

The effect of methylphenidate on attention and stopping in children with ADHD  
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Methylphenidate (MPH) might improve the deficiency of inhibitory motor control, which is an important aspect attention-deficit/hyperactivity disorder (ADHD). However, previous studies suggested that the efficacy of MPH depends on which task is used to assess inhibitory motor control (stop and change task, assessing the integrity of attentional and stopping processes). In the stop task, higher doses are more effective to improve inhibitory motor control than lower doses or placebo are. On the other hand, in the change task lower doses are more effective than higher doses or placebo are. In this study we tested whether we could find evidence of such a dissociation by applying both tasks in a single design. Furthermore, MPH might improve inhibitory motor control by a mediating effect on attention. This study directly tests whether the improving effect of MPH was higher for stopping (measured by stop signal RT, SSRT) than for attention (measured by general RT). Finally, blood serum metabolites were assessed to investigate the relationship between pharmacology and behavioral measures. Fifteen school-aged children with ADHD performed both tasks after placebo, 0.5 and 1.0 mg/kg MPH. Trend analyses showed that the high dose was more effective for SSRT than either the low dose or placebo, without a difference between tasks. The analysis also revealed that MPH was more effective to improve SSRT than for general RT, suggesting that the improvement of behavior by MPH is caused by its effect on inhibitory motor control rather than on attention. Finally, there was an association between attentional measures and the blood serum metabolite level of norepinephrine and between inhibitory control measures and metabolite levels of dopamine, suggesting a pharmacological dissociation between these two executive functions.

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