ADHD Remission is Linked to Better Neurophysiological Error Detection and Attention-Vigilance Processes

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Abstract

Background
The processes underlying persistence and remission of attention-deficit/hyperactivity disorder (ADHD) are poorly understood. We aimed to examine whether cognitive and neurophysiological impairments on a performance monitoring task distinguish between ADHD persisters and remitters.

Methods
On average six years after initial assessment, 110 adolescents and young adults with childhood ADHD (87 persisters, 23 remitters) and 169 age-matched controls were compared on cognitive-performance measures and event-related potentials (ERPs) of conflict monitoring (N2) and error processing (ERN, Pe) from an arrow flanker task with low- and high-conflict conditions. ADHD outcome was examined with parent-reported symptoms and functional impairment measures using a categorical (DSM-IV) and a dimensional approach.

Results
ADHD persisters were impaired compared to controls on all cognitive-performance and ERP measures (all p<0.05). ADHD remitters differed from persisters, and were indistinguishable from controls, on the number of congruent (low-conflict) errors, reaction time variability (RTV), ERN and Pe (all p≤0.05). Remitters did not differ significantly from the other groups on incongruent (high-conflict) errors, mean reaction time and N2. In dimensional analyses on all participants with childhood ADHD, ADHD symptoms and functional impairment at follow up were significantly correlated with congruent errors, RTV and Pe (r=0.19-0.23, p≤0.05).

Conclusions
Cognitive and neurophysiological measures of attention-vigilance and error detection distinguished ADHD remitters from persisters. These results extend our previous findings with other tasks (Cheung et al. 2015), and indicate that such measures are markers of remission and candidates for the development of non-pharmacological interventions.