Supplementary material

Association study and a systematic meta-analysis of the VNTR polymorphism in the 3'-UTR of dopamine transporter gene and attention-deficit hyperactivity disorder

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Supplementary table S1 Quality assessment scores of each study taken into the meta-analysis (according to the Score sheet from Liu et al. (Liu et al. 2015)

A)

Criteria	Cook et al. 1995	Waldman et al. 1998	Jiang et al. 1999	Lunetta et al. 2000	Swanson et al. 2000	Curran et al. 2001 (Turkey)	Todd et al. 2001	Maher et al. 2002	Smith et al. 2003	Carrasco et al. 2004	Kustanovich et al. 2004	Galili-Weisstub et al. 2005	Bakker et al. 2005	Bobb et al. 2005 TDT	Feng et al, 2005	Kim et al. 2005	Langley et al. 2005 CC
Source of cases																	
Selected from population or general registry (Score 3)			3					3									
Selected from hospital (Score 2)	2	2			2	2	2		2	2	2	2	2	2	2	2	2
Selected from pathology archives, but without description (Score 1)																	
Not described (Score 0)				0													
Source of controls (when family study the score is automatic 3)																	
Population-based (Score 3)	3	3	3	3	3	3	3	3		3	3	3	3	3	3	3	3
Hospital-based (Score 1.5)																	
Not described (Score 0)									0								
Diagnostic criteria of ADHD																	
Acknowledged operational diagnostic criteria, such as DSM-IV, ICD-10 (Score 3)	3	3	3	3	3	3	3	3		3	3	3	3	3	3	3	3
Patient medical record (Score 1.5)									1.5								
Not description (Score 0)																	
Case-control match (when family study the score is automatic 3)																	
Matched by age and gender (Score 3)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
Matched only by age or by gender (Score 1.5)																	
Not matched or not described (Score 0)																	0
Specimens used for determining genotypes																	
Peripheral blood or buccal swabs (Score 3)	3	3	3					3	3	3	3	3	3	3	3	3	3
Not description (Score 0)				0	0	0	0										
Quality control of genotyping																	
Different genotyping assays confirmed the result (Score 3)	3																
Quality control by repeated assay (Score 1.5)		1.5											1.5				
Not description (Score 0)			0	0	0	0	0	0	0	0	0	0		0	0	0	0
Hardy-Weinberg equilibrium in controls (when family study the score is automatic 3)																	
Hardy-Weinberg equilibrium (Score 3)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Hardy-Weinberg disequilibrium (Score 0)																	
Sample size																	
≧300 (Score 3)		3				3	3				3		3	3	3	3	3
≧200 and < 300 (Score 2)			2									2					
≧100 and < 200 (Score 1)	1								1								
< 100 (Score 0)				0				0		0							
Total (Score 0-24)	21	21.5	20	12	14	17	17	18	13.5	17	20	19	21.5	20	20	20	17

B) Continue

Criteria	Simsek et al. 2005	Hawi et al. 2005	Brookes et al. 2006 Taiwan	Brookes et al. 2006 UK	Brookes et al. 2006 IMAGE ST1	Cheuk et al. 2006 TDT	Hebebrand et al. 2006	Kim et al. 2006 CC	Lim et al. 2006	Asherson et al. 2007 IMAGE ST2	Brüggermann et al. 2007	Qian Q et al. 2007	Genro et al. 2007	Johansson et al. 2008	Wang et al. 2008	Banoei et al. 2008	Kopeckova et al. 2008
Source of cases																	
Selected from population or general registry (Score 3)														3			
Selected from hospital (Score 2)	2	2	2	2	2	2	2	2	2	2		2	2		2	2	
Selected from pathology archives, but without description (Score 1)																	
Not described (Score 0)											0						0
Source of controls (when family study the score is automatic 3)																	
Population-based (Score 3)	3	3	3	3	3	3	3		3	3		3	3	3	3		
Hospital-based (Score 1.5)								1.5									
Not described (Score 0)											0					0	0
Diagnostic criteria of ADHD																	
Acknowledged operational diagnostic criteria, such as DSM-IV, ICD-10 (Score 3)	3	3	3	3	3	3	3	3	3	3		3	3	3	3	3	3
Patient medical record (Score 1.5)																	
Not description (Score 0)											0						
Case-control match (when family study the score is automatic 3)																	
Matched by age and gender (Score 3)		3	3	3	3	3	3		3	3			3	3	3		
Matched only by age or by gender (Score 1.5)	1.5							2								1.5	1.5
Not matched or not described (Score 0)											0	0					
Specimens used for determining genotypes																	
Peripheral blood or buccal swabs (Score 3)	3				3	3		3	3			3	3	3	3	3	3
Not description (Score 0)		0	0	0			0			0	0						
Quality control of genotyping																	
Different genotyping assays confirmed the result (Score 3)																	
Quality control by repeated assay (Score 1.5)							1.5							1.5			
Not description (Score 0)	0	0	0	0	0	0		0	0	0	0	0	0		0	0	0
Hardy-Weinberg equilibrium in controls (when family study the score is automatic 3)																	
Hardy-Weinberg equilibrium (Score 3)	3	3	3	3	3	3	3	3	3	3			3	3	3	3	3
Hardy-Weinberg disequilibrium (Score 0)											0	0					
Sample size																	
≧300 (Score 3)		3	3	3	3		3			3		3	3	3			
≧200 and < 300 (Score 2)	2										2					2	2
≧100 and < 200 (Score 1)						1		1							1		
< 100 (Score 0)									0								
Total (Score 0-24)	17.5	17	17	17	20	18	18.5	15.5	17	17	2	14	20	22.5	18	14.5	12.5

C) Continue

Criteria	Franke et al. 2008	Niederhofer et al. 2008	Kereszturi et al. 2008	Gizer (Mick) et al 2009	Wohl M et al. 2008	Martinez-Levy GA et al. 2009	Hawi et al. 2010 (IMAGE)	Hawi et al. 2010 (English 3)	Hawi et al. 2010 (Irish 2)	Hawi et al. 2010 (Irish 1)	Dresler et al. 2010	Franke et al. 2010 (German)	Franke et al. 2010 (Norway)	Franke et al. 2010 (Spanish)	Aparacida da Silva et al. 2011	Bidwell et al. 2011	Das et al. 2011 (CC)	Das et al. 2011 (TDT)
Source of cases																		
Selected from population or general registry (Score 3)													3			3		
Selected from hospital (Score 2)	2		2	2	2	3	2	2	2	2	2	2		2	2		2	2
Selected from pathology archives, but without description (Score 1)																		
Not described (Score 0)		0																
Source of controls (when family study the score is automatic 3)																		
Population-based (Score 3)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3		3
Hospital-based (Score 1.5)																		
Not described (Score 0)																	0	
Diagnostic criteria of ADHD																		
Acknowledged operational diagnostic criteria, such as DSM-IV, ICD-10 (Score 3)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Patient medical record (Score 1.5)																		
Not description (Score 0)																		
Case-control match (when family study the score is automatic 3)																		
Matched by age and gender (Score 3)		3	3	3	3	3	3	3	3	3	3				3	3		3
Matched only by age or by gender (Score 1.5)	1.5																	
Not matched or not described (Score 0)												0	0	0			0	
Specimens used for determining genotypes																		
Peripheral blood or buccal swabs (Score 3)		3	3			3					3	3	3		3	3	3	3
Not description (Score 0)	0			0	0		0	0	0	0				0				
Quality control of genotyping																		
Different genotyping assays confirmed the result (Score 3)												3	3	3				
Quality control by repeated assay (Score 1.5)	1.5					1.5												
Not description (Score 0)		0	0	0	0		0	0	0	0	0				0	0	0	0
Hardy-Weinberg equilibrium in controls (when family study the score is automatic 3)																		
Hardy-Weinberg equilibrium (Score 3)	3		3	3	3	3	3	3	3	3	3	3	3	3	3		3	3
Hardy-Weinberg disequilibrium (Score 0)		0														0		
Sample size																		
≧300 (Score 3)	3		3	3	3		3			3		3	3	3	3	3		3
≧200 and ﹤300 (Score 2)						2		2			2						2	
≧100 and ﹤200 (Score 1)		1							1									
﹤100 (Score 0)																		
Total (Score 0-24)	17	13	20	17	17	21.5	17	16	15	17	19	20	21	17	20	18	13	20

