

# Colourful wishes

The need for research-led practice extends to adjustment schedules



Rob McIntosh, Sergio Della Sala, Stuart Ritchie  
Human Cognitive Neuroscience, University of Edinburgh





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## Learning and Teaching Conference

### Evidencing the value of learning and teaching

#### **Values**

This University  
values research-led  
teaching

Our learning and  
teaching should be  
evidence-based

#### **Challenges**

Learning and  
teaching are vastly  
multivariate  
interactions

#### **Choices**

Evidence of what?

What does good  
evidence look like?



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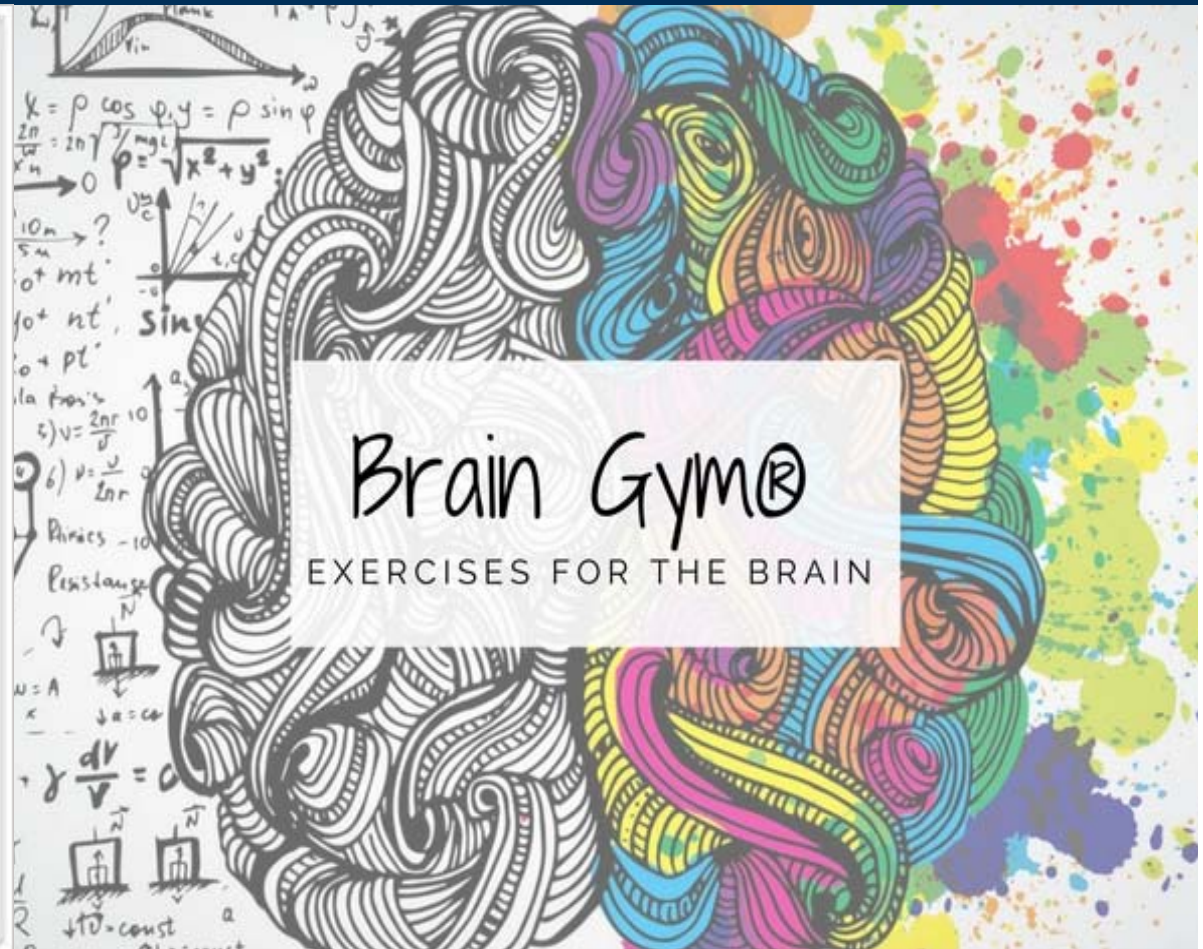
## Learning and Teaching Conference

Brain Gym®  
Teacher's Edition



Paul E. Dennison  
Gail E. Dennison

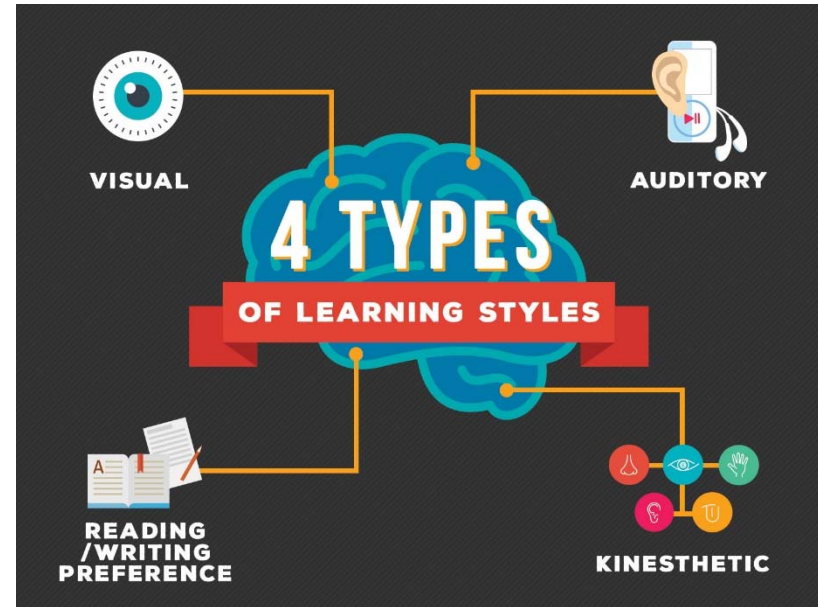
*The Companion Guide to  
Brain Gym®: Simple Activities for Whole-Brain Learning*



