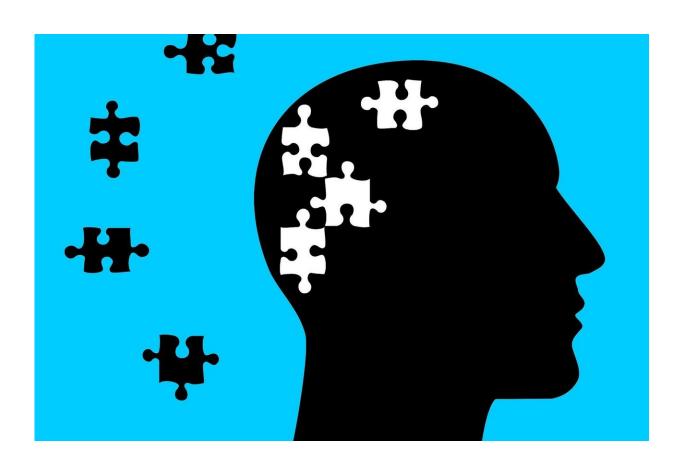# Researchers develop new methodology to diagnose attention deficit hyperactivity disorder

November 13 2019

Credit: CC0 Public Domain

A multidisciplinary scientific team, formed by specialists from three universities in Physics, Mathematics and Psychology and of which

Esperanza Navarro, a researcher at the University of Valencia, is part of, has developed a new methodology for rapid prediagnosis of one of the most frequent pathologies in girls and school-age children, attention deficit hyperactivity disorder (ADHD).

With the work a simple, fast and automated methodology has been developed that can be applied to children with cognitive and attention disorders in general. To accomplish this, the research team has drawn from global prevalence data and correlation evidence found between the response time to visual stimuli in computerized tasks and cognitive disorders in general, and with attention deficit hyperactivity disorder (ADHD) in particular.

The team of the University of Valencia (UV), the Polytechnic University of Valencia (UPV) and the Polytechnic University of Madrid (UPM) also notes that the final diagnosis must be made by specialists in clinical psychology or psychiatry, and the selection provided by this methodology will allow a smaller number of girls and boys to be evaluated, which would help save time and other resources. This research has been published in the journal Mathematics.

The American Psychiatric Association establishes that between five and seven out of every 100 school-age children can be diagnosed with attention deficit hyperactivity disorder (ADHD), making it one of the most prevalent pathologies in childhood globally. The diagnosis of this type of cognitive disorder is usually a difficult process and interviews are usually conducted with the child and his family, and people in the school environment. ADHD is related to behavior problems, academic achievement, school adaptation or lack of social skills; thus having a quick diagnosis is a very valuable element.

To this end, the study aims to provide a methodology for a rapid determination of people whose reaction over time differs from the

average and, therefore, are [potential candidates]() to be diagnosed with ADHD.

The authors of this study analyzed the response to short presentation stimuli, through the probability distribution functions of the response times collected during the experiments. An essential element was the adjustment of the experimental probability functions to exGaussian curves.

The [new methodology]() is based on procedures that are not standard within Psychology, derived from a constant inspiration in concepts of Physics and Mathematics. For example, when selecting candidates furthest from the normative behavior of boys and girls, the authors have taken into account the asymmetries of the probability distributions of the exGaussians parameters.

"Rapid prediagnosis consists, in short, in the processing, automatically and instantaneously, of the children response times when they perform an experiment developed with visual stimuli on a computer," the specialists write.

The test is very simple to implement in schools or health centers and to respond. On this basis, the experts (psychologists or psychiatrists) can have an accurate idea of the possible candidates to be diagnosed with ADHD within a school-age population. "We just have to imagine what would it cost, when it comes to human resources, to carry out a massive evaluation to detect ADHD," the article concludes.