D) Continue

Criteria	El-Tarras et al. 2012	Hoogman et al. 2013 (IMpACT)	Martinez-Levy GA et al. 2013	de Azeredo et al. 2014	Shang CY et al. 2014	Hasler et al. 2015	Sery et al. 2015	Fonseca et al. 2015 TDT	Agudelo et al. 2015	Gomez-Sanchez et al. 2016	Onnink et al. 2016 (NeuroIMAGE)	Onnink et al. 2016 (IMpACT+BIG)	Ortega-Rojas et al. 2017	Stanley et al. 2017	Wiguna et al. 2017	Hong et al. 2018	Morgan et al. 2018	Grünblatt et al CC	Grünblatt et al TDT
Source of cases																			
Selected from population or general registry (Score 3)			3						3		3	3							
Selected from hospital (Score 2)	2	2		2	2	2	2			2			2	2	2	2	2	2	2
Selected from pathology archives, but without description (Score 1)																			
Not described (Score 0)								0											
Source of controls (when family study the score is automatic 3)																			
Population-based (Score 3)		3	3		3	3	3		3	3	3	3	3		3	3	3	3	3
Hospital-based (Score 1.5)	1.5			1.5										1.5					
Not described (Score 0)								0											
Diagnostic criteria of ADHD																			
Acknowledged operational diagnostic criteria, such as DSM-IV, ICD-10 (Score 3)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Patient medical record (Score 1.5)																			
Not description (Score 0)																			
Case-control match (when family study the score is automatic 3)																			
Matched by age and gender (Score 3)		3			3		3	3		3	3	3	3		3	3		3	3
Matched only by age or by gender (Score 1.5)				1.5		1.5								1.5			1.5		
Not matched or not described (Score 0)	0		0						0										
Specimens used for determining genotypes																			
Peripheral blood or buccal swabs (Score 3)	3	3	3	3		3	3	3	3	3	3	3	3	3	3	3	3	3	3
Not description (Score 0)					0														
Quality control of genotyping																			
Different genotyping assays confirmed the result (Score 3)						3								3					
Quality control by repeated assay (Score 1.5)									1.5									1.5	1.5
Not description (Score 0)	0	0	0	0	0		0	0		0	0	0	0		0	0	0		
Hardy-Weinberg equilibrium in controls (when family study the score is automatic 3)																			
Hardy-Weinberg equilibrium (Score 3)			3	3	3			3	3	3	3	3			3		3	3	3
Hardy-Weinberg disequilibrium (Score 0)	0	0				0	0						0	0		0			
Sample size																			
≧300 (Score 3)			3	3	3	3	3			3	3	3				3		3	3
≧200 and ﹤300 (Score 2)	2							2					2				2		
≧100 and ﹤200 (Score 1)		1							1										
﹤100 (Score 0)														0	0				
Total (Score 0-24)	11.5	15	18	17	17	18.5	17	14	17.5	20	21	21	16	14	17	17	17.5	21.5	21.5

Supplementary table S4 Excluded studies in the *DAT1* 3'-UTR VNTR meta-analyses and reasons for the exclusion

Serial No.	References	Reasons
1	(Gill et al. 1997)	Excluded as the cohort was enlarged in Daly et al. 1999
2	(Daly et al. 1999)	Excluded as the cohort was enlarged in Hawi et al. 2003
3	(Palmer et al. 1999)	Excluded as the cohort was enlarged in Kustanovich et al. 2004
4	(Holmes et al. 2000)	Excluded as the cohort was enlarged in Langley et al. 2005
5	(Barr et al. 2001)	Excluded as the cohort was enlarged in Feng et al. 2005
6	(Curran et al. 2001)- **only the UK population**	Excluded as the UK cohort was enlarged in Brookes et al. 2006
7	(Roman et al. 2001)	Excluded as the cohort was enlarged in Genro et al. 2007
8	(Rowe et al. 2001)	Excluded as the sample has no diagnose for ADHD (retrospective)
9	(Kirley et al. 2002)	Excluded as the cohort already reported in Daly et al. 1999
10	(DiMaio et al. 2003)	Excluded as only a review
11	(Chen et al. 2003)	Excluded as the cohort was enlarged in Brookes et al. 2006
12	(Hawi et al. 2003)	Excluded as the cohort was enlarged in Hawi et al. 2005
13	(Qian et al. 2004)	Excluded as no info was available from authors and the cohort was enlarged in Qian et al. 2007
14	(Wang et al. 2004)	Excluded as the cohort was already published in Wang et al. 2008
15	(Purper-Ouakil et al. 2005)	Excluded as is a meta-analysis without any original unpublished data
16	(Bobb et al. 2005)- **only case-control**	Excluded as the Cases are already in TDT
17	(Cornish et al. 2005)	Excluded as related only to epidemiological samples with no DSM or ICD diagnosis
18	(Langley et al. 2005)- **only the FBAT sample**	Excluded as cases already included in the case-control and in FBAT no information to OR was available
19	(Todd et al. 2005)	Excluded as the cohort was already published in Kustanovich 2004, Palmer 1999 Todd 2001
20	(Cheuk et al. 2006)- **only case-control**	Excluded as the Cases are already in TDT
21	(Kim et al. 2006)- **only the TDT sample**	Excluded as did not get any info from authors while the Cases are already in TDT
22	(Carrasco et al. 2006)	Excluded as the cohort was the same as in Carrasco et al. 2004
23	(Li et al. 2006)	Excluded as is a meta-analysis without any original unpublished data
24	(Yang et al. 2007)	Excluded as is a meta-analysis without any original unpublished data
25	(Das and Mukhopadhyay 2007)	Excluded as the cohort was enlarged in Das et al. 2011
26	(Nyman et al. 2007)	Excluded as No response from any of the authors
27	(Kereszturi et al. 2008)- **only case-control**	Excluded as the Cases are already in TDT, as well as controls were unmatched
28	(Langley et al. 2009)	Excluded as the sample already described in Langley et al. 2005
29	(Franke et al. 2010)- **only Brüggeman and Dutch samples**	Excluded as already described in Brüggemann 2007, as well as in Franke et al. 2008
30	(Costa et al. 2011)	Excluded as related only to dopamine binding
31	(Brown et al. 2011)	Excluded due to failing information not possible to extract as first and last author are not available
32	(Shang et al. 2011)	Excluded as cohort was enlarged in Shang et al. 2014
33	(Spencer et al. 2013)	Fischman passed away, while the others claimed not to have the data (Spencer could not be reached)
34	(Faraone et al. 2014)	Excluded as describes meta-analysis with PET and SPECT

