

# Web-based Rehabilitation

Dr Alexander Leff UCL

# Outline

---

- How normal people read text
- Effect of hemianopia on text reading
- Improving reading speeds in hemianopic alexia
- Translating this therapy to the web
- Preliminary data from patients using the site
- The future

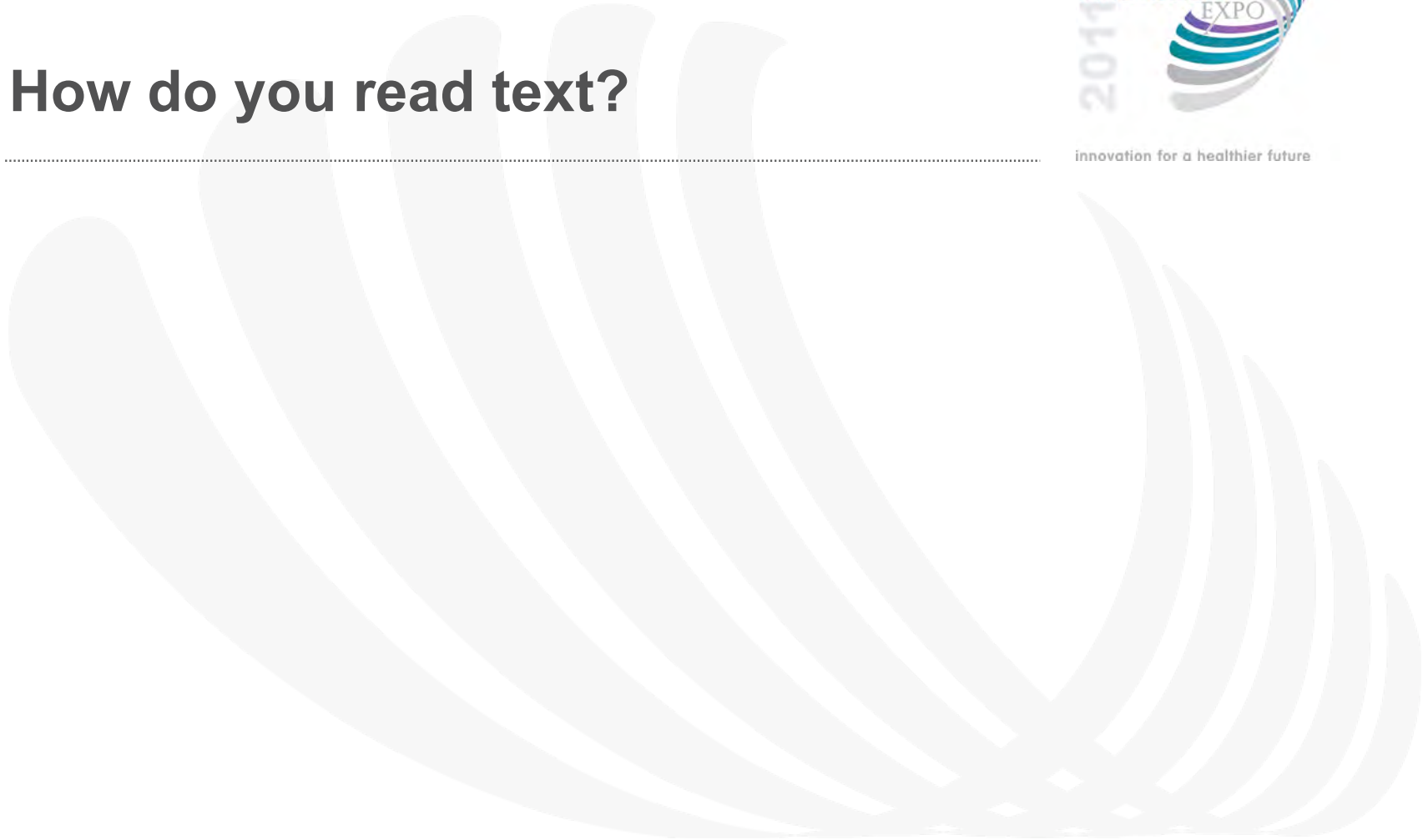


# How do you read text?

---



innovation for a healthier future

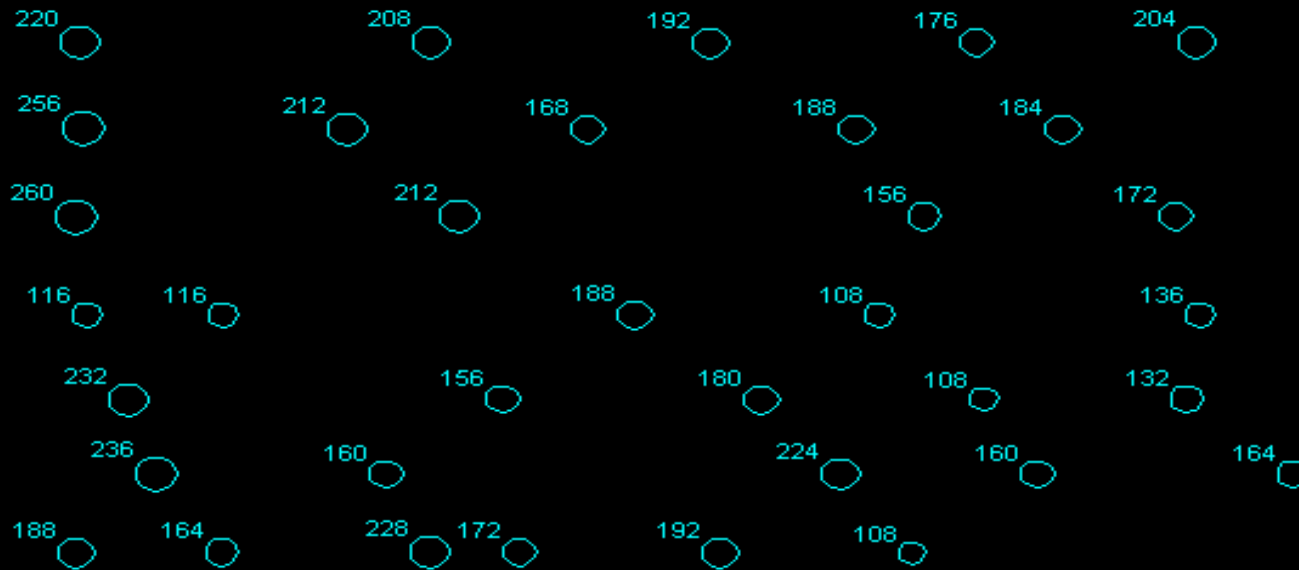


# What is a hemianopia?

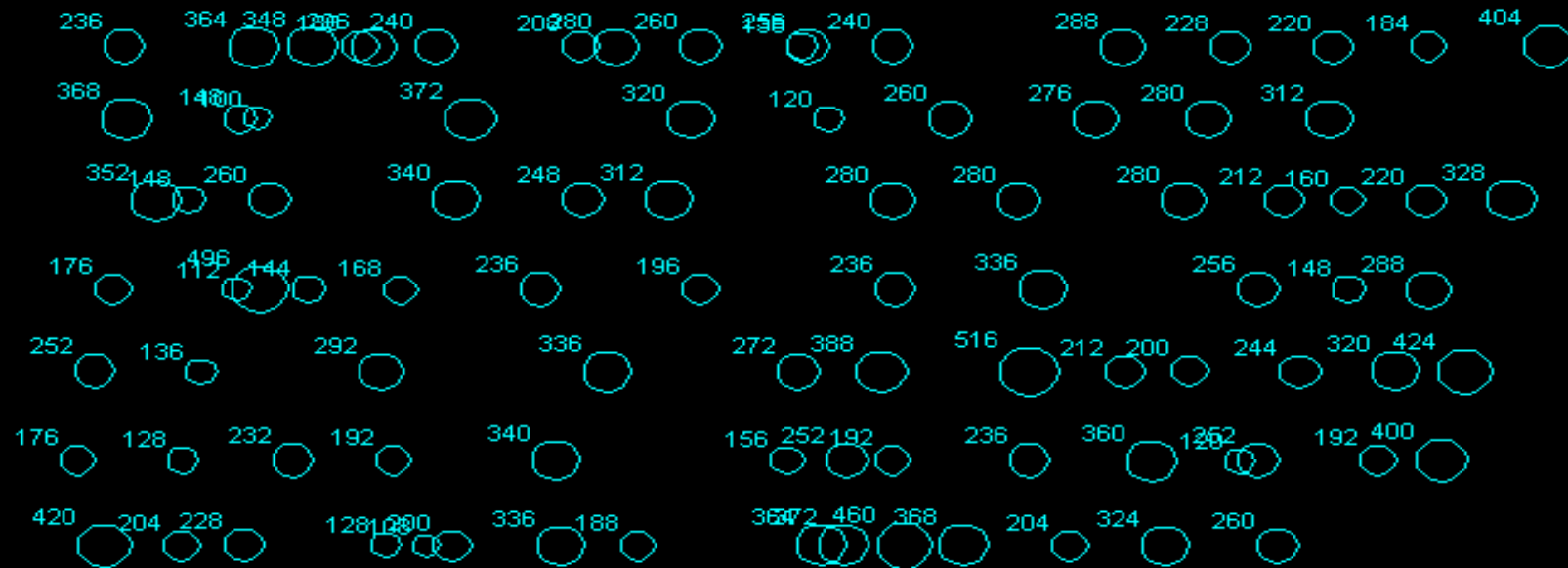
---

- Caused by brain damage
- Stroke/head injury/  
tumour
- Not eye damage

Passenger Paul Lynch stunned airport security staff when he proved his identity by showing them the cover of a Guinness Book of Records. Paul did not have any photo ID with him when he checked in at Stansted for a no-frills GO flight to Edinburgh.



text reading fixations – normal subject  
36 fixations 45 words: ratio = 0.8



text reading fixations – hemianopic alexia  
 93 fixations 45 words: ratio = 2.1

# How common is hemianopic alexia?

---

1) Difficult to say!

2) Back of an envelope calculation:

- No. of new cases of stroke in UK = 150,000
- No. of strokes with hemianopia in UK = 15,000
- No. with hemianopic alexia = 1,000 - 4,000 ?

# Optokinetic therapy improves text reading in patients with hemianopic alexia

A controlled trial

G.A. Spitzyna, MSc  
R.J.S. Wise, FRCP  
S.A. McDonald, PhD  
G.T. Plant, FRCP  
D. Kidd, FRCP  
H. Crewes, BA  
A.P. Leff, PhD

Address correspondence and reprint requests to Dr. Alexander Leff, Wellcome Department of Imaging Neuroscience, 12 Queen Square, London, WC1N 3BG, UK  
a.leff@fil.ion.ucl.ac.uk

