SUPPLEMENTARY MATERIALS

Comparative Meta-analyses of Brain Structural and Functional Abnormalities during Cognitive Control in Attention-Deficit/Hyperactivity Disorder and Autism Spectrum Disorder

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Contents

Supplement 1: Literature Search and Methods

Literature Search

A comprehensive literature search was conducted by SL, LN, and CC in PubMed, Scopus, Web of Science and ScienceDirect to identify whole-brain functional magnetic resonance imaging (fMRI) or voxel-based morphometry (VBM) studies comparing individuals with ASD or ADHD against typical controls. The searches were conducted up to 30th November 2018 and used key words related to: (1) ASD, i.e., autism OR autistic OR Asperger OR ASD OR autism spectrum disorder OR pervasive developmental disorder; (2) ADHD, i.e., hyperkinetic OR ADHD or attention-deficit/hyperactivity disorder; (3) VBM; (4) inhibitory function, i.e., inhibition OR stop OR Stroop OR flanker OR go/no-go OR Simon OR interference OR executive function OR switch; and (5) neuroimaging, i.e., fMRI OR MRI.

The following syntaxes were used on PubMed to search for (1) ADHD VBM studies: (“ADHD”[Title/Abstract] OR “attention-deficit/hyperactivity disorder”[Title/Abstract] OR “hyperkinetic”[Title/Abstract]) AND ("VBM"[Title/Abstract] OR "voxel-based morphometry"[Title/Abstract]) and (2) ASD VBM studies: (“Autism”[Title/Abstract] OR “autistic”[Title/Abstract] OR “autism spectrum disorders”[Title/Abstract] OR “pervasive developmental disorders”[Title/Abstract] OR “ASD”[Title/Abstract] OR “PDD”[Title/Abstract] OR “Asperger”[Title/Abstract]) AND ("VBM"[Title/Abstract] OR "voxel-based morphometry"[Title/Abstract]).

The following syntaxes were used on PubMed to search for (1) ADHD fMRI studies: (((“ADHD”[Title/Abstract] OR “hyperkinetic”[Title/Abstract] OR "attention-deficit/hyperactivity disorders"[Title/Abstract])) AND ("inhibition"[Title/Abstract] OR "stop" [Title/Abstract] OR "stroop"[Title/Abstract] OR "flanker "[Title/Abstract] OR " go/no-go "[Title/Abstract] OR " Simon"[Title/Abstract] OR "interference"[Title/Abstract] OR "executive function"[Title/Abstract] OR " switch"[Title/Abstract])) AND ("MRI"[Title/Abstract] OR "fMRI"[Title/Abstract]), and (2) ASD fMRI studies: (((“Autism”[Title/Abstract] OR “autistic”[Title/Abstract] OR “autism spectrum disorders”[Title/Abstract] OR “pervasive developmental disorders”[Title/Abstract] OR “ASD”[Title/Abstract] OR “PDD”[Title/Abstract]

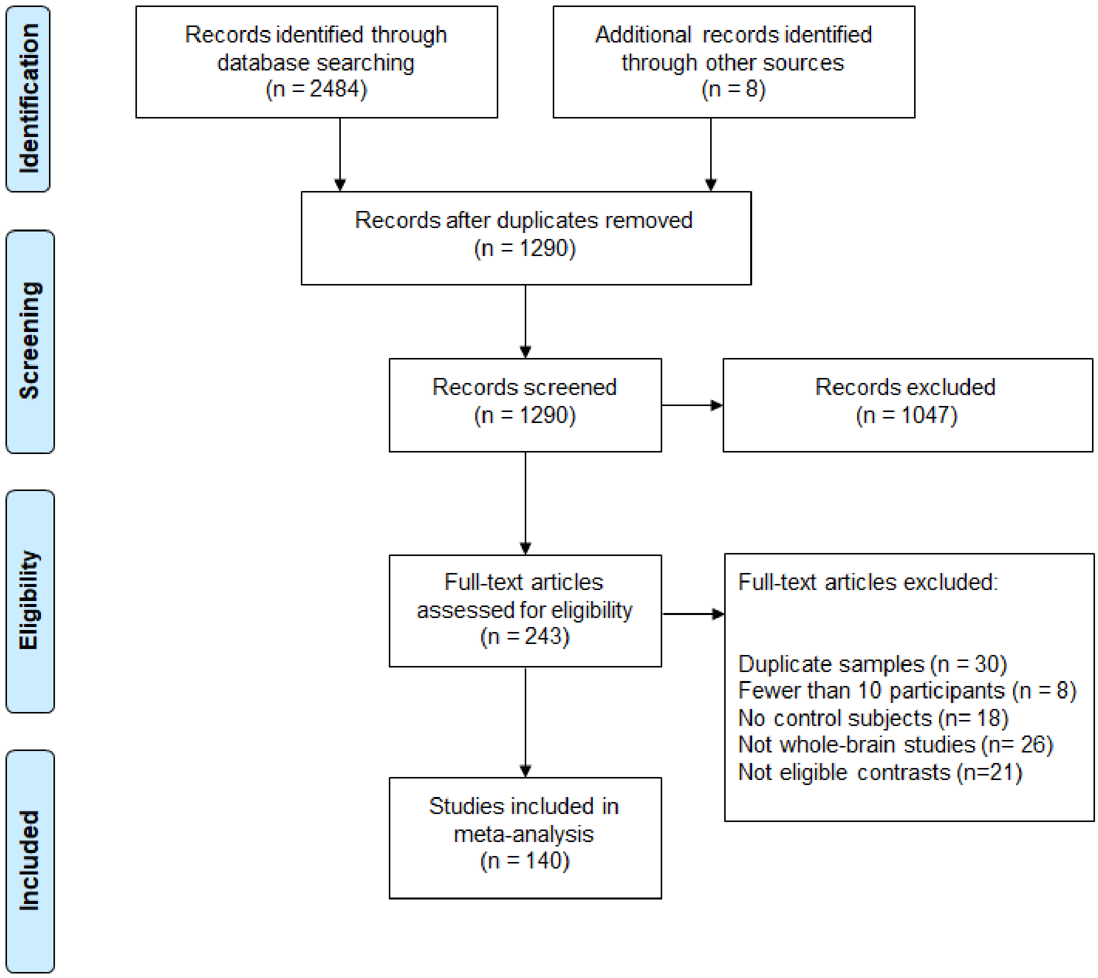
OR “Asperger”[Title/Abstract])) AND ("inhibition"[Title/Abstract] OR "stop" [Title/Abstract] OR "stroop"[Title/Abstract] OR "flanker "[Title/Abstract] OR " go/no-go "[Title/Abstract] OR " Simon"[Title/Abstract] OR "interference"[Title/Abstract] OR "executive function"[Title/Abstract] OR " switch"[Title/Abstract])) AND ("MRI"[Title/Abstract] OR "fMRI"[Title/Abstract]).

Only predefined contrasts comparing inhibitory control (i.e., stop, no-go, incongruent or switch trials) against a control condition (i.e., failed stop, go, oddball, congruent or repeated trials) were included in the fMRI meta-analysis. Data extracted included age, sex, IQ, current and historic exposure of psychostimulant medications and comorbidity of ASD and ADHD in the counterpart disorder groups. From the database searches, 2484 records were retrieved, and eight further records were identified from past meta-analyses. After duplicates were removed, 1290 records remained and were screened, yielding 243 full-text articles assessed for eligibility, and 140 included in the meta-analysis. Of the full-text articles excluded, 30 included samples already used in previous publications, eight included fewer than ten participants, 18 had no control participants, 26 were not whole-brain studies and 21 did not include eligible contrast.

Seed-based *d* Mapping (SDM)

The anisotropic seed-based *d* Mapping AES-SDM (www.sdmproject.com) is meta-analytic software for neuroimaging data. The software takes both statistical parametric maps of MRI/fMRI contrasts (Radua et al., 2012), and the conventional peak coordinates and effect sizes (*t*-scores) as input data. When provided with the latter type of data, AES-SDM estimates signed (positive/negative) effect size and variance maps that represent the difference of brain activations or gray matter structures between patient and control groups. These maps are computed by convolving an anisotropic non-normalized Gaussian kernel with Hedges effect size of each peak. Thus, voxels correlated with peaks are assigned higher effect sizes. Combinations of maps between studies are based on a random-effects model, accounting for sample size, within-study variability and between-study heterogeneity. An update of AES-SDM software also allows adjustment for correlated datasets, accounting for shared variance of brain activations or structure across datasets (Norman et al., 2016), e.g., when pairs of datasets investigating two inhibitory tasks take places in the same or largely overlapping sample.

Figure S1. Flow Diagram of Literature Search and Study Selection Process



Flow diagram describing the literature search, which included the databases PubMed, ScienceDirect, Scopus and Web of Knowledge

Supplement 2: Full Characteristic Tables and Summary Findings of ADHD and ASD Neuroimaging Studies

Table S2a. Sample Characteristics and Summary Findings of VBM and fMRI Cognitive Control Studies in ADHD

Source	Age group	Task	Patients						Controls			Summary findings
			N (% male)	Age, Range, y	IQ	Life Stim %	Cur Stim %	Com ASD %	N (% male)	Age, y Range, y	IQ	
(A) VBM studies in ADHD												
Ahrendts et al. (2011)	Adult	--	31 (65)	31.2 (18-55)	n/a	3	0	n/a	31 (65)	31.5 (19-52)	n/a	ADHD<TD: L/R occipital lobe
Montes et al. (2010)	Adult	--	20 (50)	29.0 (25-35)	102.9	0	0	n/a	20 (50)	27.6 (25-35)	100.2	ADHD<TD: R caudate
Amico, Stauber, Koutsouleris, and Frodl (2011)	Adult	--	20 (75)	33.6 (n/a)	n/a	n/a	30	n/a	20 (75)	34.7 (n/a)	n/a	--
Bonath, Tegelbeckers, Wilke, Flechtner, and Krauel (2016)	Pediat.	--	18 (100)	13.6 (11-17)	106.8	78	56	n/a	18 (100)	14.1 (11-17)	108.1	ADHD<TD: L/R cerebellum, occipital cortex, L/R hippocampus/ amygdala complex, L ACC
Bralten et al. (2016)	Mixed	--	307 (68)	17.1 (8-30)	97.1	89	n/a	n/a	196 (49)	16.7 (8-30)	106.6	ADHD<TD: L pre-CG, L OFC, R frontal pole, L paracingulate/cingulate cortex/frontal pole, bilateral medial FG/ paracingulate/cingulate/ subcallosal cortices
Brieber et al. (2007)	Pediat.	--	15 (100)	13.1 (10-16)	104.1	n/a	67	0	15 (100)	13.3 (10-16)	107.7	ADHD<TD: L/R caudate nucleus, L/R hippocampus, R MFG, L insula, L STG, L MOG; ADHD>TD: L/R SPL, post-CG, L middle cingulate, precuneus, L IPL
Carmona et al. (2005)	Pediat.	--	25 (84)	10.8 (6-16)	n/a	100	100	n/a	25 (84)	11.2 (6-16)	n/a	ADHD<TD: L pre-/post-CG, paracentral lobule, R rectal gyrus, R inferior and superior orbital frontal, L/R cerebellum
Depue, Burgess, Bidwell, Willcutt, and Banich (2010)	Adult	--	31 (61)	20.0 (n/a)	114.2	77	77	n/a	21 (65)	19.3 (n/a)	112.6	--
Gehricke et al. (2017)	Adult	--	32 (81)	25.3 (n/a)	n/a	n/a	25	n/a	40 (83)	23.9 (n/a)	n/a	ADHD<TD: R M/IFG, R S/MTG, L caudate head, L PHG
He et al. (2015)	Pediat.	--	37 (100)	9.9 (7-16)	n/a	0	0	n/a	35 (100)	10.7 (8-15)	n/a	ADHD<TD: R OFC, R PMC, L PCC, L posterior midcingulate cortex
Iannaccone, Hauser, Ball, et al. (2015)	Pediat.	--	18 (50)	14.5 (12-16)	114.5	72	72	n/a	18 (61)	14.8 (12-16)	108.5	ADHD<TD: R medial SFG/ACC/SFG, L SMA/cingulate gyrus, L cerebellum; ADHD>TD: R pre- and post-CG
Jagger-Rickels, Kibby, and Constance (2018)	Pediat.	--	41 (44)	9.6 (8-12)	n/a	n/a	n/a	n/a	32 (56)	9.7 (8-12)	n/a	ADHD<TD: L MTG/STS, R STS L/R caudate/ putamen, L/R SFG, L/R insula, L/R thalamus, R medial OFC, L MFG, L/R occipital lobe, L medial SFG, L pre-CG, R post cingulate/anterior lingual, R calcarine/cuneus, L supramarginal gyrus

Johnston et al. (2014)	Pediat.	--	34 (100)	12.5 (n/a)	99.8	n/a	29	n/a	34 (100)	13.2 (n/a)	103.7	ADHD<TD: Brainstem, putamen
Kappel et al. (2015)	Pediat.	--	14 (71)	9.8 (8-12)	104.6	0	0	n/a	10 (80)	11.0 (8-12)	111.9	ADHD<TD: R STG, R Heschl's gyrus, R rolandic operculum; ADHD>TD: L paracentral lobule, L/R middle orbital gyrus, R FFG, L rectal gyrus
	Adult	--	16 (94)	23.5 (19-31)	97.8	38	0	n/a	20 (100)	23.7 (19-31)	108.4	ADHD<TD: R supramarginal gyrus, R precuneus, L OFG, R hippocampus, L rectal gyrus
Kaya et al. (2018)	Pediat.	--	19 (74)	10.3 (7-14)	113.5	0	0	n/a	18 (67)	10.2 (6-14)	119.7	ADHD>TD: L/R SFG, R MFG, L/R SMA, L/R pre-CG, L post-CG, R MOG, L cuneus
Kobel et al. (2010)	Pediat.	--	14 (100)	10.4 (9-13)	n/a	100	100	n/a	12 (100)	10.9 (9-13)	n/a	ADHD<TD: R S/MTG
Kumar, Arya, and Agarwal (2017)	Pediat.	--	18 (100)	9.6 (7-13)	92.1	n/a	0	0	18 (100)	9.7 (7-13)	109.7	ADHD<TD: L OFC, L MFG/ dlPFC, L MTG, L cerebellum
Li et al. (2015)	Pediat.	--	30 (100)	10.3 (8-14)	121.7	0	0	n/a	30 (100)	10.3 (8-14)	107.1	ADHD<TD: R insula, R OFC
Lim et al. (2015)	Pediat.	--	44 (100)	13.6 (10-18)	92.2	18	14	0	33 (100)	14.3 (10-18)	110	ADHD<TD: L/R cerebellum, L IPL, pre-/post-CG
Maier et al. (2015)	Adult	--	131 (48)	34.5 (18-58)	113.1	27	0	0	95 (47)	37.7 (n/a)	121	--
McAlonan et al. (2007)	Pediat.	--	28 (100)	9.9 (6-13)	109.9	100	100	n/a	31 (100)	9.6 (6-13)	116.5	ADHD<TD: R MFG, L/R SFG/IFG, R globus pallidus/putamen/ thalamus, precuneus, L IPL, L SOG, R cerebellum vermis
Moreno-Alcázar et al. (2016)	Adult	--	44 (66)	31.6 (18-54)	105.0	66	66	n/a	44 (66)	32.6 (18-54)	106.0	ADHD<TD: R SMA/SFG, subgenual ACC, R DLPFC
Onnink et al. (2014)	Adult	--	119 (39)	36.3, (n/a)	107.5	80	69	n/a	107 (42)	36.9 (n/a)	110.2	--
Overmeyer et al. (2001)	Pediat.	--	18 (83)	10.4 (8-13)	99	94	94	n/a	16 (94)	10.3 (7-14)	n/a	ADHD<TD: R PCC, R SFG, L/R putamen/globus pallidus
Ramesh and Rai (2013)	Pediat.	--	15 (26)	16.8 (11-20)	n/a	n/a	n/a	n/a	15 (26)	16.7 (11-20)	n/a	ADHD<TD: L cingulate gyrus, R mid-cingulate gyrus, L SFG, L/R medial SFG, L temporal lobe, L MOG, L cuneus, L STG, L supramarginal gyrus
Roman-Urrestarazu et al. (2016)	Adult	--	49 (76)	22.2 (20-24)	96.6	2	2	0	34 (50)	22.9 (20-24)	112.2	ADHD<TD: L/R caudate
Saad et al. (2017)	Pediat.	--	16 (75)	12.8 (8-17)	n/a	38	38	n/a	28 (68)	13.1 (8–17)	n/a	--
	Pediat.	--	18 (72)	13.7 (8-17)	n/a			n/a	28 (68)	13.1 (8–17)	n/a	--
Sasayama et al. (2010)	Pediat.	--	18 (72)	10.6 (6-16)	90	83	72	0	17 (71)	10.0 (6-14)	n/a	ADHD<TD: L/R amygdala/temporal pole/OFC, L/R occipital cortex, R STS, L parietal cortex, L MFG, L temporal pole, R rectal gyrus, L PHG