Brain Gym®  
EXERCISES FOR THE BRAIN



# The case of LEARNING STYLES



## THE 8 LEARNING STYLES

Which One Works for You?



# Learning Styles

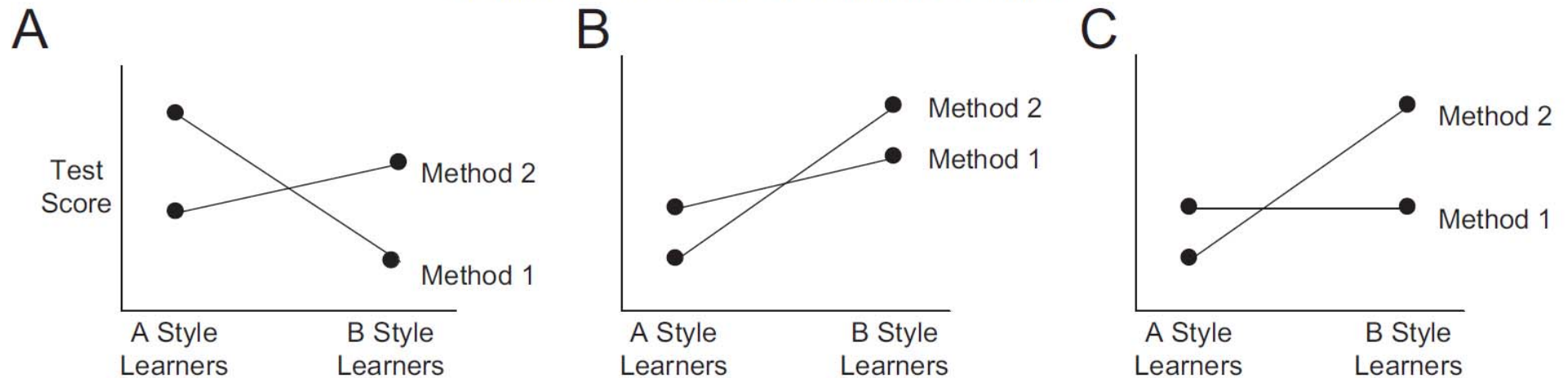
## Concepts and Evidence

Harold Pashler,<sup>1</sup> Mark McDaniel,<sup>2</sup> Doug Rohrer,<sup>3</sup> and Robert Bjork<sup>4</sup>

<sup>1</sup>University of California, San Diego, <sup>2</sup>Washington University in St. Louis, <sup>3</sup>University of South Florida, and <sup>4</sup>University of California, Los Angeles

### Acceptable Evidence

In examples A, B, and C, the learning method that optimized the mean test score of one kind of learner is *different* from the learning method that optimized the mean test score of the other kind of learner.





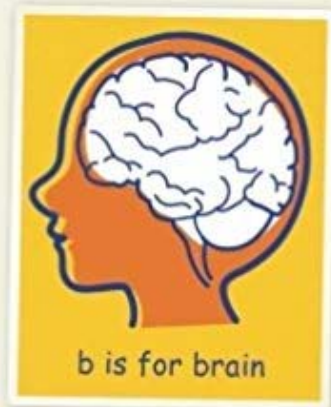
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## Learning and Teaching Conference

