

**Table S1: Sample Description**

Measure	Controls (C)	Nonaffected Siblings (S)	ADHD (A)	ANOVA	
	N = 43 Mean (SD)	N = 27 Mean (SD)	N = 97 Mean (SD)	F <sub>(2, 164)</sub>	post-hoc, p<.05
Age (in months)	136 (24.5)	140 (29.7)	138 (23.3)	0.3	-
Prorated-IQ	115 (16.0)	111 (13.2)	109 (14.0)	2.8 <sup>+</sup>	C>A
<b>SDQ<sup>b</sup></b>					
Parents <sup>c</sup>					
Hyperactivity	2.0 (1.6)	3.3 (2.3)	8.0 (1.8)	183.4 <sup>**</sup>	C<A, C<S, S<A
Prosocial Behavior	7.8 (1.6)	7.0 (2.0)	6.8 (2.2)	3.4 <sup>*</sup>	C>A
Emotional Symptoms	1.3 (1.5)	2.3 (2.9)	4.2 (2.7)	21.6 <sup>**</sup>	C<A, C<S, S<A
Conduct Problems	1.2 (1.2)	2.8 (2.1)	4.7 (2.0)	55.3 <sup>**</sup>	C<A, C<S, S<A
Peer Problems	1.1 (1.4)	2.3 (2.2)	4.3 (2.5)	32.2 <sup>**</sup>	C<A, C<S, S<A
Teacher <sup>d</sup>					
Hyperactivity	2.3 (2.4)	3.6 (2.4)	7.8 (2.0)	105.4 <sup>**</sup>	C<A, C<S, S<A
Prosocial Behavior	7.0 (1.9)	6.6 (2.3)	5.4 (2.9)	6.4 <sup>**</sup>	C>A, S>A
Emotional Symptoms	1.2 (1.6)	2.0 (2.4)	3.1 (2.7)	9.6 <sup>**</sup>	C<A, S<A
Conduct Problems	1.0 (1.8)	1.8 (2.0)	3.1 (2.0)	18.2 <sup>**</sup>	C<A, S<A
Peer Problems	1.3 (1.6)	2.1 (2.4)	3.7 (2.6)	15.4 <sup>**</sup>	C<A, S<A

<sup>+</sup>  $\alpha < .1$ <sup>\*</sup>  $\alpha < .05$ <sup>\*\*</sup>  $\alpha < .01$ <sup>b</sup> Strengths and Difficulties Questionnaire<sup>c</sup> not available for 3 subjects, df=2, 161<sup>d</sup> not available for 7 subjects, df=2, 157

**Table S2: Performance Data**

Measure	Controls (C)	Nonaffected Siblings (S)	ADHD (A)	ANOVA group		repeated measure ANOVA		
	N = 43	N = 27	N = 97	F <sub>(2, 164)</sub>	post-hoc, p<.05	Task	Group	Task*Group
<b>Reaction-times of correct responses (ms)</b>								
Standard-CPT	430 (93)	398 (74)	437 (89)	2.0	-	F <sub>(1, 105)</sub> =50.9** part. $\eta^2$ =.24 con < incon	F <sub>(2, 105)</sub> =2.8+ part. $\eta^2$ =.03 C < A	F <sub>(2, 105)</sub> =2.2 part. $\eta^2$ =.03 -
Flanker-CPT	463 (92)	458 (91)	502 (113)	3.2*	C<A, S<A			
Difference	33 (64)	59 (51)	65 (97)	2.2	-			
<b>RT variability of correct responses (ms)</b>								
Standard-CPT	131 (59)	120 (54)	141 (55)	1.7	-	F <sub>(1, 105)</sub> =5.5* part. $\eta^2$ =.03 con < incon	F <sub>(2, 105)</sub> =4.4* part. $\eta^2$ =.05 C < A, S < A	F <sub>(2, 105)</sub> =1.4 part. $\eta^2$ =.02 -
Flanker-CPT	132 (53)	136 (54)	162 (56)	5.2*	C<A, S<A			
Difference	2 (53)	16 (50)	20 (68)	1.4	-			
				<b>Kruskal-Wallis Test</b>		<b>Post-hoc Mann-Whitney U-Tests<sup>a</sup></b>		
				overall		C≠S	C≠A	S≠A
<b>Hit-Rate (%)</b>								
Standard-CPT	96.7 (3.6)	94.5 (6.0)	90.1 (10.0)	$\chi^2_{(2)}$ =22.2**		U=462, p=.14	U=1094, p<.01	U=932, p=.02
Flanker-CPT	93.6 (11.3)	92.4 (7.7)	90.2 (9.3)	$\chi^2_{(2)}$ =11.4**		U=475, p=.19	U=1348, p<.01	U=1107, p=.22
<b>False Alarms to cued non-targets (%)</b>								
Standard-CPT	2.7 (3.3)	3.5 (4.2)	4.6 (6.5)	$\chi^2_{(2)}$ =2.1		-	-	-
Flanker-CPT	8.0 (9.3)	8.5 (9.5)	8.5 (10.2)	$\chi^2_{(2)}$ =0.1		-	-	-

