

# Greater Motor Competence and Enhanced Inhibitory Control Development in Children with ADHD: A Neuroelectric Study

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## Introduction

- Inhibitory control is a common developmental challenges in children with attention-deficit/hyperactivity disorder (ADHD).
- Previous studies have suggested that greater motor competence (MC) is associated with better inhibitory control development on both behavioral and neuroelectric levels in children with ADHD.
- However, some limitations remain, such as the lack of consideration for potential covariates like IQ and aerobic fitness, as well as the inclusion of typically developing children in the comparison.

## Purpose

- To examine whether higher MC is associated with optimal inhibitory control development in children with ADHD, as indexed by behavioral and neuroelectric indices of inhibitory control in a well-designed study.

## Methods

- Sixty children with ADHD were divided into high MC ( $n = 30$ ) and low MC ( $n = 30$ ) groups, based on the median total composite scores from the Bruininks-Oseretsky Test of Motor Proficiency (BOT-2).
- Forty-four typically developing (TD) children were recruited as the healthy control.
- The Stroop task was used to examine inhibitory control while electroencephalography was recorded to derive P3 component.

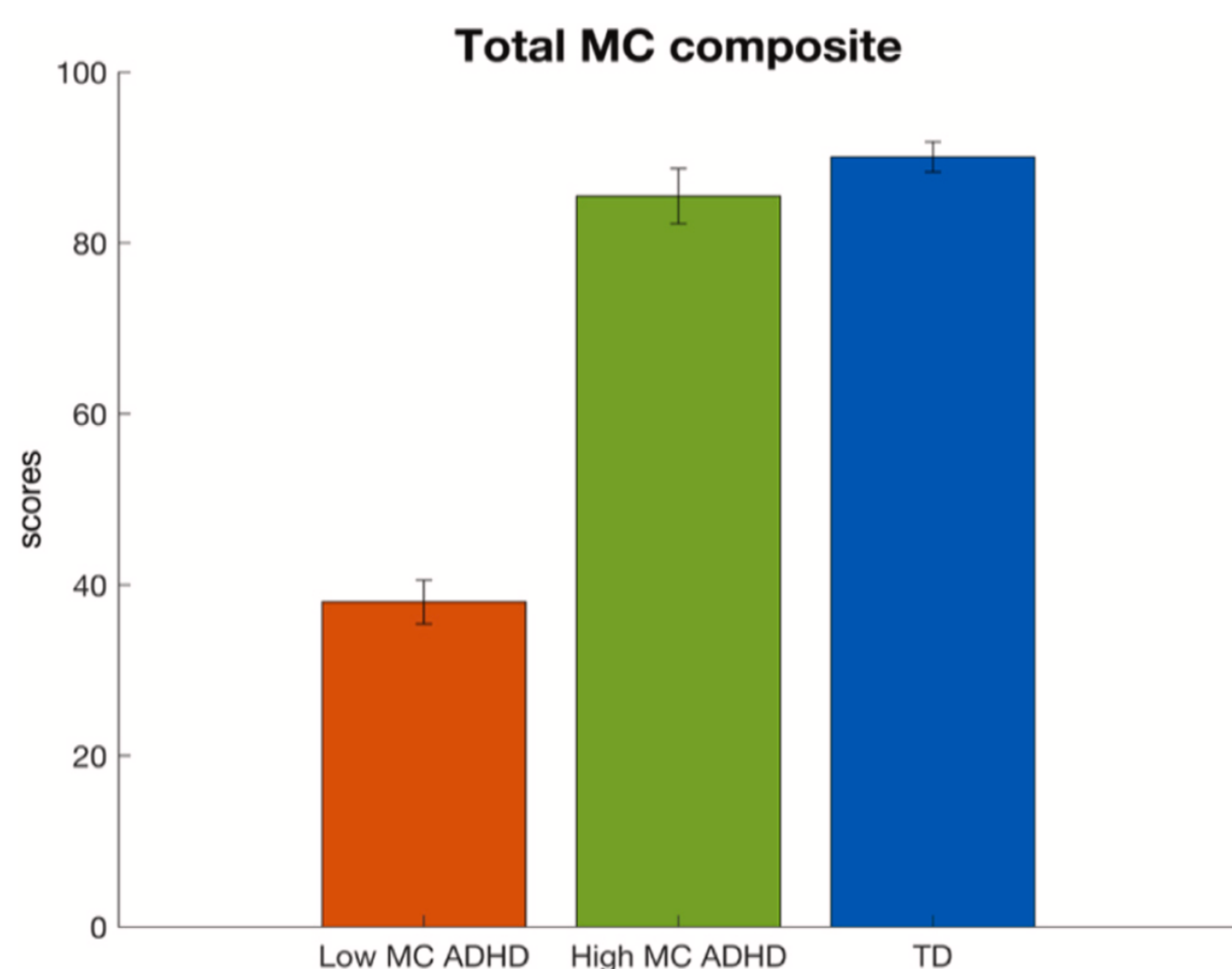


Fig. 1. Mean ( $\pm$ SE) total motor competence (MC) composite scores for each group.

## Results

- Both TD children and High MC ADHD groups demonstrated shorter reaction time (RT), and greater P3 amplitude relative to the Low MC ADHD group while controlling for IQ and aerobic fitness.
- Although the TD group demonstrated higher accuracy rates (AR) than both ADHD groups, no significant differences in RT or P3 amplitude were found between the TD and High MC ADHD groups.