**ABSTRACT Objective:** An acquired right-sided homonymous hemianopia can result in slowed left-to-right text reading, called hemianopic alexia (HA). Patients with HA lack essential visual information to help guide ensuing reading fixations. We tested two hypotheses: first, that practice with a visual rehabilitation method that induced small-field optokinetic nystagmus (OKN) would improve reading speeds in patients with HA when compared to a sham visual rehabilitation therapy; second, that this therapy would preferentially affect reading saccades into the blind field. **Methods:** Nineteen patients with HA were entered into a two-armed study with two therapy blocks in each arm: one group practiced reading moving text (MT) that scrolled from right to left daily for two 4-week blocks (Group1), while the other had sham therapy (spot the difference) for the first block and then crossed over to MT for the second. **Results:** Group 1 showed significant improvements in static text reading speed over both therapy blocks (18% improvement), while Group 2 did not significantly improve over the first block (5% improvement) but did when they crossed over to the MT block (23% improvement). MT therapy was associated with a direction-specific effect on saccadic amplitude for rightward but not leftward reading saccades. **Conclusion:** Optokinetic nystagmus inducing therapy preferentially affects reading saccades in the direction of the induced (involuntary) saccadic component. This is the first study to demonstrate the effectiveness of a specific eye movement based therapy in patients with hemianopic alexia (HA) in the context of a therapy-controlled trial. A free Web-based version of the therapy used in this study is available online to suitable patients with HA. **NEUROLOGY 2007;68:1922-1930**

# Read-Right

<http://www.readright.ucl.ac.uk>

A screenshot of the Read-Right website interface. The header includes the text 'Read-Right Hemianopic Alexia Therapy' and 'UCL Institute of Neurology | UCL Multimedia' on the left, and the 'UCL' logo on the right. A navigation bar contains 'Home', 'Patient', and 'Help' links. The main content area features a 'Welcome to Read-Right' message, a descriptive paragraph about the therapy, a video player with a 'Click to watch video about Read-Right' button, and a 'PATIENT' section with an eye icon and 'Free Therapy' text. A 'FIND OUT MORE' section lists links for 'About Read-Right', 'Read-Right Account', 'Reading Test', 'Visual Field Test', 'Read-Right Therapy', 'Read-Right FAQ', and 'Contact Us'. The footer includes the text 'The Read-Right project is funded by The Stroke Association' and the 'The STROKE Association' logo with the website 'www.stroke.org.uk'.

Read-Right Hemianopic Alexia Therapy  
UCL Institute of Neurology | UCL Multimedia

Home Patient Help

Welcome to Read-Right

Read-Right aims to provide free rehabilitation to patients with Hemianopic Alexia. This is a specific reading disorder related to visual impairment usually caused by a stroke or head injury.

Click to watch video about Read-Right

**PATIENT**

Read-Right

**Free Therapy**

Read-Right provides a free downloadable therapy which can help to improve reading speeds in patients with Hemianopic Alexia.

Get started now!

Try Demo version

**FIND OUT MORE**

- About Read-Right
- Read-Right Account
- Reading Test
- Visual Field Test
- Read-Right Therapy
- Read-Right FAQ
- Contact Us

The Read-Right project is funded by The Stroke Association

The STROKE Association  
www.stroke.org.uk

# Read-Right Therapy material: Library texts



innovation for a healthier future

The screenshot shows the 'Read-Right Hemianopic Alexia Therapy' web application. At the top, it identifies the user as 'user1@yahoo.com' and provides navigation links for 'Tour', 'Therapy', 'History', 'Help', and 'Signout'. A video player is currently displaying a scene from 'Harry Potter and the Chamber of Secrets' with the text 'burst with the strange and unexp'. Below the video player are tabs for 'Library', 'BBC Live', 'Therapy Time', and 'Colours'. The 'Library' tab is active, showing a table of books and a list of chapters for the selected book, 'Harry Potter and the Chamber of Secrets'.

| Book Title                            | Author              | Genre                |
|---------------------------------------|---------------------|----------------------|
| A Christmas Carol                     | Charles Dickens     | Christmas Stories    |
| Alice's Adventure in Wonderland       | Lewis Carroll       | Fantasy              |
| American Fairy Tales                  | L. Frank Baum       | Fantasy              |
| Discourse On Inequality               | Jean Jacques Rou    | Non-Fiction          |
| Harry Potter and the Chamber of Sec   | Copyright © J. K. f | Fantasy, Thriller    |
| Harry Potter and the Philosopher's St | Copyright © J. K. f | Fantasy, Thriller    |
| The Adventures of Sherlock Holmes     | Arthur Conan Doyl   | Adventure            |
| The Color of Magic                    | Terry Pratchett     | Comic Fantasy        |
| The Metamorphosis                     | Franz Kafka         | Psychological Fictio |

