– SUPPLEMENTARY MATERIAL –

Meta-analytical Transdiagnostic Neural Correlates in common Pediatric Psychiatric Disorders

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Supplementary Table 1. Included studies: Sample characteristics and fMRI task.

Primary Diagnosis	First Author, Year	Experimental Task	TD (N=)	CASES (N=)	Male (%)	Mean Age
ADHD	Braet et al. 2011 (1)	Go-No/Go	38	20	0.85	14.1
ADHD	Bédard et al. 2014 (2)	N-Back	21	24	0.88	12.4
ADHD	Bollmann et al. 2017 (3)	Spatial Working Memory Task	14	12	0.47	10.9
ADHD	Booth et al. 2005 (4)	Go-No/Go	12	12	0.67	11.0
ADHD	Cao et al. 2008 (5)	Cued Target Detection	13	12	1.00	13.4
ADHD	Cerullo et al. 2009 (6)	Continuous Performance Task	13	10	0.70	14.0
ADHD	Chou et al. 2015_1 (7)	Stroop Task	20	25	0.85	10.5
ADHD	Chou et al. 2015_2 (7)	Stroop Task	20	25	0.85	10.5
ADHD	Christakou et al. 2013 (8)	Sustained Attention Task	20	20	1.00	14.0
ADHD	Durston et al. 2006 (9)	Go-No/Go	11	11	1.00	13.9
ADHD	Durston et al. 2007_1 (10)	Go-No/Go	12	12	1.00	14.9
ADHD	Durston et al. 2007_2 (10)	Go-No/Go	12	12	1.00	14.9
ADHD	Ercan et al. 2016 (11)	Go-No/Go	100	50	0.58	11.0
ADHD	Fan et al. 2014 (12)	Stroop Task	23	25	0.92	10.9
ADHD	Hart et al. 2014 (13)	Stop Task	20	20	1.00	12.1
ADHD	Hart et al. 2014 (14)	Stop Task	30	30	1.00	13.9
ADHD	Hauser et al. 2014 (15)	Reversal Learning Task	20	20	0.65	14.6
ADHD	Hwang et al. 2015 (16)	Stroop Paradigm	35	26	0.65	14.5
ADHD	Iannaccone et al. 2015_1 (17)	Speeded Flanker Task	18	18	0.61	14.5
ADHD	Iannaccone et al. 2015_2 (17)	Speeded Flanker Task	18	18	0.61	14.5
ADHD	Janssen et al. 2015 (18)	Stop-Signal Task	17	21	0.91	10.6
ADHD	Kohls et al. 2014 (19)	Rewarded Go-No/Go	17	16	1.00	14.5
ADHD	Konrad et al. 2006 (20)	Attention Network Test	16	16	1.00	10.2
ADHD	Krauel et al. 2007 (21)	Recognition Test	12	12	1.00	14.5
ADHD	Li et al. 2014 (22)	N-Back	27	33	1.00	9.9
ADHD	Ma et al. 2012 (23)	Go-No/Go	15	15	0.53	9.9
ADHD	Ma et al. 2016 (24)	Rewarded Stroop Task	33	25	0.76	15.4
ADHD	Massat et al. 2012 (25)	N-Back	14	19	0.47	10.8
ADHD	Massat et al. 2018 (26)	Stop Signal Task	19	18	0.44	10.6
ADHD	Metin et al. 2017 (27)	Spatial Attention Paradigm	16	19	0.74	10.32
ADHD	Mostofsky et al. 2006 (28)	Finger Sequencing Paradigm	11	11	0.73	10.4
ADHD	Norman et al. 2017 (29)	Sustained Attention Task	20	20	1.00	15.0
ADHD	Norman et al. 2018 (30)	Iowa Gambling Task	20	16	1.00	14.6
ADHD	O'Conaill et al. 2015 (31)	Visual Search Task	21	19	0.90	11.9
ADHD	Orinstein et al. 2014 (32)	Auditory Oddball Attention Task	20	18	0.78	15.2
ADHD	Passarotti et al. 2010 (33)	N-Back	19	14	0.64	13.0
ADHD	Passarotti et al. 2010 (34)	Emotional Valence Stroop Task	14	15	0.80	12.9
ADHD	Passarotti et al. 2010 (35)	Response Inhibition Task	15	11	0.55	13.1
ADHD	Poissant et al. 2016 (A) (36)	Pictures Story	12	7	0.00	11.0
ADHD	Poissant et al. 2016 (B) (36)	Pictures Story	9	16	1.00	11.0
ADHD	Posner et al. 2011 (37)	Subliminal Fearful Faces	15	15	0.87	13.5
ADHD	Posner et al. 2011 (38)	Emotional Stroop Task	15	15	0.87	13.5
ADHD	Rubia et al. 2005 (39)	Stop Task	22	16	1.00	13.0
ADHD	Rubia et al. 2008 (40)	Stop Task	20	20	1.00	13.2
ADHD	Rubia et al. 2009 (41)	Reward Continuous Performance	16	18	1.00	13.3
ADHD	Rubia et al. 2009 (42)	Simon Task	20	20	1.00	13.2
ADHD	Rubia et al. 2009 (43)	Delay Discounting Task	10	10	1.00	14.0
ADHD	Rubia et al. 2010 (44)	Visual–Spatial Switch Task	20	14	1.00	13.3
ADHD	Rubia et al. 2010_1 (45)	Stop Task	20	18	1.00	14.5

