The Significance of Impulsive Error in Children with ADHD.

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Abstract

A deficit of inhibition ability is a neuropsychological problem in children with attention deficit hyperactivity disorder (ADHD). We investigated whether in children who made impulsive error (IE), less error-related negativity (ERN) would correlate with poorer executive attention functions (EAFs). Ninety children (49 with ADHD and 41 without ADHD) were investigated by a 4-minute simple reaction time task and simultaneous electroencephalogram. When they made IE, the ERN in response-locked event-related potential (ERP) was defined as error awareness. The average area under curve of ERN in the control group with IEs was used as the proper criterion for regrouping the children with ADHD into 2 groups: ADHD children with enough ERN (ADHD-enough ERN) and those with less ERN (ADHD-less ERN). EAFs from Comprehensive Nonverbal Attention Test were used as objective indices, and behavioral questionnaires were used as subjective indices and statistically analyzed within ADHD groups. Forty-eight percent of the children made IEs. ADHD(n = 31, 63%) was significantly more than in the control group (n = 12, 29%; P < .001). The ADHD group had significantly less ERN than did the control group while making IE, especially at frontal and central electrodes (P < .01). Both ADHD-less ERN and ADHD-enough ERN groups had poorer subjective EAFs on questionnaires. Only the ADHD-less ERN group had significant poorer objective EAFs on the Comprehensive Nonverbal Attention Test than did the ADHD without IE. We conclude that investigating the IE and ERN of IE in children with ADHD might help to differentiate subtypes of ADHD with different neuropsychological abilities, and the possibility that ADHD-less ERN children might be confirmed a meaningful subgroup that needs close follow-up, treatments different from standard, or both.