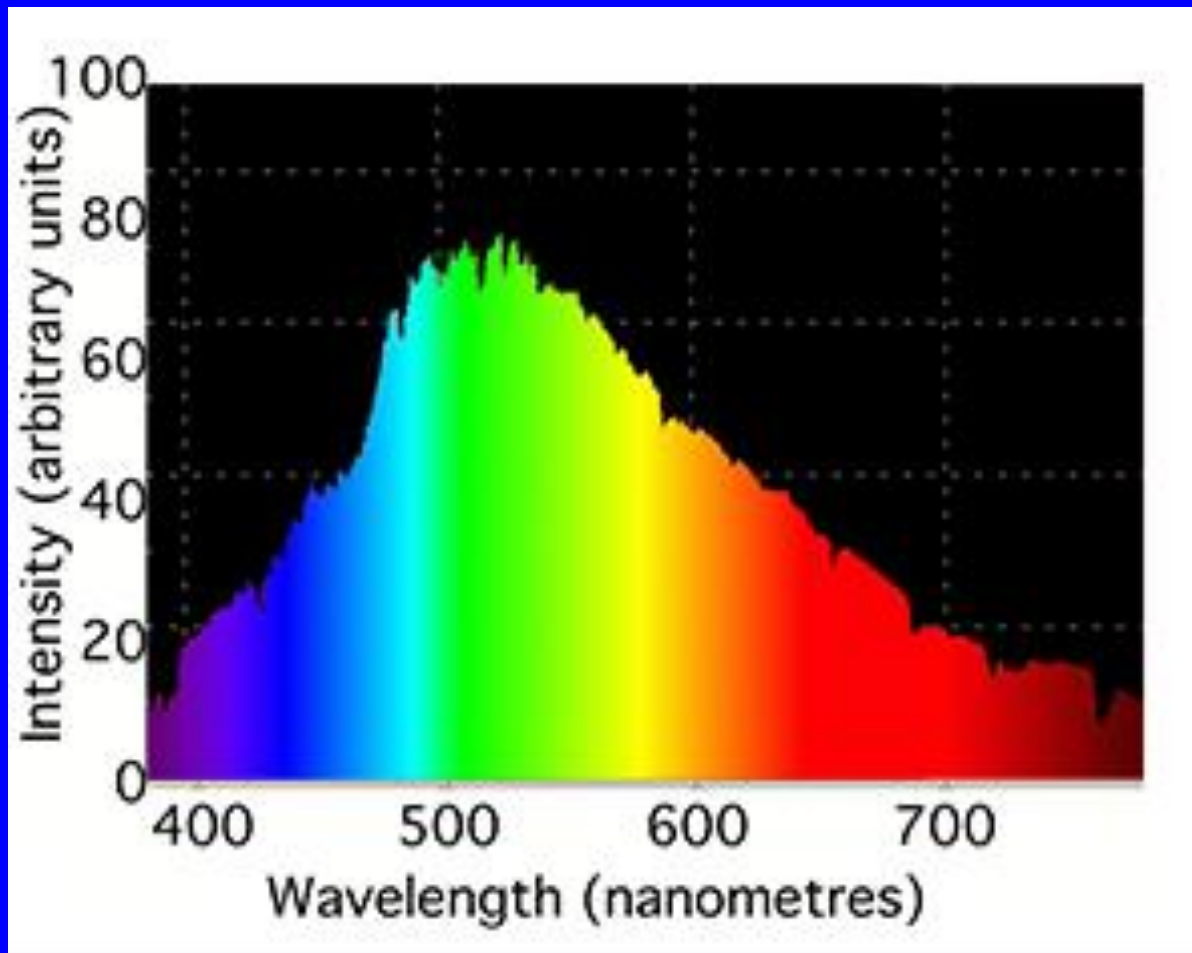
% improvements

	1988	1991	1993
<b>Overall Improvement</b>	57	83*	58
<b>Reading:</b>			
difficulty	38	57	48
fluency	45	52	43
comprehension	40	35	33
concentration	42	53	49
<b>Spelling</b>	35	23	20
<b>Handwriting</b>	29	25	25
<b>Visual anomalies:</b>			
skip lines	34	52	50
confusion (& reversals)	32	47	59
eyestrain	44	54	44
tiredness (while reading)	25	46	27
glare		52	
<b>Self confidence</b>	33	30	35