ADHD	Rubia et al. 2010$_2$ (45)	Switch Task	-	12	1.00	13.7
ADHD	Rubia et al. 2011 (46)	Simon Task	20	18	1.00	14.3
ADHD	Schwarz et al. 2015 (47)	Anti-Saccades	11	11	0.64	10.4
ADHD	Sheridan et al. 2007 (48)	Match-to-Sample Task	10	10	0.00	15.2
ADHD	Silk et al. 2008 (49)	Raven's Progressive Matrices	12	12	1.00	11.2
ADHD	Siniatchkin et al. 2012 (50)	Go/NoGo	27	17	0.83	9.3
ADHD	Smith et al. 2008 (51)	Time Discrimination	17	21	1.00	12.8
ADHD	Spinelli et al. 2011 (52)	Go-No/Go	17	13	0.69	10.6
ADHD	Spinelli et al. 2011 (53)	Go-No/Go	17	13	0.69	10.6
ADHD	Stevens et al. 2017$_1$ (A) (54)	Monetary Incentive Delay	134	40	0.78	14.8
ADHD	Stevens et al. 2017$_2$ (A) (54)	Monetary Incentive Delay	-	-	0.78	14.8
ADHD	Stevens et al. 2017$_1$ (B) (54)	Monetary Incentive Delay	-	31	0.84	15.0
ADHD	Stevens et al. 2017$_2$ (B) (54)	Monetary Incentive Delay	-	-	0.84	15.0
ADHD	Stevens et al. 2017 (C) (54)	Monetary Incentive Delay	-	46	0.80	15.1
ADHD	Tamm et al. 2004 (55)	Go-No/Go	12	10	1.00	16.0
ADHD	Tamm et al. 2006 (56)	Oddball Task	12	14	1.00	15.6
ADHD	Tamm et al. 2012 (57)	Fluid Reasoning Task	10	12	0.54	9.0
ADHD	Tegelbeckers et al. 2015 (58)	Visual Oddball Task	19	19	1.00	13.3
ADHD	Vance et al. 2007 (59)	Mental Rotation Task	12	12	1.00	11.1
ADHD	van Ewijk et al. 2015 (60)	Spatial span task	103	109	0.60	17.1
ADHD	van Rooij et al. 2015 (61)	Stop-Signal Task	111	185	0.70	17.3
ADHD	Vetter et al. 2018 (62)	perceptual discrimination task	25	25	1.00	14.3
ADHD	Vloet et al. 2010 (63)	Spatial Stimulus–Response	14	14	1.00	11.3
ADHD	von Rhein et al. 2015 (64)	monetary incentive delay task	108	150	0.70	17.7
ADHD	Wang et al. 2013 (65)	Continuous Performance Task	31	28	0.89	9.6
ADHD	Hegarty et al. 2021 (66)	Stop-Signal Task	30	30	0.67	10.1
ADHD	Finger et al., 2008 (67)	Probabilistic Reversal Task	14	14	0.71	13.4