Select a book and click a chapter to read:

**Harry Potter and the Chamber of Secrets**  
~ Copyright © J. K. Rowling 1998

- 01 - The Worst Birthday
- 02 - Dobby's Warning
- 03 - The Burrow
- 04 - At Flourish and Blotts
- 05 - The Whomping Willow
- 06 - Gilderoy Lockhart
- 07 - Mudbloods and Murmurs
- 08 - The Deathday Party
- 09 - The Writing on the Wall

# Read-Right Therapy material: bbc.co.uk/



innovation for a healthier future

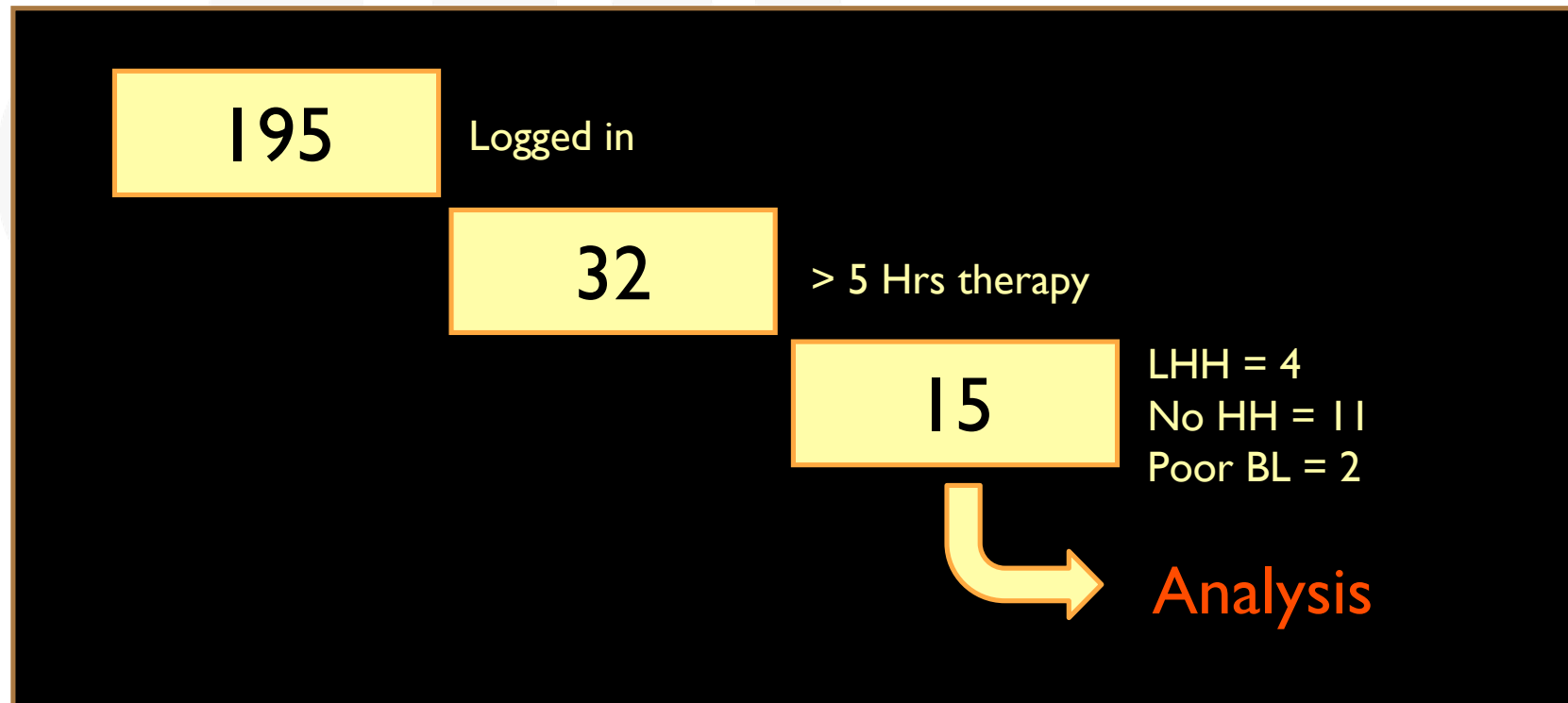
The screenshot shows the 'Read-Right Hemianopic Alexia Therapy' web application. The header includes the 'Read-Right' logo (an eye) and the text 'Read-Right Hemianopic Alexia Therapy' and 'UCL Institute of Neurology | UCL Multimedia'. Below the header is a navigation bar with 'Welcome, user1' and buttons for 'Tour', 'Therapy' (highlighted in red), 'History', 'Help', and 'Signout'. The main content area features a video player with a large blue text overlay: 'ar Libya's Tunisian border with a th'. The video player controls show 'BBC News World applies pressure on Gaddafi' and a speed slider between 'Slow' and 'Fast'. Below the video player are four tabs: 'Library', 'BBC Live', 'Therapy Time', and 'Colours'. On the left side, there is a vertical menu with icons and labels for 'News', 'Business', 'Science', 'Sport', and 'Health'. The 'News' section is active, displaying a table of news items from 'bbc.co.uk/news'.