# O'Connor Study



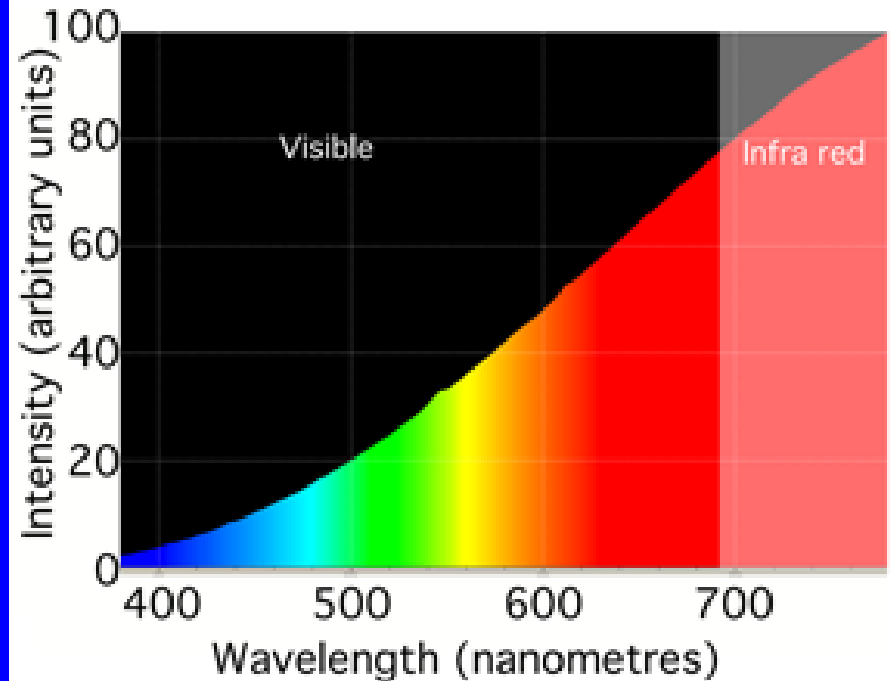
# Sunlight Spectrum



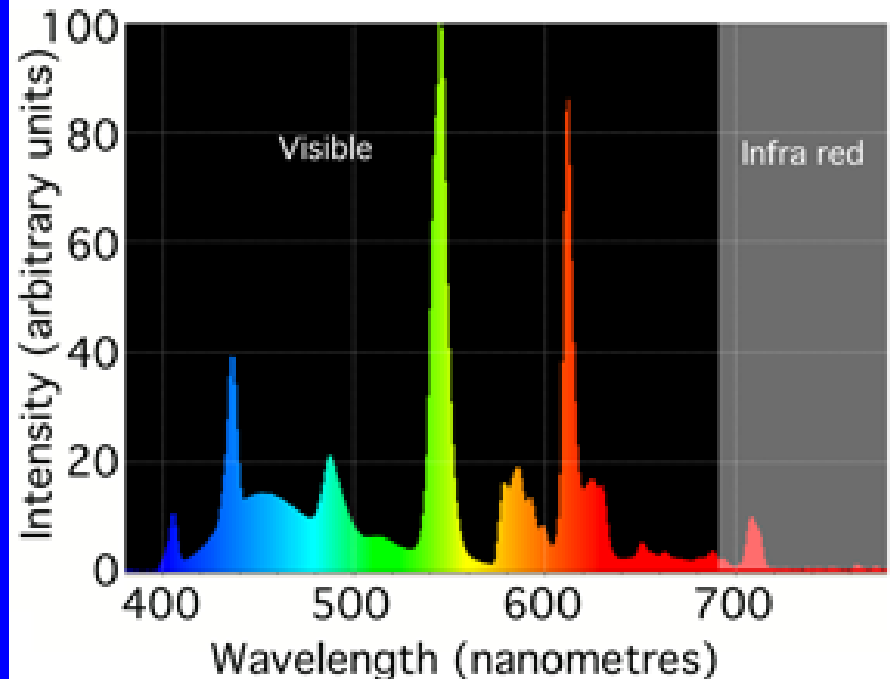


# Spectral Characteristics

1. Incandescent lamp



1. Compact Fluorescent lamp

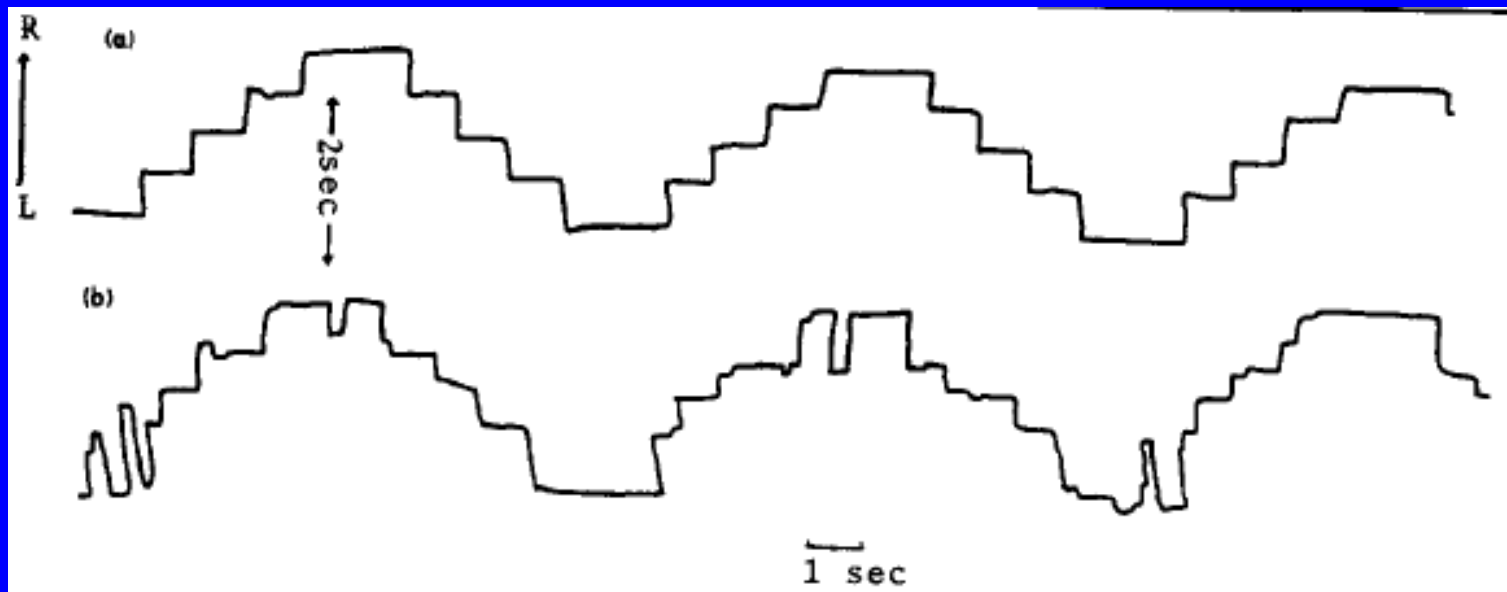


# Difficulty recognising embedded letters

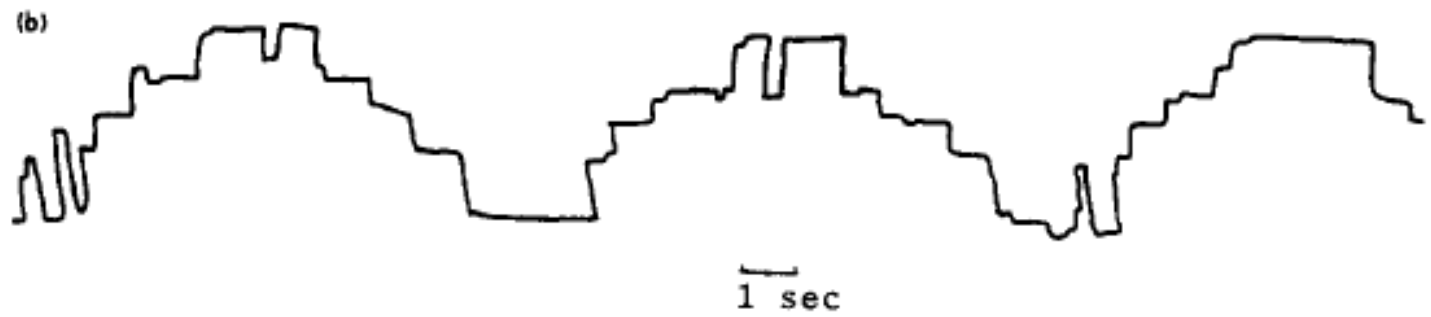
x a x

# Eye movements of Normal and Dyslexic Readers (tracking lights)

Normal

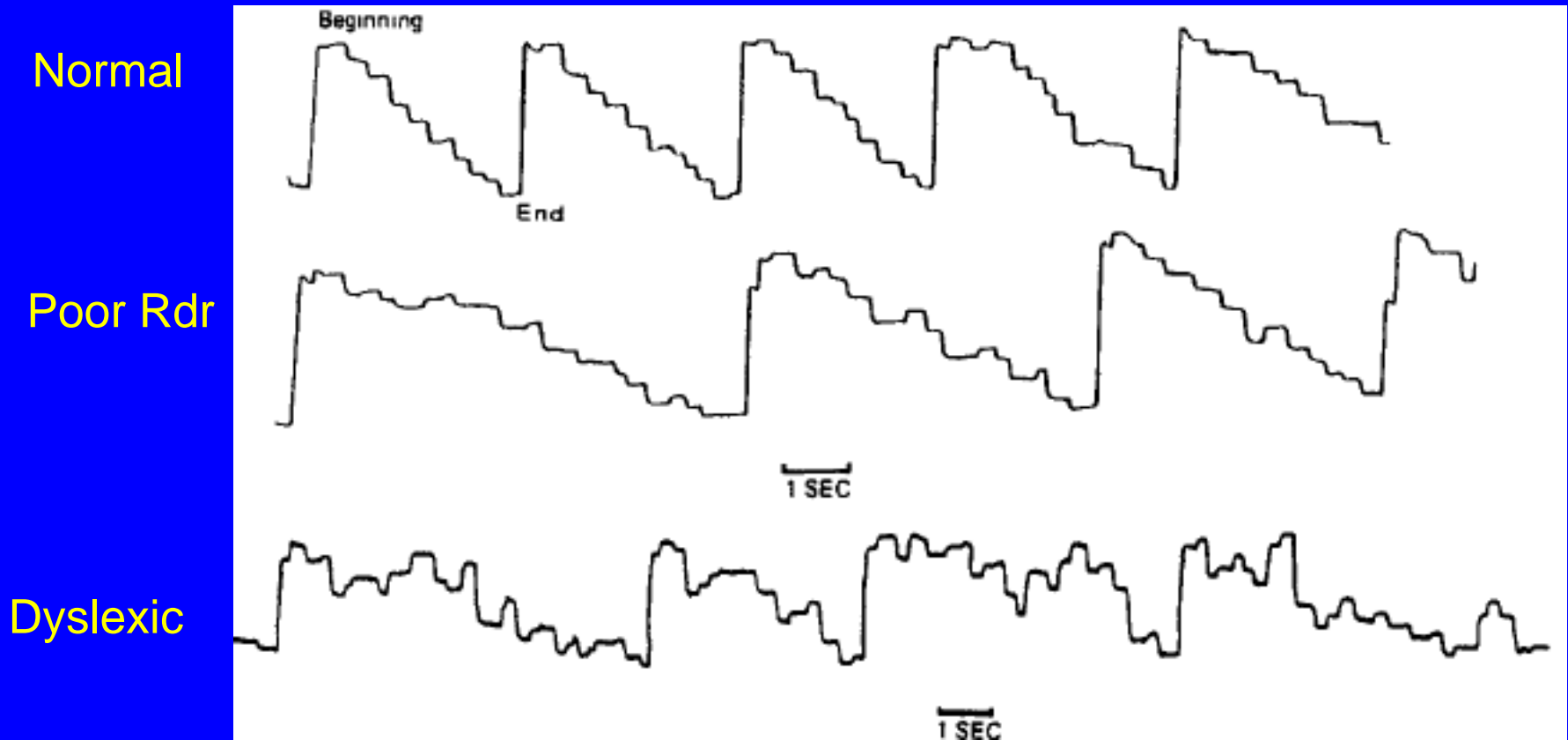


Dyslexic



# Eye Movements of 3 readers

(text was at the reading age of each)



# Prevalence

- 7-10% of the population have SLD
- More than 12% of the population and as many as 20% may have Irlen Syndrome
- 50% - 60% of all people with SLD or reading difficulties have Irlen Syndrome
- 60% of these people will respond to the lenses and not need further treatment
- 40% will need lenses and remediation programs
- 50% - 70% of jail inmates have Irlen

# Incidence of Irlen symptoms (1)

Author	LD?	Subjects	Incidence (%)
Irlen 1983	LD	107	70-78
Adler & Attwood 1987	LD	333	42
O' Connor et al 1990	LD	92	73
Williams et al 1992	LD	54	70
MacLachlan 1993	LD	74	47
Kyd et al 1992	LD	75	45
Grant (2004)	LD	377	42-76