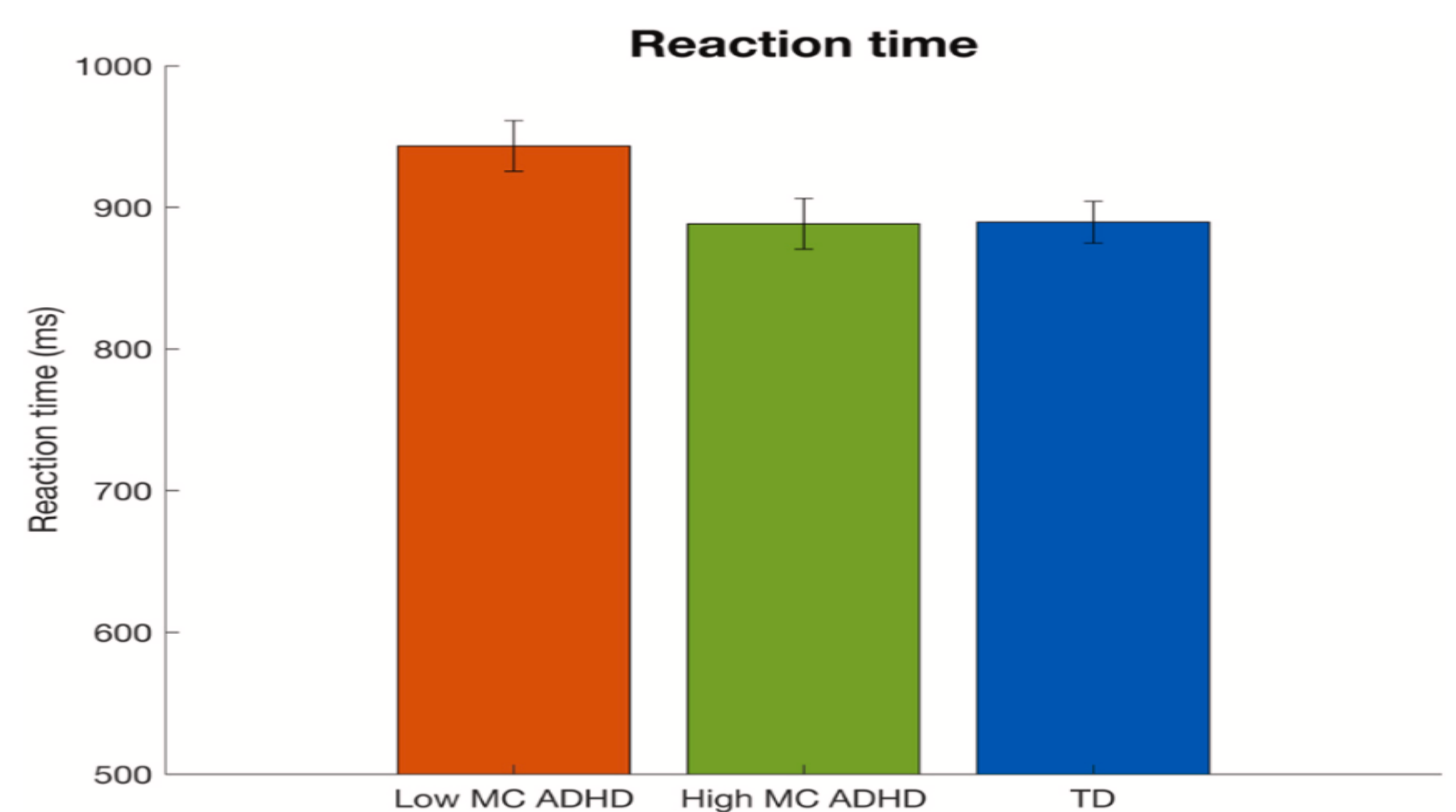


Fig. 2. Mean ( $\pm$ SE) reaction time collapsed across congruency for each group.