Seidman et al. (2011)	Adult	--	74 (51)	37.3 (18-59)	116	69	28	n/a	54 (46)	34.3 (18-59)	115.8	--
Sethi et al. (2017)	Adult	--	30 (63)	33.7 (18-65)	109.0	100	100	n/a	30 (63)	32.6 (18-65)	110.1	ADHD<TD: R IPC
Shimada et al. (2015)	Pediat.	--	17 (88)	10.3 (n/a)	95.3	n/a	n/a	n/a	15 (73)	12.8 (n/a)	104.1	ADHD<TD: L putamen
Stevens and Haney-Caron (2012)	Pediat.	--	24 (67)	15.7 (12-18)	n/a	n/a	n/a	n/a	24 (70)	16.0 (12-18)	n/a	--
van Wingen et al. (2013)	Adult	--	14 (100)	32.0 (22-50)	104	0	0	n/a	15 (100)	37.0 (22-50)	99	ADHD<TD: R putamen, R cerebellum; ADHD>TD: L/R midbrain, R pre-CG
Vilgis, Sun, Chen, Silk, and Vance (2016)	Pediat.	--	48 (100)	12.6 (8-17)	92.2	25	25	n/a	31 (100)	12.8 (8-17)	109.6	ADHD<TD: R SPL, L IPL, L/R S/MFG, medial FG, R MTG
Villemonteix et al. (2015)	Pediat.	--	33 (55)	10.3 (7-13)	105.6	0	0	n/a	24 (50)	10 (7-13)	109.7	ADHD<TD: R insula, R MTG,
	Pediat.	--	20 (80)	10.4 (7-13)	107.4	100	100	n/a	24 (50)	10 (7-13)	109.7	ADHD<TD: R MFG, R pre-CG
Wang, Jiang, Cao, and Wang (2007)	Pediat.	--	12 (100)	13.4 (n/a)	n/a	n/a	0	n/a	12 (100)	13.5 (n/a)	n/a	ADHD<TD: L SPL, R MFG, R MTG, R BG; ADHD>TD: R occipital lobe
P. Yang et al. (2008)	Pediat.	--	57 (61)	11.1 (7-17)	97.9	n/a	86	n/a	57 (60)	11.7 (7-17)	n/a	ADHD<TD: L/R caudate, L/R cerebellum, R calcarine sulcus, L cuneus
(B) fMRI cognitive control studies in ADHD												
Banich et al. (2009)	Adult	Stroop	23 (61)	20.0 (n/a)	116	87	61	n/a	23 (57)	19.0 (n/a)	113	ADHD>TD: R MFG
Bhaijiwala, Chevrier, and Schachar (2014)	Pediat.	Stop	12 (58)	13.8 (9-18)	n/a	100	100	0	12 (50)	15.4 (9-18)	n/a	ADHD<TD: R MFG, R MTG, L cerebellum; ADHD>TD: R MFG/SFG
Booth et al. (2005)	Pediat.	GNG	12 (67)	11.0 (9-12)	n/a	100	100	n/a	12 (58)	11.7 (9-12)	n/a	ADHD<TD: L/R pre-CG, L/R caudate, R caudate head, R IFG, L/R thalamus.
Carmona et al. (2012)	Adult	GNG	19 (100)	33.6 (n/a)	110.9	0	0	n/a	19 (100)	29.4 (n/a)	111.7	ADHD<TD: R STG
Chantiluke, Barrett, Giampietro, Santosh, et al. (2015)	Pediat.	Stop	18 (100)	14.3 (10-17)	95	78	61	0	25 (100)	13.4 (10-17)	109	ADHD<TD:L OFC/STL/putamen/GP, L IPL
Chen et al. (2015)	Adult	GNG	29 (100)	24.9 (n/a)	n/a	0	0	n/a	25 (100)	25.6 (n/a)	n/a	--
Chou, Chia, Shang, and Gau (2015)	Pediat.	Stroop	42 (81)	10.5 (7-17)	108.5	0	0	n/a	20 (80)	12.0 (8-17)	106.5	ADHD<TD: R MFG/IFG (atomoxetine group pre-treatment), L IFG, L SPL, R medial FG (methylphenidate group pre-treatment); ADHD>TD: L/R SPL, pre-CG, L dlPFC, L dACC (atomoxetine group pre-treatment), post-CG (methylphenidate group pre-treatment)
Congdon et al. (2010)	Adult	Stop	35 (54)	30.9 (21-50)	n/a	n/a	29	n/a	62 (45)	30.8 (21-50)	n/a	--

Cubillo et al. (2010) [a]	Adult	Stop, Switch	11 (100)	29.0 (26-30)	92	0	0	n/a	14 (100)	28.0 (26-30)	106	ADHD<TD: L IFC/AI/PMC, R IFC/AI/caudate/thalamus/ putamen/PMC, L/R SMA/ACC (stop), R IFG/insula/caudate/ putamen L IFG/insula/ putamen/pre- /post-CG/inferior parietal (switch)
Cubillo et al. (2014)	Pediat.	Stop	19 (100)	13.1 (10-17)	92	0	0	0	29 (100)	13.8 (10-17)	110	ADHD<TD: L/R IFG, L M/ITG/parietal gyri, R cerebellum/FFG; ADHD>TD: L cerebellum, L/R PCC/occipital gyri, R STG/post-CG/posterior insula/ putamen
Cubillo, Halari, Giampietro, Taylor, and Rubia (2011) [a]	Adult	Simon	11 (100)	29.0 (26-30)	92	0	0	n/a	15 (100)	28.0 (26-30)	112	ADHD<TD: L OFC/IFC/mPFC/ACC/ caudate/PMC
Dibbets, Evers, Hurks, Marchetta, and Jolles (2009) [b]	Adult	GNG	16 (100)	28.9 (21-42)	n/a	88	88	n/a	13 (100)	28.1 (21-41)	n/a	--
Dibbets, Evers, Hurks, Bakker, and Jolles (2010) [b]	Adult	Switch	15 (100)	28.8 (21-42)	n/a	80	80	n/a	14 (100)	28.6 (21-41)	n/a	ADHD<TD: R putamen, R dorsal posterior CG, L mPFC, R thalamus, L OFC/ claustrum/post-CG; ADHD>TD: R MTG, R dACC, R precuneus, R lingual gyrus, L pre-CG/SMA, L insula
Durston, Mulder, Casey, Ziermans, and van Engeland (2006)	Pediat.	GNG	11 (100)	14.0 (8-20)	100	82	55	n/a	11 (100)	15.3 (8-20)	106	--
L. Y. Fan, Chou, and Gau (2017) [c]	Adult	Stroop	12 (42)	28.9 (n/a)	115.8	0	0	n/a	12 (42)	30.3 (n/a)	118.3	ADHD>TD: R IFG, RACC
	Adult	Stroop	12 (42)	32.5 (n/a)	119.9	0	0	n/a	12 (42)	30.3 (n/a)	118.3	ADHD>TD: R IFG
L. Y. Fan, Shang, Tseng, Gau, and Chou (2018)	Pediat.	Stroop	27 (89)	12.1 (9-15)	105.2	0	0	n/a	27 (78)	11.8 (9-16)	110.4	ADHD < TD: R MFG, R post-CG, R SPL
Hwang et al. (2015)	Pediat.	Stroop	26 (65)	13.9 (n/a)	106.4	n/a	42	0	35 (51)	14.5 (n/a)	105.1	ADHD < TD: Medial FG, cerebellar tonsil
Iannaccone, Hauser, Staempfli, et al. (2015)	Pediat.	GNG/ Flanker	18 (50)	14.5 (12-16)	108.5	72	72	n/a	18 (61)	14.8 (12-16)	114.4	ADHD<TD: R MFG/dlPFC/SFG; ADHD>TD: L/R MTG/STG, L insula/putamen/pre-CG, L ITG/FFG/PHG/MTG, L pons, L amygdala/ hippocampus, L FFG/ lingual gyrus, L post-CG/IPG, R brainstem/ pons/cerebellum
Janssen, Heslenfeld, Mourik, Logan, and Oosterlaan (2015)	Pediat.	Stop	21 (90)	10.6 (8-13)	98.6	90	90	n/a	17 (76)	10.3 (8-13)	108.7	ADHD<TD: L/R mPFC, R MFG, R IFG, R pre-CG, R ACC, L SFG; ADHD>TD: L/R ACC, L/R MFG, R mPFC, R PCC, R cuneus, L IFG, L post-CG, L pre-CG.
Konrad, Neufang, Hanisch, Fink, and Herpertz-Dahlmann (2006)	Pediat.	Flanker	16 (100)	10.2 (8-12)	103	0	0	0	16 (100)	10.3 (8-12)	105	ADHD<TD: L pre-CG, R putamen; ADHD>TD: L medial SPL
Kooistra et al. (2010)	Adult	GNG	11 (100)	21.5 (18-25)	110	100	0	n/a	11 (100)	10.1 (18-25)	125	ADHD>TD: L/R ACC, R supramarginal gyrus, L angular gyrus, L/R supramarginal gyrus, R occipital gyrus, L frontal pole, L/R MFG, L/R IFG, L SFG, paracingulate gyrus, medial thalamus, L caudate nucleus, L posterior putamen,

												L lateral occipital gyrus, L/R pre-CG, R post-CG, R mPFC, L PCC, L STG
J. Ma et al. (2012)	Pediat.	GNG	15 (53)	9.8 (8-12)	100.2	27	0	n/a	15 (53)	22.3 (8-12)	102.6	ADHD>TD: R ITF, R midbrain, R pre-CG, R calcarine, R IOG, R MOG, L/R cerebellum, L post-CG, L IFG, R hippocampus
I. Ma et al. (2016)	Pediat.	Stroop	25 (76)	15.4 (14-17)	98.3	n/a	60	n/a	33 (67)	15.3 (14-17)	108.9	--
Massat et al. (2018)	Pediat.	Stop	18 (44)	10.0 (8-12)	106.8	0	0	n/a	19 (47)	10.6 (8-12)	114.4	ADHD>TD: L caudate body, L ventral putamen R dorsal putamen, R insula, L caudate tail, R middle CC, R ACC
Passarotti et al. (2010)	Pediat.	Stop	11 (55)	13.1 (10-18)	107.6	48	0	n/a	15 (48)	9.9 (10-18)	101.2	ADHD<TD: R MFG, R mPFC, L/R I/SFG, L STG; ADHD>TD: R caudate tail, L caudate, L anterior cerebellar vermis
Peterson et al. (2009)	Pediat.	Stroop	16 (81)	14.1 (7-18)	101.2	100	0	n/a	20 (60)	14.1 (7-18)	118.5	ADHD<TD: L ACC, insula R, precuneus, thalamus, caudate; ADHD>TD: R SFG, hippocampus, L ACC
Rasmussen et al. (2016)	Adult	GNG	50 (82)	24.8 (n/a)	102.1	n/a	4	n/a	23 (70)	24.1 (n/a)	109.2	ADHD<TD: R supramarginal gyrus, superior parietal, angular gyrus, L/R MFG. R frontal pole, L/R SPL, L/R IFG, L/R pre-/post-CG, R caudate/ accumbens, L/R precuneus, R OFC, R posterior cingulate gyrus, R insula, R thalamus
Rubia, Smith, Brammer, Toone, and Taylor (2005)	Pediat.	Stop	16 (100)	13.2 (9-16)	100	0	0	n/a	21 (100)	13.4 (9-16)	95	ADHD<TD: R IFC, OFC, pre-CG, STL
Rubia, Halari, Cubillo, et al. (2011) [d]	Pediat.	Simon	12 (100)	13.0 (10-15)	90	0	0	0	13 (100)	14.0 (11-16)	102	ADHD<TD: R IFC/inferior parietal, L vmPFC/BG/thalamus, R SMA/ACC/PCC/SPL, L STL/MTL/occipital
Rubia, Halari, Mohammad, Taylor, and Brammer (2011) [d]	Pediat.	Stop	12 (100)	13.0 (10-15)	90	0	0	0	13 (100)	13.0 (11-16)	102	ADHD<TD: B IFC, insula, ACC, pre-SMA; thalamus; R MTL, occipital, IPL, precuneus, PCC, cerebellum
Schulz et al. (2004)	Pediat.	GNG	10 (100)	17.9 (15-19)	88.4	70	0	0	9 (100)	17.5 (16-19)	91.9	ADHD<TD: R pre-CG, R ITG, L hippocampus, R lingual gyrus, L/R cerebellum; ADHD>TD: L/R MFG, L/R IFG, L medial FG, L ACC, L/R IPL, R precuneus
Schulz et al. (2014)	Adult	GNG	14 (100)	23.3 (19-27)	n/a	71	0	0	14 (100)	22.8 (18-26)	n/a	--
Schulz et al. (2017)	Adult	Stroop	27 (89)	24.2 (21-28)	n/a	74	0	0	28 (86)	24.6 (21-28)	n/a	ADHD<TD: L/R cerebellum, L MTG, R lingual gyrus, R IFG, R MTG, R OFG, R SOG, R precuneus, R IPL. R MOG
Sebastian et al. (2012) [e]	Adult	GNG Stroop Stop	20 (55)	33.3 (n/a)	115.3	0	0	n/a	24 (46)	17.5 (n/a)	115.7	ADHD<TD: R caudate (GNG), R GP (Stop), R post-CG, L para-central lobule/mid-CC, L STG/MTG, R temporal pole, R GP (Stroop)
Shang, Sheng, Yang, Chou, and Gau (2018) [f]	Adult	Stroop	25 (48)	29.1 (17-44)	112.8	0	0	n/a	30 (50)	28.2 (20-42)	115.4	ADHD<TD: L IFG, L/R caudate nucleus
	Adult	Stroop	25 (56)	28.5 (17-50)	113.1	0	0	n/a	30 (50)	28.2 (20-42)	115.4	ADHD<TD: L IFG, L caudate nucleus, L SPL
Siniatchkin et al. (2012)	Pediat.	GNG	12 (83)	9.3 (7-13)	n/a	n/a	n/a	n/a	12 (75)	30.3 (7-13)	n/a	ADHD<TD: ACC, R dlPFC, R caudate nucleus