# Incidence of Irlen symptoms (2)

Author	LD?	Subjects	%
Fisher & Miller 1987	Reg	80	45
Robinson et al 1993-6	Random	350+	21-25
Whichard, Feller, Kastner	Prison	155	80
Wilkins et al 2001	Reg	426	33
Kriss & Evans 2005	Reg	32	25

# Familial Incidence

	N	%
Robinson, Foreman, Dear & Sparkes, 2004 (3 studies)	751	84



# Print has characteristics similar to gratings



# Arnold Wilkins: Multifocal Cortical Hyperexcitability

- Certain patterns of stripes induce seizures
- Similar patterns cause illusions, distortions
- Such patterns aversive to migraineurs
- Text can have spatial characteristics of aversive patterns
- Colour helps migraineurs
- Children who benefit from colour in reading are twice as likely to have migraine in their family

# Rate of Reading Test (Wilkins, 1996)

come see the play look up is cat not my and dog for you to  
the cat up dog and is play come you see for not to look my  
you for the and not see my play come is look dog cat to up  
dog to you and play cat up is my not come for the look see  
play come see cat not look dog is my up the for to and you  
to not cat for look is my and up come play you see the dog  
my play see to for you is the look up cat not dog come and  
look to for my come play the dog see you not cat up and is  
up come look for the not dog cat you to see is and my play  
is you dog for not cat my look come and up to play see the  
see the look dog and not is you come up to my for cat play  
not up play my is dog you come look for see and to the cat  
look up come and is my cat not dog you see for to play the  
my you is look the dog play see not come and to cat for up  
for the to and you cat is look up my not dog play see come  
you look see and play to the is cat not come for my up dog  
come not to play look the and dog see is cat up you for my  
and is for dog come see the cat up look you play my not to  
dog you cat to and play for not come up the see look my is  
the come to up cat my see dog you not look is play and for

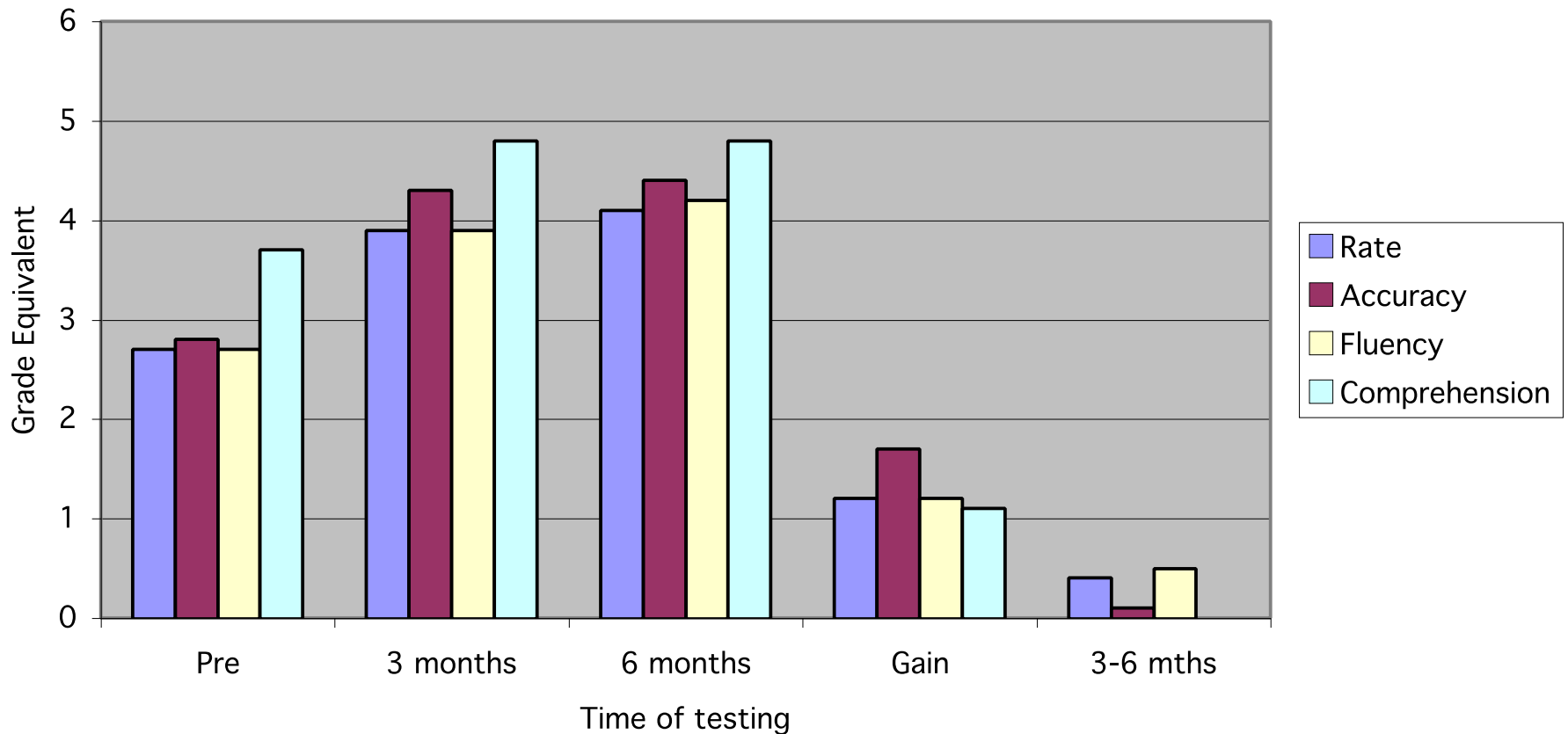
# Coloured Overlays - Wilkins

- 50% normal children choose overlays
- 20% use them long-term
  - Particularly if they are poor readers
- Colour choice is individual but reliable
- Reading is faster with overlays (5% go + 25% )
- No speed/accuracy trade-off
- Not related to orthoptic abnormalities
- Not a placebo effect