| Date                 | Title                             |
|----------------------|-----------------------------------|
| 2011-02-28 Mon 10:47 | HSBC sees profits double in 2010  |
| 2011-02-28 Mon 10:45 | World applies pressure on Gaddafi |
| 2011-02-28 Mon 10:44 | Miliband warns of costs 'crisis'  |
| 2011-02-28 Mon 10:44 | Man killed during off-road event  |
| 2011-02-28 Mon 10:30 | Views sought on high-speed rail   |
| 2011-02-28 Mon 10:26 | Belarus 'breaks Ivorian embargo'  |
| 2011-02-28 Mon 10:26 | Primark warns of slowdown in UK   |
| 2011-02-28 Mon 10:19 | S Korea starts joint US exercises |
| 2011-02-28 Mon 10:15 | Vodafone network hit by break-in  |

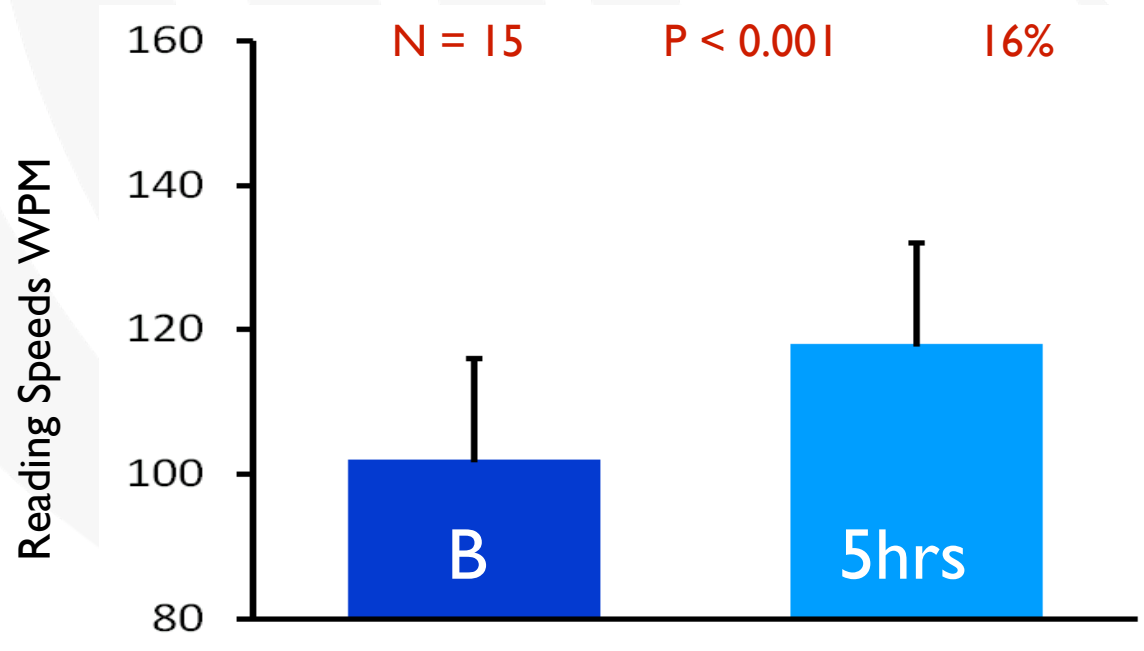
# Preliminary analysis of Read-Right data