Smith, Taylor, Brammer, Toone, and Rubia (2006) [g]	Pediat.	GNG	17(100)	12.8 (n/a)	n/a	0	0	0	18 (100)	9.3 (n/a)	n/a	ADHD<TD: L MFG
		Stroop	19 (100)	12.9 (n/a)	n/a	0	0	0	24 (100)	12.8 (n/a)	n/a	--
		Switch	14 (100)	13.3 (n/a)	n/a	0	0	0	27 (100)	12.9 (n/a)	n/a	ADHD<TD: L STG/IFG/pre-CG/insula, R MTG/IFG, IPL/STG
Spinelli et al. (2011)	Pediat.	GNG	13 (69)	10.6 (8-13)	109.2	n/a	15	n/a	17 (47)	13.3 (8-13)	108.8	ADHD>TD: R pre-CG, MFG
Szekely et al. (2018)	Adult	Stop	64 (56)	24.0 (n/a)	n/a	n/a	62.5	n/a	84 (57)	24.5 (n/a)	n/a	--
Tamm, Menon, Ringel, and Reiss (2004)	Pediat.	GNG	10 (100)	16.0 (14-18)	109.2	n/a	50	n/a	12 (100)	10.6 (14-16)	111.6	ADHD<TD: R ACC/SMA/ MFG; ADHD>TD: L M/I/STG
Thornton, Bray, Langevin, and Dewey (2018)	Pediat.	GNG	20 (90)	12.4 (8-17)	109.4	n/a	n/a	0	20 (40)	10.6 (8-17)	112.6	--
van Hulst, de Zeeuw, Rijks, Neggers, and Durston (2017)	Pediat.	GNG	24 (100)	11.2 (8-12)	105.6	n/a	n/a	n/a	26 (100)	10.5 (8-12)	117.3	--
van Rooij et al. (2015)	Pediat.	Stop	108 (64)	15.1 (8-17)	92.7	75	n/a	n/a	77 (49)	16.0 (9-17)	109.2	ADHD<TD: L STG, pre-CG; ADHD>TD: L SMA
	Adult	Stop	77 (78)	20.3 (18-25)	99.1	79	n/a	n/a	45 (33)	14.6 (18-23)	106.4	ADHD<TD: L SFG, R hippocampal gyrus
Zamorano et al. (2017)	Pediat.	Stroop	17 (100)	11.6 (10-12)	104.2	100	100	n/a	17 (100)	11.7 (10-12)	109.8	ADHD>TD: R medial/IFG

Abbreviations. N=sample size, y=year, pediat.=pediatric (child/adolescent) sample, life/cur stim exp=lifetime/current stimulant exposure, com ASD=comorbid autism spectrum disorder based on explicit reporting or study exclusion criteria, ADHD=attentional-deficit/hyperactivity disorder, TD=typically developing controls, L/R=Left/Right, GNG = Go/No-Go. Brain region (in alphabetical order): ACC=anterior cingulate cortex, BG=basal ganglia, dACC=dorsal ACC, dlPFC=dorsolateral prefrontal cortex, FFG=fusiform gyrus, I/M/medial/SFG=inferior/middle/medial/superior frontal gyrus, I/M/SOG=inferior/middle/superior occipital gyrus, I/M/STG=inferior/middle/superior temporal gyrus, I/SPL=inferior/superior parietal lobe, mPFC=medial prefrontal cortex, OFC=orbital frontal cortex, OFG=orbital frontal gyrus, PCC=posterior cingulate cortex, pre-/post-CG=pre-/post-central gyrus, PHG=parahippocampal gyrus, PMC=premotor cortex, SMA=supplementary motor area, STS=superior temporal sulcus

Table S2b. Sample Characteristics and Summary Findings of VBM and fMRI Cognitive Control Studies in ASD

Source	Age group	Task	Patients				Controls			Summary findings
			N (% male)	Age (Range), y	IQ	Com ADHD %	N (% male)	Age (Range), y	IQ	
(A) VBM studies in ASD										
Abell et al. (1999)	Adult	--	15 (80)	28.8 (n/a)	n/a	n/a	15 (80)	25.3 (n/a)	n/a	ASD<TD: R paracingulate, L IFG, L occipito-temporal junction; ASD>TD: L amygdala, L/R anterior cerebellum, L MTG, R ITG
Boddaert et al. (2004)	Pediat.	--	21 (76)	9.3 (7-15)	n/a	n/a	12 (58)	10.8 (7-15)	n/a	ASD<TD: L/R STS
Bonilha et al. (2008)	Pediat.	--	12 (100)	12.4 (8-15)	n/a	n/a	16 (100)	13.2 (n/a)	n/a	ASD>TD: L/R IFG, L/R cuneus, L/R ACC, R PCC, claustrum, L/R precuneus, L/R STG, L/R MTG, L ITG, thalamus (pulvinar), L/R SFG, L/R SPL, L insula, L putamen, R caudate, L/R FFG, L/R occipital gyrus, L lingual gyrus, L pre-CG, L post-CG, L/R thalamus, L/R PHG, L/R mPFC, R IPL
Brieber et al. (2007)	Pediat.	--	15 (100)	14.2 (10-16)	106.8	0	15 (100)	13.3 (10-16)	107.7	ASD<TD: L/R ITG/hippocampus/ amygdala, L MOG, L PMC, L hippocampus; ASD>TD: R supramarginal gyrus, L post-CG
Cai et al. (2018)	Pediat.	--	38 (84)	9.6 (5-16)	75.8	n/a	27 (96)	8.3 (5-14)	98.6	ASD<TD: R cerebellum anterior lobe, R precuneus, R angular gyrus; ASD>TD: L ITG, L/R MTG
Cheng, Chou, Fan, and Lin (2011)	Pediat.	--	25 (100)	13.7 (10-18)	101.6	n/a	25 (100)	13.5 (11-18)	109.0	ASD<TD: R IFG, R pre-CG, L post-CG, cuneus, thalamus, lingual gyrus, STG; ASD>TD: ACC, paracentral lobule, SPL, precuneus, MFG, FFG, subcallosal gyrus
Contarino, Bulgheroni, Annunziata, Erbetta, and Riva (2016)	Pediat.	--	25 (88)	6.1 (2-12)	56	n/a	25 (65)	6.1 (2-12)	103	--
M. Craig et al. (2007)	Adult	--	14 (0)	37.9 (n/a)	103.4	n/a	19 (0)	35.0 (n/a)	111.2	ASD<TD: Cuneus, L ITG/STG, R MTG, R ACC
D'Mello, Crocetti, Mostofsky, and Stoodley (2015)	Pediat.	--	35 (86)	10.4 (8-13)	n/a	n/a	35 (60)	10.4 (8-13)	n/a	ASD<TD: R lingual gyrus, R cerebellum, R angular gyrus; ASD>TD: L PCC/precuneus, R SFG, L MOG
Ecker et al. (2012)	Adult	--	89 (100)	27.0 (18-43)	110	n/a	89 (100)	28.0 (18-43)	113.0	ASD<TD: R occipital/ITG/MTG, R cerebellum, R posterior FFG, R lingual gyrus, L/R inferior and R SOG, R cuneus, precuneus, R PCC; ASD>TD: L /R ITG/MTG/STG/ L/R FFG/PHG/insula, L IFG, L putamen/caudate, L thalamus, L/R dlPFC/ MFG/pre-/post-CG, R IPL
Foster et al. (2015)	Pediat.	--	38 (100)	12.4 (6-17)	102.5	n/a	46 (100)	12.6 (7-17)	113.1	ASD<TD: R STG, L/R supramarginal gyrus, L cerebellum; ASD>TD: R central sulcus, L medial FG, L/R IFG, L/R pre-CG, L MFG, L pre-SMA, R SFG, L ACC, L OFC, L ITG/STG. L/R MTG, L Heschl's gyrus, R lingual gyrus, L FFG, L post-CG, L PCC, L precuneus, R supramarginal/angular gyrus, L IOG, L/R cuneus, L putamen, L caudate
Freitag et al. (2008)	Mixed	--	15 (87)	17.5 (n/a)	101.2	n/a	15 (87)	18.6 (n/a)	112.1	ASD<TD: R intraparietal sulcus

Greimel et al. (2013)	Mixed	--	47 (100)	18.3 (10-50)	107.5	13	51 (100)	21.4 (8-47)	112.5	ASD<TD: ACC, L/R posterior STS, R MTG
Groen, Buitelaar, van der Gaag, and Zwiers (2011)	Pediat.	--	17 (82)	14.4 (12-18)	98.0	n/a	25 (88)	15.5 (12-18)	105.0	--
Hyde, Samson, Evans, and Mottron (2010)	Mixed	--	15 (100)	22.7 (14-33)	100.4	n/a	15 (100)	19.2 (14-34)	106.6	ASD<TD: R post-CG, L/R pre-CG; ASD>TD: Brainstem/midbrain, reticular, medial FG/OFC, L/R MFG
Itahashi et al. (2015)	Adult	--	46 (100)	30.2 (19-50)	106.0	n/a	46 (100)	30.5 (19-47)	109.2	--
Katz et al. (2016)	Adult	--	23 (100)	26.6 (18-45)	n/a	n/a	32 (100)	29.8 (19-48)	n/a	ASD>TD: L/R OFC, ACC
Kaufmann et al. (2013)	Pediat.	--	10 (80)	14.7 (n/a)	102.3	n/a	10 (80)	13.8 (n/a)	109.5	ASD<TD: Lateral portion of R precuneus; ASD>TD: L medial FG, R precuneus
Ke et al. (2008)	Pediat.	--	17 (82)	8.9 (6-14)	108.8	n/a	15 (80)	9.7 (6-14)	109.8	ASD<TD: R PHG; ASD>TD: L/R supramarginal gyrus, post-CG, R MFG, R cerebellum
Kosaka et al. (2010)	Adult	--	32 (100)	23.8 (17-32)	101.6	n/a	40 (100)	22.5 (18-34)	109.7	ASD<TD: R insula, R IFG, R IPL
Kurth et al. (2011)	Pediat.	--	52 (73)	11.2 (5-20)	102.2	n/a	52 (73)	11.1 (6-19)	106.0	ASD<TD: Hypothalamus
Kwon, Ow, Pedatella, Lotspeich, and Reiss (2004)	Pediat.	--	20 (100)	13.5 (10-18)	n/a	n/a	13 (100)	13.6 (10-18)	n/a	ASD<TD: R ITG, R entorhinal cortex, R FFG
Langen et al. (2009)	Pediat.	--	99 (92)	12.9 (7-24)	107.6	n/a	89 (92)	12.4 (6-24)	110.0	--
Lim et al. (2015)	Pediat.	--	19 (100)	14.9 (11-17)	113.0	0	33 (100)	14.9 (11-17)	110.0	ASD>TD: L MTG/STG, L medial FG
Lin, Ni, Lai, Tseng, and Gau (2015)	Pediat. (Child)	--	28 (100)	10.7 (7-12)	106.9	9	43 (100)	10.6 (7-12)	115.2	ASD<TD: R post-CG, precuneus, L MOG; ASD>TD: L subcallosal gyrus, L/R sublobar areas
	Pediat. (Adole scent)	--	40 (100)	14.7 (13-17)	101.5		18 (100)	15.5 (13-17)	108.7	--
	Adult	--	18 (100)	22.2 (18-29)	99.6		29 (100)	23.4 (18-29)	116.8	ASD>TD: L/R SFG, L MFG
Lin, Tseng, Lai, Chang, and Gau (2017)	Pediat.	--	20 (100)	13.5 (8-19)	103.8	0	54 (100)	12.8 (8-19)	112.5	ASD>TD: L cerebellum crus I
McAlonan et al. (2002)	Adult	--	17 (90)	32.0 (18-49)	96.0	n/a	24 (92)	33.0 (18-49)	114.0	ASD<TD: R cerebellum, L/R lenticular nucleus, R CG, L/R MFG, R SFG, precuneus
McAlonan et al. (2008)	Pediat.	--	33 (82)	11.6 (7-16)	113.2	0	55 (86)	10.7 (7-16)	117.1	ASD<TD: L dlPFC, L/R BG, L/R inferior cerebellar vermis, L STS, posterior parietal cortices
Mengotti et al. (2011)	Pediat.	--	20 (90)	7.0 (4-14)	n/a	0	22 (91)	7.7 (4-11)	n/a	ASD<TD: L SMA, R IFG; ASD>TD: R IPL, L/R ITG, L SPL, R SOG, precuneus
Mueller et al. (2013)	Adult	--	12 (75)	35.5 (n/a)	111.3	n/a	12 (67)	33.3 (n/a)	110.8	ASD<TD: L/R TPJ, L/R temporal lobe, L/R IFG, L MFG, L frontal pole, L/R mPFC, paracingulate gyrus

Ni et al. (2018)	Pediat.	--	81 (100)	12.6 (7-17)	107.4	14.8	61 (100)	12.4 (7-17)	112.0	ASD<TD: L lateral occipital/superior parietal cortex, L frontal pole
Pereira et al. (2018)	Mixed		19 (82)	17.4 (14-25)	99.8	n/a	25 (66)	18.5 (14-25)	105.8	ASD<TD: L/R cerebellum, posterior lobe, R cerebellum anterior lobe, L FFG, L/R CG, L paracentral lobule, R MFG, L claustrum, R medial FG, L PHG L amygdala, L post-CG, R SFG; ASD>TD: L/R brainstem, R cerebellum, posterior lobe
Poulin-Lord et al. (2014)	Mixed	--	23 (87)	19.8 (14-30)	100.3	n/a	22 (86)	22.6 (15-35)	107.3	--
Poustka et al. (2012)	Pediat.	--	18 (89)	9.7 (6-12)	111.0	n/a	18 (89)	9.7 (6-12)	112.8	--
Radeloff et al. (2014)	Mixed	--	34 (91)	19.1 (14-33)	105.7	n/a	26 (85)	19.5 (14-27)	107.8	--
Retico et al. (2016)	Pediat.	--	76 (50)	4.6 (3-7)	71	n/a	76 (50)	4.6 (2-7)	73	ASD<TD: L posterior MTG, L cerebellum, L/R temporal pole; ASD>TD: L precuneus, L PCC, R posterior STG, R MTG/ITG, R mPFC, L SPL, mid-CC
Riedel et al. (2014)	Adult	--	30 (63.3)	35.4 (21-52)	124.5	n/a	30 (63)	35.5 (22-53)	123.6	--
Riva et al. (2013)	Pediat.	--	26 (89)	5.8 (2-10)	51.6	n/a	21 (62)	6.8 (3-10)	n/a	ASD<TD: L/R cerebellum crus II, vermis 8/9, L/R hippocampus, L IFG, L MOG/SOG, L ITG, L SFG. R IOG, R post-CG
Rojas et al. (2006)	Mixed	--	24 (100)	20.8 (7-44)	94.8	n/a	23 (100)	21.4 (7-44)	118.7	--
Sato et al. (2017)	Adult	--	36 (69.4)	27.0 (18-53)	110.4	n/a	36 (69)	24.9 (20-43)	n/a	ASD<TD: R IOG/ITG/MTG, L FFG, L/R amygdala, R PHG, R L/MFG, R SMA, L/R CG, ACC, L/R medial SFG, R OFG
Schmitz et al. (2006)	Adult	--	10 (100)	38.0 (18-52)	105.0	0	12 (100)	39.0 (18-52)	106	ASD>TD: L IFG, ACC, R SFG, L/R MFG
Toal et al. (2010)	Adult	--	65 (88)	31.0 (16-59)	98.0	n/a	33 (91)	32.0 (19-58)	105	ASD<TD: R cerebellum/PHG/ FFG, R ITG/STG L PHG/STG/TG/FFG/ cerebellum
Waiter et al. (2004)	Pediat.	--	16 (100)	15.4 (12-20)	100.4	n/a	16 (100)	15.5 (12-20)	99.7	ASD<TD: R thalamus; ASD>TD: L SFG, R FFG, R mPFC, L MTG, R PCC, L/R STG, L lingual gyrus, L IFG, L MFG, L IOG, L PHG
Wang et al. (2017)	Pediat.	--	31 (100)	4.8 (3-7)	62.5	n/a	31 (100)	4.8 (3-6)	97.1	ASD>TD: L STG, L post-CG
Wilson, Tregellas, Hagerman, Rogers, and Rojas (2009)	Adult	--	10 (80)	30.1 (22-47)	91.5	n/a	10 (70)	29.4 (21-43)	127.2	--
Q. Yang et al. (2018)	Pediat.	--	16 (63)	10.4 (6-15)	45.3	n/a	16 (63)	10.5 (6-15)	97.5	ASD<TD: L cerebellum, L caudate
(B) fMRI studies in ASD										
Ambrosino et al. (2014)	Pediat.	GNG	19 (100)	11.5 (9-12)	112	n/a	19 (100)	11.1 (9-14)	120	--
Chantiluke, Barrett, Giampietro, Santosh, et al. (2015)	Pediat.	Stop	19 (100)	14.7 (10-17)	112	0	25 (100)	13.4 (10-17)	109	ASD<TD: L IPL; ASD>TD: R IFC, L IFG/MFG