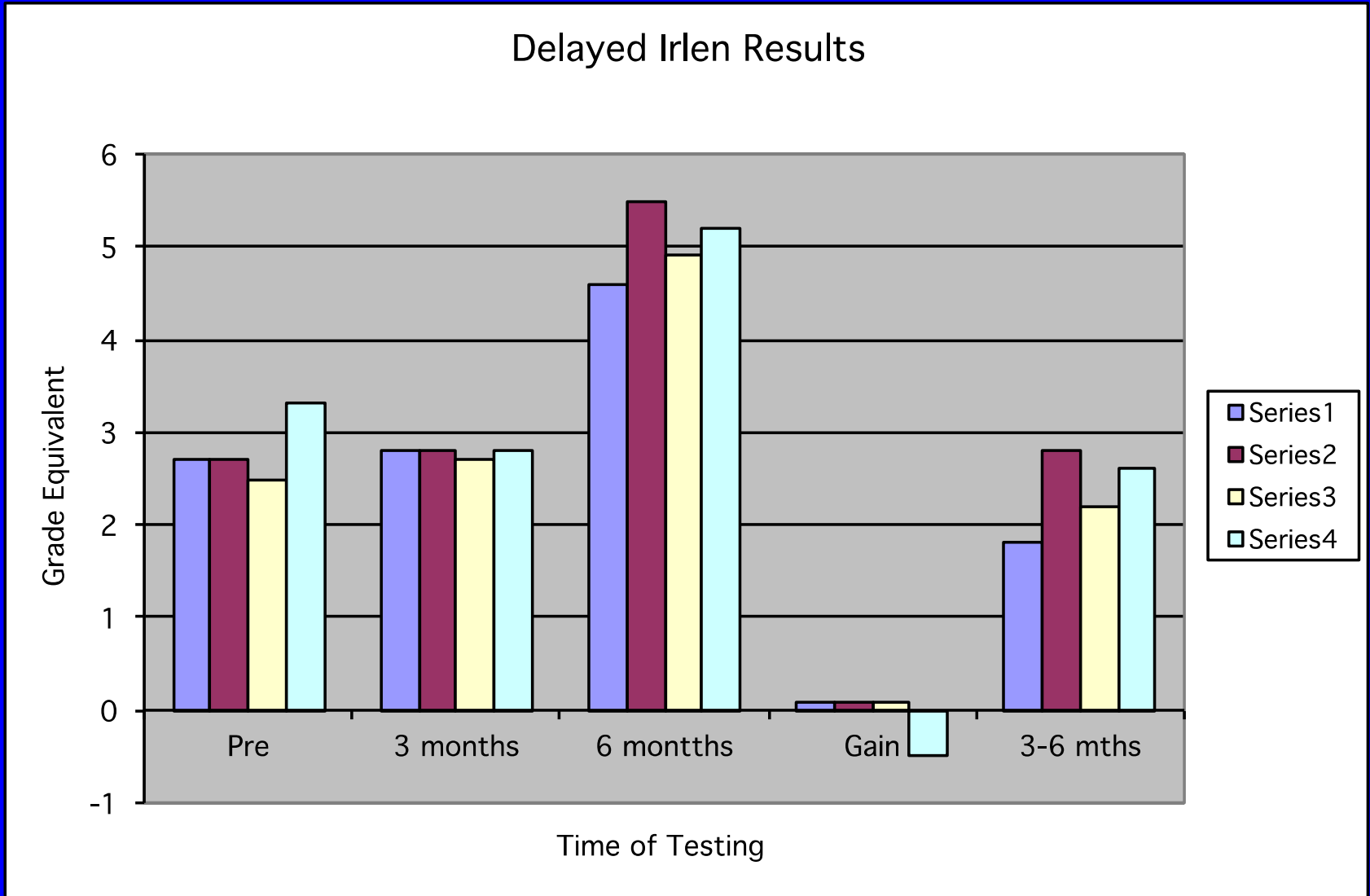
# 2004 3rd Grade Study – immediate

(Robinson, Irlen et al, 2004)