35	(Kambeitz et al. 2014)	Excluded as describes meta-analysis of *DAT1* 3'-UTR VNTR and methylphenidate response
36	(van Rooij et al. 2015)	Excluded as most likely is the same sample as in Onnink et al 2016
37	(Gatt et al. 2015)	Excluded as only a review
38	(Ettinger et al. 2016)	Excluded as described meta-analysis between *DAT1* 3'-UTR VNTR and cognition without diagnosis information
39	(Bonvicini et al. 2016)	Excluded as describes only meta-analysis in adults ADHD without original unpublished data
40	(Soleimani et al. 2018)	Excluded as describes meta-analysis of *DAT1* 3'-UTR VNTR and methylphenidate response
41	(Adriani et al. 2018)	Excluded as related only to methylation data

Supplementary table S5 Characteristics of included studies in the *DAT1* 3'-UTR VNTR meta-analyses

Serial No.	Reference	Country [ethnicity]	Study design	ADHD [Child-adolescent/ Adult]	Diagnostic criteria	Case/control [family]	Quality score**	HWE
1	(Cook et al. 1995)	USA (83% Caucasian)	HHRR	Children	DSM-III-R	[49]	21	n.a.
2	(Waldman et al. 1998)	USA (68% Caucasian)	TDT	Children	DSM-IV	[117]	21.5	yes
3	(Jiang et al. 1999)	Chinese	HRR	Children	DSM-III-R	[74]	20	yes
4	(Lunetta et al. 2000)	USA	TDT	Children	DSM-IV	[35]	12	n.a.
5	(Swanson et al. 2000)	USA	HRR	Children	DSM-IV	[80]	14	n.a.
6	(Curran et al. 2001)	Turkey	TDT	Children	DSM-IV	[111]	17	n.a.
7	(Todd et al. 2001)	USA	TDT	Children	DSM-IV	[523]	17	n.a.
8	(Maher et al. 2002)	USA Caucasian (males)	TDT	Children	DSM-III-R	[33]	18	n.a.
9	(Smith et al. 2003)	USA Caucasian	CC	Children	Semi DSM-IV	105/68	13.5	yes
10	(Carrasco et al. 2004)	Chile	HHRR	Children	DSM-IV	[26]	17	n.a.
11	(Kustanovich et al. 2004)	USA (79% Caucasian)	TDT	Children	DSM-IV	[293]	20	n.a.
12	(Galili-Weisstub et al. 2005)	Jewish	HRR	Children	DSM-IV	[68]	19	n.a.
13	(Bakker et al. 2005)	Dutch	TDT	Children	DSM-IV	[236]	21.5	yes
14	(Bobb et al. 2005)	USA (75% Caucasian)	TDT	Children	DSM-IV	[163]	20	yes
15	(Feng et al. 2005)	Canada	TDT	Children	DSM-IV	[178]	20	n.a.
16	(Kim et al. 2005)	Korea	TDT	Children	DSM-IV	[107]	20	yes
17	(Langley et al. 2005)	UK (White British)	CC	Children	ICD-10, DSM-IV & DSM-III-R	259/278	17	yes
18	(Simsek et al. 2005)	Oman	CC	Children	DSM-IV	92/110	17.5	yes
19	(Hawi et al. 2005)	Ireland	TDT	Children	DSM-IV	[179]	17	n.a.
20	(Brookes et al. 2006)	Taiwan	TDT	Children	DSM-IV	[216]	17	n.a.
		UK	TDT	Children	DSM-IV	[180]	17	n.a.
		European (ST1 IMAGE; 8 countries)	TDT	Children	DSM-IV	[664]	20	yes
21	(Cheuk et al. 2006)	Hong Kong	TDT	Children	DSM-IV	[64]	18	n.a.
22	(Hebebrand et al. 2006)	German	TDT	Children	ICD10 & DSM-IV	[102]	18.5	n.a.
23	(Kim et al. 2006)	Korea	CC	Children (Control- Mix of children and adults)	DSM-IV	85/100	15.5	yes
24	(Lim et al. 2006)	Korea	HHRR	Children	DSM-IV	[33]	17	n.a.

25	(Asherson et al. 2007)	European (ST2 IMAGE; 8 countries)	TDT	Children	DSM-IV	[998]	17	n.a.
26	(Brüggemann et al. 2007)	German	CC	Adults	n.a.	122/177	2	n.a.
27	(Qian et al. 2007)	Chinese (Han)	CC	Children	DSM-IV	332/216	14	yes
28	(Genro et al. 2008)	Brazil (92% Caucasian)	TDT	Children	DSM-IV	[241]	20	yes
29	(Johansson et al. 2008)	Norwegian	CC	Adults	ICD-10 DSM-IV	358/340	22.5	yes
30	(Wang et al. 2008)	Chinese (Han)	HHRR	Children	DSM-IV	[54]	18	yes
31	(Banoei et al. 2008)	Iran	CC	Children	DSM-IV	100/130	14.5	yes
32	(Kopeckova et al. 2008)	Czech	CC	Children	DSM-IV	100/100	12.5	yes
33	(Franke et al. 2008)	Dutch	CC	Adults	DSM-IV	213/507	17	yes
34	(Niederhofer et al. 2008)	European (German/Austria)	HRR	Children	DSM-IV	[49]	13	n.a.
35	(Kereszturi et al. 2008)	Hungarian	TDT	Children	DSM-IV	[168]	20	yes
36	(Gizer et al. 2009)	USA (97% Caucasian)	TDT	Children & Adults	DSM-III-R / DSM-IV	[266]	17	n.a.
37	(Wohl et al. 2008)	French (86% Caucasian)	TDT	Children	DSM-IV TR	[146]	17	n.a.
38	(Martinez-Levy et al. 2009)	Mexico	CC	Children	ICD-10, DSM-IV-R	105/113	21.5	yes
39	(Hawi et al. 2010)	IMAGE (European)	TDT	Children	DSM-IV	[1033]	17	n.a.
		English	TDT	Children	DSM-IV	[107]	16	n.a.
		Irish (2)	TDT	Children	DSM-IV	[52]	15	n.a.
		Irish (1)	TDT	Children	DSM-IV	[178]	17	n.a.
40	(Dresler et al. 2010)	German	CC	Adults	DSM-IV	161/109	19	n.a.
41	(Franke et al. 2010)	German	CC	Adults	DSM-IV	421/405	20	yes
		Norwegian	CC	Adults	DSM-IV	450/548	21	yes
		Spanish (Caucasian)	CC	Adults	DSM-IV	264/195	17	yes
42	(Aparecida da Silva et al. 2011)	Brazil	CC	Adults	DSM-IV	102/479	20	yes
43	(Bidwell et al. 2011)	USA	HHRR	Children	DSM-IV	[202]	18	n.a.

