Chinese dyslexia may be much more complex than the English variety, according to a new paper published online today in *Current Biology*. English speakers who have developmental dyslexia usually don’t have trouble recognizing letters visually, but rather just have a hard time connecting them to their sounds.

What about languages based on full-word characters rather than sound-carrying letters? Researchers looking at the brains of dyslexic Chinese children have discovered that the disorder in that language often stems from two separate, independent problems: sound and visual perception.

The pronunciation of detailed and complex Chinese characters must be memorized, rather than sounded out like words in alphabet-based languages. That requirement led researchers to suspect that disabilities in the visual realm might come into play in dyslexia in that language. "A fine-grained visuospatial analysis must be performed by the visual system in order to activate the characters' phonological and semantic information," said lead author Wai Ting Siok of the University of Hong Kong, in a prepared statement.

To see whether Chinese dyslexics had trouble comprehending visual details, researchers used functional magnetic resonance imaging (fMRI) to study the brains of 12 Chinese children with dyslexia. When asked to complete a task that involved visually judging size, the dyslexic children had less activation in an area of the brain that is charged with visual-spatial processing (the left intraparietal sulcus) than did Chinese children with normal reading levels. Previous research had also shown that the dyslexic group had weak activation in areas that process phonological information (the left middle frontal gyrus) when tested with a rhyming task.

Because of the two processes—aural and visual—that must come together for Chinese literacy, Siok concluded in the statement: "Disordered phonological processing may commonly coexist with abnormal visuospatial processing in Chinese dyslexia."

The new confirmation may eventually have ramifications for the way Chinese students with dyslexia are helped. But in the meantime, more research and investigation into the field of character-based language dyslexia must be completed. As she added: "Our results strongly indicate the need for a unifying theory of a sufficient scope to accommodate the full complexity of the observed dysfunctions and interactions of the brain systems underlying reading impairments."

*Image of child with Chinese writing (unrelated to study) courtesy of Catsper via Flickr*