

Synergy between behavioral and pharmacologic interventions for ADHD

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Attention-deficit/hyperactivity disorder (ADHD) is one of the most common mental health disorders affecting children and adolescents. Children with ADHD are excessively restless, impulsive, and distractible and experience difficulties at home and in school. Problems inhibiting behavior are a common theme for ADHD symptoms. These symptoms are usually treated with stimulant medications, behavioral approaches or a combination of the two.

In a new study appearing in [Biological Psychiatry](#), published by Elsevier, researchers compared children with ADHD and typically developing children using a video-game task, which required them to focus their attention and to control impulsive actions. The children performed this task under three different motivational conditions, and the children with ADHD were tested both on and off their usual dose of medication. This allowed the researchers to compare the effects of both medication and motivation on the children's response inhibition.

Dr. Madeleine Groom, corresponding author of the study and Professor Chris Hollis, principal investigator, explained their findings: "We found that brain electrical activity in children with ADHD when attending to the task and restraining impulsive responses differed from a comparison group of children without ADHD, but became more similar when they took stimulant medication. Intriguingly, rewards and penalties given to improve task performance also changed [brain activity](#), and did so in both children with ADHD and in the control group, although these motivational effects were much smaller than those associated with

medication."

These findings suggest that stimulant medication tends to normalize [brain function](#) in children with ADHD and enables them to better maintain attention and restrain impulsive responses. Motivational incentives also seem to play a role in modulating similar [neural circuits](#) and work additively with medication to improve performance in children with ADHD.

Dr. John Krystal, Editor of *Biological Psychiatry*, commented that "the findings suggest that there may be important additive effects of stimulant medications and behavioral strategies for increasing motivation in ADHD. These interactive effects are important to bear in mind when optimizing the performance of children in school and other settings that require control of attention and behavior."

More information: The article is "Effects of Motivation and Medication on Electrophysiological Markers of Response Inhibition in Children with Attention-Deficit/Hyperactivity Disorder" by Madeleine J. Groom, Gaia Scerif, Peter F. Liddle, Martin J. Batty, Elizabeth B. Liddle, Katherine L. Roberts, John D. Cahill, Mario Liotti, and Chris Hollis. Groom, Batty, EB Liddle, Roberts, Cahill, and Hollis are affiliated with Developmental Psychiatry, University of Nottingham, Nottingham, United Kingdom. Scerif is affiliated with the Department of Experimental Psychology, University of Oxford, Oxford, United Kingdom. PF Liddle is affiliated with Behavioural Sciences, Division of Psychiatry, University of Nottingham, Nottingham, United Kingdom. Liotti is affiliated with the Department of Psychology, Simon Fraser University, Burnaby, British Columbia, Canada. The article appears in *Biological Psychiatry*, Volume 67, Issue 7 (April 1, 2010).

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