44	(Das et al. 2011)	India	CC	Children (Control- Mix)	DSM-IV	125/93	13	yes
		India	TDT	Children	DSM-IV	[122]	20	yes
45	(El-Tarras et al. 2012)	Saudi	CC	Children	DSM-IV	120/160	11.5	n.a.
46	(Hoogman et al. 2013)	Dutch	CC	Adults	DSM-IV	87/77	15	n.a.
47	(Martinez-Levy et al. 2013)	Mexico	CC	Children	ICD-10, DSM-IV	215/283	18	yes
48	(de Azeredo et al. 2014)	Brazil (European)	CC	Adults	DSM-IV	476/587	17	yes
49	(Shang and Gau 2014)	Taiwan	TDT	Children	DSM-IV	[382]	17	yes
50	(Hasler et al. 2015)	European (Swiss)	CC	Adults	DSM-IV TR	75/391	18.5	n.a.
51	(Sery et al. 2015)	Czech	CC	Children	ICD-10, DSM-IV	218/253	17	n.a.
52	(Fonseca et al. 2015)	Columbia	TDT	Children	DSM-IV	[86]	14	yes
53	(Agudelo et al. 2015)	Columbia	CC	Children	DSM-IV	70/53	17.5	yes
54	(Gomez-Sanchez et al. 2016)	Spanish	CC	Children	DSM-IV TR	290/340	20	yes
55	(Onnink et al. 2016)	Dutch (NeuroIMAGE)	CC	Children	DSM-IV	301/186	21	yes
		Dutsch (IMpACT+BIG)	CC	Adults	DSM-IV	118/111+1718	21	yes
56	(Ortega-Rojas et al. 2017)	Columbia	TDT	Children	DSM-IV TR	[97]	16	n.a.
57	(Stanley et al. 2017)	India	CC	Children	DSM-5	44/44	14	n.a.
58	(Wiguna et al. 2017)	Indonesian	CC	Children	DSM-IV TR	47/48	17	yes
59	(Hong et al. 2018)	Korea	CC	Children	DSM-IV	150/322	17	n.a.
60	(Morgan et al. 2018)	USA (53% Caucasian)	CC	Children	DSM-IV, DISC	113/99	17.5	yes
61	Current study	Caucasian	CC	Children	ICD-10, DSM-IV & DSM-5	220/156	21.5	yes
		Caucasia	TDT	Children	ICD-10, DSM-IV & DSM-5	[202]	21.5	yes

Abbreviations: CC, case-control study; TDT, transmission disequilibrium test; FBAT, Family Based Association Test; HRR family-based study using haplotype relative risk, HHRR, haplotype-based haplotype relative risk; n.a., not available; ADHD, attention-deficit hyperactivity disorder; DSM-IIIR/IV, diagnostic and statistical manual of mental disorders, fourth Edition/ third revised Edition; ICD-10, international classification of disease; HWE, hardy-Weinberg equilibrium; DISC, Diagnostic Interview Schedule for Children-IV.

** See table Quality assessment score (Supplementary Table S3); according to the Score sheet from Liu et al. ((Liu et al. 2015) as following:

Low quality scores	<16
High quality scores	>16
Middle quality score	=16

Supplementary table S6 Summary of all studies included in the meta analysis for the association between *DAT1* 3'-UTR VNTR 10-repeat allele and 9-repeat allele.

id	author	year	type	N	N Cases	OR	CI-	CI+	log(or)	se	Ancestry	Child/Adult
1	Cook	1995	HHRR	147	49	2.842	1.324	6.099	1.045	0.390	USA (83% Caucasian)	Child
2	Waldman	1998	TDT	392	117	1.915	1.346	2.725	0.650	0.180	USA (68% Caucasian)	Child
3	Jiang	1999	HRR	222	74	1.070	0.450	2.530	0.068	0.440	Chinese	Child
4	Lunetta	2000	TDT	60	33	1.700	0.778	3.713	0.531	0.399	USA	Child
5	Swanson	2000	HRR	240	80	0.636	0.295	1.371	-0.452	0.391	USA	Child
6	Curran (Turkey)	2001	TDT	333	111	0.813	0.533	1.240	-0.208	0.216	Turkey	Child
7	Todd	2001	TDT	2092	219	0.821	0.575	1.173	-0.197	0.182	USA	Child
8	Maher	2002	TDT	99	33	1.000	0.397	2.519	0.000	0.471	Caucasian (male)	Child
9	Smith	2003	CC	173	105	0.950	0.580	1.570	-0.051	0.254	Caucasian (USA)	Child
10	Carrasco	2004	HHRR	51	26	1.800	0.719	4.505	0.588	0.468	Chile	Child
11	Kustanovich	2004	TDT	1120	535	0.915	0.714	1.174	-0.088	0.127	USA (79% Caucasian)	Child
12	Galili-Weisstub	2005	HRR	204	68	1.031	0.634	1.677	0.031	0.248	Jewish	Child
13	Bakker	2005	TDT	901	434	0.944	0.684	1.304	-0.057	0.165	Dutch	Child
14	Bobb	2005	TDT	355	163	1.667	0.452	6.144	0.511	0.666	USA (75% Caucasian)	Child
15	Feng	2005	TDT	541	226	1.000	0.728	1.374	0.000	0.162	Canada	Child
16	Kim	2005	TDT	321	107	1.063	0.537	2.103	0.061	0.348	Korean	Child
17	Langley	2005	CC	537	259	1.047	0.800	1.380	0.046	0.139	UK (white British)	Child
18	Simsek	2005	CC	179	84	1.130	0.730	1.750	0.122	0.223	Oman	Child
19	Hawi	2005	TDT	537	179	1.167	0.889	1.531	0.154	0.139	Irish	Child
20	Brookes	2006	TDT	475	216	3.111	1.468	6.593	1.135	0.383	Taiwan	Child
21	Brookes	2006	TDT	476	180	2.031	1.330	3.102	0.709	0.216	UK	Child
22	Brookes	2006	TDT	2748	776	1.130	0.931	1.372	0.122	0.099	European (ST1 IMAGE; 8 countries)	Child
23	Cheuk	2006	TDT	192	64	0.890	0.350	2.280	-0.117	0.478	Chinese (Hong Kong)	Child
24	Hebebrand	2006	TDT	425	229	1.021	0.868	1.199	0.020	0.082	German	Child
25	Kim	2006	CC	185	85	0.317	0.142	0.709	-1.149	0.411	Korean	Child
26	Lim	2006	HHRR	99	33	7.880	2.200	28.290	2.064	0.652	Korean	Child

27	Asherson	2007	TDT	3352	1159	1.205	1.045	1.389	0.186	0.073	European (ST2 IMAGE; 8 countries)	Child
28	Brüggemann	2007	CC	296	122	0.880	0.520	1.480	-0.128	0.267	German	Adults
29	Qian Q	2007	CC	476	284	0.660	0.360	1.210	-0.416	0.309	Chinese (Han)	Child
30	Genro	2007	TDT	689	241	1.024	0.759	1.380	0.023	0.152	Brazil (92% Caucasian)	Child
31	Johansson	2008	CC	698	358	0.940	0.740	1.190	-0.062	0.121	Norway	Adults
32	Wang	2008	HHRR	111	51	1.200	0.370	3.910	0.182	0.601	Chinese (Han)	Child
33	Banoei	2008	CC	230	100	1.078	0.743	1.565	0.075	0.190	Iran	Child
34	Kopeckova	2008	CC	200	100	1.640	1.045	2.576	0.495	0.230	Czech	Child
35	Franke	2008	CC	720	213	0.760	0.590	0.980	-0.274	0.129	Dutch	Adults
36	Niederhofer	2008	HRR	134	49	1.000	0.420	2.350	0.000	0.439	German/Austria	Child
37	Keresztúri	2008	TDT	440	168	1.325	0.625	2.811	0.281	0.384	Hungarian	child
38	Gizer (Mick)	2009	TDT	1006	474	1.036	0.798	1.345	0.035	0.133	USA (97% Caucasian)	Child/Adult
39	Wohl M	2008	TDT	398	146	1.000	1.000	1.000	0.000	0.080	French (86% Caucasian)	Child
40	Martinez-Levy GA	2009	CC	218	105	0.850	0.510	1.430	-0.163	0.263	Mexico	Child
41	Hawi	2010	TDT	3099	1033	1.490	1.200	1.840	0.399	0.109	IMAGE (European)	Child
42	Hawi	2010	TDT	277	107	2.210	0.840	5.820	0.793	0.494	English	Child
43	Hawi	2010	TDT	156	52	0.780	0.300	2.060	-0.248	0.491	Irish 2	Child
44	Hawi	2010	TDT	534	178	1.630	0.930	2.850	0.489	0.286	Irish 1	Child
45	Dresler	2010	CC	270	161	1.040	0.710	1.530	0.039	0.196	German (Würzburg)	Child
46	Franke (IMpACT)	2010	CC	826	421	1.010	0.810	1.260	0.010	0.113	German (Würzburg)	Adults
47	Franke (IMpACT)	2010	CC	998	450	0.880	0.720	1.070	-0.128	0.101	Norway	Adults
48	Franke (IMpACT)	2010	CC	459	264	1.010	0.760	1.340	0.010	0.145	Spanish (Caucasian)	Adults
49	Aparacida da Silva	2011	CC	555	99	1.090	0.770	1.530	0.086	0.175	Brazil	Adults
50	Bidwell	2011	HHRR	606	202	0.990	0.670	1.480	-0.010	0.202	USA	Child
51	Das	2011	CC	211	120	0.880	0.430	1.800	-0.128	0.365	Indian	Child
52	Das	2011	TDT	354	122	0.400	0.180	0.890	-0.916	0.408	Indian	Child
53	El-Tarras	2012	CC	135	30	0.670	0.360	1.270	-0.400	0.322	Saudi	Child
54	Hoogman (IMpACT)	2013	CC	160	83	0.600	0.360	0.990	-0.511	0.258	Dutch	Adults
55	Martinez-Levy GA	2013	CC	622	215	1.280	0.840	1.940	0.247	0.214	Mexico	Child