OXFORD

### NEUROSCIENCE *in* EDUCATION

*The good, the bad and the ugly*



EDITED BY  
Sergio Della Sala  
Mike Anderson

### Chapter 14

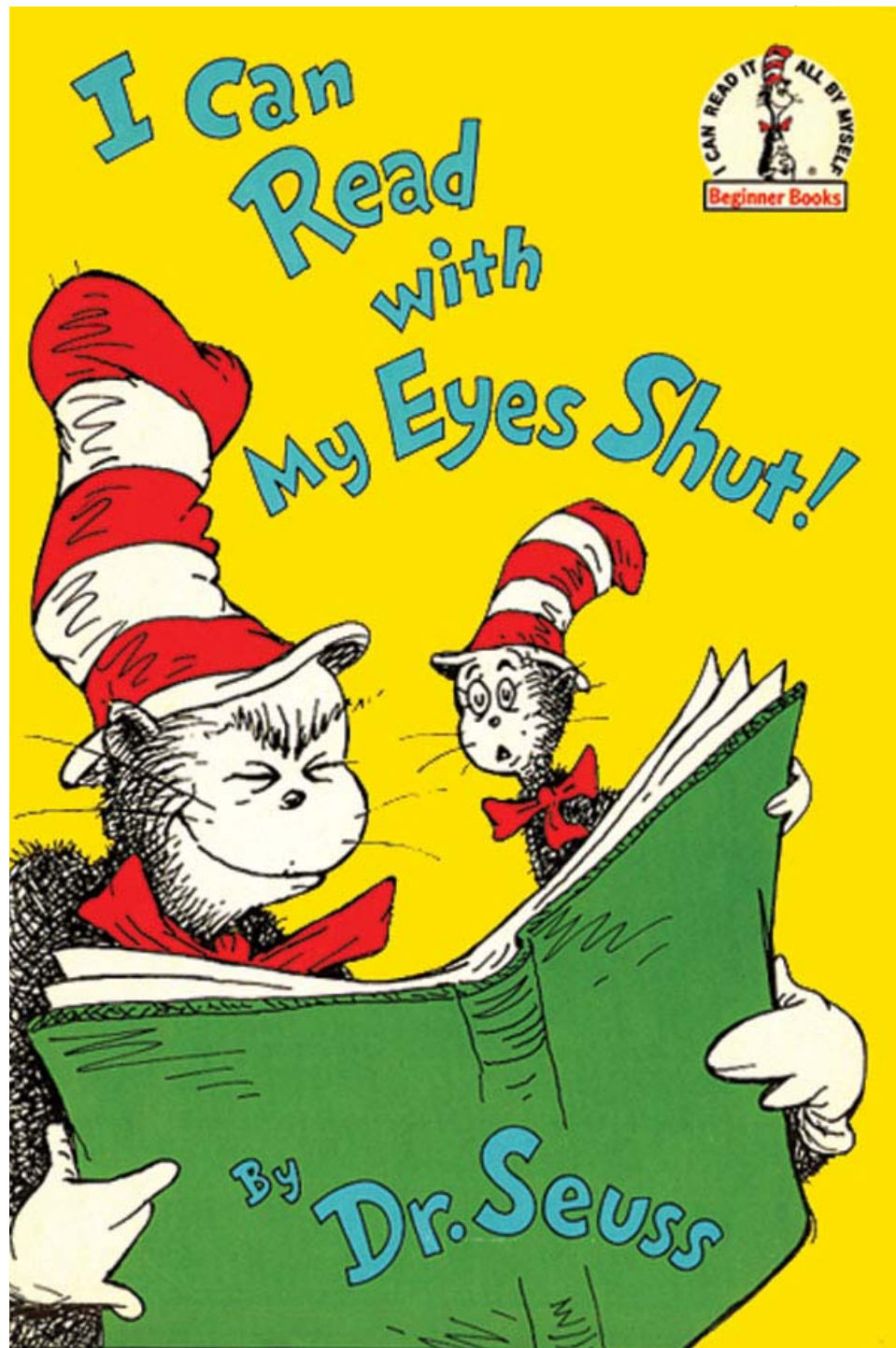
## **Rose-tinted? The use of coloured filters to treat reading difficulties**

Robert D. McIntosh and Stuart J. Ritchie

### **Overview**

In this chapter, we discuss the use of coloured filters to treat reading difficulties, and the theoretical and practical claims that underpin it. We review evidence for the efficacy of coloured filters, and report the results of a new trial in schoolchildren with reading difficulties. We conclude that there is a chasm between the dramatic claims often made for this treatment, and the small and inconsistent effects that have been demonstrated experimentally. Indeed, we suggest that coloured filters have no proven efficacy, beyond some probable placebo effect, and that their use should not be recommended to private individuals, or supported by public bodies. Resources should instead be directed towards better-proven remedial interventions.

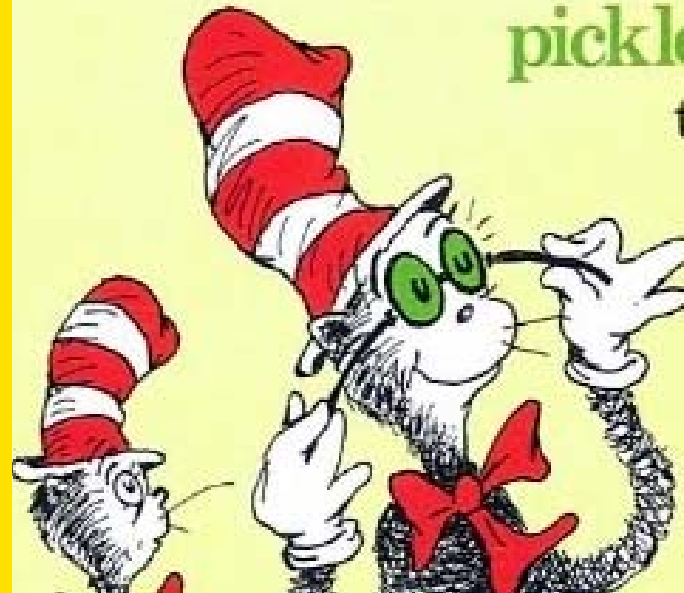




I can read  
in **red**.

I can read  
in **blue**.

I can read in  
**pickle color**  
too.