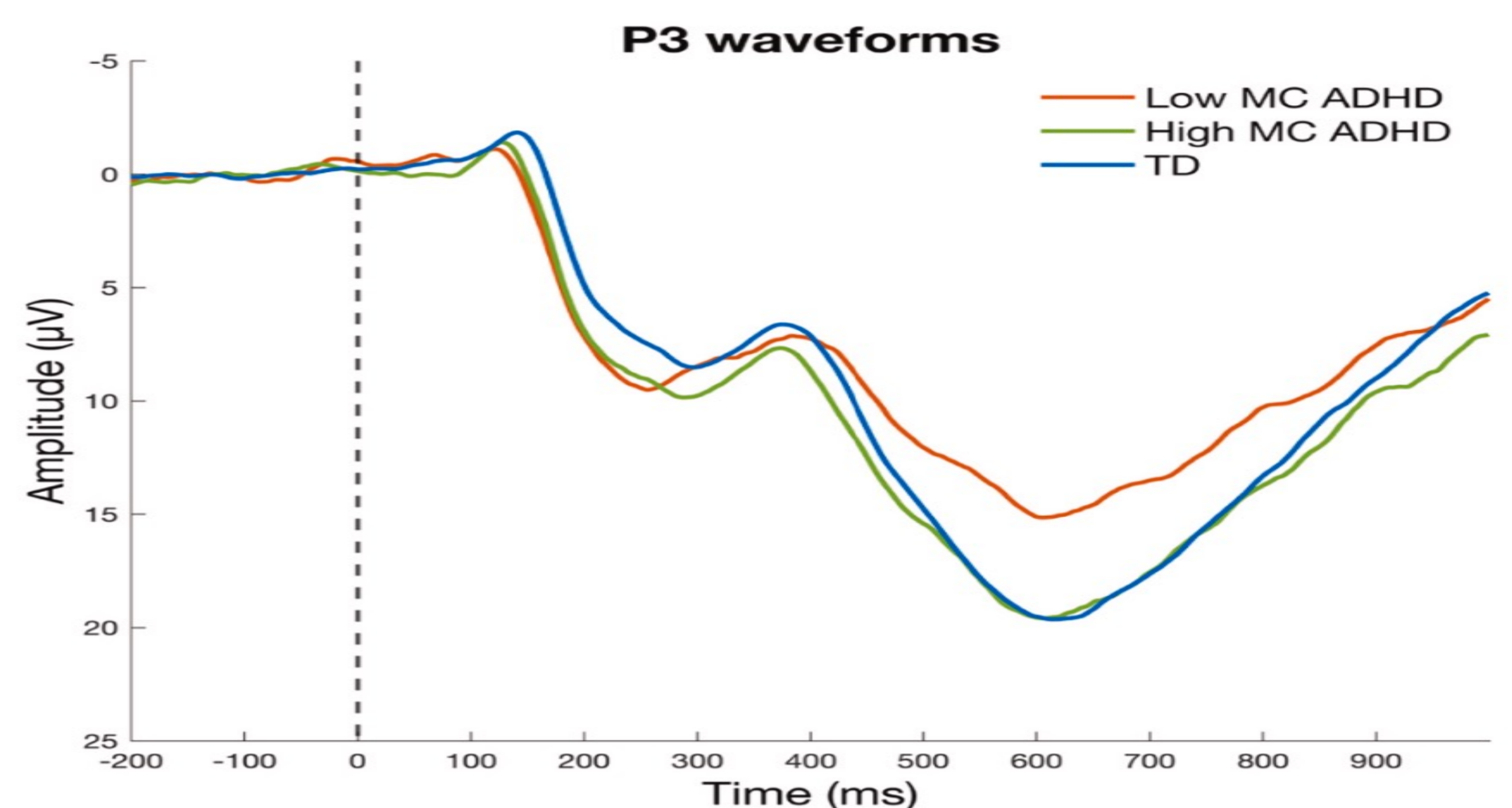


Fig. 3. Grand-averaged ERP waveforms collapsed over congruency and averaged over the ROIs of P3.