Daly et al. (2014)	Adult	GNG	14 (100)	31 (n/a)	115	n/a	14 (100)	31 (n/a)	123	ASD<TD: R IFG, L thalamus; ASD>TD: R caudate, R cerebellum
Denisova et al. (2017)	Mixed	Simon	20 (95)	22.7 (n/a)	n/a	n/a	20 (95)	23.2 (n/a)	n/a	ASD>TD: R lingual gyrus, R cerebellum, R ITG
Duerden et al. (2013)	Adult	GNG	16 (69)	27.2 (19-39)	112	0	17 (71)	30.7 (20-43)	114	ASD<TD: R MFG; ASD>TD: R IFG, R FFG
J. Fan et al. (2012)	Adult	Flanker	12 (75)	30 (n/a)	115	n/a	12 (83)	28 (n/a)	120	ASD<TD: ACC
Gooskens et al. (2018)	Pediat.	Stop	26 (35)	11.3 (8-12)	108.9	n/a	53 (45)	10.8 (8-12)	111.9	--
Kana, Keller, Minshew, and Just (2007)	Adult	GNG	12 (92)	26.8 (n/a)	110	n/a	12 (92)	22.5 (n/a)	117	ASD<TD: L ITG, R PHG, R calcarine sulcus, R PMC, R mid-CC, L/R post-CG, R insula/IFG, L lingual gyrus
Kennedy et al. (2006)	Adult	Stroop	15 (100)	25.5 (15-44)	96	n/a	14 (100)	26.1 (n/a)	n/a	ASD>TD: mPFC, precuneus
Prat, Stocco, Neuhaus, and Kleinhans (2016)	Adult	GNG	16 (63)	25.3 (18-35)	107.4	n/a	17 (65)	25.6 (19-44)	111.0	--
Schmitz et al. (2006)	Adult	GNG, Switch, Stroop	10 (100)	38 (18-52)	105	0	12 (100)	39 (18-52)	106	ASD>TD: L M/IFG, OFC (GNG), insula (Stroop), and IPL, mesial parietal lobe (Switch)
Shafritz, Dichter, Baranek, and Belger (2008)	Adult	Switch	18 (89)	22.3 (n/a)	103	n/a	15 (87)	24.3 (n/a)	111	ASD<TD: L dlPFC, ACC, L intraparietal sulcus, L BG, L insula
Shafritz, Bregman, Ikuta, and Szeszko (2015)	Mixed	GNG	15 (80)	18.1 (13-23)	102	0	15 (80)	18.4 (12-23)	115	ASD<TD: R IFG/insula
Solomon et al. (2014)	Pediat.	Switch	27 (19)	15.4 (12-18)	108	55	27 (19)	16.1 (12-18)	113	ASD<TD: L PCC, L lingual gyrus, L MOG
Vaidya et al. (2011)	Pediat.	Stroop	11 (100)	10.8 (7-12)	114	n/a	14 (100)	11.0 (n/a)	119	ASD<TD: ACC, L MFG, R caudate
van Hulst et al. (2017)	Pediat.	GNG	26 (100)	10.8 (8-12)	109.6	n/a	26 (100)	10.5 (8-12)	117.3	--
Velasquez et al. (2017)	Adult	GNG	19 (68)	25.8 (18-35)	111	0	22 (73)	29.0 (20-46)	112	ASD<TD: R ACC, post-CG, R lateral occipital cortex
Yerys et al. (2015)	Pediat.	Switch	20 (80)	11.3 (7-14)	115	n/a	19 (68)	11.4 (7-13)	120	ASD>TD: L MFG/ pre-CG, L SFG/ dACC, R IFG

Abbreviations. N=sample size, y=year, pediat.=pediatric (child/adolescent) sample, com ADHD=comorbid attention-deficit/hyperactivity disorder based on explicit reporting or study exclusion criteria, ASD=autism spectrum disorder, TD=typically developing controls, L/R=Left/Right, GNG = Go/No-Go. Brain region (in alphabetical order): ACC=anterior cingulate cortex, BG=basal ganglia, dACC=dorsal ACC, dlPFC=dorsolateral prefrontal cortex, FFG=fusiform gyrus, I/M/medial/SFG=inferior/middle/medial/superior frontal gyrus, I/M/SOG=inferior/middle/superior occipital gyrus, I/M/STG=inferior/middle/superior temporal gyrus, I/SPL=inferior/superior parietal lobe, mPFC=medial prefrontal cortex, OFC=orbital frontal cortex, OFG=orbital frontal gyrus, PCC=posterior cingulate cortex, pre-/post-CG=pre-/post-central gyrus, PHG=parahippocampal gyrus, PMC=premotor cortex, SMA=supplementary motor area, STS=superior temporal sulcus

Supplement 3: Meta-analyses in Pediatric Sample with ADHD and ASD

Table S3a. Characteristics of Overall Pediatric Sample and Age-, Sex- and IQ-matched Subgroups

	ADHD	ASD	TD_{ADHD}	TD_{ASD}
(A) Overall Sample				
VBM				
N	615	848	568	869
% males	81	87	82	86
Mean age (range), y	11.6 (6-20)	10.8 (2-24[a])	12.0 (6-20)	10.8 (2-24[a])
Mean FSIQ (SD)	102 (9.7)	94 (18.4)	110 (5.0)	106 (11.1)
fMRI during Cognitive Control				
N	568	--	572	--
% males	79	--	73	--
Mean age (range), y	13.0 (7-20)	--	13.1 (7-20)	--
Mean FSIQ (SD)	101 (6.7)	--	109 (5.5)	--
fMRI during Motor Response Inhibition				
N	389	--	395	--
% males	77	--	72	--
Mean age (range), y	13.1 (7-20)	--	13.0 (7-20)	--
Mean FSIQ (SD)	99 (7.1)	--	109 (5.5)	--
(B) Matched Subgroups				
VBM				
N	596	741	550	765
% males	82	86	82	84
Mean age (range), y	11.7 (6-20)	11.0 (2-24[a])	12.0 (6-20)	11.0 (2-24[a])
Mean FSIQ (SD)	101 (2.4)	96 (4.7)	109 (1.1)	106 (4.1)

Abbreviations: N = overall number of subjects, TD_{ASD} = typically developing controls in the ASD studies, TD_{ADHD} = typically developing controls in the ADHD studies, VBM = voxel-based morphometry, fMRI = functional Magnetic Resonance Imaging, % males = proportion of males among the samples, y = year, FSIQ = full scale IQ, and SD = standard deviation. The demographic characteristics presented here were calculated from the independent datasets with non-overlapping participants. Due to insufficient number of independent datasets, no fMRI meta-analysis in pediatric groups were carried out and no demographic information is reported here. [a]included one study primarily in adolescents with upper age limit of 24 years.

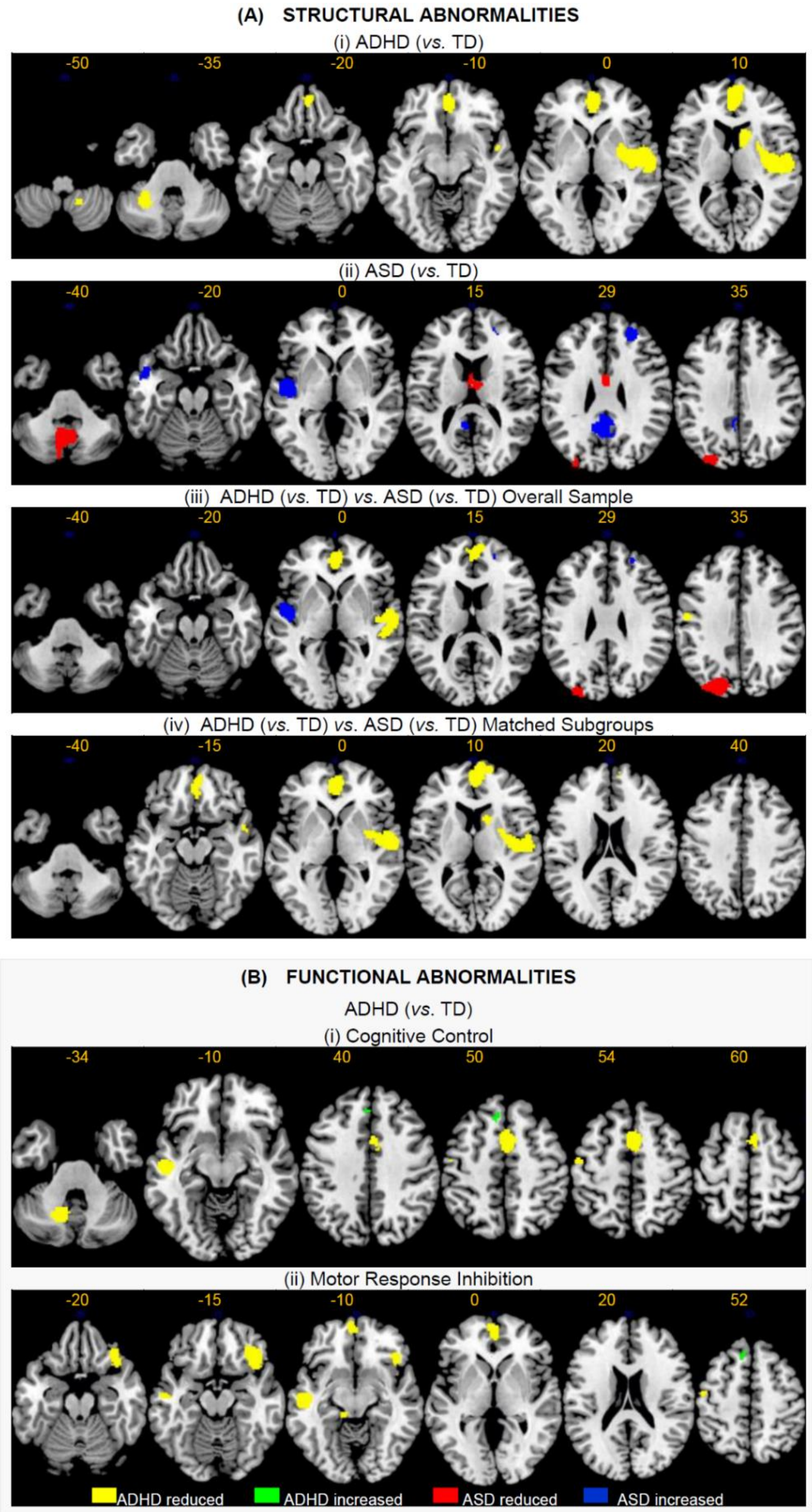
Table S3b. Structural and Functional Abnormalities in Pediatric Sample with ADHD and ASD

Contrasts	MNI coord. x, y, z	SDM Z	p-value	Voxels No	BA
(A) Structural Abnormalities					
(i) ADHD *vs*. TD					
ADHD < TD					
R STG/putamen/posterior insula*	56,-14,8	2.47	.0003	1709	48/22/38
rACC/vmPFC/vmOFC*	6,50,8	2.61	.0001	1223	32/10/11
R caudate*	18,12,10	2.44	.0003	353	--
L cerebellum hemispheric lobule VI	-28,-48,-34	2.08	.002	155	--
R cerebellum hemispheric lobule IX	16,-52,-46	1.93	.004	32	--
ADHD > TD					
Nil	--	--	--	--	--
(ii) ASD *vs*. TD					
ASD < TD					
L cerebellum lobule VIII*	-8,-66,-46	1.58	.0002	890	--
L MOG/SPG	-26,-82,40	1.59	.0002	415	19/7
Dorsomedial thalamus*	4,-4,16	1.48	.0003	144	--
Middle cingulate gyrus	0,-6,28	1.18	.002	23	--
ASD > TD					
L anterior temporal pole/STG/MTG*	-46,-10,-6	2.40	.00005	1051	21/48/22/20/38
Precuneus/PCC*	-4,-55,22	2.40	.00005	651	23/30/26
R MFG/SFG/dlPFC*	26,46,28	2.42	.00003	236	46/9
ADHD (*vs.* TD) *vs.* ASD (*vs.* TD)					
(iii) Overall Sample					
ADHD (*vs.* TD) reduced *vs.* ASD (*vs.* TD)					
R STG/MTG/AI	58,-12,0	2.29	.0006	938	22/21/48/38
mPFC/rACC/vmOFC*	6,58,10	2.46	.0003	906	10/32/11
L post-CG	-54,-12,34	2.02	.002	59	3/4
ASD (*vs.* TD) reduced *vs.* ADHD (*vs.* TD)					
L MOG	-24,-82,40	1.22	.0001	820	19
ASD (*vs.* TD) increased *vs.* ADHD (*vs.* TD)					
L posterior insula/STG/MTG*	-46,-8,-2	2.29	.0006	446	48/38
R MFG/dlPFC*	24,46,24	2.37	.0004	110	46
(iv) Matched Subgroups					
ADHD (*vs.* TD) reduced *vs.* ASD (*vs.* TD)					
R putamen/AI/STG	58,-12,2	2.09	.0006	1369	22/48
rACC/vmPFC/vmOFC*	6,60,12	2.36	.0001	1291	10/11/32
R caudate	14,14,8	1.87	.002	67	--
(B) Functional Abnormalities					
ADHD vs. TD					
(i) Cognitive Control					
ADHD < TD					
SMA/dmPFC*	4,6,50	1.72	.0001	554	6/32/24
L anterior MTG*	-50,-18,-10	1.63	.0003	197	48/22/20/21
L middle cerebellar peduncle	-14,-62,-36	1.26	.002	154	--
L post-CG*	-48,-10,56	1.23	.002	22	6
ADHD>TD					
L medial SFG	-8, 28, 48	1.09	.002	45	8/9/32

(ii) Motor Response Inhibition					
ADHD < TD					
R vlPFC/OFC/AI*	38,28,-16	1.74	.0005	379	47/38
L anterior MTG*	-52,-18,-10	2.06	.0001	323	22/21/10/48
vmOFC	-4,56,-6	1.43	.002	326	10
L lingual gyrus	-10,-32,-8	1.35	.003	47	27
L post-CG*	-48,-10,56	1.48	.002	27	6
ADHD > TD					
L medial SFG	-8,28,50	1.29	.002	39	8

Abbreviations: MNI = Montreal Neurological Institute, SDM = seed-based d mapping, BA = Brodmann Area, TD = typically developing controls, L/R = left/right. Brain regions (in alphabetical order): AI = anterior insula, dlPFC = dorsolateral prefrontal cortex, dmPFC = dorsomedial prefrontal cortex, mPFC = medial prefrontal cortex, MOG = middle occipital gyrus, M/SFG = middle/superior frontal gyrus, M/STG = middle/superior temporal gyrus, OFC = orbitofrontal cortex, PCC = posterior cingulate cortex, PHG =parahippocampal gyrus, pre-/post-CG =pre-/post-central gyrus, rACC = rostral anterior cingulate cortex, SMA =supplementary motor area, SPG = superior parietal gyrus, vlPFC = ventrolateral prefrontal cortex, vmOFC = ventromedial orbitofrontal cortex, vmPFC =ventromedial prefrontal cortex. Asterisks indicate overlapping impairments with findings in the age non-stratified overall samples. Bold fonts indicate overlapping disorder-differentiating impairment between the overall pediatric samples and age-, sex- and IQ-matched pediatric subgroups. No pediatric comparative fMRI meta-analyses involving the ASD population were carried out due to insufficient number of ASD independent datasets.

