

Supplementary Materials

Supplementary Tables

Table S1. Descriptions of the EF battery of tasks	2
Table S2. Descriptions of the tasks measuring processing speed	5
Table S3. Descriptive statistics and data coverage of executive functioning and processing speed tasks.....	6
Table S4. Model fit indices for five factor structures ADHD (using categorical indicators)	7
Table S5. Parceling of ADHD items based on rank-ordering of factor loadings onto each specific factor (Inattention and Hyperactivity/Impulsivity)	8
Table S6. Model fit indices for five factor structures ADHD (using continuous indicators)	9
Table S7. Standardized regression coefficients of ADHD symptom factors and diagnostic ADHD subtypes on EF, before and after adjusting for processing speed differences	10
Table S8. Main and moderation effects of age (modeled linearly and quadratically) on EF and ADHD	11
Table S9. Moderation of the association between EF and parent-rated ADHD using sociodemographic variables	12
Table S10. Zero-order correlations between higher- and first-order EF domain and processing speed and sociodemographic moderator variables	14
Table S11. Standardized regression coefficients of ADHD symptom factors on Common EF before and after adjusting for processing speed differences at the domain-specific and higher-order EF level.....	15

Supplementary Figures

Figure S1. Hierarchical factor structure of the superordinate Common EF factor	17
Figure S2. Factor structure of processing speed	18
Figure S3. Frequency distribution of parceled responses to parent-reported Conners-3 items ...	19
Figure S4. Path diagram representation of bifactor ADHD regressed onto common executive functioning (EF), after accounting for the effects of processing speed on EF at the domain-specific level	20
Figure S5. Moderation model of the EF-ADHD association by socioeconomic status	21
Figure S6. Diagnostic categories of child-rated ADHD regressed onto processing speed and speed-residualized executive function (EF)	22

Supplementary Tables

Table S1.

Descriptions of the EF battery of tasks.

EF Domain Assessed	Task	Description	References	Reliability (α)
Inhibition	<i>Animal Stroop</i>	Participants verbally identify animals based on 3 conditions- <ul style="list-style-type: none"> • <u>Congruent</u>: Animal’s face matches the body • <u>Neutral</u>: Animal face is removed, identification based on animal’s body • <u>Incongruent</u>: Animal’s face does not match the body, participants are asked to name animal based on the body 	Wright, Waterman, Prescott, & Murdoch-Eaton (2003)	.84
Inhibition	<i>Mickey</i>	Participants press a button corresponding to the side of the screen that the Mickey Mouse picture flashes. One or two white squares flash before the Mickey appears; participants are told to ignore them. 3 conditions administered- <ul style="list-style-type: none"> • <u>Congruent</u>: Square flashes on same side as Mickey • <u>Neutral</u>: Squares flash on both sides • <u>Incongruent</u>: Square flashes on opposite side from Mickey 	Lee, K., Bull, R., & Ho, R.M.H (2013)	.46
Inhibition	<i>Stop Signal</i>	<i>Stop Signal – Visual</i> Participants press a button to indicate the direction an arrow is pointing, but are told not to respond when an ‘X’ appears a short delay after arrow presentation.	Verbruggen & Logan (2008)	.40

		<i>Stop Signal – Auditory</i> Same as above, except participants are required to inhibit their response when a tone sounds		.31
Working Memory	<i>Symmetry Span</i>	Participants view squares flashing on a grid, and are required to memorize the order of presentation. A symmetry task (indicating whether a geometric picture is symmetrical or not) is used as a distractor on alternating trials (i.e. between each square flashed).	Kane et al. (2004)	.78
Working Memory	<i>Listening Recall</i>	Participants listen to single letters and sentences, presented on alternating trials. They are required to both recall the letters presented in order and determine whether the sentence presented makes sense. The number of letters presented increases with each trial set.	Daneman & Carpenter (1980)	.78
Working Memory	<i>Digit Span - Backwards</i>	Participants are required to recall and recite increasingly long sets of numbers backward.	Wechsler (2003)	.59
Updating	<i>Keeping Track</i>	Participants listen to a list of words associated with between two and six categories. They are required to recall the most recent word from a selected category.	Miyake et al. (2000)	.52
Updating	<i>2-back/n-back</i>	Participants view a series of shapes and press a button to indicate whether the current shape matches the shape presented either 1 or 2 trials prior.	Jaeggi et al. (2010);	2 back: .84 n-back: .89
Updating	<i>Letter Recall</i>	Participants are presented a sequence of single letters. They are required to identify the last <i>N</i> letters, in order of presentation.	Broadway & Engle (2010)	.75
Switching	<i>Trail Making (“Connections”)</i>	A paper-and-pencil task in which participants connect circles containing either letters or numbers according to task rules from 3 conditions- <ul style="list-style-type: none"> • <u>Numbers</u>: Connect circles in numerical order 	Salthouse (2011)	.87

		<ul style="list-style-type: none"> • <u>Letters</u>: Connect circles in alphabetical order • <u>Number-Letter</u>: Connect numbers and letters in alternating fashion, but still following numerical and alphabetical order (i.e. 1-A-2-B-3-C etc.) • <u>Letter-Number</u>: Connect letters and numbers in alternating fashion, but still following numerical and alphabetical order (i.e. A-1-B-2-C-3 etc.) 		
Switching	<i>Local-Global</i>	<p>Participants verbally identify letters and shapes composed of smaller letters and shapes, respectively, based on 3 conditions-</p> <ul style="list-style-type: none"> • <u>Local</u>: Participants name the small letters or shapes that make up the larger figure • <u>Global</u>: Participants name the large letter or shape • <u>Alternating</u>: Participants alternate between naming the smaller and larger letter/shape (based on the rule listed above “small” or “big”, respectively) 	Miyake et al. (2000)	.73
Switching	<i>Plus-Minus</i>	<p>A paper-and-pencil task in which participants are given lists of 2-digit numbers and complete addition and subtraction problems based on 3 conditions-</p> <ul style="list-style-type: none"> • <u>Addition</u>: Participants add 1 to each number in the first list • <u>Subtraction</u>: Participants subtract 1 to each number in the second list • <u>Alternating</u>: Participants alternate between adding 1 and subtract 1 from each number in the third list 	Miyake et al. (2000)	.69
Switching	<i>Cognitive Flexibility</i>	<p>A rule matching game in which participants press a button to indicate which image choice (presented in the middle of the screen) matches a target shape that pops up at the bottom of the screen. The rules are to either match by shape or color.</p>	Baym, Corbett, Wright, & Bunge (2008)	.82