ADHD	Gatzke-Kopp et al. 2009 (68)	Monetary Incentive task	11	19	1.00	13.6
ADHD	Bubenzer-Busch et al. 2016$_1$ (69)	Point Subtraction Aggression	27	27	1.00	10.9
ADHD	Bubenzer-Busch et al. 2016$_2$ (69)	Point Subtraction Aggression	27	27	1.00	10.9
CD/ODD	Banich et al. 2007 (70)	Stroop Task	12	12	1.00	16.7
CD/ODD	Bjork et al. 2010 (71)	Monetary Incentive Delay Task	12	12	1.00	15.4
CD/ODD	Crowley et al. 2010$_1$ (72)	Colorado Balloon Game	20	20	1.00	16.5
CD/ODD	Crowley et al. 2010$_2$ (72)	Colorado Balloon Game	20	20	1.00	16.5
CD/ODD	Dong et al. 2017 (73)	Facial Expression (Pain)	36	30	1.00	15.1
CD/ODD	Fairchild et al. 2014 (74)	Emotional Face Task	20	20	0.00	16.9
CD/ODD	Fehlbaum et al. 2018 (75)	Affective Stroop Task	39	39	0.74	15.9
CD/ODD	Finger et al. 2011$_1$ (76)	Probabilistic Reversal Task	15	15	0.60	14.1
CD/ODD	Finger et al. 2011$_2$ (76)	Probabilistic Reversal Task	15	15	0.60	14.1
CD/ODD	Herpertz et al. 2008 (77)	Passive-Viewing (Emotional)	22	22	1.00	14.7
CD/ODD	Hwang et al. 2016 (A) (78)	Affective Stroop Task	28	17	0.71	14.8
CD/ODD	Hwang et al. 2016 (B) (78)	Affective Stroop Task	-	18	0.56	14.6
CD/ODD	Klapwijk et al., 2016a (79)	Empathic Emotional Face Task	33	23	1.00	16.6
CD/ODD	Klapwijk et al., 2016b (80)	Dictator Game	33	32	1.00	16.8
CD/ODD	Marsh et al., 2011 (81)	Implicit Association Test	14	14	0.57	14.4
CD/ODD	Marsh et al., 2013 (82)	Empathic Situation of Pain Task	21	14	0.54	15.4
CD/ODD	Passamonti et al., 2010 (A) (83)	Emotional Face Task	40	27	1.00	17.7
CD/ODD	Passamonti et al., 2010 (B) (83)	Emotional Face Task	-	25	1.00	17.1
CD/ODD	Rubia et al. 2008 (40)	Stop Task	20	13	1.00	13.0
CD/ODD	Rubia et al. 2009 (41)	Reward Continuous Performance	16	14	1.00	12.8
CD/ODD	Rubia et al. 2009 (42)	Simon Task	20	13	1.00	12.9
CD/ODD	Rubia et al. 2010 (44)	Visual–Spatial Switch Task	20	14	1.00	12.6

