

Scientists may have found a cause of dyslexia

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OpenDyslexic is a free [typeface/font](#) designed to mitigate some of the common reading errors caused by dyslexia. The typeface was created by Abelardo Gonzalez, who released it through an open-source license.^[1] Like many [dyslexia-intervention](#) typefaces, most notably [Dyslexie](#), OpenDyslexic adds to dyslexia research and is a reading aid, but it is not a cure for dyslexia.^[2] The typeface includes regular, bold, italic, bold-italic, and [monospaced font](#) styles. In 2012, Gonzalez

An example of OpenDyslexic typeface, used to try to help with common reading errors in dyslexia. Credit: OpenDyslexic

A duo of French scientists said Wednesday they may have found a physiological, and seemingly treatable, cause for dyslexia hidden in tiny light-receptor cells in the human eye.

In people with the reading disability, the cells were arranged in matching patterns in both eyes, which may be to blame for confusing the [brain](#) by producing "mirror" images, the co-authors wrote in the journal

Proceedings of the Royal Society B.

In non-dyslexic people, the cells are arranged asymmetrically, allowing signals from the one eye to be overridden by the other to create a single image in the brain.

"Our observations lead us to believe that we indeed found a potential cause of [dyslexia](#)," study co-author Guy Ropars of the University of Rennes, told AFP.

It offers a "relatively simple" method of diagnosis, he added, by simply looking into a subject's eyes.

Furthermore, "the discovery of a delay (of about 10 thousandths of a second) between the primary image and the mirror image in the opposing hemispheres of the brain, allowed us to develop a method to erase the [mirror image](#) that is so confusing for dyslexic people"—using an LED lamp.

Like being left- or right-handed, human beings also have a dominant eye.

As most of us have two eyes, which record slightly different versions of the same image, the brain has to select one of the two, creating a "non-symmetry."

Many more people are right-eyed than left, and the dominant eye has more neural connections to the brain than the weaker one.

Image signals are captured with rods and cones in the eye—the cones being responsible for colour.

"b" or "d"

The majority of cones, which come in red, green and blue variants, are found in a small spot at the centre of the cornea of the eye known as the fovea. But there is a small hole (about 0.1-0.15 millimetres in diameter) with no blue cones.

In the new study, Ropars and colleague Albert le Floch spotted a major difference between the arrangement of cones between the eyes of dyslexic and non-dyslexic people enrolled in an experiment.

In non-dyslexic people, the blue cone-free spot in one eye—the dominant one, was round and in the other eye unevenly shaped.

In dyslexic people, both eyes have the same, round spot, which translates into neither eye being dominant, they found.

"The lack of asymmetry might be the biological and anatomical basis of reading and spelling disabilities," said the study authors.

Dyslexic people make so-called "mirror errors" in reading, for example confusing the letters "b" and "d".

"For dyslexic students their two eyes are equivalent and their brain has to successively rely on the two slightly different versions of a given visual scene," the duo added.

The team used an LED lamp, flashing so fast that it is invisible to the naked eye, to "cancel" one of the images in the brains of dyslexic trial participants while reading.

In initial experiments, dyslexic study participants called it the "magic lamp," said Ropars, but further tests are required to confirm the technique really works.

About 700 million people in the world are known to suffer from dyslexia—about one in ten of the global population.

More information: Left-right asymmetry of the Maxwell spot centroids in adults without and with dyslexia, *Proceedings of the Royal Society B*, [rspb.royalsocietypublishing.org1098/rspb.2017.1380](https://royalsocietypublishing.org/doi/10.1098/rspb.2017.1380)

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