56	de Azeredo	2014	CC	1063	476	1.040	0.870	1.260	0.039	0.094	Brazil (European)	Adults
57	Shang CY	2014	TDT	1298	439	1.150	0.750	1.760	0.140	0.218	Taiwan	Child
58	Hasler	2015	CC	372	70	0.900	0.590	1.370	-0.105	0.215	European (Swiss)	Adults
59	Sery	2015	CC	471	218	1.290	0.950	1.740	0.255	0.154	Czech	Child
60	Fonseca	2015	TDT	258	86	1.412	0.223	2.252	0.345	0.590	Columbia (Spanish)	Child
61	Agudelo	2015	CC	123	70	1.060	0.560	1.980	0.058	0.322	Columbia (Spanish)	Child
62	Gomez-Sanchez	2016	CC	630	290	0.970	0.770	1.210	-0.030	0.115	Spanish (Caucasian)	Child
63	Onnink (NeuroIMAGE)	2016	CC	471	294	1.050	0.760	1.440	0.049	0.163	Dutch	Child
64	Onnink (IMpACT+BIG)	2016	CC	1894	115	0.830	0.610	1.120	-0.186	0.155	Dutch	Adults
65	Ortega-Rojas	2017	TDT	291	97	0.787	0.424	1.471	-0.239	0.317	Columbia (Spanish)	Child
66	Stanley	2017	CC	85	42	4.930	1.580	15.340	1.595	0.580	Indian	Child
67	Wiguna	2017	CC	92	47	2.400	1.050	5.460	0.875	0.421	Indonesian	Child
68	Hong	2018	CC	450	146	1.530	0.650	3.620	0.425	0.438	Korean	Child
69	Morgan	2018	CC	212	113	0.980	0.630	1.520	-0.020	0.225	53% Caucasian	Child
70	Grünblatt	2019	CC	366	211	0.676	0.484	0.945	-0.391	0.171	Caucasian (Swiss)	Child
71	Grünblatt	2019	TDT	719	314	1.048	0.742	1.480	0.047	0.176	Caucasian (Swiss)	Child

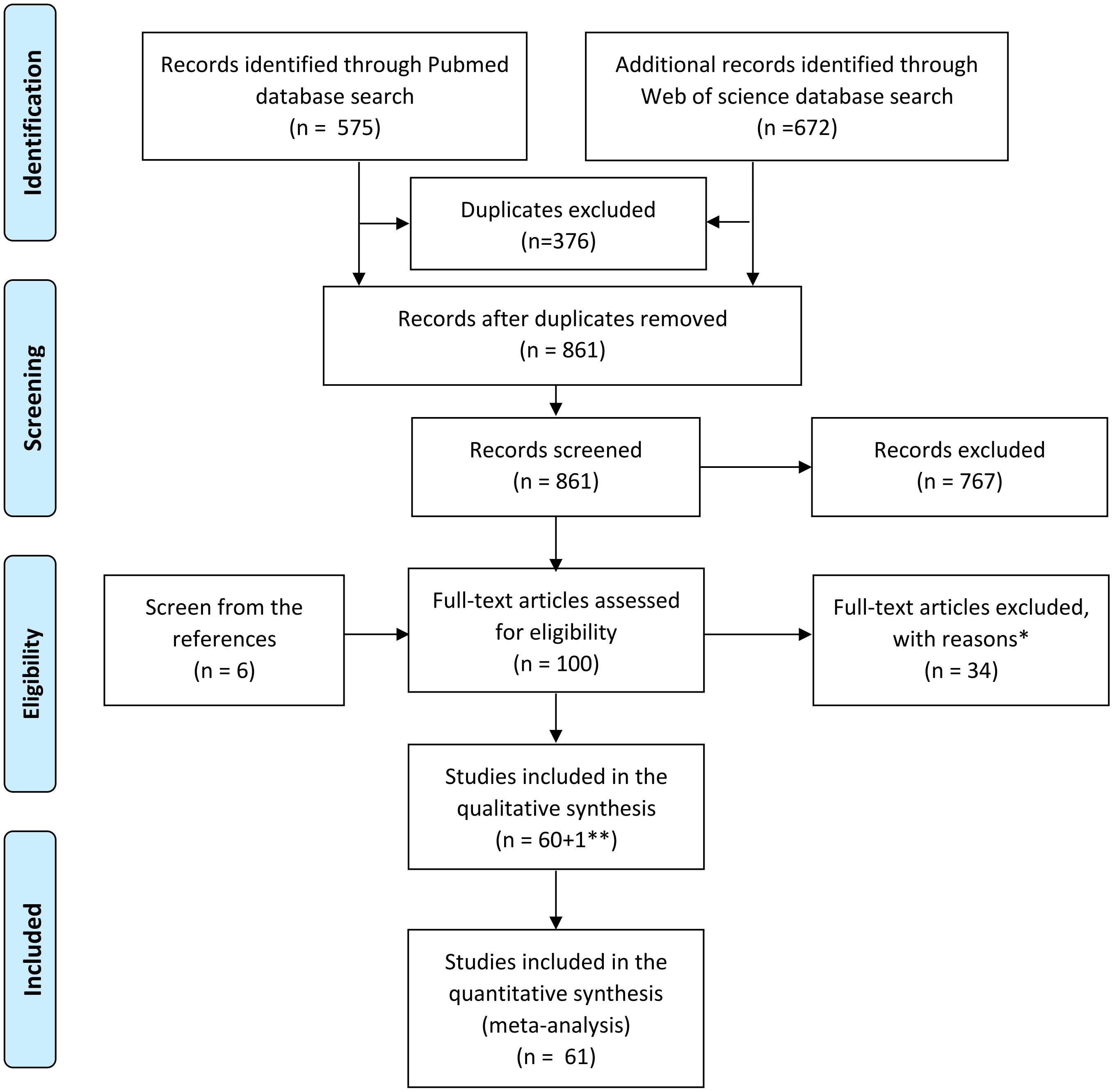
Supplementary table S7 Summary of all studies included in the meta analysis for the association between *DAT1* 3'-UTR VNTR Long-repeat allele and Short-repeat allele.