CD/ODD	Schwenck et al., 2017 (84)	monetary gambling task	24	19	1.00	13.8
CD/ODD	Thornton et al., 2017 (85)	Animacy Attention Task	20	29	0.69	14.7
CD/ODD	White et al., 2012a (86)	Eye Gaze Task	19	17	0.76	15.5
CD/ODD	White et al., 2012b (87)	Emotion-Attention Bars task	17	15	0.80	15.7
CD/ODD	White et al., 2013_1 (88)	Passive Avoidance Task	18	20	0.82	15.2
CD/ODD	White et al., 2013_2 (88)	Passive Avoidance Task	18	20	0.82	15.2
CD/ODD	White et al., 2014 (89)	Doors Task	15	15	0.73	14.4
CD/ODD	Zhang et al., 2015 (90)	Go/Stop Task	40	29	1.00	15.1
CD/ODD	Zhu et al. 2014 (91)	Go/Stop Task	10	11	1.00	11.5
CD/ODD	Raschle et al. 2019 (92)	emotion-regulation task	29	30	0.00	16.3
ANX	Yang et al. 2004 (93)	Emotional Perception	6	5	0.20	13.0
ANX	Carrion et al. 2008 (94)	Go-No/Go	14	16	0.56	13.7
ANX	Keding-Herringa et al. 2016 (95)	Dynamic Face Task	25	28	0.35	14.3
ANX	Hart et al. 2018 (96)	emotion discrimination task	27	20	0.70	17.5
ANX	Carlisi et al. 2017 (97)	face-attention paradigm	19	14	0.29	14.1
ANX	Gold et al. 2020 (98)	threat conditioning	47	53	0.45	12.8
ANX	Thomas et al. 2001 (99)	Passive-Viewing Emotional Face	12	12	0.58	12.8
ANX	Monk et al. 2006 (100)	Emotional Face probe detection	15	18	0.47	12.3
ANX	Monk et al. 2008 (101)	Emotional Face visual probe task	12	17	0.65	13.1
ANX	Strawn et al. 2012 (102)	Emotional CPT	10	10	0.40	14.3
ANX	Yin et al. 2017 (103)	Valence Evaluation Task	14	20	0.25	15.7
ANX	Burkhouse et al. 2018 (104)	Emotional Conflict Task	25	25	0.41	15.3
ANX	Blair et al. 2011 (105)	Emotional Face Task	16	14	0.50	13.3
DEP	Chantiluke et al. 2012_1 (106)	Reward Continuous Performance	21	20	0.50	16.2
DEP	Chantiluke et al. 2012_2 (106)	Reward Continuous Performance	21	20	0.50	16.2
DEP	Colich et al. 2015 (107)	modified affective Go/No-Go	15	18	0.17	15.6
DEP	Davey et al. 2011 (108)	Being-Liked (Emotional Face)	20	19	0.35	18.6
DEP	Diler et al. 2013 (109)	emotional faces (gender)	10	10	0.20	15.9
DEP	Diler et al. 2014 (110)	Go/No-Go	10	10	0.20	15.9
DEP	Gaffrey et al. 2013 (111)	Facial Emotion Viewing Task	31	23	0.57	5.0
DEP	Halari et al. 2009_1 (112)	Simon Task	21	21	0.48	16.2
DEP	Halari et al. 2009_2 (112)	Switch Task	21	21	0.48	16.2
DEP	Halari et al. 2009_3 (112)	Stop Task	21	21	0.48	16.2
DEP	Hall et al. 2014 (113)	Emotional Faces Task	23	32	0.26	15.5
DEP	Roberson-Nay et al. 2006 (114)	Emotional Face Task: Encoding	23	10	0.30	13.8
DEP	Sharp et al. 2014 (115)	Modified card-guessing game	19	14	0.00	13.4
DEP	Tao et al. 2012 (116)	Emotional Face Task (gender)	21	19	0.42	14.2
DEP	Yang et al. 2009 (117)	Stop Task	13	13	0.46	16.0
DEP	Yang et al. 2010 (118)	facial-emotion matching task	12	12	0.58	15.9
DEP	Pan et al. 2011 (119)	Go/No-Go task	-	15	0.47	15.9
DEP	Pan et al. 2013 (A) (120)	Iowa Gambling Task	13	15	0.27	16.2
DEP	Pan et al. 2013 (B) (120)	Iowa Gambling Task	-	14	0.50	15.8
DEP	Groschwitz et al. 2016 (121)	Cyberball Task	15	14	0.21	15.4
DEP	Suzuki et al. 2014 (A) (122)	Emotional Face Task	51	42	0.48	9.8
DEP	Suzuki et al. 2014 (B) (122)	Emotional Face Task	-	22	0.41	10.2
DEP	De Bellis et Hooper 2013 (123)	Emotional oddball task	5	5	0.40	15.5