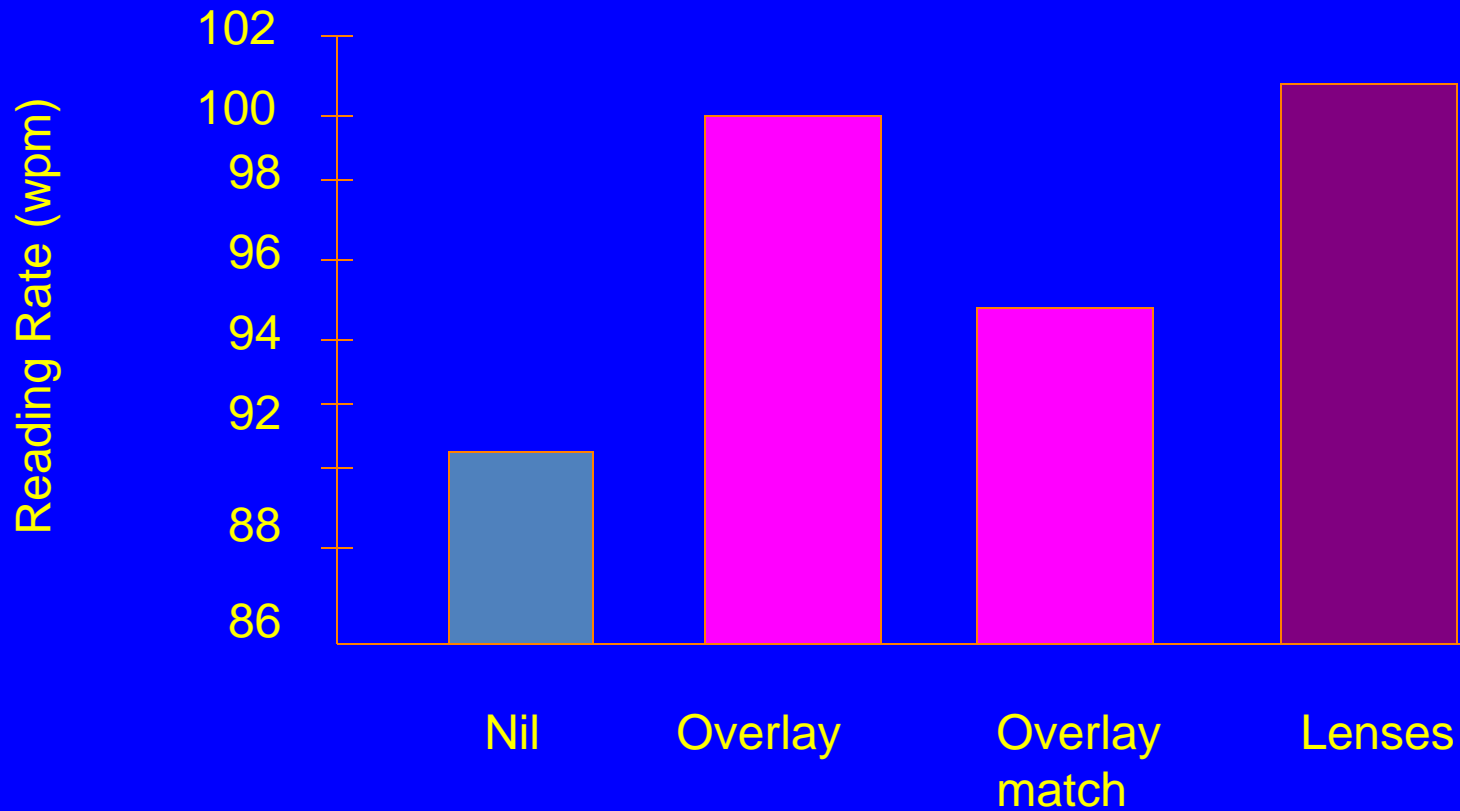
Immediate Irlen results



# 2004 3rd Grade Study - delayed



# Lenses that match overlays are no good (Wilkins, A. - Colorimeter)



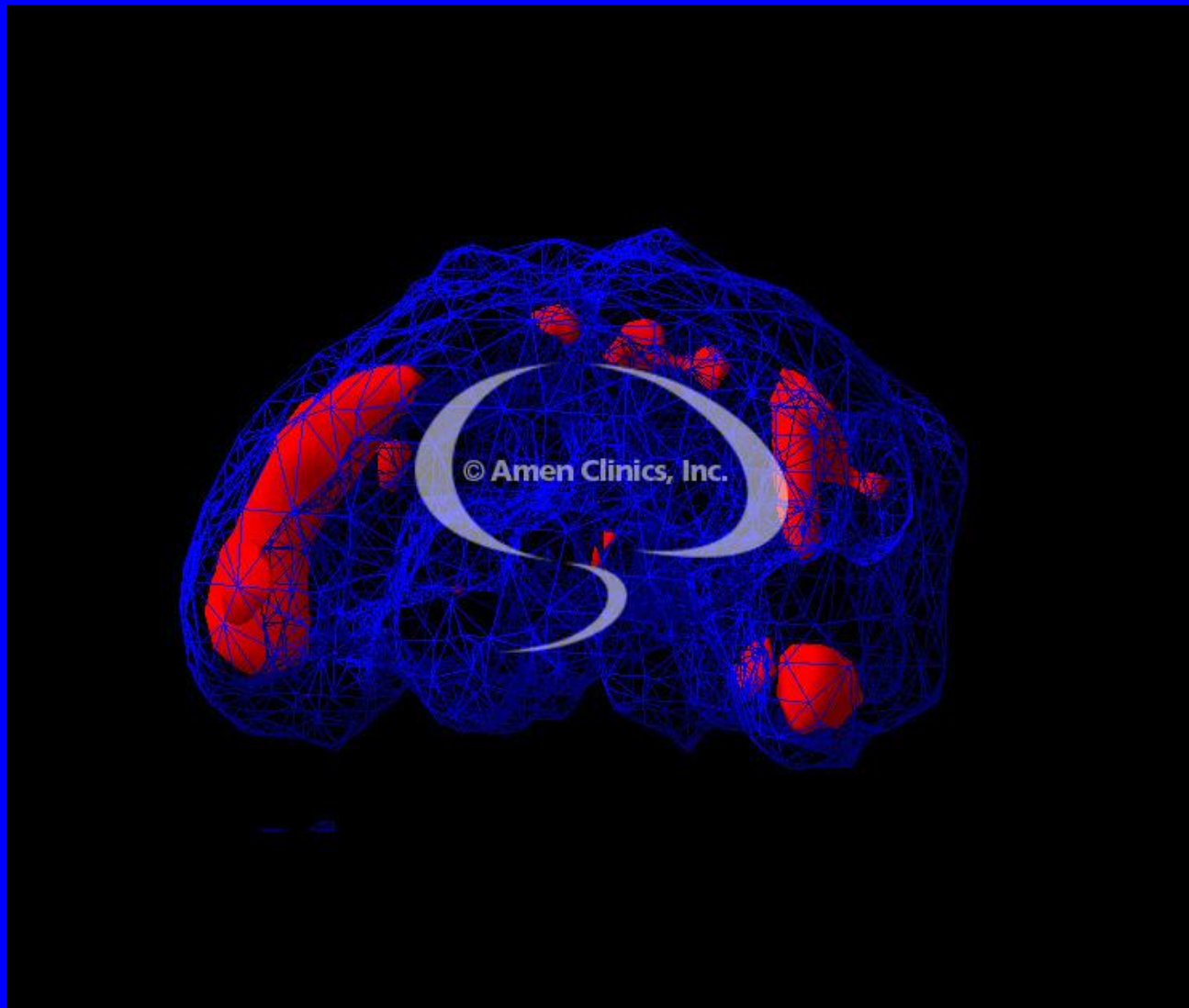
# Symptom Frequency

(Evans & Joseph, 2002)

