Dyslexia Doesn't Translate

The culture you grow up in can shape your diet, your taste in clothes, and your religious views. It can also shape your brain. New research reveals that the kind of language you learn can influence how language areas in the brain develop. The work also suggests that interventions for reading disorders such as dyslexia may need to be modified for various languages.

Dyslexia seems to be rooted in the left temporoparietal region of the brain, at least for native speakers of alphabet-based languages such as English, Italian, or German. Reading such languages involves converting letters into sounds. Reading a symbol-based language, such as Chinese, is vastly different; it requires remembering what each character looks like, how it is pronounced, and what it means.

To investigate, a team of neuroscientists led by Wai Ting Siok of the University of Hong Kong scanned the brains of normal and dyslexic Chinese children. In one experiment, children looked at two Chinese characters and had to decide if they would sound the same. Dyslexic children had much less activity in the left middle frontal cortex, an area related to visual representation and memory, compared to normal readers, the researchers report in the 2 September issue of *Nature*.

The children were also shown a symbol and asked whether it was a real character. Scans during this task revealed that impaired readers had more brain activity in the right inferior occipital cortex, an area that processes visual information. The findings suggest that the dyslexic brain tries to compensate for poor wiring in one pathway by amping up activity in another. Taken as a whole, the findings reveal that the brain regions used by normal Chinese and English speakers for language processing differ, and also that the differences between normal and dyslexic children depend on the kind of language they speak.

It makes sense that culture shapes the development of the brain’s language regions, says Paula Tallal of Rutgers University in Newark, New Jersey. Li Hai Tan of the National Institute of Mental Health in Bethesda, Maryland, a member of the brain-scanning team, says the next step is to figure out how to tailor therapies for reading disorders to an individual’s language background.
--RACHEL EHRENBERG

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