# IRLEN DO AWARENESS YOU WEEK SEE IT?

**1 in 2 people with reading problems  
has Irlen Syndrome, do you?**



**Irlen Awareness Week**

October 20-24, 2014

[www.irlen.com](http://www.irlen.com)



Change background color to see how color can help you :



Where the Science of Color Transforms Lives

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TAKE AN IRLEN® SELF-TEST

About Who We Help Get Tested The Science For



Self Tests

Find an Irlen Testing Center

Color Awareness 20-24th, 2014

LEARN MORE

Reading Problems

Headaches

Light Sensitivity



### Take the Irlen Self-Test

Whether you have specific difficulties or just want answers, the first question is: Do you have Irlen Syndrome?



### Find a Diagnostician

Irlen-certified diagnosticians and screeners can help you determine if you have Irlen Syndrome and how color can help you. You can find us in 170 clinics in the US and 46 countries throughout the world.

Do you skip words or lines when reading?

- Yes
- No

Do you reread lines?

- Yes
- No

Do you lose your place?

- Yes
- No

Are you easily distracted when reading?

- Yes
- No

Do you need to take breaks often?

- Yes
- No

Do you find it harder to read the longer you read?

- Yes
- No

Do you get headaches when you read?

- Yes
- No

Change background color to see how color can help you : 



Where the Science of Color Transforms Lives

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TAKE AN IRLLEN® SELF-TEST

About

Who We Help

Get Tested

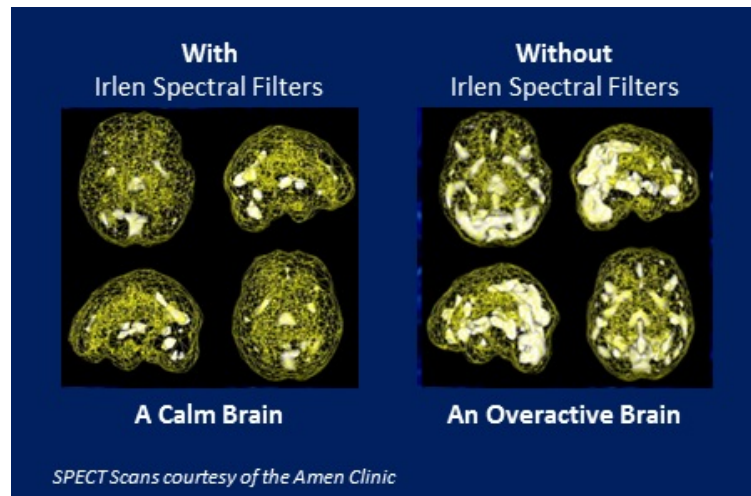
The Science

For Professionals

News

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## Irlen and The Brain



The following research papers highlight the impact that Irlen Syndrome has on brain function and anatomy.

The most current research on Irlen Syndrome and the use of color utilizes advanced brain-mapping technology to show actual changes and normalization of brain functioning that is not achieved through ophthalmological treatments (plain lenses, prisms, or vision therapy). Researchers have utilized functional magnetic resonance imaging (fMRI), visual evoked responses (VER), and single photon emission computed tomography (SPECT) scans to objectively document the profound effects of visual sensory overload on the brain and the normalization of brain activity when individually-prescribed, precision-tinted colored filters are worn.

**A Magnetoencephalographic Investigation of Visual Information Processing in Irlen's Scotopic**

### KEY FACTS

The Irlen Method is scientifically proven to correct the issues related to Irlen Syndrome and is supported by experts in the fields of education, psychology, medicine, ophthalmology, and neuroscience around the world

### LIBRARY OF RESOURCES

Irlen is supported by over 30 years worth of scientific research. [Read the research now.](#)

### SEE WHAT PEOPLE ARE SAYING





Inverclyde  
council

d/slexia  
friendly

irlen Scotland





Inverclyde  
council

d/slexia  
friendly

Newark Primary School

Liz McKelvie

irlen Scotland

Hi Liz,

I think that this is an excellent opportunity and would encourage you to get involved. I would also like to offer my support and would like to write back, as well. **I would like to help in the research design** and provide them with contacts with others who have done research...

Colourful wishes,

Helen

**Helen L. Irlen, MA, LMFT**  
**Executive Director Irlen Institute International HQ**  
**PPS Credentialed School Psychologist**  
**Educational Therapist**  
**Adult Learning Disability Specialist**  
**Board Certified Professional Counselor**  
**Licensed Therapist**

**Reading by the Colors: A Piece of the Puzzle**

## Selection by teachers



## Irlen screening



## Overlay provision



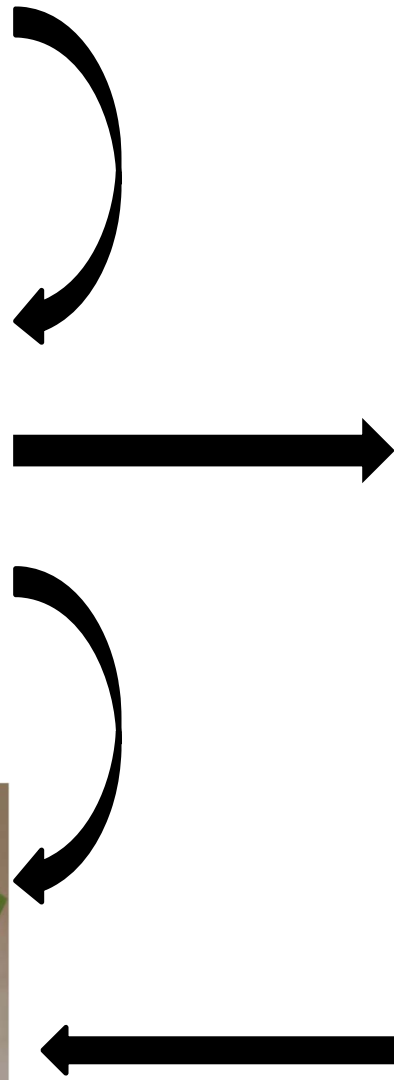
## Double-masked treatment study

(Moray Endowment Fund)