Table S2.*Descriptions of the tasks measuring processing speed.*

Task	Description	References	Reliability (α)
<i>Letter Comparison</i>	A paper-and-pencil task in which participants compare two letter strings and decide as quickly as possible whether they are the same or different.	Salthouse & Babcock (1991)	0.85
<i>Pattern Comparison</i>	A paper-and-pencil task in which participants compare two geometric patterns and decide as quickly as possible whether they are the same or different.	Salthouse & Babcock (1991)	0.84
<i>Symbol Search</i>	A paper-and pencil task in which participants determine and indicate whether target symbols (simple line drawings) appear in line of various simple symbols.	Wechsler (2003)	0.79

Table S3.*Descriptive statistics and data coverage of executive functioning and processing speed tasks.*

Domain	Task	N	Mean	SD	% Missing
EF: Inhibition	Stroop	1545	-230.55	238.38	0.19
	Mickey	931	-36.88	70.12	39.86
	<i>Stop Signal - Auditory</i>	682	-.329.90	82.14	55.94
	<u>Stop Signal - Visual</u>	660	-260.49	62.04	57.36
EF: WM	Symmetry Span	1492	20.84	8.80	3.62
	Listen Recall	1423	-3.39	1.16	8.07
	Digit Back	1120	7.07	1.83	27.65
EF: Updating	Keep Track	1525	6.75	2.32	1.49
	<i>2-Back</i>	731	-3.82	1.06	52.78
	<u>1- and 2-Back</u>	778	-3.97	1.66	49.74
	Running Memory	1029	19.17	8.06	33.53
EF: Switching	Connections	1065	-6.93	0.58	31.20
	Local Global	1526	-7.15	0.43	1.42
	<i>Plus-Minus</i>	722	-683.67	1274.72	53.36
	<u>Cognitive Flexibility</u>	772	-1088.32	190.73	50.13
Processing Speed	Letter Comparison	1546	6.99	2.52	0.13
	Pattern Comparison	1548	14.22	3.81	0
	Symbol Search	1482	23.83	7.26	4.26

Note. After the third year of data collection, three tasks (italicized) were replaced by tasks from the same EF domain (underlined).

Table S4.*Model fit indices for alternate factor structures of ADHD using categorical indicators.*

<i>Model</i>	Model Fit Indices					
	χ^2	df	p(χ^2)	RMSEA (95% CI)	CFI	TLI
One factor: ADHD	2637.43	170	<0.0001	0.100 (0.097-0.103)	0.87	0.82
Two factors: Inatt, Hyp/Imp	822.22	169	<0.0001	0.052 (0.048-0.055)	0.97	0.95
Three factors: Inatt, Hyp, Imp	788.66	167	<0.0001	0.051 (0.047-0.054)	0.97	0.96
Bifactor [2 specific factors]: ADHD, Inatt, Hyp/Imp	432.88	150	<0.0001	0.036 (0.032-0.040)	0.99	0.98
Bifactor [3 specific factors]: ADHD, Inatt, Hyp, Imp	616.93	150	<0.0001	0.046 (0.043-0.050)	0.98	0.96

Note. Models were constructed using categorical indicators. Bold signifies the best-fitting model for each rater. ADHD = Attention-Deficit Hyperactivity Disorder; Inatt = Inattention; Hyp = Hyperactivity; Imp = Impulsivity; χ^2 =chi-square; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index

Table S5.

Parceling of ADHD items based on rank-ordering of factor loadings onto each specific factor (Inattention and Hyperactivity/Impulsivity).

Item No.	Item	Target Domain	Factor Loading			Parcel No.
			ADHD	IA	H/I	
7	Has trouble organizing tasks or activities	<i>Inattention</i>	0.491**	0.698**		1
6	Fails to complete schoolwork, chores, or tasks	<i>Inattention</i>	0.502**	0.692**		
1	Is forgetful in daily activities	<i>Inattention</i>	0.467**	0.650**		2
5	Does not follow through on instructions	<i>Inattention</i>	0.577**	0.649**		
4	Doesn't pay attention to details; makes careless mistakes	<i>Inattention</i>	0.592**	0.612**		3
9	Loses things (e.g. schoolwork, pencils, books, tools, or toys)	<i>Inattention</i>	0.481**	0.598**		
8	Has trouble keeping his/her mind on work or play for long	<i>Inattention</i>	0.659**	0.554**		4
3	Does not seem to listen to what is being said to him/her	<i>Inattention</i>	0.658**	0.496**		
10	Is easily distracted by sights or sounds	<i>Inattention</i>	0.616**	0.481**		5
2	Avoids or dislikes things that take a lot of effort and are not fun	<i>Inattention</i>	0.473**	0.439**		
12	Blurts out answers before the question has been completed	<i>Hyper/Impuls</i>	0.557**		0.639**	6
11	Talks too much	<i>Hyper/Impuls</i>	0.495**		0.493**	
20	Interrupts others (e.g. butts into conversations or games)	<i>Hyper/Impuls</i>	0.700**		0.419**	7
14	Has difficulty waiting for his/her turn	<i>Hyper/Impuls</i>	0.702**		0.413**	
13	Acts as if driven by a motor	<i>Hyper/Impuls</i>	0.696**		0.388**	8
16	Is noisy and loud when playing or using free time	<i>Hyper/Impuls</i>	0.580**		0.372**	
15	Runs or climbs when he/she is not supposed to	<i>Hyper/Impuls</i>	0.721**		0.222**	9
17	Leaves seat when he/she should stay seated	<i>Hyper/Impuls</i>	0.852**		0.093	
19	Restless or overactive	<i>Hyper/Impuls</i>	0.893**		0.088	10
18	Fidgets or squirms in seat	<i>Hyper/Impuls</i>	0.888**		-0.026	

ADHD= Attention-deficit hyperactivity disorder; Specific Factors: IA=Inattention, H/I=Hyperactivity/Impulsivity.