	%
Headaches	39
Skips, re-reads	35
Blurring	24
Rubs eyes	20
Sore, tired eyes	17
Print doubles	16
Print jumps	12
Print changes size	6
Print fades, disappears	3.5

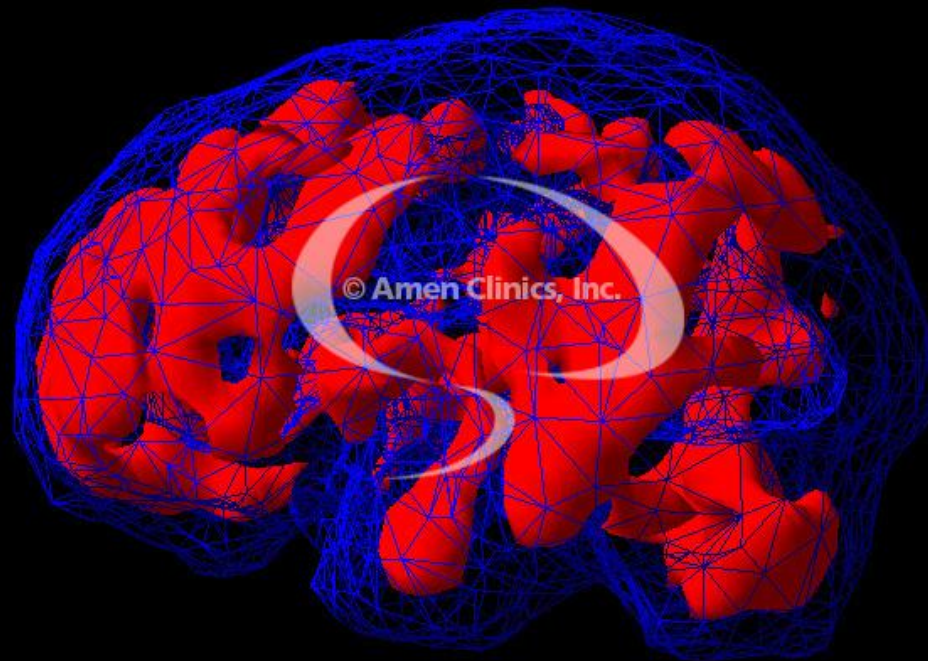


# Brain activity in normal reader

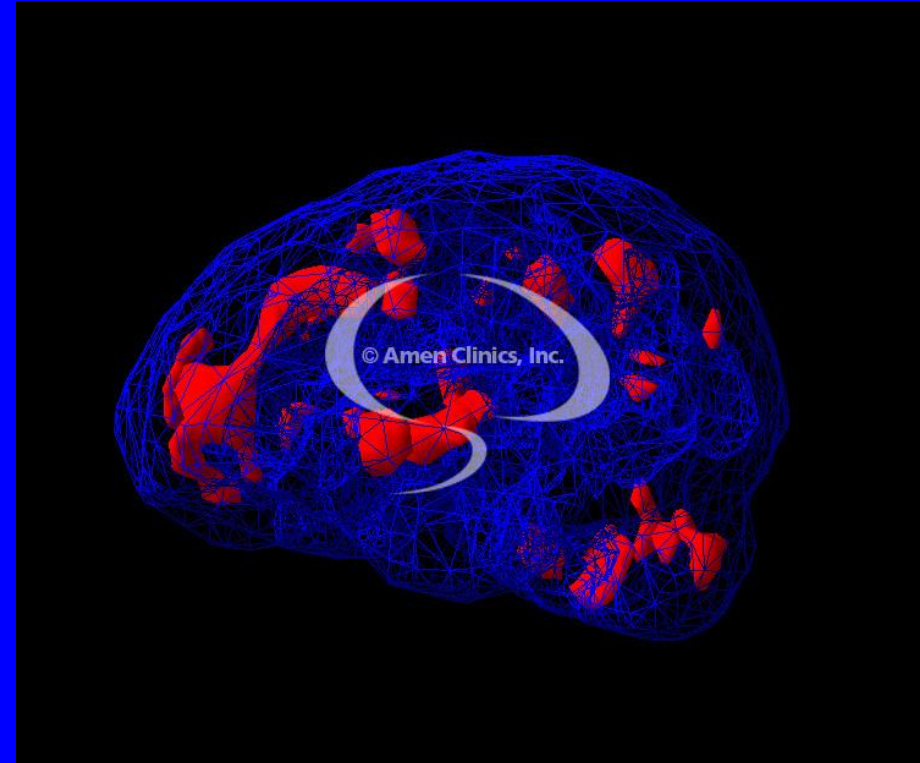
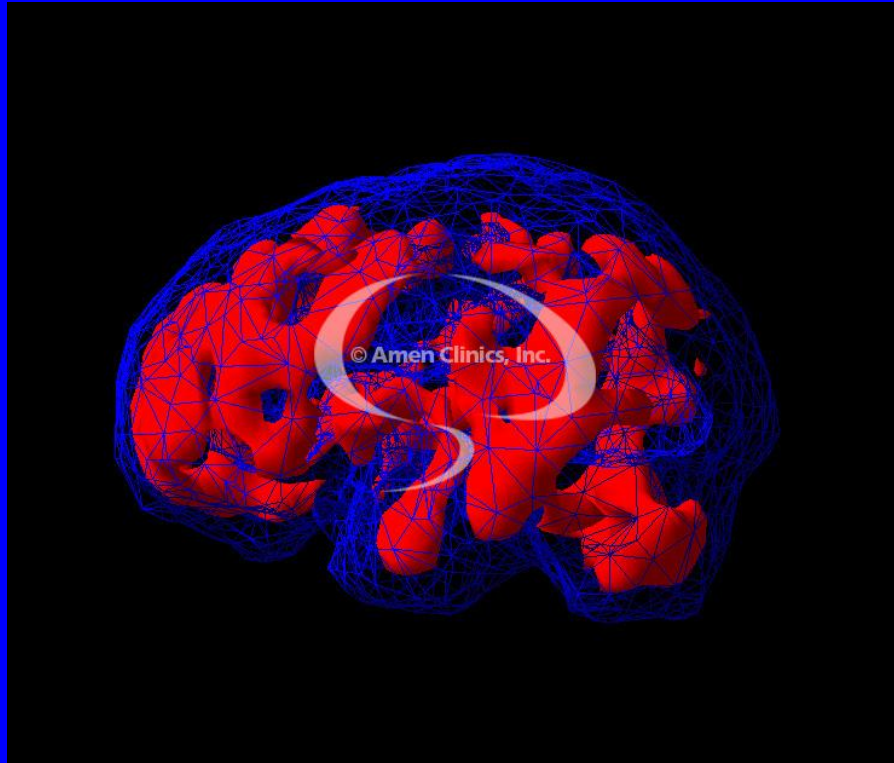