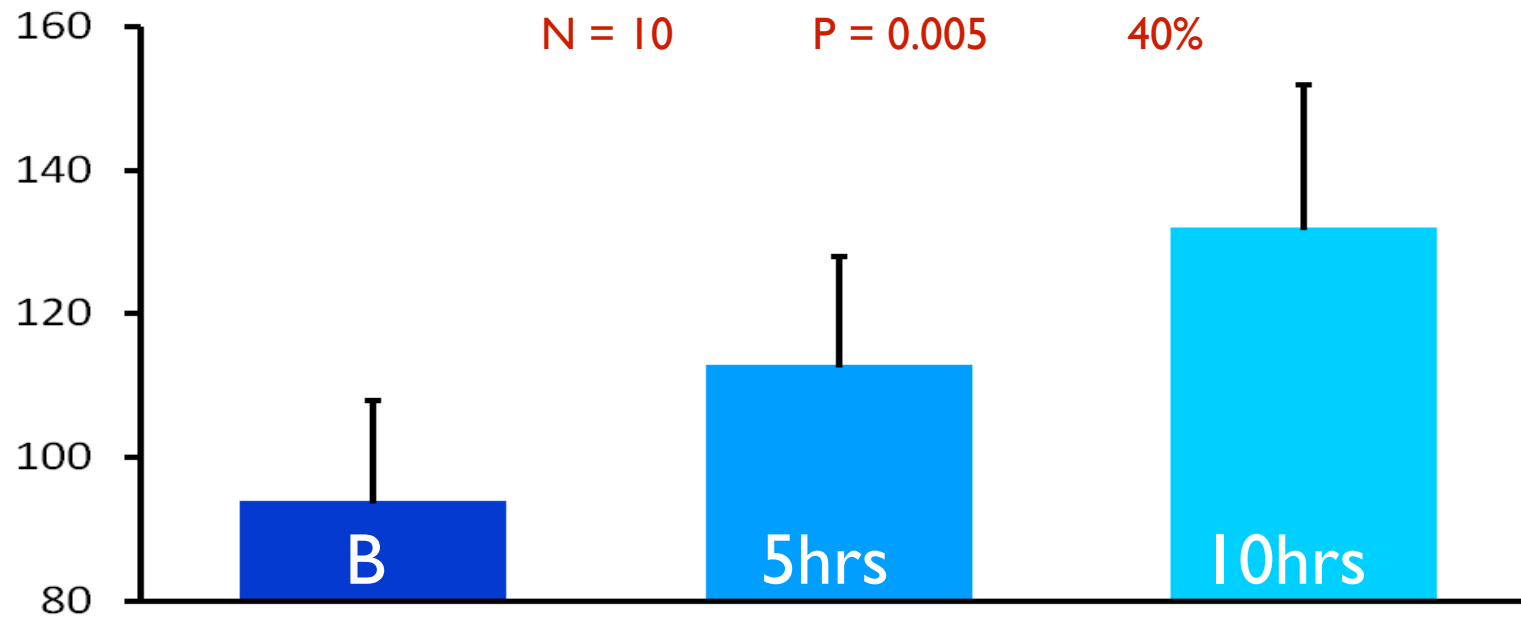
innovation for a healthier future



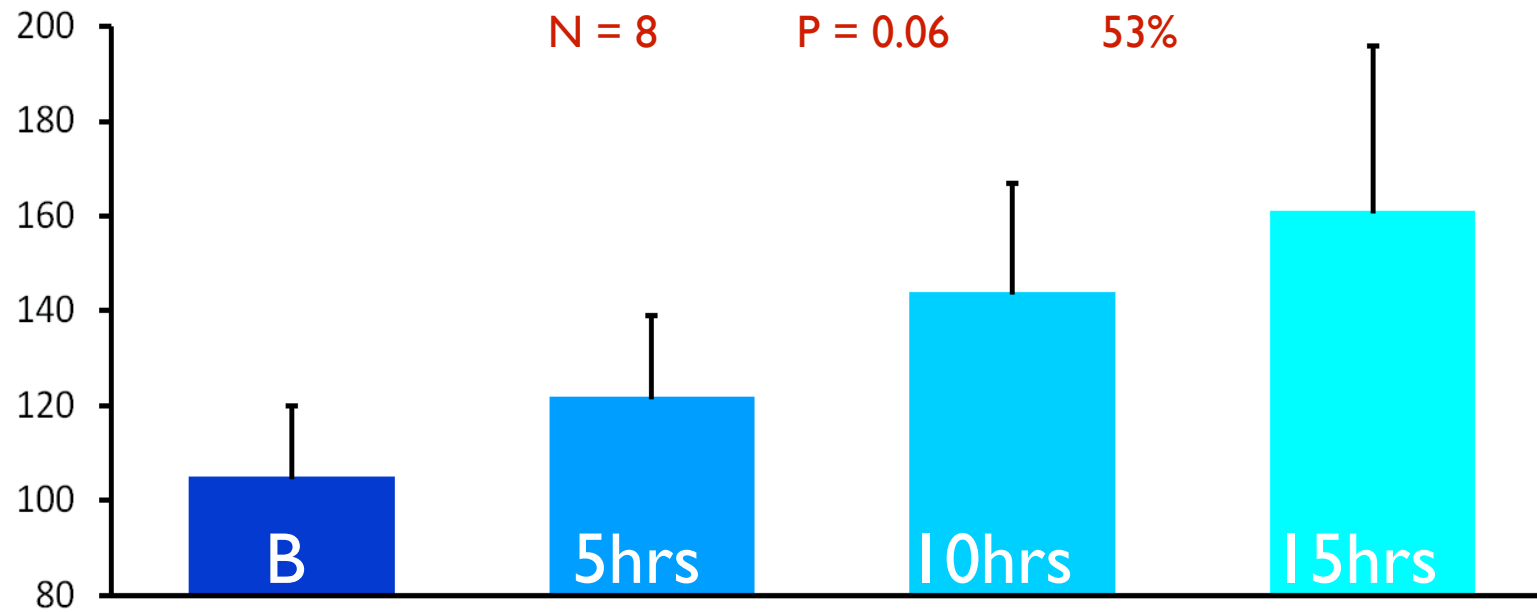
# Preliminary analysis of Read-Right data: 5 hours of therapy



# Preliminary analysis of Read-Right data: 10 hours of therapy



# Preliminary analysis of Read-Right data: 15 hours of therapy



# Vision

---

- Behavioural therapies work, but the issue is dose
- Roll out for more scientifically proven therapies
  - 1) Read-Right
  - 2) Eye-search
  - 3) iTALK: interactive speech therapy application