* $p < 0.05$; ** $p < 0.001$

Table S6.*Model fit indices for alternative factor structures of ADHD using parceled indicators.*

<i>Model</i>	Model Fit Indices							
	χ^2	df	p(χ^2)	RMSEA (95% CI)	CFI	TLI	AIC	BIC
One factor: ADHD	1626.75	35	<0.0001	0.18 (0.17-0.19)	0.76	0.55	43383.14	43647.00
Two factors: Inatt, Hyp/Imp	291.65	34	<0.0001	0.07 (0.07-0.08)	0.96	0.92	40942.12	41211.26
Three factors: Inatt, Hyp, Imp	245.00	25	<0.0001	0.08 (0.07-0.09)	0.96	0.92	38582.50	38830.53
Bifactor [2 groups]: ADHD, Inatt, Hyp/Imp	75.18	25	<0.0001	0.04 (0.03-0.05)	0.99	0.98	40529.00	40845.64
Bifactor [3 groups]: ADHD, Inatt, Hyp, Imp	117.76	19	<0.0001	0.06 (0.05-0.07)	0.98	0.96	38358.61	38638.30

Note. Models were constructed using parceled indicators that were treated as continuous. Bold signifies the best-fitting model for each rater. ADHD = Attention-Deficit Hyperactivity Disorder; Inatt = Inattention; Hyp = Hyperactivity; Imp = Impulsivity; χ^2 =chi-square; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; AIC= Aikake Information Criterion; BIC= Bayesian information Criterion

Table S7.

Standardized regression coefficients of ADHD symptom factors and diagnostic ADHD subtypes on EF, before and after adjusting for processing speed differences.

Predictor	Inattention		Hyperactivity/Impulsivity		General ADHD		EF β [SE]
	β [SE]		β [SE]		β [SE]		
	Dim.	Diag. (ADHD-IA)	Dim.	Diag. (ADHD-HI)	Dim.	Diag. (ADHD-C)	
Model 1							
EF	-0.24** [0.05]	-0.17* [0.05]	0.01 [0.06]	-0.10 [0.06]	-0.12* [0.05]	-0.12 [0.07]	
Model 2							
EFr	-0.21* [0.08]	-0.12 [0.10]	-0.09 [0.10]	-0.10 [0.10]	-0.11 [0.09]	-0.004 [0.13]	
PS	-0.16 [0.10]	-0.22* [0.12]	0.23 [0.13]	-0.07 [0.13]	-0.08 [0.10]	-0.33* [0.17]	0.76** [0.03]

Note. Dim.= dimensional latent domain factor; Diag.= symptom count threshold variable (ADHD

presentation); EF= Common executive function factor; PS= processing speed latent factor; EFr= Common executive function factor residualized for processing speed

* $p < 0.05$; ** $p < 0.01$

Table S8.*Main and moderation effects of age (modeled linearly and quadratically) on EF and ADHD.*

Predictor	Inattention		Hyperactivity/ Impulsivity		General ADHD		EF		Speed-resid EF	
	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>
Model 1										
Age	0.07	0.05	-0.06	0.13	-0.25*	<.001	0.73*	<.001	0.22*	<.001
Age ²	-0.03	0.39	-0.05	0.12	0.05	0.14	-0.10	0.001	-0.08	0.004
Model 2										
Age	0.23*	<0.001	-0.07	0.18	-0.18	0.01				
Age ²	-0.05	0.25	-0.08	0.05	0.09	0.14				
EF × Age	-0.01	0.85	0.05	0.31	-0.08	0.18				
EF × Age ²	0.01	0.78	0.02	0.69	0.001	0.99				
Model 3										
Age	0.29*	<0.001	-0.14	0.02	-0.13	0.05				
Age ²	-0.05	0.23	-0.09	0.04	0.09	0.17				
rEF × Age	0.004	0.94	0.05	0.32	-0.07	0.28				
rEF × Age ²	0.005	0.90	0.04	0.35	-0.02	0.67				

**p*<0.001

Table S9.

Moderation of the association between EF and parent-rated ADHD using sociodemographic variables.

Predictor	Inattention		Hyperactivity/ Impulsivity		General ADHD	
	β	p	β	p	β	p
<u>Model 1</u>						
EF	-0.24*	<0.001	-0.08	0.82	-0.12*	0.01
<u>Model 2</u>						
Processing Speed	-0.16	0.10	0.23	0.07	-0.08	0.43
Speed-residualized EF (rEF)	-0.21*	0.01	-0.09	0.34	-0.11	0.23
<u>Model 3a: Age moderation</u>						
EF	-0.29*	<0.001	0.02	0.76	-0.15*	0.01
Age	0.23*	<0.001	-0.08	0.13	-0.16*	0.002
EF \times Age	-0.04	0.29	0.000	0.99	-0.03	0.46
<u>Model 3b: Age moderation</u>						
Processing Speed	-0.10	0.10	0.21	0.10	-0.06	0.57
Speed-residualized EF (rEF)	-0.25*	0.01	-0.11	0.35	-0.12	0.25
Age	0.28	0.07	-0.13	0.03	-0.13	0.03
rEF \times Age	-0.01	0.82	-0.01	0.89	-0.01	0.70
<u>Model 4a: Sex moderation</u>						
EF	-0.24*	<0.001	0.01	0.86	-0.12*	0.01
Sex	0.04	0.36	-0.15*	0.004	0.23*	<0.001
EF \times Sex	-0.02	0.72	0.04	0.49	-0.05	0.26
<u>Model 4b: Sex moderation</u>						
Processing Speed	-0.16	0.10	0.23	0.08	-0.07	0.48
Speed-residualized EF (rEF)	-0.12*	0.01	-0.09	0.36	-0.12	0.18
Sex	-0.02	0.89	-0.26	0.13	0.45	0.01
rEF \times Sex	0.02	0.70	0.03	0.46	-0.06	0.13