id	author	year	type	N	N Cases	OR	CI-	CI+	log(or)	se	Ancestry	Child/Adult
1	Cook	1995	HHRR	147	49	2.842	1.324	6.099	1.045	0.390	USA (83% Caucasian)	Child
2	Waldman	1998	TDT	392	117	1.915	1.346	2.725	0.650	0.180	USA (68% Caucasian)	Child
3	Jiang	1999	HRR	222	74	1.070	0.450	2.530	0.068	0.440	Chinese	Child
4	Lunetta	2000	TDT	60	33	1.700	0.778	3.713	0.531	0.399	USA	Child
5	Swanson	2000	HRR	240	80	0.636	0.295	1.371	-0.452	0.391	USA	Child
6	Curran (Turkey)	2001	TDT	333	111	0.813	0.533	1.240	-0.208	0.216	Turkey	Child
7	Todd	2001	TDT	2092	219	0.821	0.575	1.173	-0.197	0.182	USA	Child
8	Maher	2002	TDT	99	33	1.000	0.397	2.519	0.000	0.471	Caucasian (male)	Child
9	Smith	2003	CC	173	105	0.950	0.580	1.570	-0.051	0.254	Caucasian (USA)	Child
10	Carrasco	2004	HHRR	51	26	1.800	0.719	4.505	0.588	0.468	Chile	Child
11	Kustanovich	2004	TDT	1120	535	0.915	0.714	1.174	-0.088	0.127	USA (79% Caucasian)	Child
12	Galili-Weisstub	2005	HRR	204	68	0.700	0.360	1.380	-0.357	0.343	Jewish	Child
13	Bakker	2005	TDT	901	434	0.944	0.684	1.304	-0.057	0.165	Dutch	Child
14	Bobb	2005	TDT	355	163	1.667	0.452	6.144	0.511	0.666	USA (75% Caucasian)	Child
15	Feng	2005	TDT	541	226	1.030	0.660	1.600	0.030	0.226	Canada	Child
16	Kim	2005	TDT	321	107	1.140	0.410	3.150	0.131	0.520	Korean	Child
17	Langley	2005	CC	537	259	1.047	0.800	1.380	0.046	0.139	UK (white British)	Child
18	Simsek	2005	CC	202	92	1.060	0.710	1.600	0.058	0.207	Oman	Child
19	Hawi	2005	TDT	537	179	1.167	0.889	1.531	0.154	0.139	Irish	Child
20	Brookes	2006	TDT	475	216	5.320	1.910	14.770	1.671	0.522	Taiwan	Child
21	Brookes	2006	TDT	476	180	4.320	2.370	7.890	1.463	0.307	UK	Child
22	Brookes	2006	TDT	2748	776	1.130	0.931	1.372	0.122	0.099	European (ST1 IMAGE; 8 countries)	Child
23	Cheuk	2006	TDT	192	64	0.890	0.350	2.280	-0.117	0.478	Chinese (Hong Kong)	Child
24	Hebebrand	2006	TDT	425	229	1.021	0.868	1.199	0.020	0.082	German	Child
25	Kim	2006	CC	185	85	0.400	0.170	0.910	-0.916	0.428	Korean	Child
26	Lim	2006	HHRR	99	33	7.880	2.200	28.290	2.064	0.652	Korean	Child

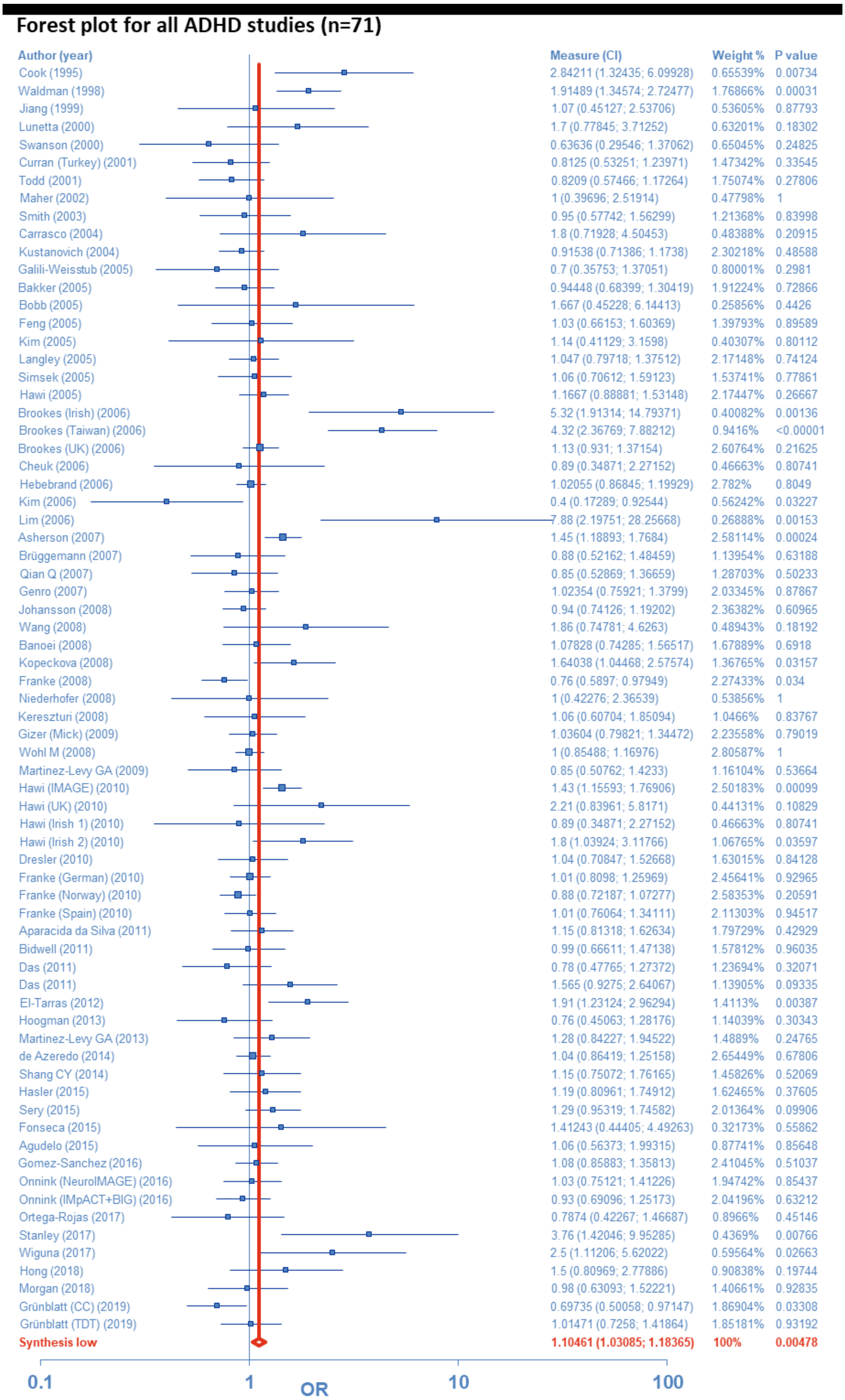
27	Asherson	2007	TDT	3352	1159	1.450	1.190	1.770	0.372	0.101	European (ST2 IMAGE; 8 countries)	Child
28	Brüggemann	2007	CC	296	122	0.880	0.520	1.480	-0.128	0.267	German	Adults
29	Qian Q	2007	CC	548	332	0.850	0.530	1.370	-0.163	0.242	Chinese (Han)	Child
30	Genro	2007	TDT	689	241	1.024	0.759	1.380	0.023	0.152	Brazil (92% Caucasian)	Child
31	Johansson	2008	CC	698	358	0.940	0.740	1.190	-0.062	0.121	Norway	Adults
32	Wang	2008	HHRR	162	54	1.860	0.750	4.640	0.621	0.465	Chinese (Han)	Child
33	Banoei	2008	CC	230	100	1.078	0.743	1.565	0.075	0.190	Iran	Child
34	Kopeckova	2008	CC	200	100	1.640	1.045	2.576	0.495	0.230	Czech	Child
35	Franke	2008	CC	720	213	0.760	0.590	0.980	-0.274	0.129	Dutch	Adults
36	Niederhofer	2008	HRR	134	49	1.000	0.420	2.350	0.000	0.439	German/Austria	Child
37	Kereszturi	2008	TDT	440	168	1.060	0.610	1.860	0.058	0.284	Hungarian	child
38	Gizer (Mick)	2009	TDT	1006	474	1.036	0.798	1.345	0.035	0.133	USA (97% Caucasian)	Child/Adult
39	Wohl M	2008	TDT	398	146	1.000	1.000	1.000	0.000	0.080	French (86% Caucasian)	Child
40	Martinez-Levy GA	2009	CC	218	105	0.850	0.510	1.430	-0.163	0.263	Mexico	Child
41	Hawi	2010	TDT	3099	1033	1.430	1.150	1.760	0.358	0.109	IMAGE (European)	Child
42	Hawi	2010	TDT	277	107	2.210	0.840	5.820	0.793	0.494	English	Child
43	Hawi	2010	TDT	156	52	0.890	0.350	2.280	-0.117	0.478	Irish 2	Child
44	Hawi	2010	TDT	534	178	1.800	1.040	3.120	0.588	0.280	Irish 1	Child
45	Dresler	2010	CC	270	161	1.040	0.710	1.530	0.039	0.196	German (Würzburg)	Child
46	Franke (IMpACT)	2010	CC	826	421	1.010	0.810	1.260	0.010	0.113	German (Würzburg)	Adults
47	Franke (IMpACT)	2010	CC	998	450	0.880	0.720	1.070	-0.128	0.101	Norway	Adults
48	Franke (IMpACT)	2010	CC	459	264	1.010	0.760	1.340	0.010	0.145	Spanish (Caucasian)	Adults
49	Aparacida da Silva	2011	CC	581	102	1.150	0.810	1.620	0.140	0.177	Brazil	Adults
50	Bidwell	2011	HHRR	606	202	0.990	0.670	1.480	-0.010	0.202	USA	Child
51	Das	2011	CC	218	125	0.780	0.480	1.280	-0.248	0.250	Indian	Child
52	Das	2011	TDT	354	122	1.565	0.928	2.641	0.448	0.267	Indian	Child
53	El-Tarras	2012	CC	280	120	1.910	1.230	2.960	0.647	0.224	Saudi	Child
54	Hoogman (IMpACT)	2013	CC	164	87	0.760	0.450	1.280	-0.274	0.267	Dutch	Adults
55	Martinez-Levy GA	2013	CC	622	215	1.280	0.840	1.940	0.247	0.214	Mexico	Child