# Brain activity in Irlen Syndrome

Single photon emission computed tomography (SPECT)



# Without & with Irlen Filters

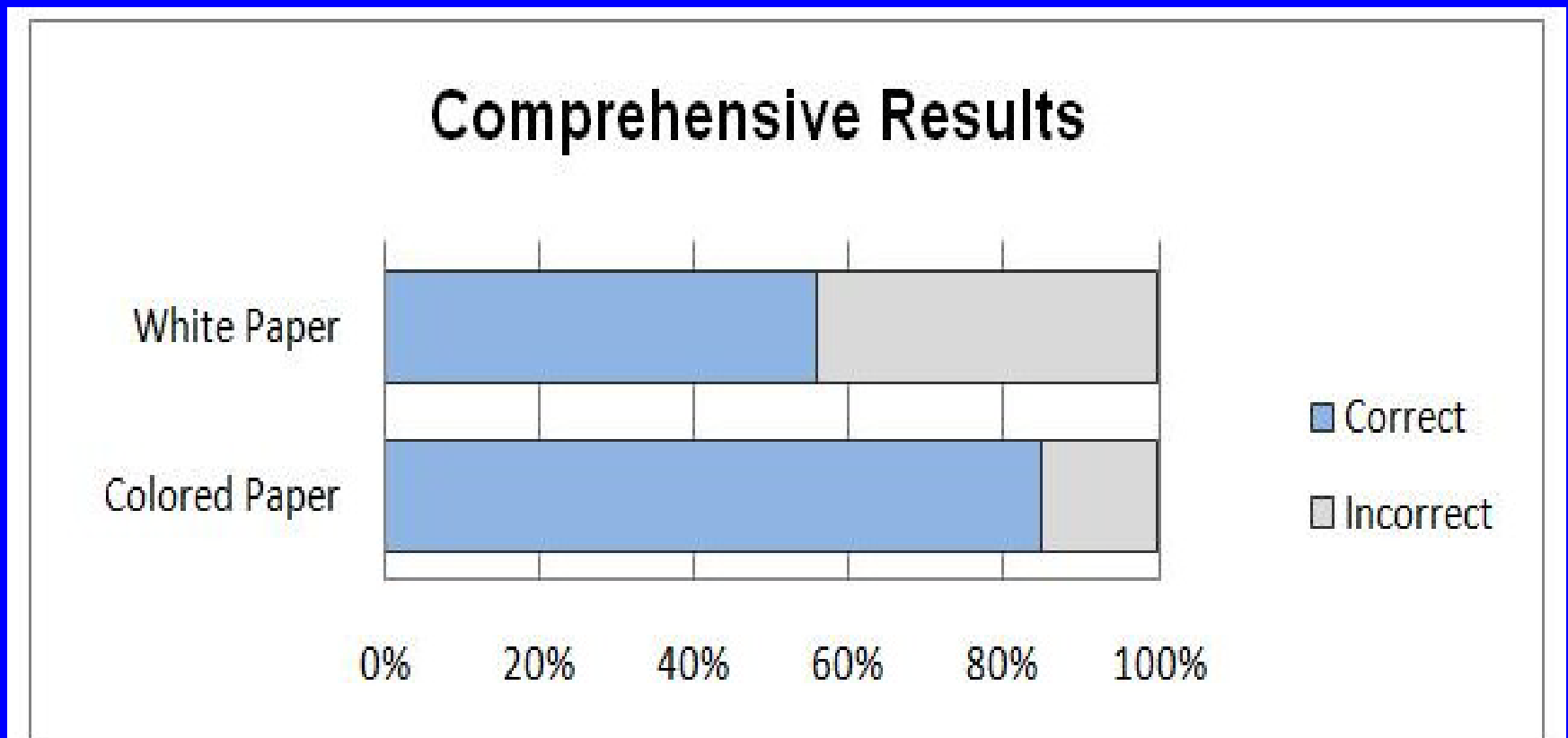


Source, Amen Clinics, USA

# Difficulties with Music

(Solis, M.A. 2010)

## Pitch & Rhythm Accuracy in Reading Music



Irlen

And

ADHD

TRAIT	IRLEN	ADHD
Headache, fatigue	●	●
Skips words or lines	●	●
Loses place	●	●
Slow reader	●	●
Comprehension poor	●	●
Avoids reading	●	●
Unequal letter size or spacing	●	●
Difficulty writing on the line	●	●
Poor handwriting; avoids cursive	●	●
Restless or day-dreamy	●	●
Struggles to complete homework	●	●
Depressed, frustrated, or angry	●	●
Sense of self /depression/anxiety	●	●
Difficulty make / keep friends	●	●