Model 5a: SES moderation

EF	-0.25	<0.001	0.04	0.54	-0.08	0.10
SES	0.03	0.51	-0.11	0.03	-0.07	0.03
EF × SES	-0.04	0.37	-0.07	0.30	0.11	0.02

Model 5b: SES moderation

Processing Speed	-0.16	0.10	0.25	0.05	-0.08	0.41
Speed-residualized EF (rEF)	-0.23*	0.01	-0.06	0.54	-0.07	0.44
SES	0.06	0.76	0.13	0.48	-0.45*	0.01
rEF × SES	-0.004	0.93	-0.07	0.23	0.10	0.03

Model 6a: Race moderation

EF	-0.40	0.04	-0.28	0.04	-0.22	0.24
Hispanic	-0.07	0.11	0.13*	0.01	-0.01	0.75
Black	-0.003	0.94	-0.003	0.95	0.07	0.30
Asian	-0.05	0.17	0.04	0.29	-0.07	0.05
EF × Hispanic	-0.03	0.63	-0.03	0.63	-0.07	0.16
EF × Black	-0.12	0.10	-0.09	0.10	-0.06	0.53
EF × Asian	0.004	0.92	-0.09	0.03	0.02	0.64

Model 6b: Race moderation

Processing Speed	-0.15	0.12	0.23	0.07	-0.08	0.41
Speed-residualized EF (rEF)	-0.37	0.04	-0.29	0.03	-0.07	0.68
Hispanic	-0.11	0.40	0.26	0.11	0.12	0.53
Black	0.29	0.31	0.17	0.34	0.16	0.42
Asian	0.02	0.87	0.31*	0.01	-0.24	0.04
rEF × Hispanic	0.01	0.76	-0.04	0.38	-0.04	0.47
rEF × Black	-0.08	0.34	-0.05	0.29	-0.02	0.71
rEF × Asian	-0.02	0.56	-0.08*	0.01	0.05	0.08

Note. All sociodemographic moderator variables were centered: age and SES were mean-centered, race and sex were effect-coded. Coefficients reported are the standardized values.

* $p < \text{FDR-adjusted threshold for significance}$

Table S10.

Association between higher- and first-order EF domain and processing speed and sociodemographic moderator variables.

	EF Factor (Est. [95% CI])					PS (Est. [95% CI])
	<i>Common EF</i>	<i>WM</i>	<i>Inhibition</i>	<i>Switching</i>	<i>Updating</i>	
PS	0.82** [0.79-0.86]	0.52** [0.42-0.61]	0.27** [0.12-0.42]	0.53** [0.43-0.63]	0.18** [0.08-0.27]	
SES	0.17* [0.10-0.24]	0.08 [-0.09-0.26]	0.01 [-0.16-0.19]	0.07 [-0.32-0.46]	0.13 [-0.08-0.34]	0.12** [0.06-0.18]
Age	0.73** [0.69-0.77]	0.41** [0.34-0.49]	0.36** [0.23-0.50]	0.30** [0.20-0.41]	0.31** [0.25-0.37]	0.77** [0.74-0.80]
Sex	0.01 [-0.07-0.10]	0.08 [-0.01-0.16]	-0.07 [-0.22-0.08]	0.00 [-0.01-0.10]	-0.03 [-0.11-0.06]	-0.02 [-0.10-0.06]
Race						
Hispanic	-0.16** [-0.24- -0.07]	-0.15** [-0.24- -0.08]	0.09 [-0.04- -0.21]	-0.08 [-0.18-0.01]	0.21** [-0.29- -0.13]	-0.07 [-0.15-0.01]
Black	-0.14* [-0.23- -0.06]	-0.14* [-0.22- -0.05]	-0.05 [-0.19- 0.10]	-0.12 [-0.22-0.01]	0.16** [-0.25- -0.07]	-0.03 [-0.11-0.05]
Asian	-0.01 [-0.12-0.10]	0.01 [-0.09- 0.11]	0.01 [-0.09- 0.11]	-0.05 [-0.18-0.08]	0.01 [-0.13-0.12]	0.01 [-0.10-0.12]

Note. For race and sex, parameter estimates reflect mean differences (standardized betas) between the reference (white, female) and alternate category. For age and SES, Pearson's R estimates are reported. Associations between each moderator variable and lower- (i.e. WM, Inhibition, Switching, Updating) and higher-order EF factors (Common EF) were assessed in separate models.

* $p < 0.05$; ** $p < 0.01$ (after FDR-adjustment)

Table S11.

Standardized regression coefficients of ADHD symptom factors on Common EF, before and after adjusting for processing speed differences at the domain-specific and higher-order EF level.

	Model 1 (Common EF only)	Model 2 (Common EF + Processing Speed)	Model 3[†] (+4 EF Domain paths)
Paths from Common EF to ADHD			
Common EF → Inattention	-0.24** [0.05]	-0.21* [0.08]	-0.12* [0.05]
Common EF → Hyperactivity/Impulsivity	0.01 [0.06]	-0.09 [0.10]	0.06 [0.06]
Common EF → General ADHD	-0.12* [0.05]	-0.11 [0.09]	-0.07 [0.06]
Paths from Processing Speed to EF			
PS → Common EF		0.76*** [0.03]	
PS → EF Domain: Inhibition			0.56*** [0.12]
PS → EF Domain: Working Memory			0.61*** [0.06]
PS → EF Domain: Switching			0.78*** [0.06]
PS → EF Domain: Updating			0.60*** [0.06]
Paths from Processing Speed to ADHD			
PS → Inattention		-0.16 [0.10]	-0.33*** [0.06]
PS → Hyperactivity/Impulsivity		0.23 [0.13]	0.17 [0.09]
PS → General ADHD		-0.08 [0.10]	-0.17* [0.07]
Model Comparison (χ_{diff}^2)			
Nested model: Model 2			34.85***

Note. Bolded estimates indicate significance (* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$).

