

Attenuated Graphomotor Procedural Learning in Children and Adolescents with ADHD

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Introduction

- Research indicates children, adolescents, and young adults with ADHD frequently present with motor difficulties, including handwriting problems and reduced automatization and procedural learning of motor skills (Adi-Japha et al., 2011; Brossard-Racine et al., 2015; Duda et al., 2014; Koziol et al., 2013).
- There are no published studies that have investigated the development of graphomotor procedural learning in children with ADHD.
- The present study sought to determine if children and adolescents with ADHD would demonstrate reduced procedural learning of a novel grapheme relative to typically developing peers as indicated by an objective measure of graphomotor automatization and fluency.

Results

- Control participants demonstrated a statistically significant improvement in graphomotor fluency from the beginning to the end of practice, $t = 2$, $z = -2.53$, $p = .009$, $r = -0.448$, whereas participants with ADHD did not, $t = 4$, $z = -1.81$, $p = .074$, $r = -0.32$.

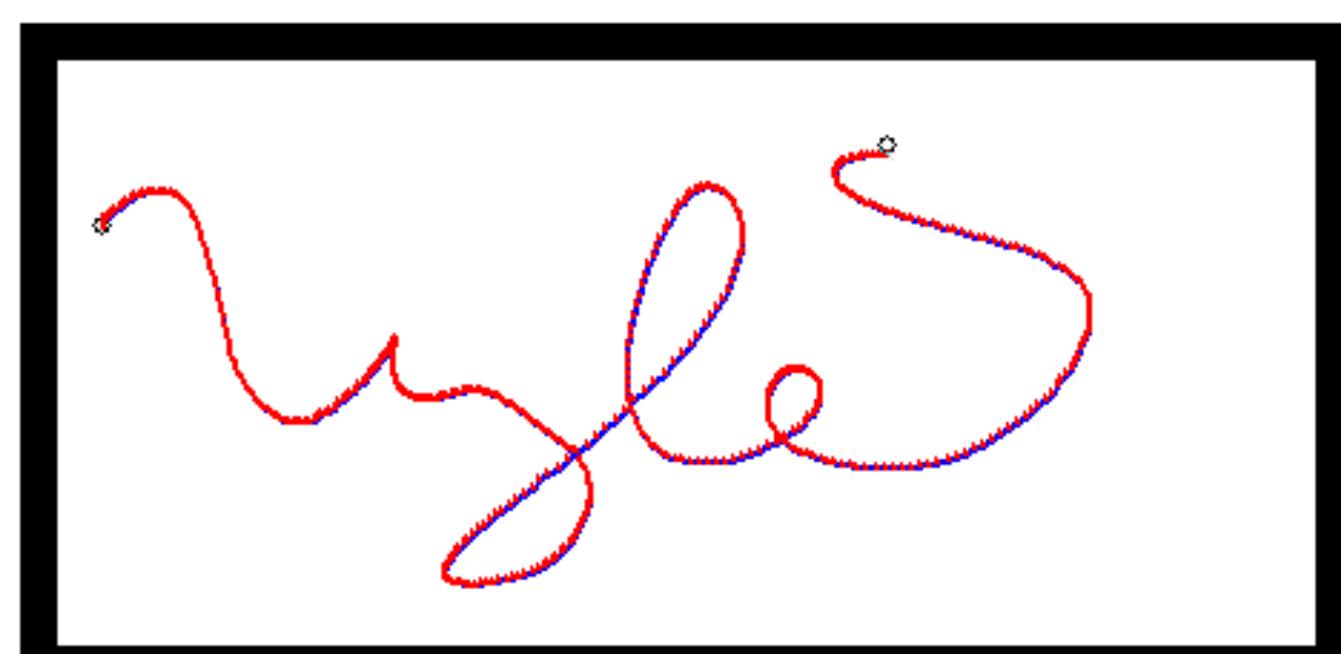
Discussion & Conclusions

- Consistent with findings in adults with ADHD, results provide evidence that graphomotor procedural learning in children and adolescents with ADHD may be attenuated relative to typically developing peers.
- Attenuation of learning versus no learning is emphasized noting near-significant improvement in the ADHD group and a medium effect size.
- Findings have implications for future research that may inform remediation of handwriting difficulties, academic accommodations, and using digitizing technology as a neuropsychological assessment instrument.

Participants & Methods

- Thirty-two children and adolescents with ($n = 16$) and without ($n = 16$) ADHD who did not differ significantly in age, IQ, and SES participated in the study.
- Participants with ADHD discontinued stimulant medication 24 hours prior to taking part in the study ($n = 2$) or were medication naïve ($n = 14$).
- Participants practiced a novel grapheme on a digitizing tablet 30 times.
- Normalized Jerk (NJ) was operationalized as degree of graphomotor automaticity. Higher NJ values indicated a less automatized graphomotor program, and lower NJ values indicated a more automatized graphomotor program.

Novel grapheme



Nonparametric Test Results			Mann-Whitney U		Wilcoxon Signed-Rank			
	N	M NJ	SD NJ	M Rank	Sum of Ranks	Neg. Ranks	Pos. Ranks	Ties
Beginning								
Controls	16	535	323	15	240			
ADHD	16	835	841	18	288			
Ending								
Controls	16	406	400	15	236			
ADHD	16	591	594	18	292			
Beg.-End.								
Main Effect						26	6	0
Controls						14	2	0
ADHD						12	4	0

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