

How emotions affect word retrieval in people with aphasia

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People with aphasia have more trouble coming up with words they want

to use when they're prompted by images and words that carry negative emotional meaning, new research suggests.

The study involved individuals whose language limitations resulted from damage to the brain caused by a stroke—the most common cause of aphasia, affecting at least one-third of stroke survivors. The disorder impairs the expression and understanding of language as well as reading and writing.

Researchers from The Ohio State University who led the study said the findings—suggesting that prompts with negative and even positive emotional context can disrupt word retrieval—have implications for clinical assessments and therapy, where the potential influence of emotion may not be taken into account. And because many patients already feel isolated by the condition, they said, insights from this study could help reduce interference with communication efforts by people with aphasia in multiple settings.

"Emotions are a big part of having aphasia—it impacts your quality of life drastically," said first author Deena Schwen Blackett, who completed this work as a graduate student in speech and hearing science at Ohio State.

"The fact that an [emotional reaction](#) interferes with the ability of people with aphasia to come up with words—on top of how hard it already is—could validate their experience if they're saying that a heightened emotional state makes it harder for them to communicate, so they might need to keep their environment mellow."

The study was [published](#) recently in the journal *Neuropsychologia*.

Though previous research has found that emotional stimuli can improve performance by people with aphasia on auditory comprehension, reading

and writing, and repetition tasks, this is one of the first such studies of emotions' effects on word retrieval, said senior author Stacy Harnish, associate professor of speech and hearing science at Ohio State.

"This has practical implications but also theoretical significance," Harnish said. "When we see behavior across people pointing to differences between emotional versus non-emotional words, that tells us something is going on in the brain to process these stimuli differently. So that warrants interrogating it more, figuring out why that is and building on it."

The study involved 13 people with aphasia and 13 neurotypical people as controls who participated in four single-word naming tasks: two image-based tasks to name objects or actions represented by a picture, and two word-based tasks to name words that fit into a category or verbs that logically accompany the word used as a prompt.

The pictures and words used as stimuli had been previously validated as carrying either negative or positive emotional context or as neutral. Negative pictures included skull, garbage and kick and negative words included disaster, poison and mold. Positive pictures included images of bunnies and a waterfall, while positive words included food and pillow. In all, the tasks added up to 219 image and word prompts divided equally into negative, positive or neutral context categories.

Though there was some nuance and variation to the results, a pattern emerged in people with aphasia as a group. Emotional pictures and words, primarily those with negative meaning but also many with positive contexts, resulted in worse naming performance in terms of word accuracy and in the time it took to respond compared to results from neutral word and image prompts.

Results showed similar effects of emotional stimuli on neurotypical

study participants' performance on word retrieval tasks, though to a lesser degree—hinting that there could be some universality to how emotions place demands on the brain that compromise this specific type of language processing.

In fact, Schwen Blackett expected an earlier study she had led in people who didn't have aphasia to show that emotions surrounding stimuli would generate a strong performance in word retrieval—possibly by harnessing the right brain hemisphere to give a boost to language processing in the left hemisphere. But she found just the opposite to be true in a single word-retrieval task.

"So this new study using varied tasks was validating, and replicated those findings—we saw the same thing in people with mild to moderate aphasia but to a greater magnitude than what was seen in neurotypical people," said Schwen Blackett, now a postdoctoral fellow at the Medical University of South Carolina.

Harnish and Schwen Blackett theorized that simultaneous emotional arousal and language processing led to fragmentation in the brain's attention capabilities: Overlapping regions involved in both types of processing are triggered to tend to the physiological and memory components of an emotional response, which interferes with the focused attention on language required to perform well on word retrieval.

The team said more research is needed to fully understand the effect of [emotional stimuli](#) in people with aphasia, including in patients with differing [aphasia](#) origins.

"Deena's work is at the forefront of emotional processing in word retrieval," Harnish said. "We want to build on it now and see where it goes."

Additional co-authors were Shari Speer and Xueliang Pan of Ohio State and Joan Borod of Queens College.

More information: Deena Schwen Blackett et al, The effects of emotional stimuli on Word retrieval in people with aphasia, *Neuropsychologia* (2023). [DOI: 10.1016/j.neuropsychologia.2023.108734](https://doi.org/10.1016/j.neuropsychologia.2023.108734)

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