## Reading tests

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

## Orthoptic assessment





61 poor readers  
(aged 7-12)

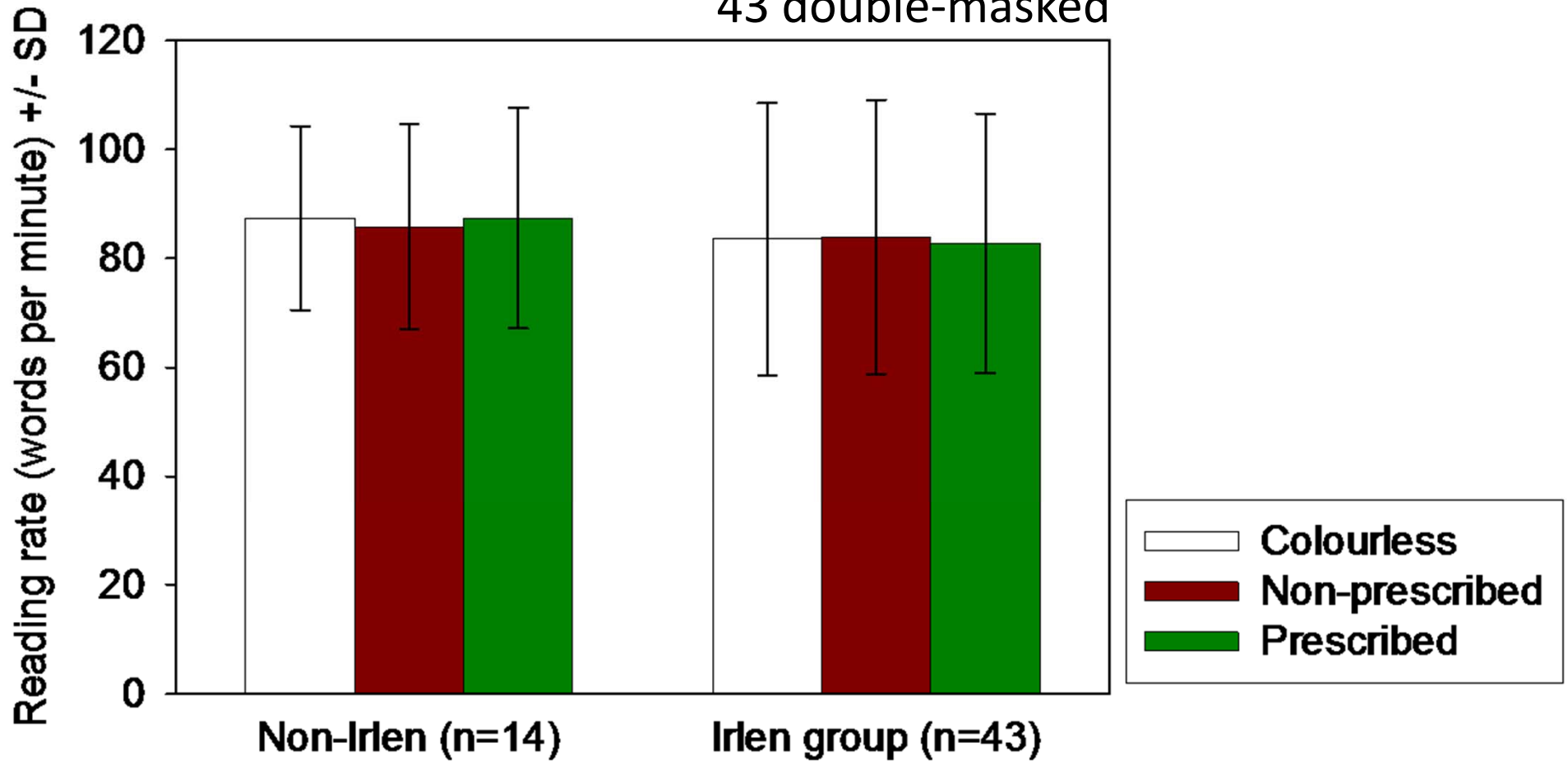
## Double-masked treatment study

(Moray Endowment Fund)

14 non-Irlen

47 with Irlen diagnosis (77%)

43 double-masked



# Irlen Colored Overlays Do not Alleviate Reading Difficulties



**WHAT'S KNOWN ON THIS TOPIC?** Colored overlays are recommended by Irlen diagnosticians to alleviate Irlen syndrome (also known as Scotopic Sensitivity Syndrome) which is posited to be a cause of reading difficulties. Colored overlays are an intervention and have been widely used.



**WHAT THIS STUDY ADDS:** This study found that Irlen colored overlays do not alleviate reading difficulties in children with reading difficulties. The study revealed that Irlen colored overlays do not have any demonstrable immediate effect on reading in children with reading difficulties.