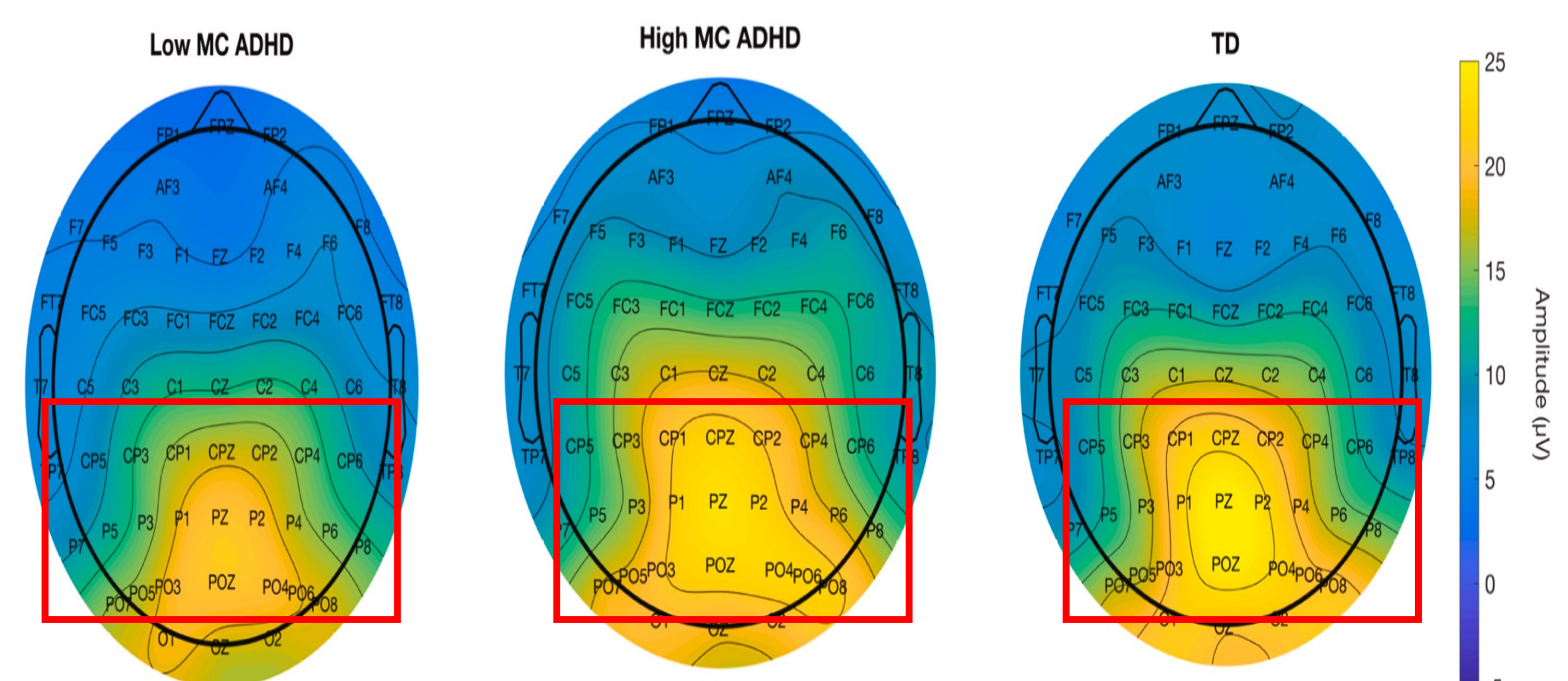


Fig. 4. Topographical maps of P3 amplitude collapsed over congruency for each group.

## Conclusions

- Greater MC in children with ADHD is associated with enhanced neurocognitive development of inhibitory control processing at behavioral and neuroelectric levels.
- These findings suggest that MC plays a critical role in shaping the neurocognitive trajectory of children with ADHD during development.