

New study aims at early diagnosis for ADHD and Parkinson's disease

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Eye movement tests developed by Queen's University researchers to aid in understanding childhood brain development and healthy aging may also help in the diagnosis of Attention Deficit Hyperactivity Disorder and detecting the early onset of Parkinson's disease. The project has received close to \$1 million in recent funding from the Canadian Institutes of Health Research (CIHR).

"An important aspect of what makes us human is the ability to control our behaviour," says Physiology professor Douglas Munoz, who leads the study. "Our project investigates how the brain provides this control by observing [eye movements](#). Our experiments have been designed to combine high speed eye movement recording with modern brain imaging techniques to identify brain regions that control our behaviour."

To test this, the team designed a simple yet ingenious experiment. Participants from a wide range of age groups were placed in a [magnetic resonance imaging](#) unit that measured their [brain activity](#). While in the unit, they were shown a series of lights and asked to move their eyes toward or away from the lights. The speed and accuracy of their eye movements were recorded and correlated to the activity being documented in specific areas of their brains.

The study showed that at early ages, children scored low. Although they understood the task, sometimes they couldn't help but look at the light, even when asked to look away from it. As the age of the subjects increased, response times decreased and accuracy improved, peaking at

age 20-25. As the subjects continued to age, the response times started to increase.

The researchers could also see which sections of the participant's brains were active, and which were less active, with age. With these baselines in place, the same experiments can now be conducted with patients who have ADHD and Parkinson's disease.

"In preliminary experiments, kids with ADHD could not help but look at the light no matter if they were asked to look away or not. Normal brain activity was also decreased," says Professor Munoz. "When they took their ADHD medication the success rates, and the activity in certain areas of the brain, increased. This test could therefore be used to examine the effectiveness of new ADHD medication."

The same holds true for Parkinson's disease. In preliminary experiments, patients with the disease had a consistent pattern of eye movement time and brain activity. Introducing the tests in clinics as part of regular health exams could result in earlier diagnosis of Parkinson's, allowing the disease progression to be controlled with diet and medication, Dr. Munoz adds.

Other members of the research team include, from Queen's, Drs. Giovanna Pari (Neurology), Angela Garcia (Geriatrics) and Patrick Stroman (Diagnostic Radiology); and Thomas Trappenberg, a computer scientist at Dalhousie University. The investigation into ADHD and [Parkinson's disease](#) will take place over the next five years, thanks to the \$953,000 funding grant from CIHR.

Source: Queen's University ([news](#) : [web](#))

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