56	de Azeredo	2014	CC	1063	476	1.040	0.870	1.260	0.039	0.094	Brazil (European)	Adults
57	Shang CY	2014	TDT	1298	439	1.150	0.750	1.760	0.140	0.218	Taiwan	Child
58	Hasler	2015	CC	466	75	1.190	0.810	1.750	0.174	0.197	European (Swiss)	Adults
59	Sery	2015	CC	471	218	1.290	0.950	1.740	0.255	0.154	Czech	Child
60	Fonseca	2015	TDT	258	86	1.412	0.223	2.252	0.345	0.590	Columbia (Spanish)	Child
61	Agudelo	2015	CC	123	70	1.060	0.560	1.980	0.058	0.322	Columbia (Spanish)	Child
62	Gomez-Sanchez	2016	CC	630	290	1.080	0.860	1.360	0.077	0.117	Spanish (Caucasian)	Child
63	Onnink (NeuroIMAGE)	2016	CC	487	301	1.030	0.750	1.410	0.030	0.161	Dutch	Child
64	Onnink (IMpACT+BIG)	2016	CC	1947	118	0.930	0.690	1.250	-0.073	0.152	Dutch	Adults
65	Ortega-Rojas	2017	TDT	291	97	0.787	0.424	1.471	-0.239	0.317	Columbia (Spanish)	Child
66	Stanley	2017	CC	88	44	3.760	1.420	9.950	1.324	0.497	Indian	Child
67	Wiguna	2017	CC	95	47	2.500	1.110	5.610	0.916	0.413	Indonesian	Child
68	Hong	2018	CC	471	150	1.500	0.810	2.780	0.405	0.315	Korean	Child
69	Morgan	2018	CC	212	113	0.980	0.630	1.520	-0.020	0.225	53% Caucasian	Child
70	Grünblatt	2019	CC	376	220	0.697	0.501	0.972	-0.360	0.169	Caucasian (Swiss)	Child
71	Grünblatt	2019	TDT	743	324	1.015	0.726	1.418	0.015	0.171	Caucasian (Swiss)	Child

