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TV test: Eye motion reveals attention trouble



Because the test is so simple—just "watch and enjoy" television for 20 minutes—the researchers believe it could help diagnose some children and elderly patients who might not comply with more difficult tests. The patients' eye movements can reveal a range of neurological disorders, including ADHD and Parkinson's disease. (Credit: <u>iStockphoto</u>)

USC (**US**) — A new way of detecting neurological dysfunction requires very little from the patient: just 20 minutes of watching TV.



The researchers claim that because Attention Deficit Hyperactivity Disorder (ADHD), Fetal Alcohol Spectrum Disorder (FASD), and Parkinson's disease each involve ocular control and attention dysfunctions, they can be easily identified through an evaluation of how patients move their eyes while they watch television.

Straight from the Source

Read the original study

DOI: 10.1007/s00415-012-6631-2

"Natural attention and eye movement behavior—like a drop of saliva—contains a biometric signature of an individual and her/his state of brain function or dysfunction," they write in the study, which is published in the *Journal of Neurology*.

"Such individual signatures, and especially potential biomarkers of particular neurological disorders which they may contain, however, have not yet been successfully decoded."

Typical methods of detection—clinical evaluation, structured behavioral tasks, and neuroimaging—are costly, labor-intensive, and limited by a patient's ability to understand and comply with instructions.

To solve this problem, doctoral student Po-He Tseng and Professor Laurent Itti of the department of computer science at the University of Southern California's Viterbi School of Engineering, along with collaborators at Queen's University in Canada, have devised the new screening method.

Participants in the study were simply instructed to "watch and enjoy" television clips for 20 minutes while their eye movements were recorded.

Eye-tracking data was then combined with normative eye-tracking data and a computational model of visual attention to extract 224 quantitative features, allowing the team to use new machine-learning techniques to identify critical features that differentiated patients from control subjects.

With eye movement data from 108 subjects, the team was able to identify older adults with Parkinson's Disease with 89.6 percent accuracy, and children with either ADHD or FASD with 77.3 percent accuracy.

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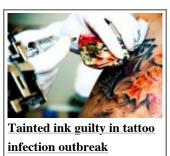
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Providing new insights into which aspects of attention and gaze control are affected by specific disorders, the team's method provides considerable promise as an easily deployed, low-cost, high-throughput screening tool, especially for young children and elderly populations who may be less compliant to traditional tests.

"For the first time, we can actually decode a person's neurological state from their everyday behavior, without having to subject them to difficult or time-consuming tests," Itti says.

Funding for the research came from the National Science Foundation, the Army Research Office, the Human Frontier Science Program, and the Canadian Institutes of Health Research.

Source: <u>USC</u>

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Tags: <u>attention</u>, <u>attention deficit hyperactivity disorder</u>, <u>children's health</u>, <u>eyes</u>, <u>fetal alcohol spectrum disorder</u>, <u>neurology</u>, <u>Parkinson's disease</u>, <u>television</u>, <u>University of Southern California</u>







2 Comments

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nerf herder Sep 7, 2012 15:15

Well, the big question is, how do people with ADHD (if that really is a "disorder"), FASD or Parkinsons watch TV differently? Do they look around more or less or at different targets than 'normal' people? As a first guess, I'd say ADHD at least would involve more eye movements than a more normal sedentary person, but I read this article hoping to find out.

Jean Nystrom Sep 9, 2012 13:51

I totally agree with this article. I have switched to a neurofeedback platform- playattention. I believe that the eyes can tell a story within their depths. When she uses this program she has to focus not only with her mind but also with her eyes. Neuro stimulation and behavior shaping is the results.

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