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Study pinpoints part of brain that suppresses instinct

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Research from York University is revealing which regions in the brain "fire up" when we suppress an automatic behaviour such as the urge to look at other people as we enter an elevator.

A York study, published recently in the journal *Frontiers in Human Neuroscience*, used fMRI (functional Magnetic Resonance Imaging) to track brain activity when study participants looked at an image of a facial expression with a word superimposed on it. Study participants processed the words faster than the facial expressions. However, when the word did not match the image – for example, when the word "sad" was superimposed on an image of someone smiling – participants reacted less quickly to a request to read the word.

"The emotion in the word doesn't match the emotion in the facial expression, which creates a conflict," said Joseph DeSouza, assistant professor of psychology in York's Faculty of Health. "Our study showed – for the first time – an increase in signal from the left inferior frontal cortex when the study participant was confronted by this conflict between the word and the image and asked to respond to directions that went against their automatic instincts."

Previous research on the prefrontal cortex has found this region to be implicated in higher order cognitive functions including longterm planning, response suppression and response selection. This experiment, conducted by graduate student Shima Ovaysikia under DeSouza's supervision, allowed researchers to study inhibitory mechanisms for

much more complex stimuli than have been studied in the past.

The inferior frontal cortex is located near the front left temple. People who have problems with inhibition, including stroke or schizophrenia patients, may have damage to this inferior frontal cortex zone, says DeSouza. As a result, when they see something that is inconsistent – such as the image of a smiling face with the word "sad" across it – they would be expected to take more time to react, because the part of their brains needed to process it has been damaged or destroyed.

Provided by New York University