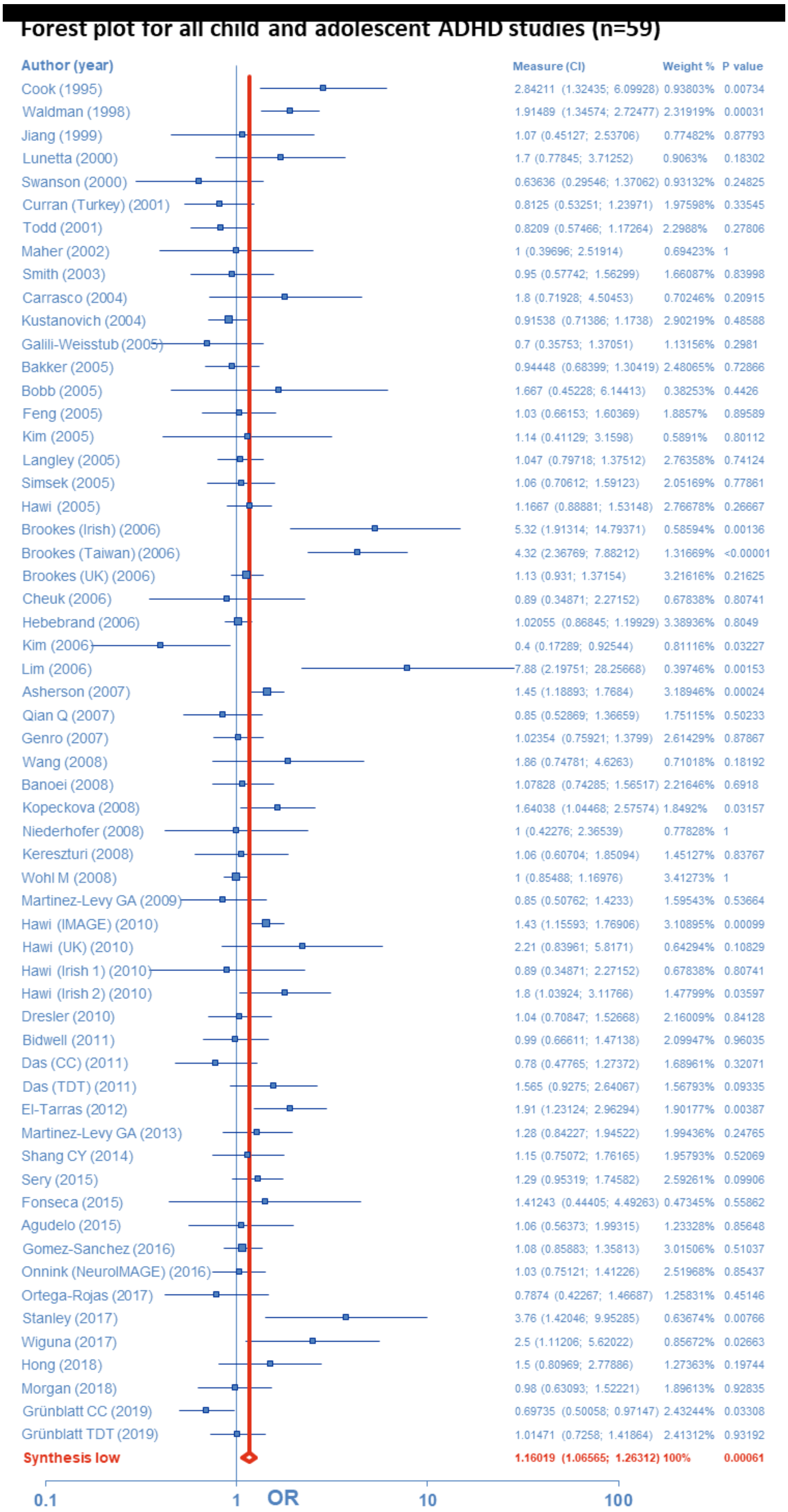
PRISMA 2009 Flow Diagram



Supplementary Figure S1 PRISMA Flow diagram for literature search of *DAT1* 3'-UTR VNTR polymorphism and ADHD data published till December 31, 2018. Search terms were (DAT* OR SLC6A3 OR "dopamine transporter") AND (polymorphism* OR VNTR OR "tandem repeat" OR "untranslated region") AND (ADHD OR "attention hyperactivity"). * Details are described in Supplementary Table S1; ** Current study samples



Supplementary Figure S2 Meta-analysis of all cohorts and published association analyses (n=71) of the *DAT1* 3'-UTR VNTR Long-allele with attention-deficit hyperactivity disorder (ADHD) including ID number, individual OR and 95% CI, individual weight and individual P-value. Black whiskers in the forest plot represent 95% confidence intervals (CI) for odds ratio; the weight (inverse variance) of the study is reflected in symbol (box) size. Sample demographics, individual statistics, heterogeneity, literature bias statistics, quality assessments and scores, and model used is summarized in supplementary tables S3, S5-S6.



Supplementary Figure S3 Meta-analysis in child and adolescent ADHD studies (n=59) of the *DAT1* 3'-UTR VNTR Long-allele with attention-deficit hyperactivity disorder (ADHD) including ID number, individual OR and 95% CI, individual weight and individual P-value. Black whiskers in the forest plot represent 95% confidence intervals (CI) for odds ratio; the weight (inverse variance) of the study is reflected in symbol (box) size. Sample demographics, individual statistics, heterogeneity, literature bias statistics, quality assessments and scores, and model used is summarized in supplementary tables S3, S5-S6.

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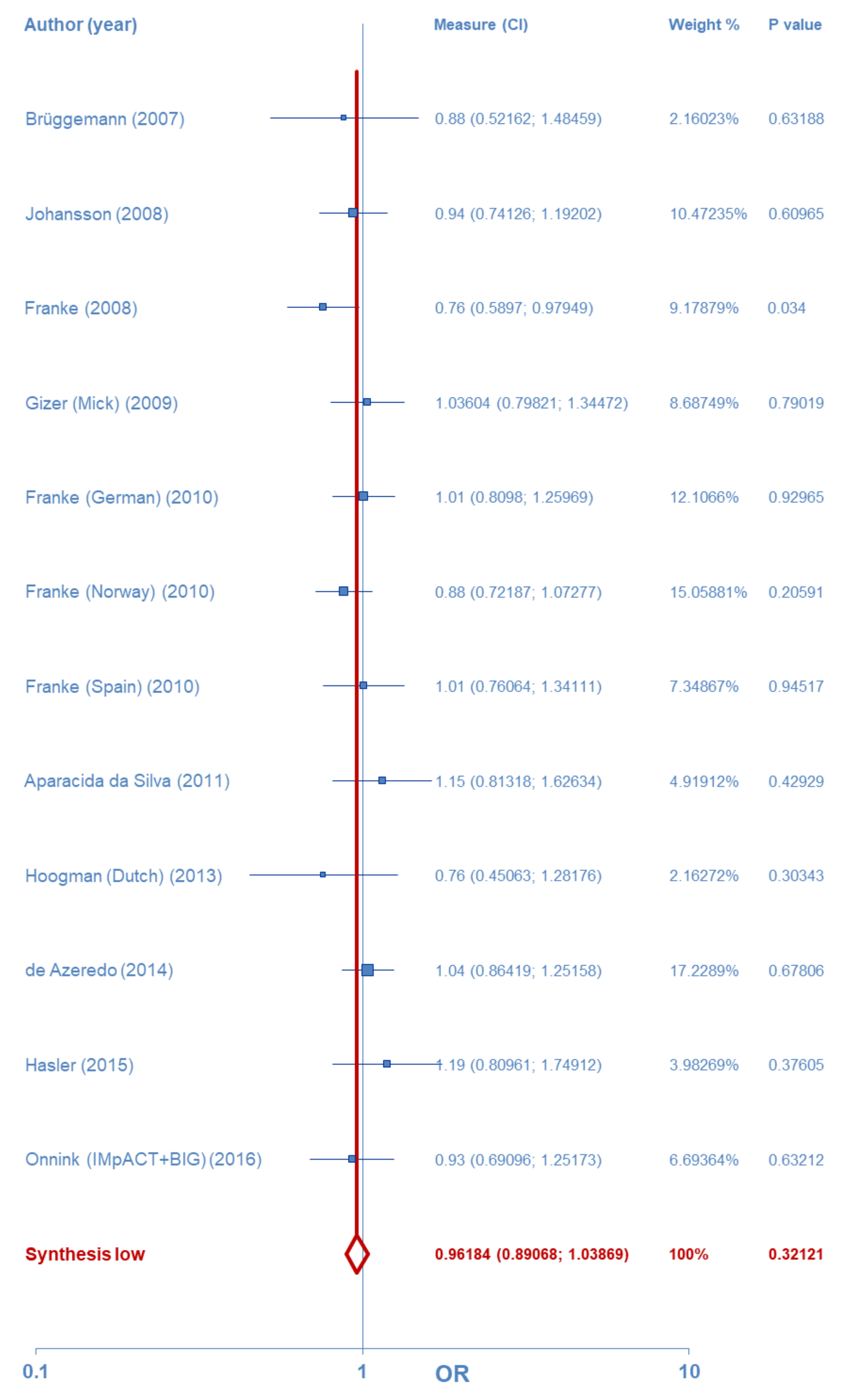

Supplementary Figure S4 Meta-analysis in adult ADHD studies (n=12) of the *DAT1* 3'-UTR VNTR Long-allele with attention-deficit hyperactivity disorder (ADHD) including ID number, individual OR and 95% CI, individual weight and individual P-value. Black whiskers in the forest plot represent 95% confidence intervals (CI) for odds ratio; the weight (inverse variance) of the study is reflected in symbol (box) size. Sample demographics, individual statistics, heterogeneity, literature bias statistics, quality assessments and scores, and model used is summarized in supplementary tables S3, S5-S6.

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