## Abstract

**OBJECTIVES:** To test the effectiveness of Irlen colored overlays in alleviating reading difficulties in children with reading difficulties and proposed perceptual disorder.

**PARTICIPANTS AND METHODS:** 100 children (ages 7-12 years) with reading difficulties were assessed by an Irlen diagnostician. We used a within-subject study design to measure reading rate across 3 conditions: using an overlay of a prescribed color; using an overlay of a nonprescribed color; and no overlay. In a subset of 44 children, all of whom had a diagnosis of Irlen syndrome, we also used a between-group design to test the effects of Irlen colored overlays on a global reading measure.

**RESULTS:** The Irlen diagnostician diagnosed Irlen syndrome in 77% of our poor readers. We found no evidence for any immediate benefit of Irlen colored overlays as measured by the reading-rate test or the global reading measure.

**CONCLUSIONS:** Our data suggest that Irlen colored overlays do not have any demonstrable immediate effect on reading in children with reading difficulties. *Pediatrics* 2011;128:e932–e938

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<sup>a</sup>Human Cognitive Neuroscience, University of Edinburgh, Edinburgh, United Kingdom

### KEY WORDS

education, reading, dyslexia, learning disorders, color, ocular physiological processes

### ABBREVIATIONS

Irlen syndrome  
Wechsler Adult Intelligence Scale  
Wechsler Memory Scale  
Wechsler Reading Test  
Wechsler Reading Test  
Wechsler Reading Test

Dr Ritchie and Dr McIntosh  
Dr Della Sala and Dr McIntosh  
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098-4275).

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icated they have  
icle to disclose.



"This is a flawed study," Irlen said.  
"It was designed to set up for failure".

REUTERS



# Irlen Colored Filters in the Classroom: A 1-Year Follow-Up

Stuart J. Ritchie<sup>1</sup>, Sergio Della Sala<sup>1</sup>, and Robert D. McIntosh<sup>1</sup>

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**ABSTRACT**—Colored filters are used to treat Irlen syndrome (IS), a controversial disorder posited to be the cause of a substantial proportion of reading difficulties. Previously, we found that Irlen colored filters do not produce any short-term alleviation of reading difficulties in schoolchildren aged 7–12. Here, we tested whether colored filters show benefits with longer-term use, in a subset of the original sample. We measured reading rate with and without filters in 18 children diagnosed with IS, who had been using the filters for 1 year, and compared the progression of their reading ability across the year against 10 poor-reader control children. The Irlen-treatment group did not read any faster when using their colored filter, and showed no disproportionate gain in reading progress across the year compared to controls. We conclude that Irlen filters do not benefit reading, even after 1 year of use.

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Irlen syndrome (IS), also known as Meares–Irlen syndrome, scotopic sensitivity syndrome, or visual stress, is a controversial diagnostic entity that purportedly causes visual distortions and illusions when an affected person views text or other high-contrast patterns (Irlen, 1991; Wilkins, 2003). The Irlen Institute posits that these symptoms are often the cause of reading difficulties in up to 46% of individuals with “reading problems, dyslexia, and learning difficulties” (Perceptual Development Corporation, 1998), but also that they can be alleviated by the use of individually prescribed colored filters (Irlen, 2010; Wilkins, 1994). The colored filter treatment is not marketed as a cure for reading difficulties, but is believed to remove a barrier to reading development (Irlen, 2010). These filters, either in the form of tinted lenses or colored plastic

Considerable controversy surrounds the efficacy of this treatment; three recent reviews (American Academy of Pediatrics, 2009; Hyatt et al., 2009; Royal College of Ophthalmologists, 2009) and one systematic review (Albon, Adi, & Hyde, 2008) have concluded that it should not be recommended for individuals with reading difficulties until more rigorous research shows positive effects.

Our recent study (Ritchie, Della Sala, & McIntosh, 2011) drew similar conclusions. We administered reading tests with and without colored overlays to 61 primary school children aged 7–12 years, 77% of whom had been diagnosed with IS by an Irlen Institute diagnostician. Importantly, the children diagnosed with IS were not informed of the color of their prescribed overlay before testing. Under these masked conditions, the overlays failed to produce any significant increase in the reading rate, as measured by the Wilkins Rate of Reading Test (WRRT), or global reading ability, as measured on the Gray Oral Reading Test (GORT). We concluded that Irlen colored filters do not alleviate reading difficulties.