†The secondary specification of processing speed, EF, and ADHD (Model 3) highlights the construct validity of EF, as the factor loadings of all EF domains on Common EF remained significant ($p < 0.001$) demonstrating convergent validity above and beyond any influence of processing speed.

Supplementary Figures

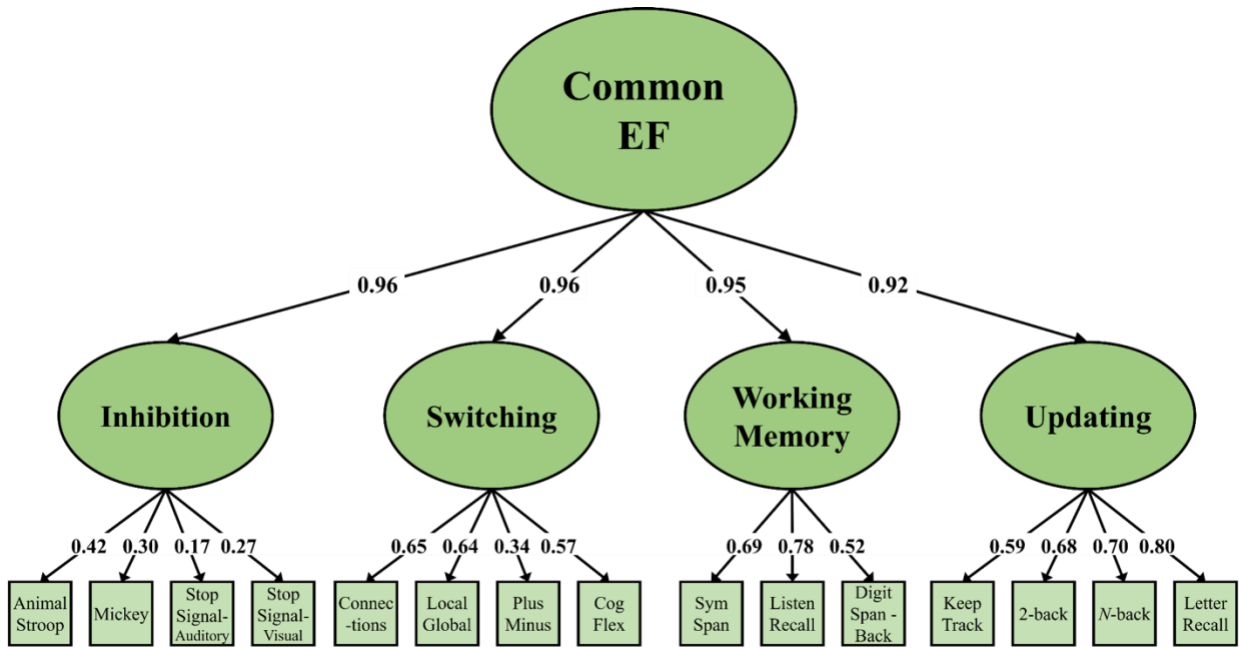


Figure S1. Hierarchical factor structure of the super-ordinate Common EF factor. Estimates represent standardized factor loadings. Fit statistics: RMSEA=0.02, $\chi^2(77)=113.14$, $p<0.01$, CFI=0.99, TLI=0.98, SRMR=0.04.

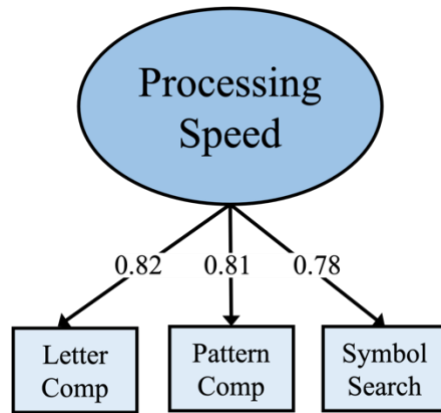


Figure S2. Factor structure of processing speed. Estimates represent standardized factor loadings. Fit statistics: RMSEA=0.00, CFI=1.00, TLI=1.00, SRMR=0.00. This is a just-identified model.