Figure S3. Structural and Functional Abnormalities in Pediatric Sample with ADHD and ASD



Abnormalities in the (A) gray matter volume (GMV) and (B) brain activations during (i) cognitive control and (ii) motor response inhibition only in ADHD relative to typically developing (TD) controls. A statistical threshold of $p < .005$ and a cluster extent of 20 voxels were used.

Supplement 4: Meta-analyses in Adults with ADHD and ASD

Table S4a. Characteristics of Adult Overall Sample and Subgroups Matched on Age, Sex and IQ

	ADHD	ASD	TD_{ADHD}	TD_{ASD}
(A) Overall Sample				
VBM				
N	611	417	531	427
% males	57	87	58	87
Mean age (range), y	32.0 (18-65)	29.1 (16[a]-59)	32.4 (18-65)	27.7 (18-58)
Mean FSIQ (SD)	108 (5.6)	104 (11.5)	112 (5.7)	113 (6.0)
fMRI during Cognitive Control				
N	433	152	432	135
% males	75	85	65	84
Mean age (range), y	25.4 (17-50)	28.7 (15[b]-52)	25.8 (18-50)	28.4 (18-52)
Mean FSIQ (SD)	106 (6.6)	108 (5.8)	112 (4.6)	114 (5.3)
fMRI during Motor Response Inhibition				
N	346	--	339	--
% males	77	--	65	--
Mean age (range), y	25.4 (18-50)	--	26.0 (18-50)	--
Mean FSIQ (SD)	103 (5.3)	--	111 (5.2)	--
(B) Matched Subgroups				
VBM				
N	287	232	275	223
% males	71	77	70	75
Mean age (range), y	27.7 (18-65)	31.4 (16[a]-59)	28.4 (18-65)	28.5 (18-58)
Mean FSIQ (SD)	103 (5.7)	102 (13.6)	108 (4.5)	114 (8.7)
fMRI during Overall Cognitive Control				
N	257	152	241	135
% males	81	85	80	84
Mean age (range), y	26.5 (17-50)	28.7 (15[b]-52)	26.0 (18-50)	28.4 (18-52)
Mean FSIQ (SD)	109 (6.8)	108 (5.8)	114 (3.8)	114 (5.3)

Abbreviations: N = overall number of subjects, TD_{ASD} = controls in the ASD studies, TD_{ADHD} = controls in the ADHD studies, VBM = voxel-based morphometry, fMRI = functional Magnetic Resonance Imaging, % males = proportion of males among the samples, y = year, FSIQ = full scale IQ, and SD = standard deviation. The demographic characteristics presented here were calculated from the independent datasets with non-overlapping participants. There were insufficient number of adult ASD fMRI datasets during motor control thus no meta-analyses involving adult ASD participants were conducted during prepotent response inhibition and the participant characteristics are not reported in this table. [a] included one study primarily in adults with lower age limit of 16 years. [b] included a study conducted primarily in adult with 3/12 participants aged 15-16 years old.

Table S4b. Structural and Functional Abnormalities in Adults with ADHD and ASD

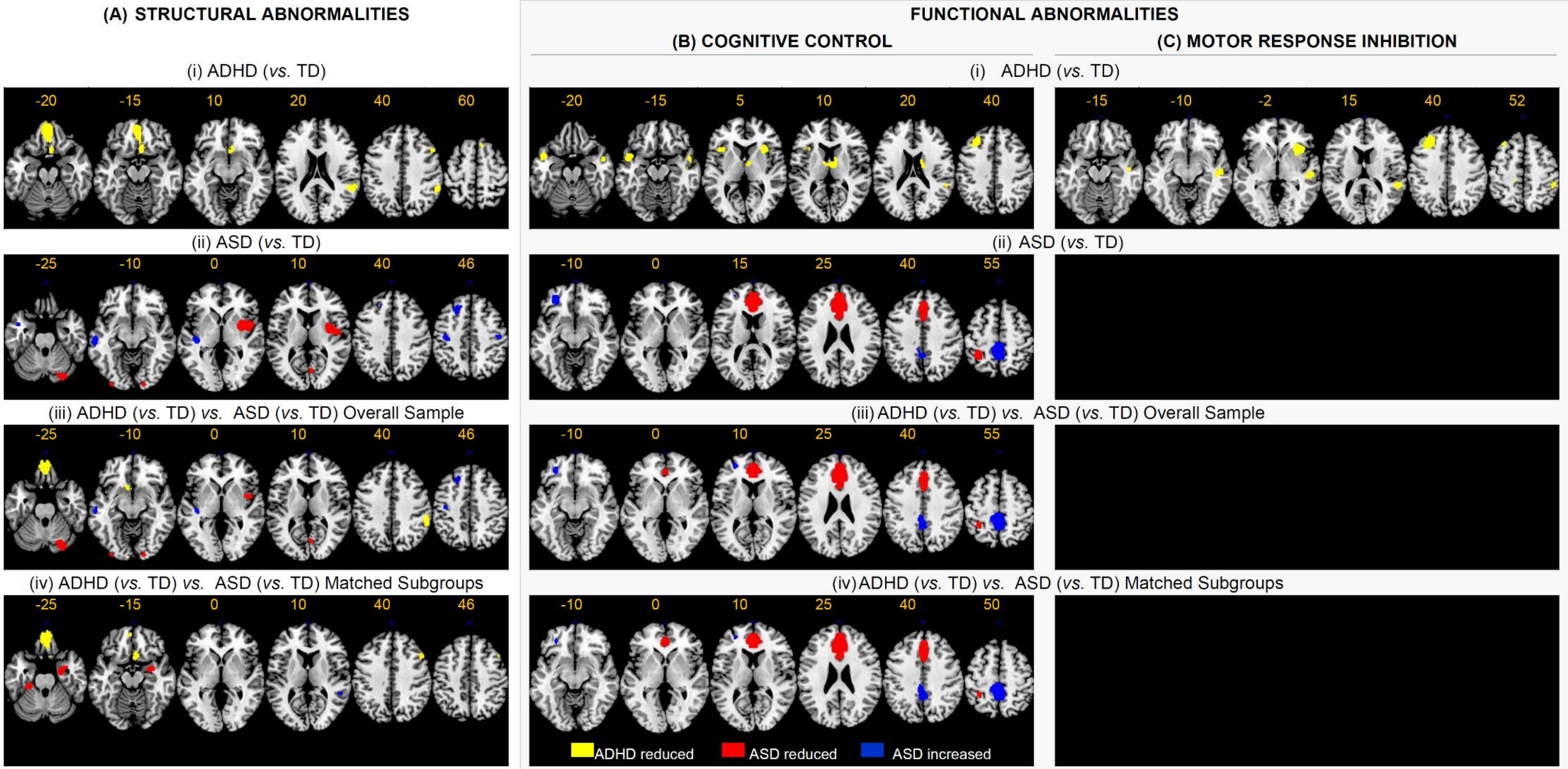
Contrasts	MNI coord. x, y, z	SDM Z	*p*-value	Voxels No	BA
(A) Structural Abnormalities					
(i) ADHD *vs.* TD					
ADHD < TD					
vmOFC/subcallosal gyrus*	0,56,-24	1.81	.00005	952	11/25
R supramarginal gyrus/posterior MTG/STG	54,-42,24	1.45	.0005	680	48/42/40/22/21/41
R IFG/MFG	46,16,40	1.11	.003	53	44/9
R SMA	8,26,64	1.03	.004	27	8
ADHD>TD					
Nil	--	--	--	--	--
(ii) ASD *vs.* TD					
ASD < TD					
R putamen/posterior insula	38, 6, -2	1.86	.001	920	48
R cerebellum crus I	26, -78, -24	1.80	.001	174	19/18
L/R cuneus	6, -70, 12	1.85	.001	67	17/18
R lingual gyrus	18,-96,-10	1.84	.001	45	18
L MOG	-36,-94,-10	1.73	.002	30	18
ASD > TD					
L anterior MTG/ITG*	-60,-22,-16	2.15	.00002	266	21/20/22
L pre-/post-CG	-38,-16, 50	1.75	.0002	212	6/4
L SFG/MFG/dlPFC	-20, 28, 44	1.84	.0001	117	9/8/32
L posterior STG	-40, -22, -2	1.61	.0007	111	48
R pre-/post-CG	46, -18, 50	1.50	.002	98	6/4
L MTG	-44, 4, -26	1.68	.0005	37	20/21
ADHD (*vs.* TD) *vs.* ASD (*vs.* TD)					
(iii) Overall Sample					
ADHD (*vs.* TD) reduced *vs.* ASD (*vs.* TD)					
vmOFC/subcallosal gyrus*	-4,56,-22	1.87	.00004	672	11
vmOFC/gyrus rectus*	-10,16,-12	1.29	.002	65	11
R supramarginal gyrus	58,-36,38	1.42	.0007	269	40/48
ASD (*vs.* TD) reduced *vs.* ADHD (*vs.* TD)					
R cerebellum, crus I	26,-78,-24	1.37	.002	261	--
R insula	44,2,2	1.34	.002	104	--
R occipital pole	6,-72,12	1.47	.001	60	18
R lingual gyrus	18,-94,-10	1.59	.0006	50	18
L occipital pole	-36,-94,-10	1.32	.002	27	18
ASD (*vs.* TD) increased *vs.* ADHD (*vs.* TD)					
L MTG*	-60,-22,-16	1.56	.0003	154	21/20
L pre-CG	-38,-16,50	1.33	.001	90	6
L dlPFC/MFG/SFG	-20,30,46	1.45	.0006	62	9/8
(iv) Matched Subgroups					
ADHD (*vs.* TD) reduced *vs.* ASD (*vs.* TD)					
vmOFC/subcallosal gyrus*	0,48,-28	1.39	.0006	604	11
vmOFC/gyrus rectus*	6,14,-18	1.15	.002	87	11
R IFG/MFG	46,18,40	1.25	.001	59	44
ASD (*vs.* TD) reduced *vs.* ADHD (*vs.* TD)					
R amygdala/PHG/FFG	30,-2,-22	1.95	.0003	375	36/34/28
L FFG	-28,-32,-26	1.49	.003	84	20/30/27

ASD (*vs.* TD) increased *vs.* ADHD (*vs.* TD)					
R posterior STG*	56,-42,22	1.24	.001	180	42/48/41
(B) Functional Abnormalities during Cognitive Control					
(i) ADHD *vs.* TD					
ADHD < TD					
L MFG/dlPFC*	-26,34,40	1.71	.0002	361	9/46/8
R caudate/dorsomedial thalamus*	6,-6,12	1.76	.0001	364	--
R AI/putamen*	30,24,2	1.40	.002	274	47/48
L temporal pole/STG/insula*	-48,8,-14	1.43	.001	270	38/21/48
L AI/IFG*	-36,20,6	1.37	.002	86	48/45
R temporal pole/MTG/STG*	52,4,-18	1.31	.003	74	21/38
R MTG/STG*	52,-12,-12	1.26	.003	41	22/20
R posterior STG	56,-40,18	1.30	.003	29	42
ADHD>TD					
Nil	--	--	--	--	--
(ii) ASD *vs.* TD					
ASD < TD					
rdACC/dmPFC*	-2,36,22	1.99	.00001	2885	32/24
L IPL/SPL*	-34,-46,52	1.43	.001	321	40/2/7
ASD > TD					
Precuneus*	6,-48,60	1.77	.00004	1181	5/4
L vlPFC/OFC*	-32,44,-14	1.35	.001	103	11/47
L MFG/dlPFC*	-26,48,14	1.35	.001	57	46/10
ADHD (*vs.* TD) *vs.* ASD (*vs.* TD)					
(iii) Overall Sample					
ASD (*vs.* TD) reduced *vs.* ADHD (*vs.* TD)					
mPFC/rACC/vmPFC/vmOFC*	0,36,20	2.70	.0000008	2948	32/24//9/10
L IPL/SPL/post-CG	-34,-42,54	1.29	.001	108	40/2/3
ASD (*vs.* TD) increased *vs.* ADHD (*vs.* TD)					
Precuneus/PCC*	-4,-40,52	2.35	.00001	1462	4/5/7
L MFG/dlPFC	-28,48,8	1.62	.001	69	46/10
L vlPFC/OFC*	-30,42,-8	1.55	.001	60	11/47
(iv) Matched Subgroups					
ASD (*vs.* TD) reduced *vs.* ADHD (*vs.* TD)					
dmPFC/ACC/vmPFC/vmOFC*	0,34,20	2.63	.0000005	3241	32/24/9/10/8/11
L IPL/SPL/post-CG*	-34,-42,54	1.22	.002	71	40/2/3
ASD (*vs.* TD) increased *vs.* ADHD (*vs.* TD)					
Precuneus/PCC*	-4,-40,54	2.33	.000008	1548	4/5/7
L vlPFC/OFC*	-30,42,-8	1.47	.002	33	11/47
L MFG/dlPFC	-28,48,8	1.48	.002	30	46/10
(C) Functional Abnormalities during Motor Response Inhibition					
(i) ADHD *vs.* TD					
ADHD < TD					
L MFG/dlPFC*	-28,28,48	1.81	.00006	554	9/46/8
R AI/putamen/IFG*	32,22,4	1.70	.0002	456	47/48/45
R MTG/STG	46,-20,-8	1.33	.002	255	48/22/21/20
R posterior STG/ supramarginal gyrus	54,-38,16	1.42	.001	165	42/48/41
R IPL	48,-36,50	1.33	.002	69	2/40
L Precuneus	-12,-32,58	1.39	.001	41	7
ADHD > TD					

Nil	--	--	--	--	--

Abbreviations: MNI=Montreal Neurological Institute, SDM=seed-based d mapping, BA=Brodmann Area, TD=typically developing controls, L/R = left/right. Brain regions (in alphabetical order): AI=anterior insula, dlPFC = dorsolateral prefrontal cortex, dmPFC = dorsomedial prefrontal cortex, FFG = fusiform gyrus, I/M/SFG = inferior/middle/superior frontal gyrus, I/M/STG=inferior/middle/superior temporal gyrus, I/SPL= inferior/superior parietal lobe, MOG = middle occipital gyrus, OFC = orbitofrontal cortex, PCC = posterior cingulate cortex, PHG = parahippocampal gyrus, pre-/post-CG = pre/postcentral gyrus, rACC = rostral anterior cingulate cortex, rdACC = rostrodorsal anterior cingulate cortex, SMA = supplemental motor area, vlPFC = ventrolateral prefrontal cortex, vmOFC = ventromedial orbitofrontal cortex, vmPFC = ventromedial prefrontal cortex. Asterisks indicate overlapping impairments with findings in the age non-stratified overall samples. Bold fonts indicate overlapping disorder-differentiating impairment between the adult overall samples and age-, sex- and IQ-matched adult subgroups. No adult fMRI meta-analyses during prepotent response inhibition involving the ASD population were carried out due to insufficient number of adult ASD independent datasets.

