

**U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
FULL COMMITTEE**

HEARING CHARTER

The Science of Dyslexia

**Thursday, September 18, 2014
11:00 a.m. - 1:00 p.m.
2318 Rayburn House Office Building**

Purpose

The Committee on Science, Space, and Technology will hold a hearing entitled *The Science of Dyslexia* on Thursday, September 18, 2014, in Room 2318 Rayburn House Office Building. Dyslexia is a difficulty to read fluently and with accurate comprehension despite a normal or above-average intelligence. It is the most common learning disability, with an estimated 1 in 5 persons suffering from some form of dyslexia.¹ While dyslexia is considered a learning disability, many talented people—especially in science, engineering, and the creative arts—have been diagnosed with dyslexia, including Albert Einstein, Thomas Edison, and John Chambers, CEO of Cisco Systems.^{2 3}

The purpose of this hearing is to understand the latest scientific research in dyslexia, to discuss promising future research directions and promising treatments for people with dyslexia to overcome challenges they face, and to explore educational opportunities for students with dyslexia in fields of science, technology, engineering, and mathematics (STEM). Witnesses will testify on their personal experience with dyslexia or how they helped others overcome this challenge through innovative and creative problem-solving.

Witnesses

Panel 1:

- **Hon. Bill Cassidy**, Co-Chair of Bipartisan Congressional Dyslexia Caucus
- **Hon. Julia Brownley**, Co-Chair of Bipartisan Congressional Dyslexia Caucus

Panel 2:

- **Dr. Sally Shaywitz**, Professor, Yale Center for Dyslexia and Creativity, Yale University
- **Mr. Max Brooks**, Author and Screenwriter
- **Ms. Stacy Antie**, Parent and Advocate
- **Dr. Peter Eden**, President, Landmark College
- **Dr. Guinevere Eden**, Director, Center for the Study of Learning (CSL) and Professor, Department of Pediatrics, Georgetown University Medical Center

¹ <http://www.yalescientific.org/2011/04/the-paradox-of-dyslexia-slow-reading-fast-thinking/>

² <http://www.dyslexia.com/famous.htm>

³ <http://www.businessinsider.com/cisco-ceo-john-chambers-talks-dyslexia-2014-7>

Hearing Overview

Introduction

Dyslexia, a developmental reading disorder, is characterized by difficulty with learning to read fluently and with accurate comprehension despite normal or above-average intelligence. This language processing disorder can hinder reading, writing, spelling and sometimes even speaking. Dyslexia is the most common learning difficulty and most recognized reading disorder. Notable scientists who had dyslexia through history include Leonardo Da Vinci, Albert Einstein, Nikola Tesla and James Clerk Maxwell.⁴

One out of every five people struggle with dyslexia.⁵ Unfortunately many of these individuals remain undiagnosed, untreated and struggling with the impact of their dyslexia. Dyslexia can affect people differently and depends upon the severity of the learning disability and the success of alternate learning methods. For example, some individuals may have trouble only with reading and spelling, while others struggle to write. Some children may show few signs of difficulty with early reading and writing. However, as adults, they may have trouble with complex language skills, such as grammar, reading comprehension and more in-depth writing. Furthermore, adults with unidentified dyslexia often work in jobs below their intellectual capacity.

People with dyslexia are often very creative, and they often think of unexpected ways to solve a problem or tackle a challenge. Researchers do not understand whether this creativity comes from the extra work dyslexics must do to succeed at reading, or whether dyslexics are just naturally creative. However, many individuals with dyslexia have exceeded expectations and having successful careers.

Issues for Consideration

The exact causes of dyslexia are not completely understood, but brain imaging studies show differences in the structure⁶ and function⁷ of the brains of dyslexic people. Moreover, most people with dyslexia have been found to have problems with identifying the separate speech sounds within a word and/or learning how letters represent those sounds, a key factor in their reading difficulties. Dyslexia is not due to either a lack of intelligence or desire to learn; with appropriate teaching methods, dyslexics can learn successfully.

Assistive technology offers a way for dyslexics to save time and overcome some of the issues they may encounter because of their dyslexia, such as slow note-taking or unreadable handwriting, and allows them to use their time productively where they are gifted. For dyslexic

⁴ http://en.wikipedia.org/wiki/List_of_people_diagnosed_with_dyslexia

⁵ <http://dyslexia.yale.edu/MDAI/>

⁶ Krafnick, A.J., Flowers, D.L., Luetje, M.M., Napoliello, E.M. and Eden, G.F., An investigation into the origin of anatomical differences in dyslexia, *Journal of Neuroscience*, 34(3): 901-8, 2014. doi:10.1523/JNEUROSCI.2092-13.2013. PMID:PMC3891966

⁷ Eden, G. F., Jones, K.M., Cappell, K., Gareau, L., Wood, F.B., Zeffiro, T.A., Dietz, N.A.E., Agnew, J.A. and Flowers, D.L., Neural changes following remediation in adult developmental dyslexia, *Neuron*, 44(3): 411-422, 2004. doi:10.1016/j.neuron.2004.10.019

students, technology opens doors and allows them to demonstrate their knowledge in ways that were unimaginable in the past. Reading is the area in which students with dyslexia struggle the most. Fortunately, many mobile apps are available that can be of help.⁸

It is difficult to find a job today which does not require some level of reading, writing and memory, or some use of a computer. Adults with dyslexia sometimes struggle with time management and organization at work. Planning and organizing, setting out timetables, distinguishing between the important and the urgent, remembering appointments, passing on telephone messages from memory and meeting deadlines can be exceptionally difficult for people with dyslexia. Individuals may get bogged down, overwhelmed by the workload and perform poorly.⁹

Initial job training would be maximized by taking into account the specific needs of employees with dyslexia. This requires flexibility in the approach to training, provision of information in alternative formats, multi-sensory learning techniques, more time and repetition of information when necessary.¹⁰

⁸ <http://www.nclld.org/students-disabilities/assistive-technology-education/apps-students-ld-dyslexia-reading-difficulties>

Apps to Help Students with Dyslexia and Reading Difficulties: <http://nclld.org/students-disabilities/assistive-technology-education/apps-students-ld-dyslexia-reading-difficulties>

Assistive Tech Innovations: 14 New Apps & Other Tools: <http://nclld.org/students-disabilities/assistive-technology-education/apps-assistive-technology>

Apps for Students with LD: Organization and Study: <http://nclld.org/students-disabilities/assistive-technology-education/apps-students-ld-organization-study>

An Overview of Assistive Technology: <http://nclld.org/students-disabilities/assistive-technology-education/overview-assistive-technology>

⁹ <http://www.nclld.org/adults-learning-disabilities/jobs-employment-ld/strengths-challenges-workplace>

¹⁰ <http://nclld.org/adults-learning-disabilities/jobs-employment-ld/common-problems-easy-solutions>