+ p &lt; 0.1

\* p &lt; .05

\*\* p &lt; .01

<sup>a</sup> These U-Tests were performed for each of the three possible comparisons between two subgroups.

**Table S3: Cue-P3 and CNV**

Amplitudes (µV)	Controls (C)	Nonaffected Siblings (S)	ADHD (A)	ANOVA group		repeated measure ANOVA	
	N = 43 Mean (SD)	N = 27 Mean (SD)	N = 97 Mean (SD)	F <sub>(2, 164)</sub>	post-hoc, p<.05		
<b>Cue-P3</b>							
Standard-CPT							
Cz	4.0 (3.0)	3.5 (3.7)	2.9 (3.3)	1.7	-	Group: F <sub>(2, 164)</sub> =4.0*, part. η <sup>2</sup> =.05 Site: F <sub>(4, 656)</sub> =101.4**, part. η <sup>2</sup> =.38 Task*Site: F <sub>(4, 656)</sub> =8.1*, part. η <sup>2</sup> =.05 Task*Site*Group: F <sub>(8, 656)</sub> =1.8 <sup>+</sup> , part. η <sup>2</sup> =.02	
P3	6.7 (2.9)	5.0 (3.5)	5.4 (3.0)	3.9*	C>A, C>S		
Pz	9.3 (3.5)	9.0 (4.2)	8.5 (3.8)	0.7	-		
P4	5.6 (3.2)	4.7 (3.7)	5.1 (2.8)	0.7	-		
Oz	5.5 (2.8)	5.1 (4.1)	4.6 (3.6)	1.0	-		
Flanker-CPT							
Cz	4.6 (3.5)	4.4 (2.7)	3.7 (3.2)	1.3	-		
P3	6.4 (2.4)	5.9 (3.3)	5.4 (3.1)	1.5	-		
Pz	9.9 (3.1)	9.4 (3.4)	8.6 (3.5)	2.2	-		
P4	5.1 (3.0)	5.3 (3.2)	4.8 (3.1)	0.4	-		
Oz	5.5 (2.9)	3.6 (3.3)	3.5 (3.3)	6.1*	C>A, C>S		
Mean Cue-P3 of both Tasks	6.2 (1.7)	5.6 (2.2)	5.3 (1.9)	4.0*	C>A, C>S <sup>+</sup>		
<b>Cue-CNV</b>							
Standard-CPT							
Cz	-5.5 (2.6)	-4.8 (1.7)	-4.3 (2.6)	3.6*	C<A, C<S	Group: F <sub>(2, 164)</sub> =9.7**, part. η <sup>2</sup> =.11 Task: F <sub>(1, 164)</sub> =5.1*, part. η <sup>2</sup> =.03 Task*Group: F <sub>(2, 164)</sub> =3.3*, part. η <sup>2</sup> =.04 Site: F <sub>(1, 164)</sub> =31.4**, part. η <sup>2</sup> =.16 Site*Group: F <sub>(2, 164)</sub> =1.6, part. η <sup>2</sup> =.02 Task*Site: F <sub>(1, 164)</sub> =4.5*, part. η <sup>2</sup> =.03	
Pz	-4.3 (2.0)	-4.0 (2.0)	-3.7 (2.1)	1.5	-		
Mean	-4.9 (1.9)	-4.4 (1.6)	-4.0 (2.0)	3.5*	C<A		
Flanker-CPT							
Cz	-5.7 (3.0)	-4.7 (1.9)	-3.6 (2.4)	11.4**	C<A, C<S, S<A		
Pz	-4.2 (1.9)	-3.2 (1.9)	-2.9 (1.8)	8.1**	C<A, C<S		
Mean	-5.0 (2.0)	-4.0 (1.6)	-3.2 (1.8)	13.7**	C<A, C<S, S<A		
Mean CNV of both Tasks	-4.9 (1.7)	-4.2 (1.4)	-3.6 (1.7)	9.7**	C<A, C<S		
Mean CNV Difference	0.1 (1.7)	-0.4 (1.7)	-0.7 (1.8)	3.3*	C<A, C<S		