Figure S4. Structural and Functional Abnormalities in Adults with ADHD and ASD



Abnormalities in the (A) gray matter volume and brain activations during (B) cognitive control and (C) motor response inhibition. Rows (i) and (ii) show abnormalities in ADHD and ASD relative to typically developing (TD) controls. Abnormalities in ADHD versus ASD, each relative to TD controls are shown in (iii) overall adult samples and (iv) age-, sex-, and IQ-matched subgroups. No adult fMRI meta-analyses during motor control involving the ASD population were carried out due to insufficient number of adult ASD independent datasets. A statistical threshold of $p < .005$ with a cluster extent of 20 voxels were used in all analyses.

Supplement 5: Associations between Brain Abnormalities and Age

Correlational Analyses between Brain Abnormalities and Age

Among the most consistent disorder-differentiating VBM abnormalities, the ADHD-differentiating GMV reduction relative to ASD in medial orbitofrontal/anterior cingulate cortices was positively correlated with age (Spearman's ρ =.18, p <.0005), while the ASD-differentiating enhanced GMV relative to ADHD in right posterior temporal (ρ = -.30, p <.0005), right dorsolateral prefrontal (ρ = -.43, p <.0005) and left anterior posterior cortices (ρ = -.29, p <.0005) was negatively correlated with age (Table S4-i).

Among the most consistent disorder-differentiating fMRI abnormalities during cognitive control, the ASD-differentiating underactivation in left middle frontal/dorsolateral prefrontal cortex (ρ =.24, p <.0005), and the overactivation in precuneus (ρ = .36, p <.0005) and in left ventrolateral prefrontal cortex (ρ = .50, p <.0005) were all positively correlated with age. However, the ASD-differentiating underactivation in anterior cingulate/dorsomedial prefrontal and the overactivation in right fusiform gyrus/inferior occipital and in inferior frontal cortices were not correlated with age (Table S4-ii).

Finally, among the most consistent disorder-differentiating fMRI abnormalities during motor response control, the ADHD-differentiating underactivation in right caudate (ρ = .44, p <.0005) and inferior frontal gyrus (ρ = .20, p = .002) both were positively correlated with age. The ASD-differentiating underactivation in precuneus (ρ = -.21, p = .02) was negatively correlated with age, while the overactivation in left ventrolateral prefrontal/orbitofrontal (ρ = .61, p < .0005) and middle frontal/dorsolateral prefrontal cortices (ρ = .61, p < .0005) both were positively correlated with age. The ASD-differentiating underactivation in left cerebellum and right dorsolateral prefrontal cortex, and the ASD-differentiating overactivation in right inferior occipital gyrus/fusiform gyrus and the shared underactivation in ASD and ADHD in right AI were not correlated with age (Table S4-iii).

Table S5. Spearman's Correlations between Disorder-Differentiating or Shared Abnormalities and Age

	Peak MNI coord. x, y, z	*ρ*	*p*-value (Bonferroni adjusted)
(i) VBM Abnormalities			
ADHD (*vs.* TD) reduced *vs.* ASD (*vs.* TD)			
vmOFC/rACC	2, 48, -18	.18	<.0005
ASD (*vs.* TD) increased *vs.* ADHD (*vs.* TD)			
R MTG/STG/angular gyrus	50, -40 ,8	-.30	<.0005
R MFG/SFG/dlPFC	24, 44, 24	-.43	<.0005
L anterior MTG/STG	-50, -20, -8	-.29	<.0005
(ii) Cognitive-Control fMRI Abnormalities			
ASD (*vs.* TD) reduced *vs.* ADHD (*vs.* TD)			
rACC/dmPFC	2, 28, 20	-.09	.54
L MFG/dlPFC	-40, 34, 28	.24	<.0005
ASD (*vs.* TD) increased *vs.* ADHD (*vs.* TD)			
Precuneus/PCC	-2, -40, 50	.36	<.0005
R FFG/IOG/ITG	36, -70, -8	.07	>.99
R IFG	44, 24, 18	-.13	.11
L vlPFC/OFC	-30, 40, -8	.50	<.0005
(iii) Motor-Response-Inhibition fMRI Abnormalities			
ADHD (*vs.* TD) reduced *vs.* ASD (*vs.* TD)			
R caudate	8, 20, 2	.44	<.0005
R IFG	42, 26, 20	.20	.002
ASD (*vs.* TD) reduced *vs.* ADHD (*vs.* TD)			
L cerebellum lobule IV/FFG/lingual gyrus	-16, -48, -12	.02	.81
R MFG/dlPFC	42, 14, 48	-.06	>.99
R precuneus	16, -36, 44	-.21	.018
ASD (*vs.* TD) increased *vs.* ADHD (*vs.* TD)			
R IOG/FFG	36, -70, -10	.06	>.99
L vlPFC/OFC	-28, 36, -8	.61	<.0005
L MFG/SFG/dlPFC	-28, 54, 8	.61	<.0005
Reduced in ASD (*vs.* TD) and ADHD (*vs.* TD)			
R AI	40, 20, -6	-.08	.54

Abbreviations: MNI = Montreal Neurological Institute, L/R=left/right, SDM = Seed-based d mapping, BA = Brodmann Area, TD = typically developing controls, r = Pearson correlation coefficient, brain regions (in alphabetical order): AI = anterior insula, dlPFC = dorsolateral prefrontal cortex, dmPFC = dorsomedial prefrontal cortex, FFG = fusiform gyrus, IFG M/SFG = inferior/middle/superior frontal gyrus, IOG = inferior occipital gyrus, I/M/STG = inferior/middle/superior temporal gyrus, OFC=orbitofrontal cortex, PCC = posterior cingulate cortex, rACC = rostral anterior cingulate cortex, vlPFC = ventrolateral prefrontal cortex, vmOFC = ventromedial orbitofrontal cortex.

Additional Analyses Covarying for Age in the Sub-Meta-Analyses with Participants Matched on Age, Sex and IQ

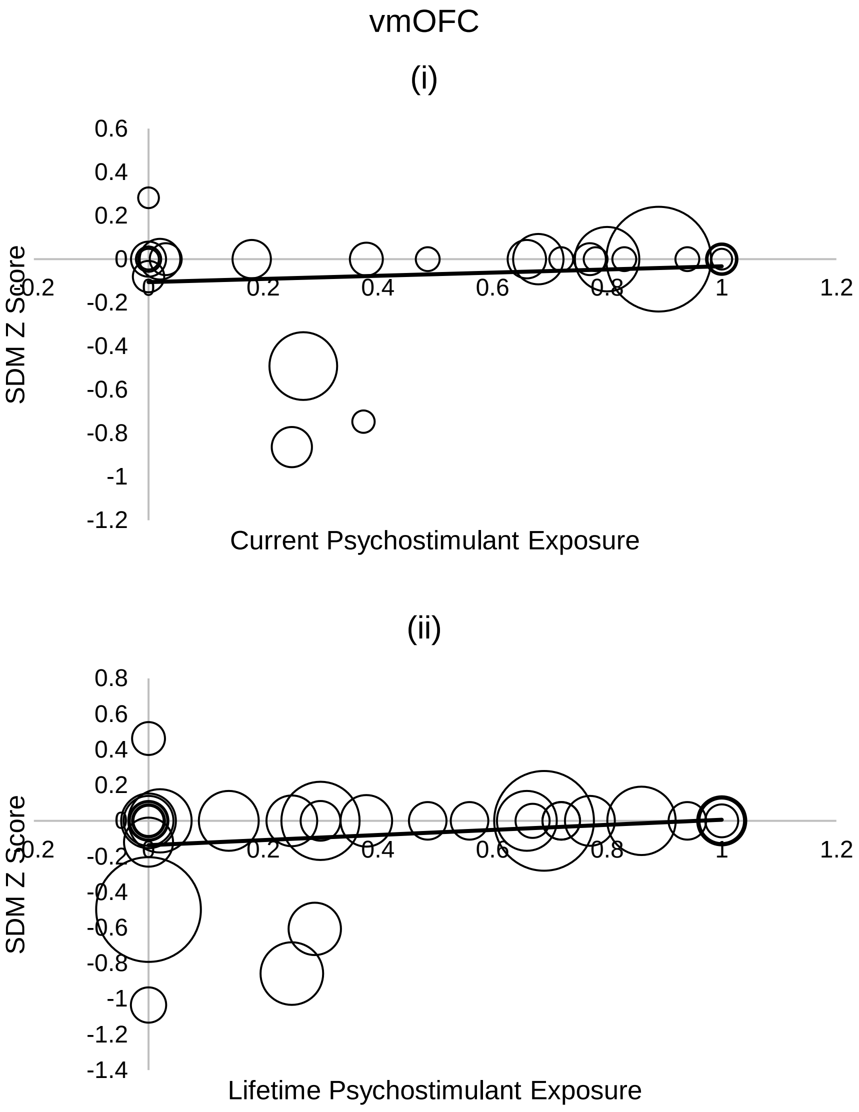
All disorder-differentiating findings in the VBM analysis, including the ADHD-differentiating reduced GMV in vmOFC/rACC (BA11; MNI coordinates: 2, 48, -18; $Z = 2.04$, $p = .002$, 193 voxels) remained after covarying for age, as did the ASD-differentiating increased GMV in right MTG/STG/angular gyrus (BA42/21/22/42; MNI coordinates: 50, -40, 8; $Z = 2.46$, $p = .0003$, 384 voxels), right MFG/SFG/dlPFC (BA46; MNI coordinates: 24, 44, 24; $Z = 2.11$, $p = .001$, 68 voxels) and left anterior MTG/STG (BA48/22/21/20; MNI coordinates: -50, -20, -8; $Z = 1.98$, $p = .002$, 58 voxels).

During cognitive control, the ASD-differentiating underactivation in rACC/dmPFC (BA32/24/9/10; MNI coordinates: 0, 30, 20; Z = 2.27, p = .0000002, 2809 voxels) and left MFG/dlPFC (BA46/45; MNI coordinates: -40,34,28; Z = 1.02, p = .001, 196 voxels), and all ASD-differentiating overactivation in precuneus/PCC (BA4/5; MNI coordinates: -2,-40,50; $Z = 1.18$, $p = .0009$, 348 voxels), right FFG/IOG/ITG (BA19/37; MNI coordinates: 36,-70,-8; Z = 1.50, p = .00007, 283 voxels), right IFG (BA48/45; MNI coordinates: 44,24,18; $Z = 1.25$, $p = .0005$, 112 voxels), and left vlPFC/OFC (BA11; MNI coordinates: -30, 40, -8; $Z = 1.06$, $p = .002$, 56 voxels) remained after covarying for age.

Specifically during motor response inhibition, with the exception of the shared right AI underactivation in both disorders, all other findings, i.e., the ADHD-differentiating underactivation in right caudate (BA25; MNI coordinates: 8,20,0; $Z = 1.35$, $p = .0008$, 188 voxels) and right inferior frontal gyrus (BA48/45; MNI coordinates: 42, 26, 20; $Z = 1.32$, $p = .0009$, 107 voxels); and the ASD-differentiating underactivation in left cerebellum/FFG/lingual gyrus (BA19/37/30; MNI coordinates: -16,-48,-12; $Z = 1.37$, $p = .0003$, 1045 voxels), right MFG/dlPFC (BA9; MNI coordinates: 42,14,48; $Z = 1.18$, $p = .001$, 77 voxels) and right precuneus (BA7; MNI coordinates: 16,-36,44; Z = -1.27, p = .0006, 49 voxels), and the ASD-differentiating overactivation in right IOG/FFG (BA19/37; MNI coordinates: 36,-72,-10; Z = 1.80, p = .00004, 461 voxels), and left vlPFC/OFC/MFG/SFG/dlPFC (BA11/10; MNI coordinates: -26,36,-8; $Z = 1.41$, $p = .0005$, 593 voxels) remained after covarying for age.

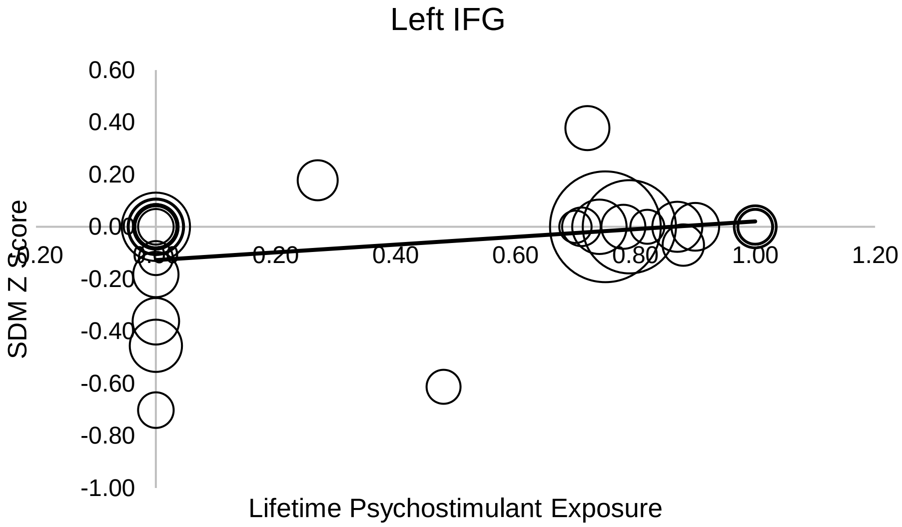
Supplement 6: Associations between Brain Abnormalities and Psychostimulant Exposure

Figure S6a. Association between VBM Abnormalities and Current Psychostimulant Exposure in ADHD



Current (i) and lifetime (ii) psychostimulant exposure were significantly associated with increased GMV in vmOFC (BA11; associations between SDM Z score and current and lifetime exposure peaked at MNI coordinates: -2, 52, -24; Z = 1.99, p = .000002, 362 voxels and coordinates: 0, 54, -26; Z = 1.59, p = .0002, 22 voxels, respectively).

Figure S6b. Association between fMRI Abnormalities and Lifetime Psychostimulant Exposure in ADHD



During overall cognitive control, lifetime psychostimulant exposure was positively associated with activation in left IFG (BA48; MNI coordinates: -46, 16, 4; $Z = 1.42$, $p = .0002$, 56 voxels). Current stimulant exposure was not significantly associated with brain functional activations in ADHD.