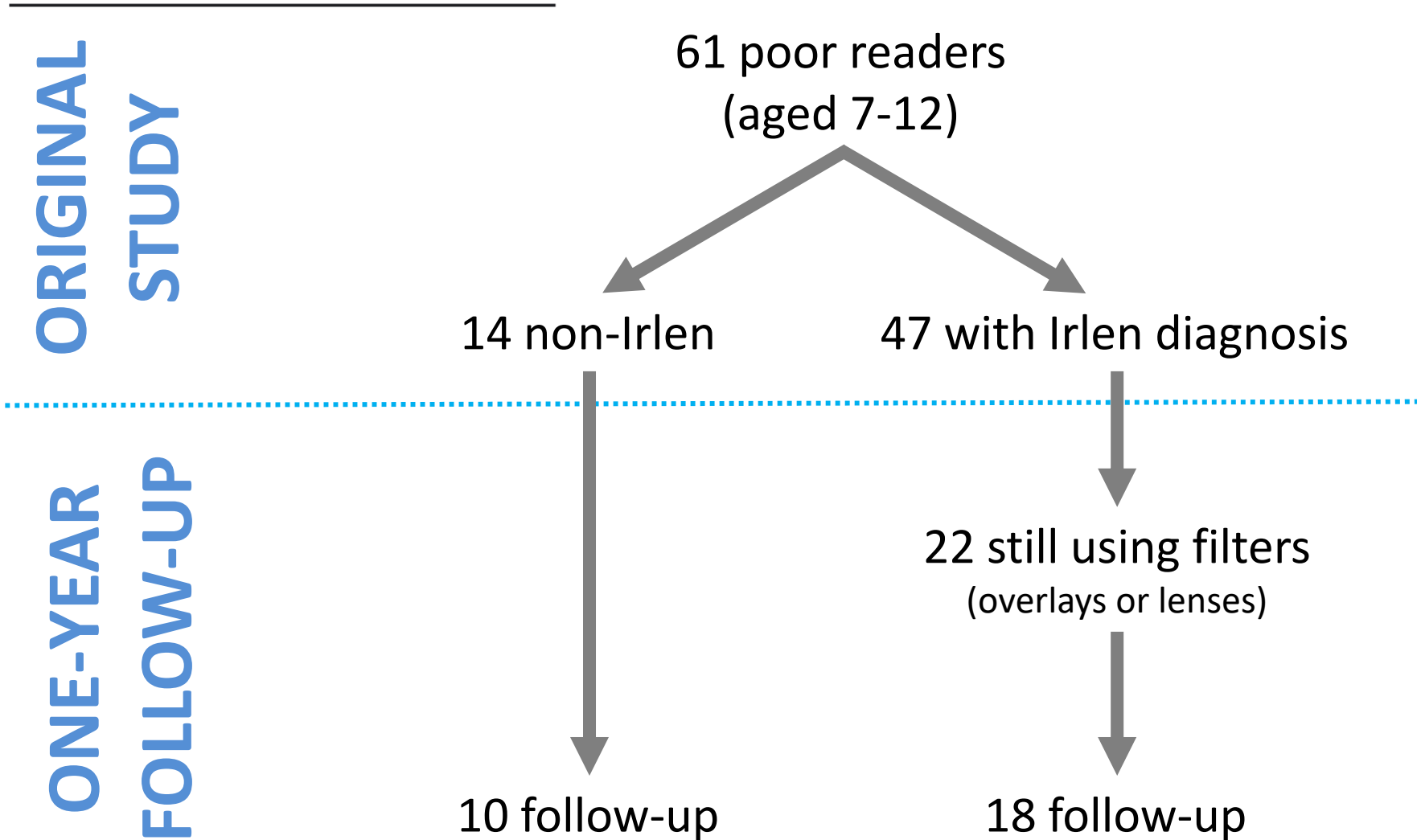
Our study, like most previous work in this area, focused on the immediate effects of colored filters (though see Noble, Orton, Irlen, & Robinson, 2004; Robinson & Foreman, 1999a, 1999b). We compared reading with and without filters at a single time point in poor-reader children who had been prescribed the filters very recently. It is clear that the colored filter theory predicts an immediate benefit at this stage, but a further key prediction concerns the longer-term benefits. As the filters are intended as a long-term aid, to be used on a continuing basis, they should facilitate reading even after extended periods of use. More crucially, because the filters purportedly remove a prior barrier to reading development, we should expect



