Medical Xpress

Study unveils clue to the origin of dyslexia

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Because dyslexia affects so many people around the world, countless studies have attempted to pinpoint the source of the learning disorder.

Even though dyslexia is defined as a reading disorder, it also affects how a person perceives spoken language. It is widely known that individuals with dyslexia exhibit subtle difficulties in speech perception. In fact, these problems are even seen among infants from dyslexic families, well before reading is acquired.

A new study by Northeastern University professor Iris Berent has uncovered a vital clue to the origin of this disorder.

Speech perception engages at least two linguistic systems: The phonetic system, which extracts discrete sound units from the acoustic input, and the phonological system, which combines these units to form individual words.

Prior to Prof. Berent's study, published in the journal *PLOS ONE*, researchers thought patients with dyslexia displayed an impairment in the phonological system. But through a series of experiments, Prof. Berent was able to show that it is the phonetic, not the phonological system, that might be the culprit.

To dissociate between these systems, Prof. Berent and her team—Vered Vaknin-Nusbaum of Western Galilee College, Israel, Evan Balaban of McGill University and Albert M. Galaburda of Harvard Medical School—examined the ability of dyslexic individuals to extract the

phonological patterns of their language, and compared it to their capacity to extract phonetic categories from speech. Results revealed various phonetic difficulties.

Dyslexic participants (adult, Hebrew-speaking college students) were impaired in discriminating speech sounds (e.g., /ba/ vs. /pa/) and even in distinguishing the sounds of human speech from nonspeech auditory stimuli. But, surprisingly, these same individuals had no difficulties in tracking abstract phonological patterns of their language (e.g., the position of the repeated consonants in gigut vs. gitut); they were able to do so even with novel words, and their performance was comparable to skilled readers.

Prof. Berent and her team were able to conclude that even though dyslexia compromises the phonetic system, it is possible that the phonological system might not be impaired.

Although this study does not deliver a specific remedy for dyslexia, it sheds new light on the nature of this learning disorder. "Research has long recognized that reading and language are closely linked, but this recognition has had little impact on how dyslexia is studied. Our research demonstrates that a closer analysis of the language system can radically alter our understanding of the disorder, and ultimately, its treatment."

More information: dx.plos.org/10.1371/journal.pone.0044875

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