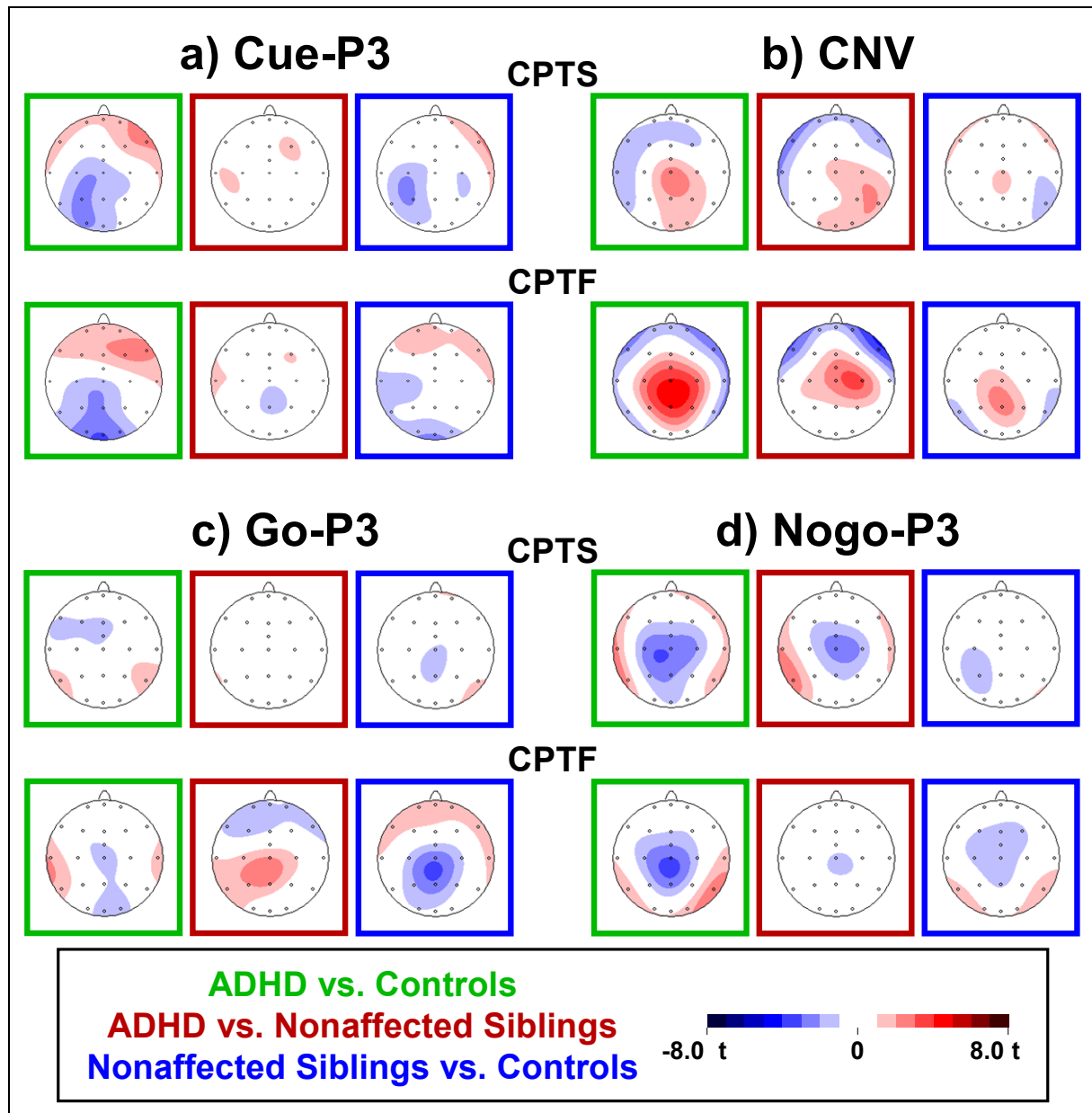
<sup>+</sup> p < 0.1  
<sup>\*</sup> p < .05  
<sup>\*\*</sup> p < .01