Supplement 7: Influences of Task Type or Performance in Disorder-differentiating Findings

Table S7. Task Types and Behavioural Performance Impairments in ADHD and ASD *vs.* TD

fMRI Studies	Task	Behavioural performance	Clinical group impaired?	Sub-group MA
ADHD Studies				
Banich et al. (2009)	Stroop	ADHD > TD (RT incongruent vs. congruent)	No	Yes
Bhaijiwala et al. (2014)	Stop	ADHD < TD (SSRT)	Yes	Yes
Booth et al. (2005)	GNG	ADHD < TD (Error rates, MRT)	Yes	Yes
Carmona et al. (2012)	GNG	ADHD < TD (MRT)	Yes	Yes
Chantiluke et al. (2015)	Stop	ADHD < TD (Omissions)	Yes	Yes
Chen et al. (2015)	GNG	ADHD = TD (Correct response, MRT)	No	Yes
Chou et al. (2015)	Stroop	ADHD < TD (Correct response, MRT)	Yes	Yes
Congdon et al. (2014)	Stop	ADHD = TD (SSRT, MRT, SDRT)	No	--
Cubillo et al. (2010)* Cubillo et al. (2011)*	Stop, Switch, Stroop	ADHD = TD (Stop: SSRT; switch: error rates and MRT; Stroop: error rates, MRT incongruent vs. congruent)	No	Yes
Cubillo et al. (2014)	Stop	ADHD = TD (SSRT, MRT, SDRT)	No	Yes
Dibbets et al. (2009)** Dibbets et al. (2010)**	GNG, Switch	ADHD < TD (Error rates) ADHD < TD (Omissions)	Yes	Yes
Durston et al. (2006)	GNG	ADHD = TD (Accuracy, MRT)	No	Yes
Fan et al. (2017)	Stroop	ADHD < TD (RT incongruent vs. congruent)	Yes	Yes
Fan et al. (2018)	Stroop	ADHD < TD (RT incongruent vs. congruent)	Yes	Yes
Hwang et al. (2015)	Stroop	ADHD < TD (MRT)	Yes	Yes
Iannaccone et al. (2015)	GNG/ Flanker	ADHD < TD (Accuracy)	Yes	Yes
Janssen et al. (2015)	Stop	ADHD < TD (SSRT, omissions)	Yes	--
Konrad et al. (2006)	Flanker	ADHD < TD (RT incongruent vs. congruent)	Yes	Yes
Kooistra et al. (2010)	GNG	ADHD < TD (MRT, SDRT)	Yes	Yes
Ma et al. (2012)	GNG	ADHD = TD (Commissions, omissions, MRT)	No	--
Ma et al. (2016)	Stroop	ADHD = TD (RT, error rates incongruent vs. congruent)	No	--
Massatt et al. (2018)	Stop	ADHD = TD (SSRT, MRT)	No	Yes
Passarotti et al. (2010)	Stop	ADHD < TD (Accuracy)	Yes	Yes
Peterson et al. (2009)	Stroop	ADHD = TD (RT incongruent vs. congruent)	No	Yes
Rassmussen et al. (2016)	GNG	ADHD < TD (Commissions)	Yes	--
Rubia et al.(2005)	Stop	ADHD < TD (SDRT, omissions)	Yes	Yes
Rubia et al. (2011)*** Rubia et al. (2011)***	Simon, Stop	ADHD < TD (MRT) ADHD < TD (SDRT)	Yes	Yes
Schulz et al. (2004)	GNG	ADHD < TD (Commissions)	Yes	Yes
Schulz et al. (2014)	GNG	ADHD < TD (Commissions, accuracy)	Yes	Yes
Schulz et al. (2017)	Stroop	ADHD = TD (MRT, error rates, omissions)	No	Yes
Sebastian et al. (2012)	GNG Stroop Stop	ADHD < TD (Stroop: interference effect; GNG: omissions; Stop: SSRT, SDRT)	Yes	Yes
Shang et al. (2018)	Stroop	ADHD = TD (MRT, SDRT)	No	Yes
Siniatchkin et al. (2012)	GNG	ADHD < TD (MRT)	Yes	Yes

Smith et al. (2006)	GNG, Stroop, Switch	ADHD < TD (GNG: MRT, SDRT; Switch: MRT; Stroop: SDRT)	Yes	Yes
Spinelli et al. (2011)	GNG	ADHD < TD (Omissions)	Yes	Yes
Szekely et al. (2018)	Stop	ADHD = TD (SSRT, MRT, accuracy)	No	--
Tamm et al. (2004)	GNG	ADHD < TD (Omissions, commissions)	Yes	Yes
Thornton et al. (2018)	GNG	ADHD < TD (Commissions)	Yes	--
Van Hulst et al. (2017)	GNG	ADHD < TD (Accuracy, SDRT, MRT)	Yes	Yes
Van Rooij et al. (2015) – adult	Stop	ADHD < TD (SSRT, errors, SDRT)	Yes	--
Van Rooij et al. (2015) – pediatric	Stop	ADHD < TD (SSRT, errors, SDRT)	Yes	--
Zamorano et al. (2017)	Stroop	ADHD > TD (RT incongruent vs. congruent)	No	Yes
ASD studies				
Ambrosino et al. (2014)	GNG	ASD = TD (Accuracy, MRT)	No	Yes
Chantiluke et al. (2015)	Stop	ASD = TD (SSRT, omissions, MRT)	No	Yes
Daly et al. (2014)	GNG	ASD = TD (MRT, probability of inhibition)	No	Yes
Denisova et al. (2017)	Stroop	ASD = TD (RT incongruent vs. congruent)	No	Yes
Duerden et al. (2013)	GNG	ASD = TD (Errors, MRT)	No	Yes
Fan et al. (2012)	Flanker	ASD < TD (Conflict errors, MRT)	Yes	Yes
Gooskens et al. (2018)	Stop	ASD = TD (SSRT, errors, MRT)	No	Yes
Kana et al. (2007)	GNG	ASD = TD (Commissions, MRT)	No	Yes
Kennedy et al. (2006)	Stroop	ASD = TD (Accuracy, MRT)	No	Yes
Prat et al. (2016)	GNG	ASD = TD (Accuracy, MRT)	No	Yes
Schmitz et al. (2006)	GNG, Switch, Stroop	ASD = TD (GNG: accuracy, MRT; Switch & Stroop: errors, RT incongruent vs. congruent)	No	Yes
Shafritz et al. (2008)	Switch	ASD < TD (Accuracy, RT)	Yes	Yes
Shafritz et al. (2015)	GNG	ASD = TD (Errors, MRT)	No	Yes
Solomon et al. (2014)	Switch	ASD < TD (Errors)	Yes	Yes
Vaidya et al. (2011)	Stroop	ASD < TD (RT incongruent vs. congruent)	Yes	Yes
Van Hulst et al. (2017)	GNG	ASD < TD (Accuracy, MRT, SDRT)	Yes	Yes
Velasquez et al (2017)	GNG	ASD = TD (Accuracy, MRT)	No	Yes
Yerys et al. (2015)	Switch	ASD < TD (Accuracy)	Yes	Yes

From the ADHD studies, 26/41 independent datasets demonstrated poorer performance in the patient group relative to controls. From the ASD studies, 6/18 independent datasets demonstrated poorer performance in the patient group relative to controls. Abbreviations: TD = typically developing controls, GNG = Go/No-Go, omissions = omission errors, commissions = commission errors, RT = response time, MRT= mean RT, SDRT = standard deviation of RT, SSRT = stop-signal reaction time. *, **, *** Datasets with largely overlapping participants, combined to control shared variance.

Comparing Task Type and Performance in ADHD and ASD *vs.* TD

A trend for an interaction between task type (motor response inhibition, cognitive interference, switch, combination of tasks) and diagnostic groups was observed overall, $\chi^2(3, N = 60) = 7.7$, $p = .06$, and in subgroups matched on age, sex and IQ, $\chi^2(3, N = 51) = 6.7$, $p = .08$. Furthermore, a significant interaction was found between performance (clinical group is impaired or unimpaired) and diagnostic groups in the overall sample, $\chi^2(1, N = 60) = 5.7$, $p = .02$, and in the subgroups matched on age, sex and IQ, i.e., fewer studies showed that people with ASD were impaired than

ADHD on the cognitive control tasks $\chi^2(1, N = 51) = 6.3$, $p = .02$. The interaction was also observed when motor response inhibition tasks only were included in the analyses using all available data, $\chi^2(1, N = 42) = 14.1$, $p < .001$ and in age-, sex- and IQ-matched subgroups $\chi^2(1, N = 29) = 15.2$, $p < .001$.

Influences of Task Type and Performance in the Disorder-differentiating Findings during Cognitive Control

To assess the influence of task type, a meta-analysis comparing the functional impairment during cognitive control, covarying separately for task type and performance, in ASD and ADHD was conducted in the overall sample and matched subgroups. Covarying for task type, ASD-differentiating reduced activation in the ACC/midcingulate/dmPFC (overall = BA32/24/9/8/10; MNI coordinates: 0, 32, 22; $Z = 2.44$, $p < .00001$, 3065 voxels; matched subgroups = BA32/24/9/10; MNI coordinates: 2, 28, 20; $Z = 2.30$, $p < .00001$, 2994 voxels); and increased activations in precuneus (overall = BA5/4/23; MNI coordinates: 0, -42, 50; $Z = 1.88$, $p = .00002$, 1203 voxels; matched subgroups = BA5/4; MNI coordinates: 0, -42, 50; $Z = 1.82$, $p = .0001$, 706 voxels) and right inferior occipital lobe (overall = BA19; MNI coordinates: 36, -70, -8; $Z = 1.28$, $p = .0003$, 51 voxels; matched subgroups = BA19; MNI coordinates: 36, -68, -8; $Z = 1.43$, $p = .002$, 66 voxels) relative to ADHD remained significant.

Covarying for behavioural performance, the disorder-differentiating impairment in the ASD relative to the ADHD group remained in the above regions, i.e., precuneus (overall = BA5/4; MNI coordinates: 0, -42, 50; $Z = 1.32$, $p = .0001$, 960 voxels; matched subgroups = BA5/4; MNI coordinates: 0, -42, 50; $Z = 1.09$, $p = .0001$, 281 voxels), right inferior occipital lobe (overall = BA19; MNI coordinates: 36, -70, -8; $Z = 1.17$, $p = .0004$, 119 voxels; matched subgroups = BA5/23/4; MNI coordinates: 38, -68, -8; $Z = 1.36$, $p = .0002$, 244 voxels) and ACC/midcingulate/dMPFC (overall = BA32/24/9/8/ 10; MNI coordinates: 0, 32, 22; $Z = 2.69$, $p < .00001$, 3214 voxels; matched subgroups = BA32/24/9/10/8; MNI coordinates: 0, 32, 22; $Z = 2.72$, $p <.00001$, 3286 voxels).

Influences of Performance in the Disorder-differentiating Findings during Motor Response Inhibition

When covarying for performance during motor response inhibition data, we observed ASD-differentiating underactivation in left lingual gyrus/FFG/cerebellum lobule (overall = BA19/37/30/18; MNI coordinates: -10, -58, -14; Z = 1.13, p = .001, 388 voxels; matched subgroups = BA19/37/30/18; MNI coordinates: -16, -48, -12; Z = 1.01, p = .0004, 747 voxels), rACC/dmPFC (overall data only = BA5/4/23; MNI coordinates: 4, 34, 20; Z = 1.23, p = .0008, 587 voxels); and left MFG/dlPFC (overall data only = BA45/48; MNI coordinates: -46, 34, 16; Z = 1.24, p = .0007, 261 voxels) and right MFG/dlPFC (overall data only = BA9/6/44; MNI coordinates: 42, 10, 48; Z = 1.09, p = .002, 49 voxels). We also observed overactivation in right IOG/FFG (overall = BA19/37; MNI coordinates: 36, -68, -8; Z = 1.57, p = .000002, 434 voxels; matched subgroups = BA19/37/18; MNI coordinates: 34, -68, -6; Z = 1.35, p =. 0000002, 524 voxels), left vlPFC/OFC (overall data only = BA11/10/47/46; MNI coordinates: -28, 38, -16; Z = 1.30, p = .00002, 868 voxels) and left posterior MTG (overall data only = BA37/21; MNI coordinates: -48, -54, 4; Z = 1.41, p = .00002, 289 voxels). The ADHD-differentiating underactivation in right IFG and caudate did not survive covarying for task performance.

Supplement 8: Jack-knife Analyses in Brain Structure and Function Abnormalities

Table S8a. Jack-knife Analyses of Reduced GMV Clusters among ADHD VBM Studies

Study excluded	L/R vmOFC/vmPFC/rACC R caudate	R putamen/posterior insula/STG	L pre-CG	R rostrolateral PFC	L vlPFC
Ahrendts et al. (2011)	Yes	Yes	Yes	Yes	Yes
Montes et al. (2010)	Yes	Yes	Yes	Yes	Yes
Amico et al. (2011)	Yes	Yes	Yes	Yes	Yes
Bonath et al. (2016)	Yes	Yes	Yes	Yes	Yes
Bralten et al. (2016)	Yes	Yes	**No**	**No**	Yes
Brieber et al. (2007)	Yes	Yes	Yes	Yes	Yes
Carmona et al. (2005)	Yes	Yes	Yes	Yes	Yes
Depue et al. (2010)	Yes	Yes	Yes	Yes	Yes
Gehricke et al. (2017)	Yes	Yes	Yes	Yes	Yes
He et al. (2015)	Yes	Yes	Yes	Yes	Yes
Iannaccone et al. (2015a)	Yes	Yes	Yes	**No**	Yes
Jagger-Rickels et al. (2018)	Yes	Yes	Yes	Yes	Yes
Johnston et al. (2014)	Yes	Yes	Yes	Yes	Yes
Kappel et al. (2015) – pediatric	Yes	Yes	Yes	Yes	Yes
Kappel et al. (2015) – adult	Yes	Yes	Yes	Yes	Yes
Kaya et al. (2018)	Yes	Yes	Yes	Yes	Yes
Kobel et al. (2010)	Yes	Yes	Yes	Yes	Yes
Kumar et al. (2017)	Yes	Yes	Yes	Yes	Yes
Li et al. (2015)	Yes	Yes	Yes	Yes	Yes
Lim et al. (2015)	Yes	Yes	Yes	Yes	Yes
Maier et al. (2015)	Yes	Yes	Yes	Yes	Yes
McAlonan et al. (2007)	Yes	Yes	Yes	Yes	Yes
Moreno-Alcázar et al. (2016)	Yes	Yes	Yes	Yes	Yes
Onnink et al. (2014)	Yes	Yes	Yes	Yes	Yes
Overmeyer et al. (2001)	Yes	Yes	Yes	Yes	Yes
Ramesh and Rai (2013)	Yes	Yes	Yes	Yes	Yes
Roman-Urrestarazu et al. (2016)	Yes	Yes	Yes	Yes	Yes
Saad et al. (2017)	Yes	Yes	Yes	Yes	Yes
Sasayama et al. (2010)	Yes	Yes	Yes	Yes	Yes
Seidman et al. (2011)	Yes	Yes	Yes	Yes	Yes
Sethi et al. (2017)	Yes	Yes	Yes	Yes	Yes
Shimada et al. (2015)	Yes	Yes	Yes	Yes	Yes
Stevens and Haney-Caron (2012)	Yes	Yes	Yes	Yes	Yes
van Wingen et al. (2013)	Yes	**No**	Yes	Yes	Yes
Vilgis et al. (2016)	Yes	Yes	Yes	Yes	Yes
Villemonteix et al. (2015)	Yes	Yes	Yes	Yes	Yes
Wang et al. (2007)	Yes	Yes	Yes	Yes	Yes
Yang et al. (2008)	Yes	Yes	Yes	Yes	Yes

L/R= left/right, vmOFC = ventromedial orbital prefrontal cortex, vmPFC = ventromedial prefrontal cortex, rACC = rostral anterior cingulate cortex, , STG = superior temporal gyrus, pre-CG = precentral gyrus, vlPFC = ventrolateral prefrontal cortex.

