

NEUROSCIENCE

We All Speed-Read

The brain doesn't sound out words it already knows, a new study shows

By Roni Jacobson on September 1, 2016



Credit: Thomas Fuchs

When children first learn to read, they painstakingly sound out every letter—C-A-T—before mentally stringing them together and connecting the result to a word and its meaning. With practice, however, we begin to recognize words on sight. In fact, our brain compiles a visual dictionary that is housed in the rear temporal lobe, adjacent to the area that recognizes faces, according to a new study published in *Neuroimage*. This dictionary eventually supersedes the responsibilities of the brain's phonics center, the researchers say, and is critical to becoming an advanced reader.

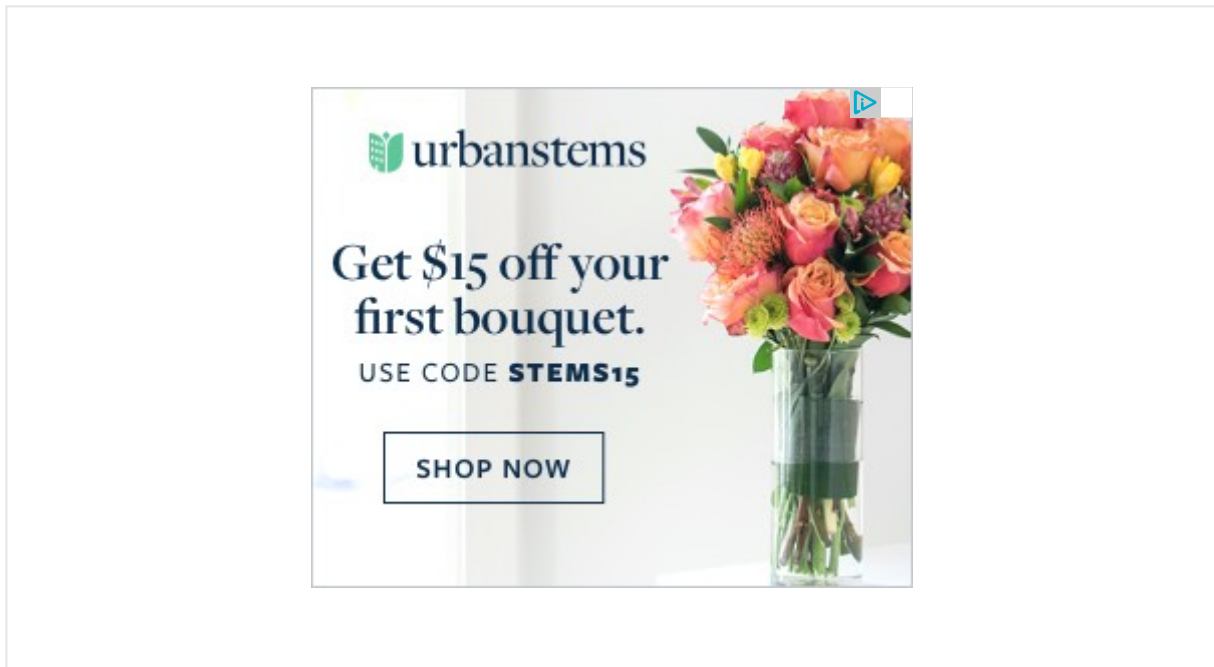
Laurie Glezer, a postdoctoral research fellow at San Diego State University, and her colleagues analyzed the brain activity of 27 participants—all native, monolingual

English speakers reading at an advanced level—as they read homophones, words that sound alike but have a different meaning, such as “hair” and “hare.” They found that the homophones activated different groups of neurons in the rear temporal lobe—an observation that suggests separate visual “entries” for the words. The same group of neurons would have lit up if the brain was sounding the homophones out.

“From this work it looks as if there are regions that are separately computing these visual and phonological aspects that are both incredibly important for reading,” Glezer says.

The study's results could inform new teaching techniques. “In the debate about what's the best way to learn to read, there's this idea that phonics is the way to go,” says Maximilian Riesenhuber, who leads the Laboratory for Computational Cognitive Neuroscience at Georgetown University Medical Center and is a co-author of the paper. This study refutes that idea, he adds, because it shows that skilled readers build up a visual vocabulary that they tap into when viewing a familiar word as a whole.

Similarly, the research may offer insight into dyslexia, notes Fumiko Hoeft, a psychology professor at the University of California, San Francisco, who was not involved in the study. For instance, perhaps people with this reading disorder have problems developing or accessing the visual dictionary. At this point, however, it is “hard to say where the breakdown is,” Glezer says. She is now planning similar studies involving subjects who are dyslexic and others who are deaf—individuals who also tend to have trouble learning to read.



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