**Table 4: P3 Amplitudes**

	<b>Controls (C)</b> N = 43	<b>Nonaffected Siblings (S)</b> N = 27	<b>ADHD (A)</b> N = 97	<b>ANOVA group</b>		<b>repeated measure ANOVA</b>	
<b>P3 Amplitudes (µV)</b>	Mean (SD)	Mean (SD)	Mean (SD)	F <sub>(2, 164)</sub>	post-hoc, p<.05		
<b>Nogo-P3</b>							
Standard-CPT							
Fz	4.4 (4.2)	4.1 (3.7)	3.5 (4.7)	0.7	-	Group: F <sub>(2, 164)</sub> =3.8*, part. η <sup>2</sup> =.04 Task: F <sub>(1, 164)</sub> =7.8*, part. η <sup>2</sup> =.05 Site: F <sub>(2, 328)</sub> =88.5**, ε=.80**, part. η <sup>2</sup> =.35 Site*Group: F <sub>(4, 328)</sub> =3.4*, part. η <sup>2</sup> =.04 Task*Site: F <sub>(2, 328)</sub> =2.2, ε=.70**, part. η <sup>2</sup> =.01	
FCz	9.6 (6.0)	9.7 (4.8)	7.3 (6.5)	3.0 <sup>+</sup>	C>A, S>A		
Cz	7.7 (5.9)	7.3 (5.1)	4.3 (6.4)	5.7**	C>A, S>A		
Flanker-CPT							
Fz	3.8 (4.0)	2.6 (4.2)	3.0 (4.7)	0.8	-		
FCz	8.6 (6.2)	6.8 (4.7)	6.5 (6.2)	1.8	-		
Cz	7.2 (5.1)	5.7 (4.4)	4.2 (5.7)	5.0**	C>A		
Mean Nogo-P3 of both Tasks	6.9 (4.2)	6.1 (3.4)	4.8 (4.5)	3.8*	C>A		
Mean Nogo-P3 Difference	-0.7 (3.7)	-2.0 (3.7)	-.5 (4.6)	1.4	-		
<b>Go-P3</b>							
Standard-CPT							
Cz	6.7 (4.7)	5.3 (4.2)	5.7 (5.9)	0.7	-		
P3	10.9 (3.5)	10.5 (4.2)	11.1 (4.4)	0.2	-		
Pz	15.5 (4.8)	14.2 (4.4)	15.2 (5.2)	0.6	-		
P4	9.5 (4.3)	9.8 (5.2)	10.2 (4.9)	0.4	-		
Oz	4.1 (4.9)	4.4 (5.3)	3.6 (6.6)	0.2	-		
Flanker-CPT							
Cz	7.2 (6.1)	3.9 (3.9)	5.8 (5.1)	3.3*	C>S, A>S		
P3	10.5 (3.5)	8.8 (4.8)	10.6 (5.0)	1.6	-		
Pz	15.5 (4.1)	12.7 (3.8)	14.8 (5.4)	3.0 <sup>+</sup>	C>S, A>S		
P4	9.9 (4.4)	9.2 (3.7)	9.3 (4.5)	0.3	-		
Oz	5.4 (5.5)	4.6 (5.6)	3.8 (5.4)	1.3	-		

