

Poor short-term memory linked to inability to ignore distraction

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John Gaspar, an SFU psychology doctoral student, places 128 electrodes into a cap. The electrodes will pick up tiny changes in the wearer's brain activity.

Simon Fraser University researchers have discovered that differences in people's working memory capacity correlate with their brain's ability to

actively ignore distraction.

Their study was published this week in the journal *PNAS*.

Psychology professor John McDonald and doctoral student John Gaspar led the research team.

They used electroencephalogram (EEG) technology, which detects electrical activity in the brain, to study memory and distraction.

They found that [individuals](#) who perform well on memory tasks were able to suppress distractions. Those who didn't perform as well couldn't suppress distractions quickly enough to prevent them from grabbing their attention.

"Distraction is a leading cause of injury and death in driving and other high-stake environments, and has been associated with attentional deficits, so these results have important implications," says McDonald, who holds a Canada Research Chair in Cognitive Neuroscience.

Researchers measured participants' [visual working memory](#) limit by having them complete change-detection tasks.

"In this task, an individual is shown a series of coloured boxes for less than a second and must remember as many boxes as they can. The better they perform on this task, the higher their [working memory capacity](#) is (i.e. the more they can remember).

To study the neural processes related to suppression, researchers recorded electrical brain signals from electrodes placed on participants' heads. Using this EEG technology they tracked the neural processing of relevant and irrelevant visual objects while individuals performed attention-demanding visual search tasks.

From these, they examined participants' [working memory](#) capacity score with respect to their electrical brain signals, to see if a relationship existed.

After examining these memory processes, researchers are now interested in what other processes and behaviours might be associated with these visual-search brain mechanisms, particularly the suppressive mechanism, says Gaspar.

"For example, how do individuals with attention-hyperactivity deficit disorder, individuals who have suffered from a concussion, or anxious individuals differ in their ability to pay attention? "Ultimately, we hope that our discoveries will enable scientists and health care professionals to understand, identify and help individuals with distraction-related attentional deficits."

The study is linked to two previous papers in 2009 and 2014, in which McDonald's research team showed that when people search the visual world for a particular object, the brain has distinct mechanisms for both locking attention onto relevant information and for suppressing irrelevant information.

The study is the first to relate these specific visual-search mechanisms to memory and show that the suppression mechanism is absent in individuals with low [memory capacity](#).

More information: John M. Gaspar et al. Inability to suppress salient distractors predicts low visual working memory capacity, *Proceedings of the National Academy of Sciences* (2016). [DOI: 10.1073/pnas.1523471113](#)

Provided by Simon Fraser University

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