Table S8b. Jack-knife Analyses of GMV Abnormalities among ASD VBM Studies

Study excluded	Reduced				Enhanced		
	L/R dACC/dmPFC	L cerebellum	R hippocampus/PHG/FG	Dorsomedial thalamus	L ITG/MTG/STG/posterior insula	L/R PCC/precuneus	R MFG/SFG/dlPFC
Abell et al. (1999)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Boddaert et al. (2004)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bonilha et al. (2008)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Brieber et al. (2007)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cai et al. (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cheng et al. (2011)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Contarino et al. (2016)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Craig et al. (2007)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
D'Mello et al. (2015)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ecker et al. (2012)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Foster et al. (2015)	Yes	**No**	Yes	Yes	Yes	Yes	Yes
Freitag et al. (2008)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Greimel et al. (2013)	**No**	Yes	Yes	Yes	Yes	Yes	Yes
Groen et al. (2011)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hyde et al. (2010)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Itahashi et al. (2015)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Katz et al. (2016)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kaufmann et al. (2013)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ke et al. (2008)	Yes	Yes	**No**	Yes	Yes	Yes	Yes
Kosaka et al. (2010)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kurth et al. (2011)	Yes	Yes	Yes	**No**	Yes	Yes	Yes
Kwon et al. (2004)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Langen et al. (2009)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lim et al. (2015)	Yes	**No**	Yes	Yes	Yes	Yes	Yes
Lin et al. (2015) – pediatric (child)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lin et al. (2015) – pediatric (adolescent)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lin et al. (2015) – adult	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lin et al. (2017)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
McAlonan et al. (2002)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
McAlonan et al. (2008)	Yes	**No**	Yes	**No**	Yes	Yes	Yes
Mengotti et al. (2011)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mueller et al. (2013)	Yes	Yes	Yes	**No**	Yes	Yes	Yes
Ni et al. (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pereira et al. (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Poulin-Lord et al. (2014)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Poustka et al. (2012)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Radeloff et al. (2014)	Yes	Yes	**No**	Yes	Yes	Yes	Yes
Retico et al. (2016)	Yes	Yes	Yes	Yes	Yes	**No**	**No**
Riedel et al. (2014)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Riva et al. (2013)	Yes	Yes	**No**	Yes	Yes	Yes	Yes
Rojas et al. (2006)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sato et al. (2017)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Schmitz et al. (2006)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Toal et al. (2010)	Yes	Yes	**No**	Yes	Yes	Yes	Yes
Waiter et al. (2004)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wang et al. (2017)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wilson et al. (2009)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yang et al. (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes

L/R = left/right, dACC = dorsal anterior cingulate cortex, dmPFC = dorsomedial prefrontal cortex, PHG = parahippocampal gyrus, FG = fusiform gyrus, ITG/MTG/STG = inferior/middle/superior temporal gyrus, PCC= posterior cingulate cortex, MFG/SFG = middle/superior frontal gyrus

Table S8c. Jack-knife Analyses of Abnormal Brain Function during Cognitive Control among ADHD fMRI Studies

	R thalamus/caudate	L M/STG/superior temporal pole	L/R SMA/dorsal cingulate	L IFG/AI/temporal pole	R AI/putamen	L post-CG	L MFG/ dlPFC	R MTG
Banich et al. (2009)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bhaijiwala et al. (2014)	Yes	**No**	Yes	Yes	Yes	Yes	Yes	Yes
Booth et al. (2005)	Yes	Yes	**No**	Yes	Yes	Yes	Yes	**No**
Carmona et al. (2012)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**No**
Chantiluke et al. (2015)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chen et al. (2015)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chou et al. (2015)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Congdon et al., 2014)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cubillo et al. (2010), Cubillo et al. (2011)*	Yes	Yes	Yes	Yes	**No**	Yes	Yes	Yes
Cubillo et al. (2014)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dibbets et al. (2010), Dibbets et al. (2009)*	Yes	Yes	Yes	Yes	**No**	Yes	Yes	Yes
Durston et al. (2006)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fan et al. (2017)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fan et al. (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hwang et al. (2015)	Yes	Yes	**No**	Yes	Yes	Yes	Yes	Yes
Iannaccone et al. (2015b)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Janssen et al. (2015)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Konrad et al. (2006)	Yes	Yes	Yes	Yes	**No**	Yes	Yes	Yes
Kooistra et al. (2010)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ma et al. (2012)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ma et al. (2016)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Massat et al. (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Passarotti et al. (2010)	Yes	Yes	Yes	**No**	Yes	Yes	Yes	Yes
Peterson et al. (2009)	Yes	Yes	**No**	Yes	Yes	Yes	Yes	Yes
Rasmussen et al. (2016)	Yes	Yes	Yes	Yes	**No**	**No**	**No**	Yes
Rubia et al. (2005)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**No**
Rubia et al. (2011a), Rubia et al. (2011b)*	Yes	Yes	**No**	**No**	**No**	Yes	Yes	Yes
Schulz et al. (2004)	Yes	Yes	Yes	Yes	Yes	**No**	Yes	**No**
Schulz et al. (2014)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Schulz et al. (2017)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**No**
Sebastian et al. (2012)	Yes	Yes	Yes	**No**	**No**	Yes	Yes	**No**
Shang et al. (2018)	Yes	Yes	Yes	**No**	Yes	Yes	Yes	Yes
Siniatchkin et al. (2012)	Yes	Yes	**No**	Yes	Yes	Yes	Yes	Yes
Smith et al. (2006)	Yes	Yes	Yes	**No**	Yes	Yes	Yes	Yes
Spinelli et al. (2011)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Szekely et al. (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tamm et al. (2004)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Thornton et al. (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
van Hulst et al. (2017)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
van Rooij et al. (2015) – pediatric	Yes	Yes	Yes	Yes	Yes	**No**	Yes	Yes
van Rooij et al. (2015) – adult	Yes	Yes	Yes	**No**	Yes	Yes	Yes	**No**
Zamorano et al. (2017)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

L/R = left/right, M/STG = middle/superior temporal gyrus, SMA = supplementary motor area, IFG = interior frontal gyrus, AI = anterior insula, post-CG = post-cingulate gyrus and MFG = middle frontal gyrus, dlPFC = dorsolateral prefrontal cortex. * Data sets were combined as they were collected from the same participants

Table S8d. Jack-knife Analyses of Abnormal Brain Function during Cognitive Control among ASD fMRI Studies

Study excluded	Underactivation					Overactivation				
	L/R ACC/midcingulate/dmPFC	L MFG/ dlPFC	R MFG/ dlPFC	L IPL	L lingual gyrus/cerebellum IV/V	L precuneus/ midcingulate	R IOG	L vlPFC/OFC	L MFG/ rostrolateral PFC	R IFG
Ambrosino et al. (2014)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chantiluke et al. (2015)	Yes	**No**	**No**	Yes	**No**	Yes	Yes	Yes	Yes	Yes
Daly et al. (2014)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Denisova et al. (2017)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Duerden et al. (2013)	Yes	Yes	No	Yes	Yes	Yes	**No**	Yes	Yes	**No**
Fan et al. (2012)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gooskens et al. (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kana et al. (2007)	Yes	Yes	Yes	**No**	**No**	Yes	Yes	Yes	Yes	Yes
Kennedy et al. (2006)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prat et al. (2016)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Schmitz et al. (2006)	Yes	Yes	Yes	Yes	Yes	**No**	Yes	**No**	**No**	Yes
Shafritz et al. (2008)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shafritz et al. (2015)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Solomon et al. (2014)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vaidya et al. (2011)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
van Hulst et al. (2017)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Velasquez et al. (2017)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yerys et al. (2015)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**No**

L/R = left/right, ACC = anterior cingulate cortex, dmPFC = dorsomedial prefrontal cortex, MFG = middle frontal gyrus, dlPFC = dorsolateral prefrontal cortex, IPL =inferior parietal lobe, IOG = inferior occipital gyrus, vlPFC = ventrolateral prefrontal cortex, OFC = orbitofrontal cortex, IFG = inferior frontal gyrus.

Table S8e. Jack-knife Analyses of Abnormal Brain Function during Motor Response Inhibition among ADHD fMRI Studies

Study excluded	L MFG/ dlPFC	L anterior MTG/STG	L post-CG	R IFG	R vlPFC/ OFC/AI	R caudate
Bhaijiwala et al. (2014)	Yes	Yes	Yes	Yes	Yes	Yes
Booth et al. (2005)	Yes	Yes	Yes	Yes	Yes	**No**
Carmona et al. (2012)	Yes	Yes	Yes	Yes	Yes	Yes
Chantiluke et al. (2015)	Yes	Yes	Yes	Yes	Yes	Yes
Chen et al. (2015)	Yes	Yes	Yes	Yes	Yes	Yes
Congdon et al. (2014)	Yes	Yes	Yes	Yes	Yes	Yes
Cubillo et al. (2010)	Yes	Yes	Yes	Yes	Yes	Yes
Cubillo et al. (2014)	Yes	Yes	Yes	Yes	Yes	Yes
Dibbets et al. (2009)	Yes	Yes	Yes	Yes	Yes	Yes
Durston et al. (2006)	Yes	Yes	Yes	Yes	Yes	Yes
Iannaccone et al. (2015b)	Yes	Yes	Yes	Yes	Yes	Yes
Janssen et al. (2015)	Yes	Yes	Yes	Yes	Yes	Yes
Kooistra et al. (2010)	Yes	Yes	Yes	Yes	Yes	Yes
Ma et al. (2012)	Yes	Yes	Yes	Yes	Yes	Yes
Massat et al. (2018)	Yes	Yes	Yes	Yes	Yes	Yes
Passarotti et al. (2010)	Yes	Yes	Yes	Yes	Yes	Yes
Rasmussen et al. (2016)	Yes	Yes	**No**	**No**	Yes	**No**
Rubia et al. (2005)	Yes	Yes	Yes	Yes	Yes	Yes
Rubia et al. (2011b)	Yes	Yes	Yes	Yes	Yes	Yes
Schulz et al. (2004)	Yes	Yes	Yes	Yes	Yes	Yes
Schulz et al. (2014)	Yes	Yes	Yes	Yes	Yes	Yes
Sebastian et al. (2012)	Yes	Yes	Yes	Yes	Yes	Yes
Siniatchkin et al. (2012)	Yes	Yes	Yes	Yes	Yes	**No**
Smith et al. (2006)	Yes	Yes	Yes	Yes	Yes	Yes
Spinelli et al. (2011)	Yes	Yes	Yes	Yes	Yes	Yes
Szekely et al. (2018)	Yes	Yes	Yes	Yes	Yes	Yes
Tamm et al. (2004)	Yes	Yes	Yes	Yes	Yes	Yes
Thornton et al. (2018)	Yes	Yes	Yes	Yes	Yes	Yes
van Hulst et al. (2017)	Yes	Yes	Yes	Yes	Yes	Yes
van Rooij et al. (2015) – pediatric	Yes	Yes	**No**	Yes	Yes	Yes
van Rooij et al. (2015) – adult	**No**	Yes	Yes	Yes	Yes	Yes

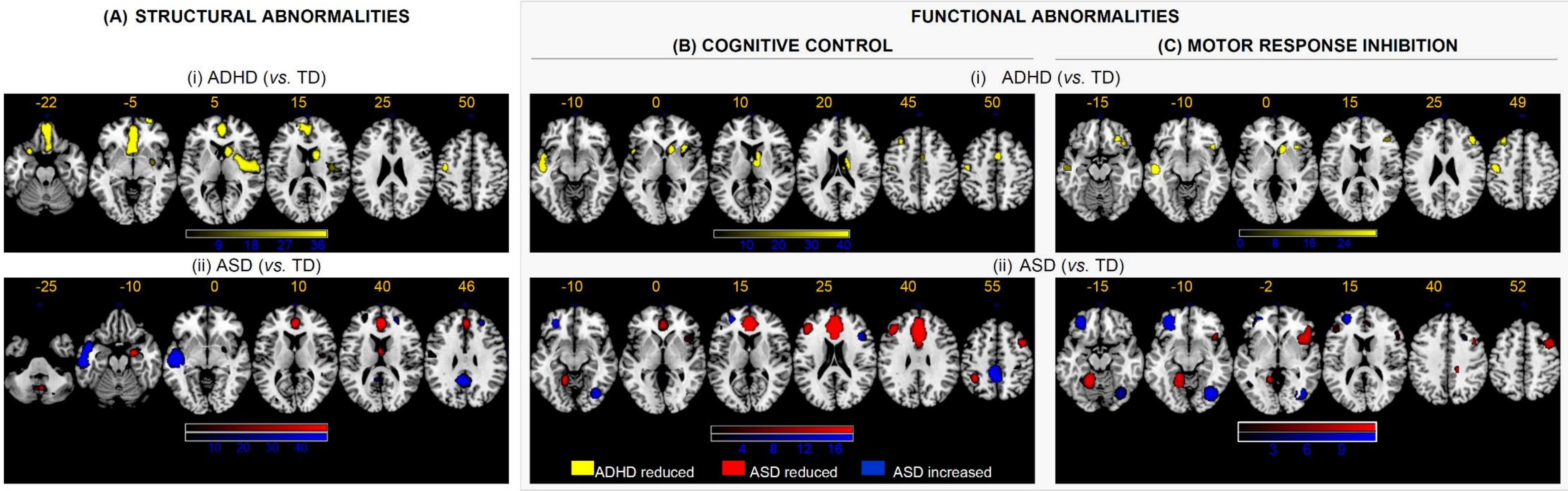
L/R = left/right, MFG = middle frontal gyrus, dlPFC = dorsolateral prefrontal gyrus, M/STG = middle/superior temporal gyrus, post-CG = post-cingulate gyrus, IFG = interior frontal gyrus, vlPFC = ventrolateral prefrontal cortex, OFC = orbitofrontal cortex, AI = anterior insula.

Table S8f. Jack-knife Analyses of Abnormal Brain Function during Motor Response Inhibition among ASD fMRI Studies

Study excluded	Underactivation				Overactivation	
	R AI/vlPFC	L cerebellum/ lingual gyrus/ FFG	R MFG/ dlPFC	R PCC/ precuneus	L vlPFC/ OFC	R IOG/FFG/ ITG
Ambrosino et al. (2014)	Yes	Yes	Yes	Yes	Yes	Yes
Chantiluke et al. (2015)	Yes	**No**	**No**	Yes	Yes	**No**
Daly et al. (2014)	Yes	Yes	Yes	Yes	Yes	Yes
Duerden et al. (2013)	Yes	Yes	**No**	Yes	Yes	**No**
Gooskens et al. (2018)	Yes	Yes	Yes	Yes	Yes	Yes
Kana et al. (2007)	Yes	**No**	Yes	**No**	Yes	Yes
Prat et al. (2016)	Yes	Yes	Yes	Yes	Yes	Yes
Schmitz et al. (2006)	Yes	Yes	Yes	Yes	**No**	Yes
Shafritz et al. (2015)	**No**	Yes	Yes	Yes	Yes	Yes
van Hulst et al. (2017)	Yes	Yes	Yes	Yes	Yes	Yes
Velasquez et al. (2017)	Yes	Yes	Yes	**No**	Yes	Yes

L/R = left/right, AI = anterior insula, vlPFC = ventrolateral prefrontal cortex, FFG = fusiform gyrus, MFG= middle frontal gyrus, dlPFC = dorsolateral prefrontal cortex, PCC= posterior cingulate cortex, OFC = orbitofrontal cortex, IOG =inferior occipital gyrus, ITG = inferior temporal gyrus.

Figure S8. Pictorial Representation of the Jack-knife Analyses



Pictorial representation of jack-knife reliability analyses for structural and functional abnormalities in ASD and ADHD. Colormap indicate the level of replicability of the significant clusters according to the number of study combinations, ranging from 0 to maximum number of study combination for each comparison (see Tables 6a-f). Darker colours indicate that the cluster is replicable in fewer combinations of studies.

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