# Irlen Colored Filters in the Classroom: A 1-Year Follow-Up



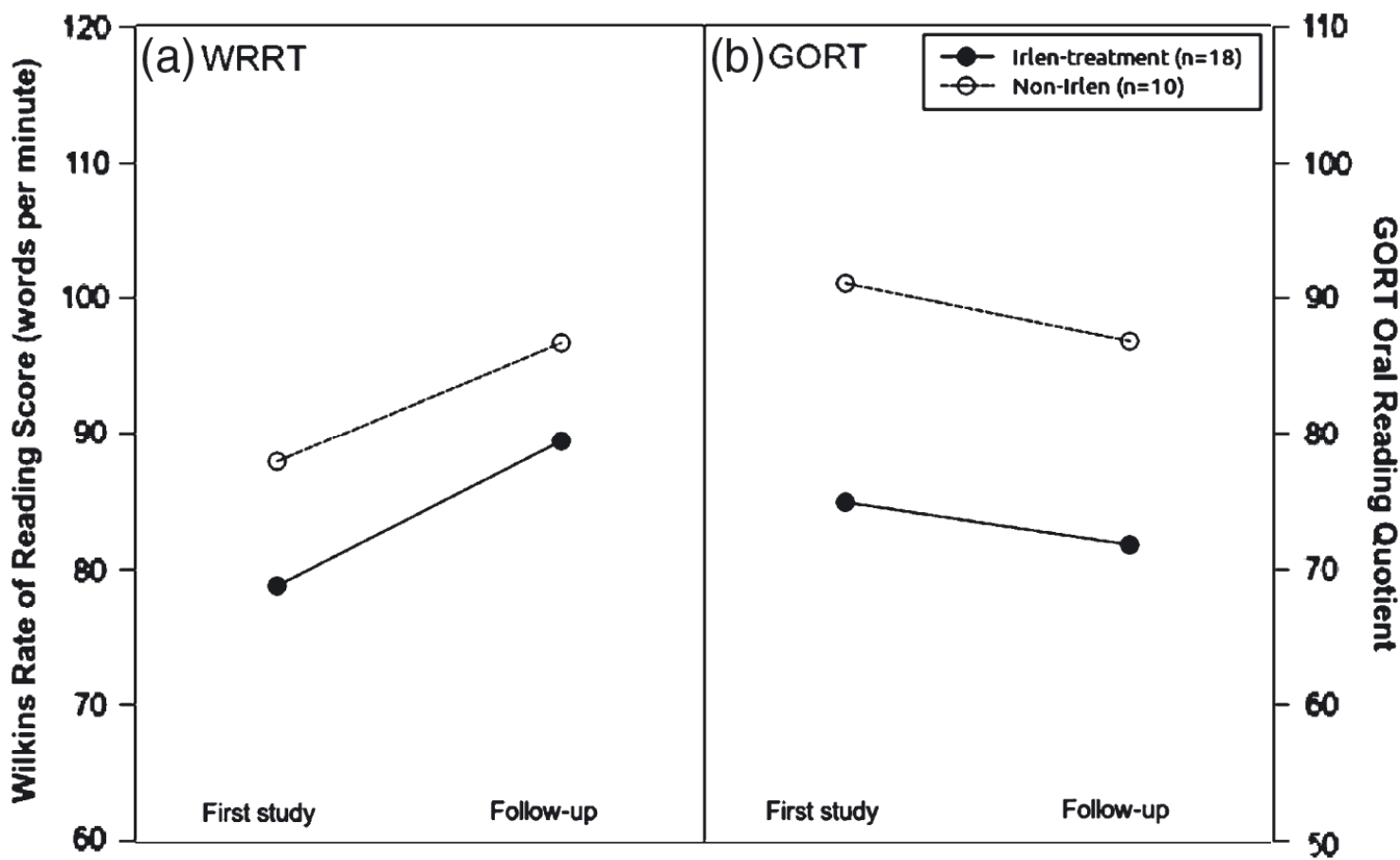
Stuart J. Ritchie<sup>1</sup>, Sergio Della Sala<sup>1</sup>, and Robert D. McIntosh<sup>1</sup>



# Irlen Colored Filters in the Classroom: A 1-Year Follow-Up



Stuart J. Ritchie<sup>1</sup>, Sergio Della Sala<sup>1</sup>, and Robert D. McIntosh<sup>1</sup>



# The effect of coloured overlays and lenses on reading: a systematic review of the literature

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**Citation information:** Griffiths PG, Taylor RH, Henderson LM & Barrett BT. The effect of coloured overlays and lenses on reading: a systematic review of the literature. *Ophthalmic Physiol Opt* 2016; 36: 519–544. doi: 10.1111/opo.12316

**Keywords:** coloured lenses, coloured overlays, Meares Irlen syndrome, reading, scotopic sensitivity syndrome, visual stress

## Abstract

**Purpose:** There are many anecdotal claims and research reports that coloured lenses and overlays improve reading performance. Here we present the results of a systematic review of this literature and examine the quality of the evidence.

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“Consistent with previous reviews and advice from several professional bodies, we conclude that the use of coloured lenses or overlays to ameliorate reading difficulties cannot be endorsed and that any benefits reported by individuals in clinical settings are likely to be the result of placebo, practice or Hawthorne effects.”

**Conclusions:** Consistent with previous reviews and advice from several professional bodies, we conclude that the use of coloured lenses or overlays to ameliorate reading difficulties cannot be endorsed and that any benefits reported by individuals in clinical settings are likely to be the result of placebo, practice or Hawthorne effects.

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## STUDENT DISABILITY SERVICE

Formal adjustments: Exam questions on specific coloured paper (n=48)  
Answer scripts on specific coloured paper (n=32)

Student study supported by provision of coloured overlays, and assistive software to change screen background or font colour/style. Most commonly for students with a diagnosis of dyslexia, but other conditions which entail some form of visual stress (such as severe migraines, Meares Irlen Syndrome or an acquired brain injury)...

“Meares Irlen Syndrome is not something that we would assess for or diagnose within the Student Disability Service. It is generally diagnosed by an optician/optometrist, who has received the relevant training in the diagnosis of the condition. There are a few opticians in Edinburgh who can provide this service, including Downes Opticians and Black and Lizars.”

# Open questions

Should we allocate resources to poorly evidenced methods to assist student learning?

Should we deny students such resources if they *believe* that they need them in order to study/perform effectively?

Do we aim to maximise student satisfaction, or educational attainment?

Do our answers to such questions communicate our institutional values, and the value that we place on evidence?



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# References

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McIntosh RD & Ritchie SJ (2012). Rose-tinted? The use of coloured overlays to treat reading difficulties. In: Della Sala S & Anderson M (Eds). Neuroscience in education: the good the bad and the ugly. Oxford University Press.

Ritchie SJ, Della Sala S & McIntosh RD (2011). Irlen colored overlays do not alleviate reading difficulties. Pediatrics. 128.4: e932-e938.

Ritchie SJ, Della Sala S & McIntosh RD (2012). Irlen colored filters in the classroom: a one-year follow-up. Mind, Brain, & Education 6: 74-80.



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