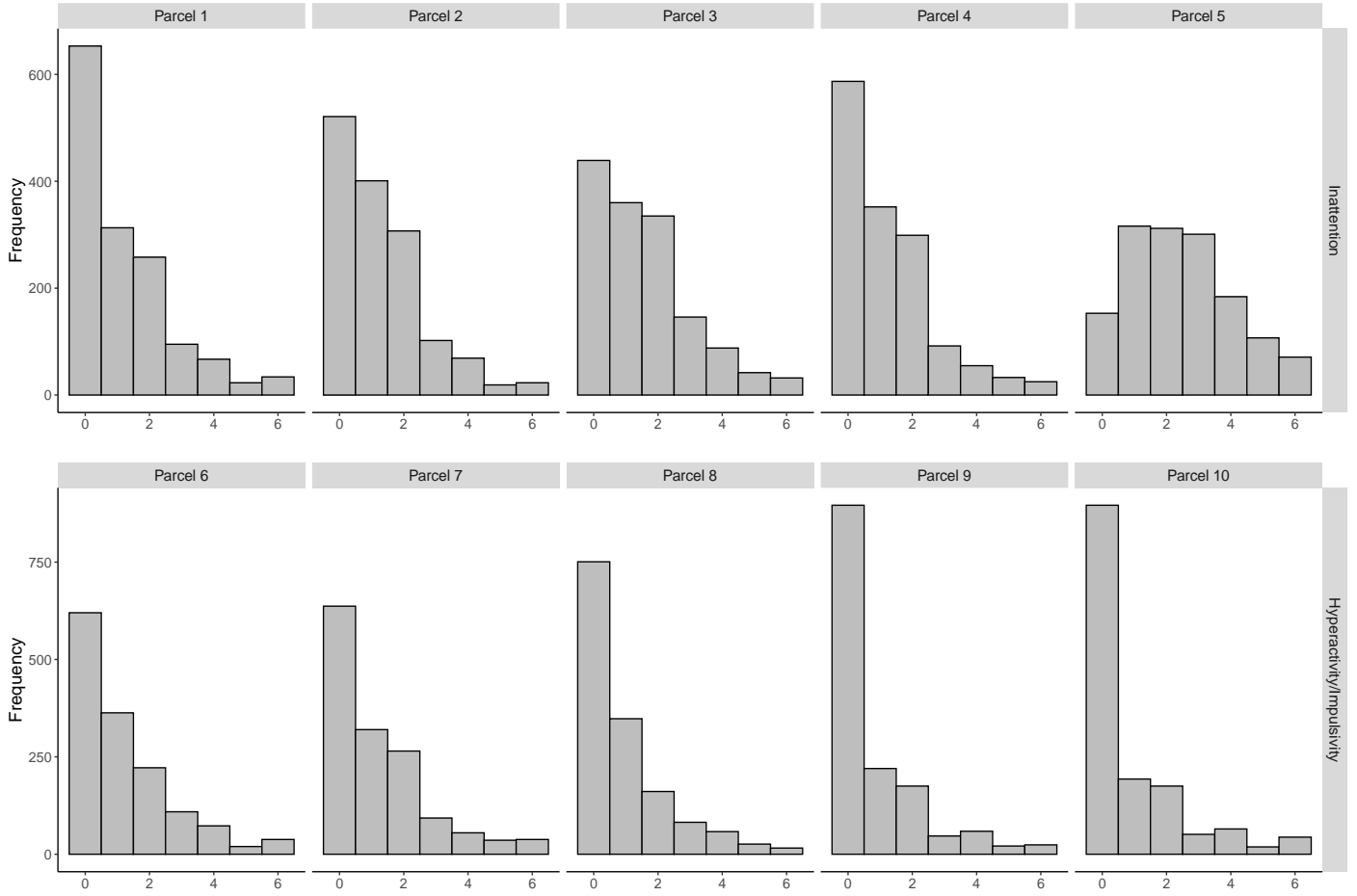


Figure S3. Frequency distribution of parceled responses to parent-reported Conners-3 items.

Note. Each parcel contains summed responses from two items.

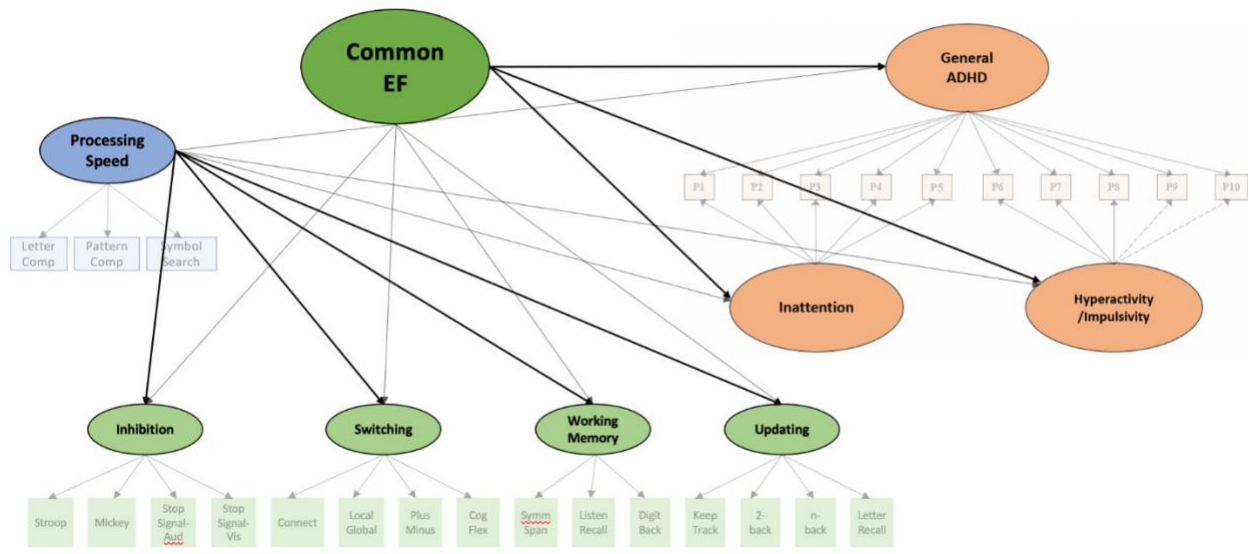


Figure S4. Full model representation of bifactor ADHD regressed onto common executive functioning (EF), after accounting for the effects of processing speed on EF at the domain-specific level. *Note.* Added paths are indicated in bold.