<sup>+</sup> p < 0.1  
 \* p < .05  
 \*\* p < .01

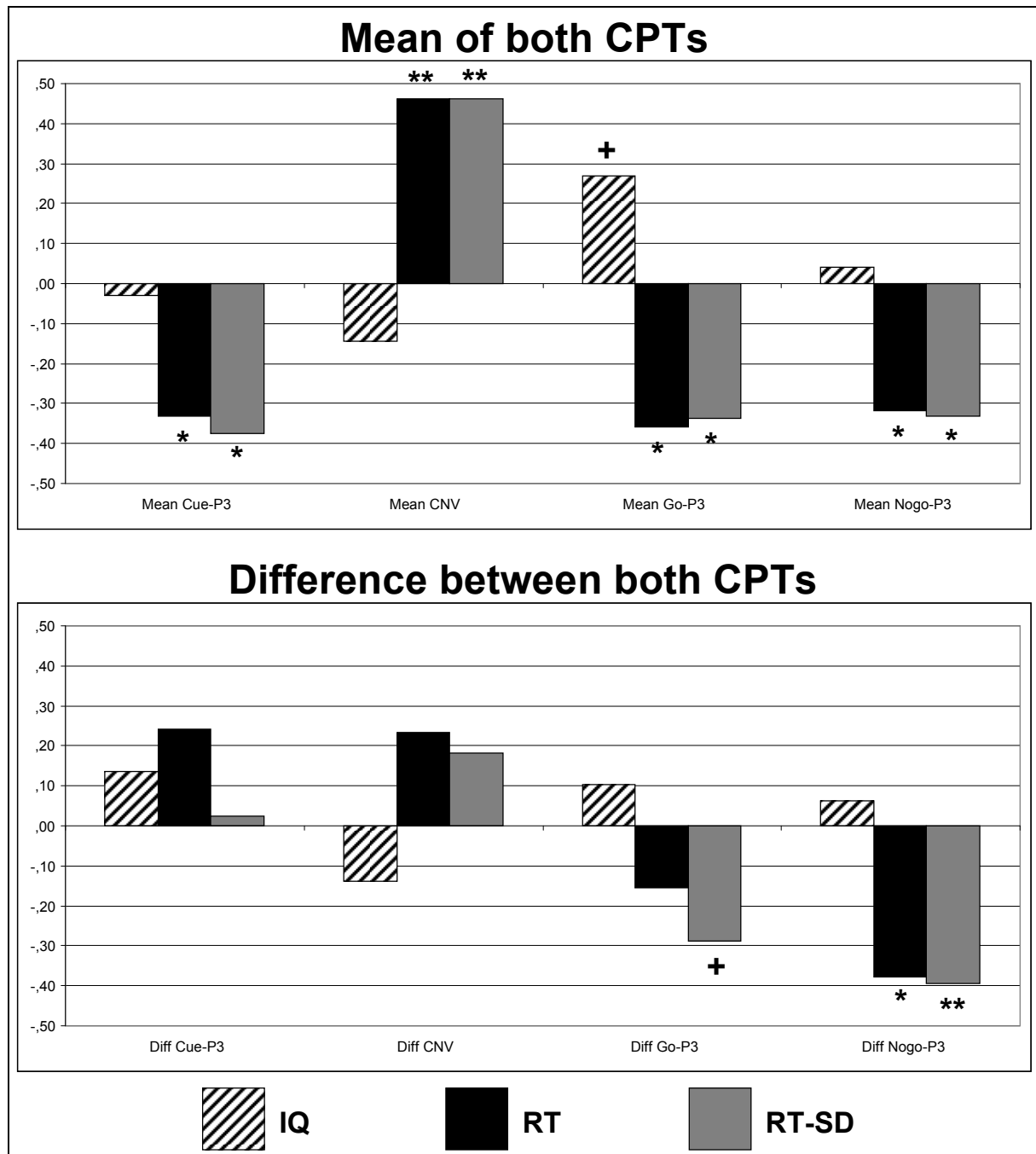
**Figure S1: T-map Group comparisons**



T-Maps indicate the topography of amplitude differences between groups (significance with  $p < .05$  is retained for  $t$ -values  $> 2$ ).

- a) The Cue-P3 amplitude in ADHD compared to controls was lower over parietal and occipital sites, but higher right-frontal Children with ADHD did not differ from nonaffected siblings in the T-maps. Nonaffected Siblings had lower Cue-P3 amplitudes than Controls (in the Standard-CPT) at left-parietal or (in the Flanker-CPT) at occipital site Oz.
- b) Cue-CNV was lower in children with ADHD and (as a trend) their nonaffected siblings compared to controls particularly for the flanker CPT over central and parietal leads while ADHD and nonaffected siblings differed at more right-central locations.
- c) Go-P3 scalp amplitudes were similar for ADHD patients compared to controls, whilst Nonaffected siblings showed reduced Go-P3 amplitude compared to both ADHD patients and controls over centro-parietal sites.
- d) The Nogo-P3 was lower in amplitude in children with ADHD compared to controls for both standard and flanker CPT over central sites, and also compared to nonaffected siblings in the standard CPT.

**Figure S2: Correlations between Performance and ERP Parameters in the control group**



Partial correlations with age used as covariates between IQ, mean performance and ERP parameters (above) and differences in performance or ERP from standard and flanker CPT (below). Faster reaction times and lower intra-individual RT variability were correlated with enhanced CNV and P3 amplitudes. The impact of additional flankers led to slower and more variable reaction times which was correlated with decreased Nogo-P3 amplitude in the Flanker-CPT. IQ was only related as a tendency to mean Go-P3 amplitude.