

Researchers find brain's 'ordering centre'

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Researchers at McGill University's Montreal Neurological Institute (MNI) have pinpointed the previously unknown part of the human brain responsible for perceiving and storing ordered visual information. This capacity is fundamental to high-level planning and is unique to humans and other primates like monkeys and chimpanzees, said study co-author Dr. Michael Petrides, director of the MNI's Neuropsychology/Cognitive Neuroscience Unit.

"Our capacity to plan and manipulate information in the mind is dependent on our ability to take in the precise order of things." continued Petrides. "Dogs and cats and rats and squirrels have a lot of memory capacity, but their brains probably do not have the ability to capture the precise order of sequences of items. Approximate order is perceived based on salient features such as the stronger impression of the most recently seen item."

The study, co-authored by postdoctoral research fellow Céline Amiez and Petrides, was pre-published online in *The Proceedings of the National Academy of Sciences* during the week of August 13. In the study, seventeen volunteer test subjects were scanned using functional magnetic resonance imaging (fMRI) as they were shown sequences of abstract black and white images.

"Immediately after they were shown the first sequence of images, they were shown the first and the second image or the third and the first and so on." explained Petrides. "Then they had to make a judgment about which image came earlier." The researchers monitored activity within

the brain during performance of this task and thus were able to localize the specific area within the mid-dorsolateral prefrontal cortex (DLPFC) responsible for taking in and maintaining the precise order of visual stimuli or events perceived by the observer.

The abstract Mondrian-like designs used in the study were chosen specifically because they could not be easily verbalized, to filter out the effects of verbal memory. "We wanted to study the capacity of the mind to hold things that you do not put into your verbal memory," said Petrides. "Interestingly, this capacity is not very large. If you can put the items into words, you can manage seven or eight, but if they're abstract visuals, it's more like four or five."

Though the study was conducted from a pure research perspective, some practical spin-offs can be expected, said Petrides. Their findings are relevant to the understanding of neurological problems like attention deficit disorder, and the study's methodology can be used to assist surgeons to map and avoid the area during surgical procedures.

Source: McGill University

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