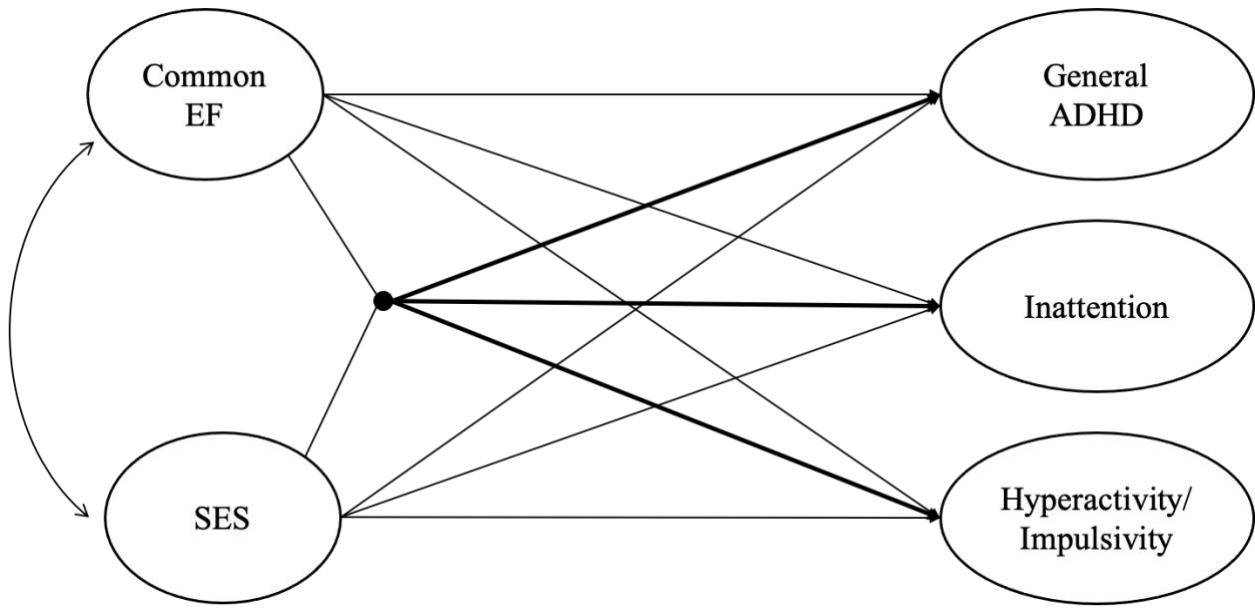


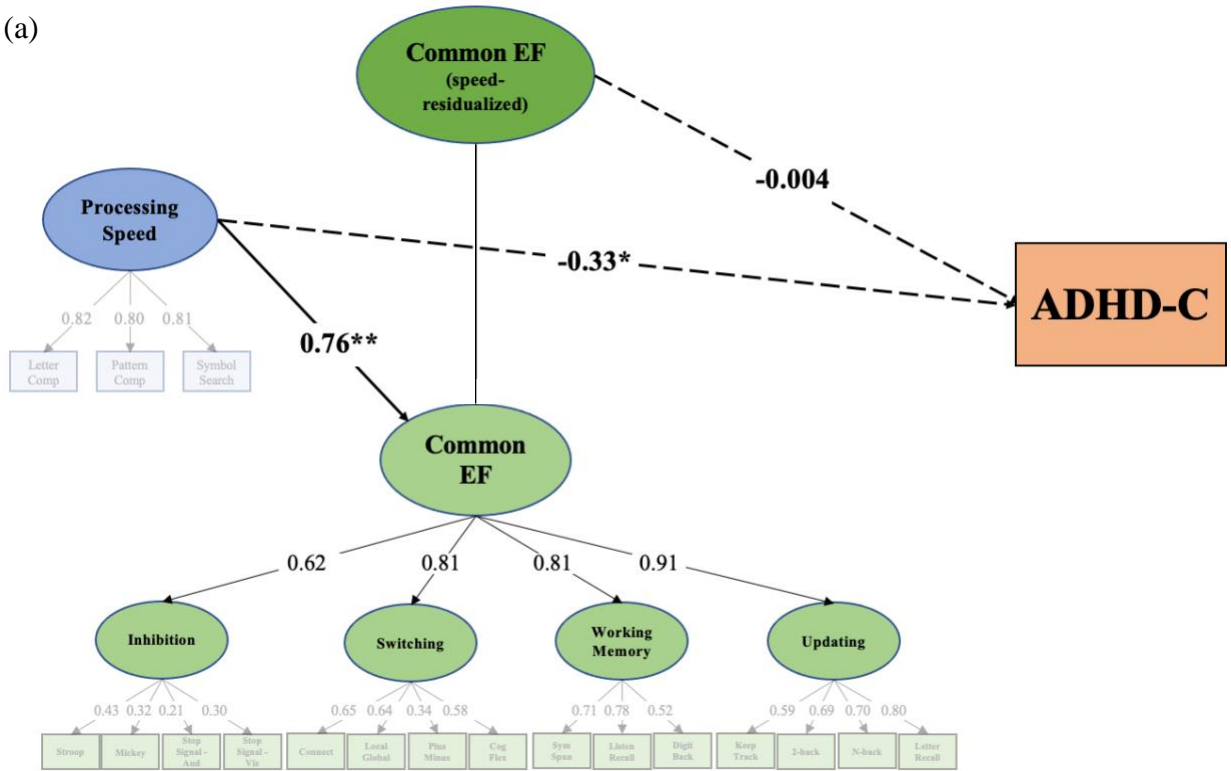
Figure S5. Latent variable interaction model.

Note. Path diagram for the moderation of the EF-ADHD association by socioeconomic status.

