Undergrad academic performance linked to neural signals

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Students will have to use their brains to get good grades at school this year, according to new University of Toronto research that relates brain activity to undergraduate academic performance.

In the first study ever to link academic performance to a neural signal, participants performed a Stroop task - a well-known test of cognitive control - while hooked up to EEG electrodes that measured their brain activity.

U of T researchers monitored a brain signal known as the error-related negativity (ERN) in each participant's brain while they completed the task. ERN signals are observed approximately 100 milliseconds after a mistake is made, and are involved in cognitive control and self-regulation. Large ERN signals indicate a participant is responding strongly when they've made a mistake; smaller ERN signals indicate they are less responsive to their mistakes.

The researchers then compared the size of each participant's ERN signals to their official university transcript grades.

"Those students with larger ERN signals did significantly better in school, showing that these neural signals have important real world implications," says doctoral researcher Jacob Hirsh.

Hirsh says students with large ERN signals are more responsive to their own errors than are students with smaller ERNs. Those with large ERN

signals are more likely to slow down in order to correct their mistakes and avoid future errors, which could contribute to better grades.

Because the size of the ERN is only 50 per cent determined by genetics, though, Hirsh says students may be able to improve their ERN signals by attending to their mistakes, thereby helping to improve their [academic performance](). "The ERN is not set in stone," he says.

It's also key to note that having extremely large ERN signals is not ideal either, says Dr. Michael Inzlicht, UofT Psychology Professor and co-author on the paper.

"[Students]() with a small ERN may have more trouble in school, but people with a large ERN can suffer from crippling anxiety because they respond strongly to the smallest perceived errors in their own behaviour," says Inzlicht. "It all comes down to this: what is the optimal response to an error?"

The study has been published in the journal *Psychophysiology*.

Source: University of Toronto ([news]() : [web]())