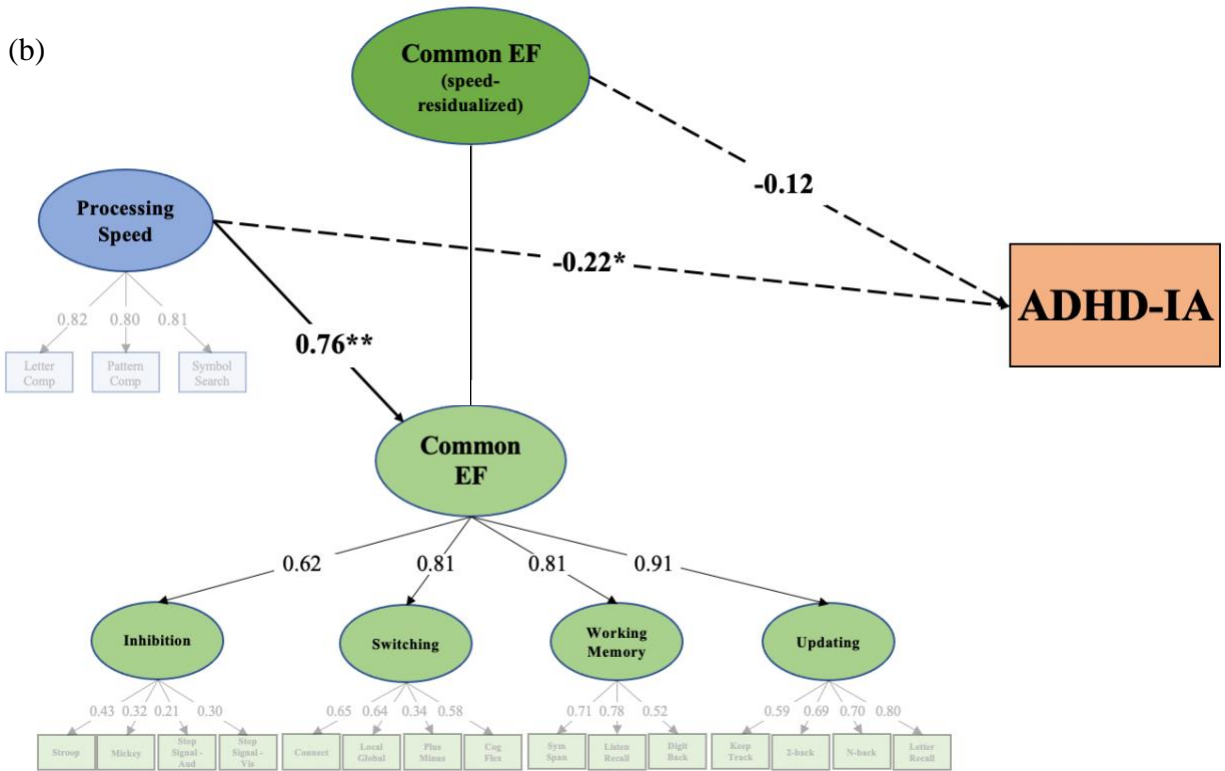
Bold lines indicate the interaction of EF and SES regressed onto each latent domain of ADHD.

The same interaction models were used to assess moderation effects of age, race, and sex on the EF-ADHD association.

(a)



(b)



(c)

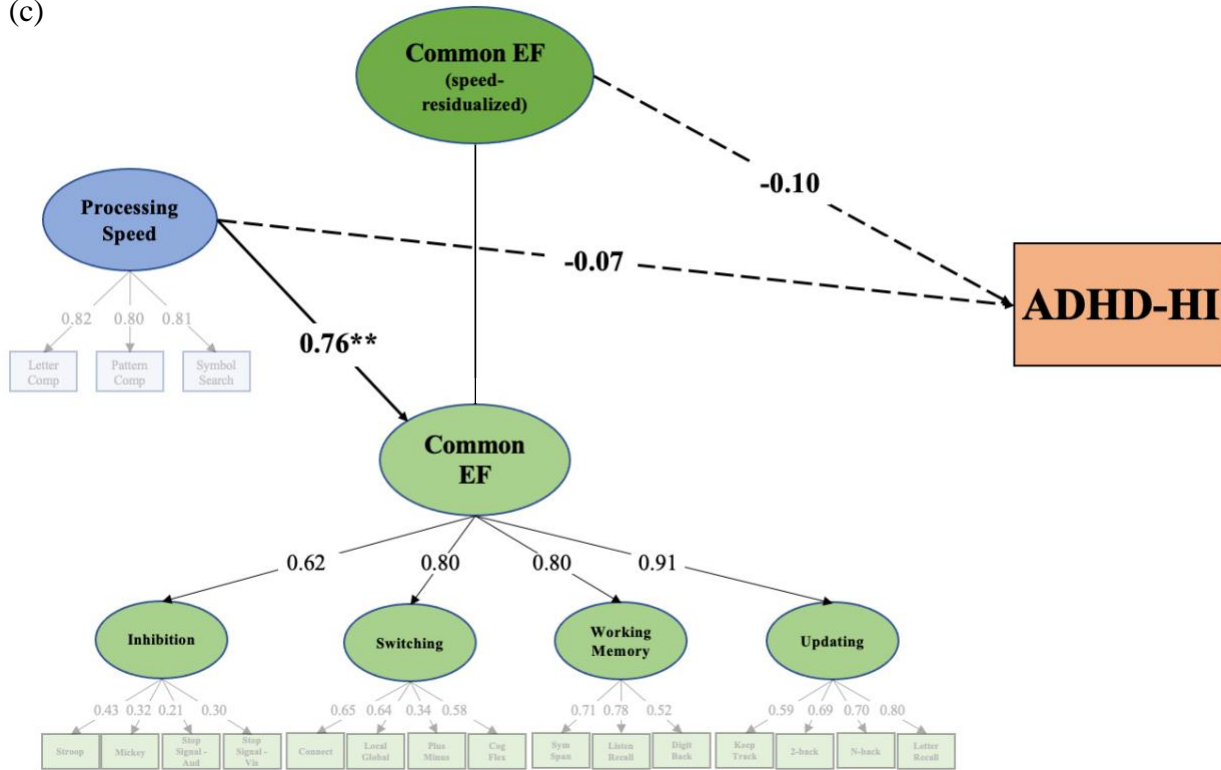


Figure S6. Full model representation of diagnostic categories of ADHD regressed onto processing speed and speed-residualized executive function (EF).

Panel depicts the association between EF, processing speed and: (a) combined-presentation ADHD (ADHD-C), (b) predominantly inattentive-presentation ADHD (ADHD-IA), and (c) hyperactive/impulsive-presentation ADHD (ADHD-HI). *Note.* Age and sex were included as covariates in these models. The effects of age and sex were controlled for at the level of the factor for processing speed and at the level of first-order factor for EF. All point estimates are standardized regression coefficients. Bold lines indicate significance ($*p < 0.05$; $**p < 0.01$). For visualization purposes, speed-residualized Common EF is represented a separate factor from Common EF, connected by a line to differentiate it from a factor loading; it was not modeled independently in our analyses and should not be interpreted as such. Fit statistics: Chi-square

posterior predictive p-value (PPP) <0.05 for all models; Univariate fit statistics: $PPP_{ADHD-C}=0.51$;
 $PPP_{ADHD-IA}=0.53$; $PPP_{ADHD-HI}=0.54$.