Note. (A)(B) = distinct samples from the same study. 1-2 = distinct task contrasts or fMRI task from the same study. MED = Medication (in %); COG = Cognitive; RI = Response Inhibition; ATTN = Attention; EMO = Emotional; BOTH = Both Positive and Negative Emotion; POS = Positive; NEG = Negative;

Supplementary Table 2. Included studies: Medication and task-characteristics

Primary Diagnosis	First Author, Year	MED (%)	Task-Characteristics							
			COG	RI	ATTN	EMO	BOTH	POS	NEG	Others
ADHD	Braet et al. 2011 (1)	NA	X	X						
ADHD	Bédard et al. 2014 (2)	0.08	X							
ADHD	Bollmann et al. 2017 (3)	0.67	X							
ADHD	Booth et al. 2005 (4)	1.00	X	X						
ADHD	Cao et al. 2008 (5)	0.25	X		X					
ADHD	Cerullo et al. 2009 (6)	0.00	X		X					
ADHD	Chou et al. 2015_1 (7)	0.00	X	X						
ADHD	Chou et al. 2015_2 (7)	0.00	X	X						
ADHD	Christakou et al. 2013 (8)	0.00	X		X					
ADHD	Durston et al. 2006 (9)	0.55	X	X						
ADHD	Durston et al. 2007_1 (10)	0.75	X	X						
ADHD	Durston et al. 2007_2 (10)	0.75	X	X						
ADHD	Ercan et al. 2016 (11)	NA	X	X						
ADHD	Fan et al. 2014 (12)	0.24	X	X						
ADHD	Hart et al. 2014 (13)	0.30	X	X						
ADHD	Hart et al. 2014 (14)	0.30	X	X						
ADHD	Hauser et al. 2014 (15)	0.80				X		X		
ADHD	Hwang et al. 2015 (16)	0.42	X	X		X	X			
ADHD	Iannaccone et al. 2015_1 (17)	0.72	X	X						
ADHD	Iannaccone et al. 2015_2 (17)	0.72	X	X						
ADHD	Janssen et al. 2015 (18)	0.90	X	X						
ADHD	Kohls et al. 2014 (19)	0.56				X		X		
ADHD	Konrad et al. 2006 (20)	0.00	X		X					
ADHD	Krauel et al. 2007 (21)	0.42	X							
ADHD	Li et al. 2014 (22)	0.00	X							
ADHD	Ma et al. 2012 (23)	0.20	X	X						
ADHD	Ma et al. 2016 (24)	0.60				X		X		
ADHD	Massat et al. 2012 (25)	0.00	X							
ADHD	Massat et al. 2018 (26)	0.00	X	X						
ADHD	Metin et al. 2017 (27)	0.00				X		X		
ADHD	Mostofsky et al. 2006 (28)	0.73								X
ADHD	Norman et al. 2017 (29)	0.35	X		X					
ADHD	Norman et al. 2018 (30)	0.50				X	X			
ADHD	O'Conaill et al. 2015 (31)	0.79	X		X					
ADHD	Orinstein et al. 2014 (32)	NA	X		X					
ADHD	Passarotti et al. 2010 (33)	0.00				X	X			
ADHD	Passarotti et al. 2010 (34)	0.00				X	X			
ADHD	Passarotti et al. 2010 (35)	0.00	X	X						
ADHD	Poissant et al. 2016 (A) (36)	NA	X							
ADHD	Poissant et al. 2016 (B) (36)	NA	X							
ADHD	Posner et al. 2011 (37)	0.00				X			X	
ADHD	Posner et al. 2011 (38)	0.53				X	X			
ADHD	Rubia et al. 2005 (39)	0.00	X	X						
ADHD	Rubia et al. 2008 (40)	0.00	X	X						
ADHD	Rubia et al. 2009 (41)	0.00	X		X	X		X		
ADHD	Rubia et al. 2009 (42)	0.00	X	X						
ADHD	Rubia et al. 2009 (43)	0.00				X		X		
ADHD	Rubia et al. 2010 (44)	0.00	X		X					

ADHD	Rubia et al. 2010_1 (45)	0.00	X	X							
ADHD	Rubia et al. 2010_2 (45)	0.00	X		X						
ADHD	Rubia et al. 2011 (46)	0.00	X	X							
ADHD	Schwarz et al. 2015 (47)	0.91									X
ADHD	Sheridan et al. 2007 (48)	0.20	X								
ADHD	Silk et al. 2008 (49)	0.00	X								
ADHD	Siniatchkin et al. 2012 (50)	0.75	X	X							
ADHD	Smith et al. 2008 (51)	0.00	X								
ADHD	Spinelli et al. 2011 (52)	0.15	X	X							
ADHD	Spinelli et al. 2011 (53)	0.15	X	X							
ADHD	Stevens et al. 2017_1 (A) (54)	0.68	X								
ADHD	Stevens et al. 2017_2 (A) (54)	0.68				X		X			
ADHD	Stevens et al. 2017_1 (B) (54)	0.77	X	X							
ADHD	Stevens et al. 2017_2 (B) (54)	0.77				X		X			
ADHD	Stevens et al. 2017 (C) (54)	0.67	X								
ADHD	Tamm et al. 2004 (55)	0.50	X	X							
ADHD	Tamm et al. 2006 (56)	0.36	X		X						
ADHD	Tamm et al. 2012 (57)	0.00	X								
ADHD	Tegelbeckers et al. 2015 (58)	0.53	X		X						
ADHD	Vance et al. 2007 (59)	0.00	X								
ADHD	van Ewijk et al. 2015 (60)	0.83	X								
ADHD	van Rooij et al. 2015 (61)	0.54	X	X							
ADHD	Vetter et al. 2018 (62)	NA	X			X			X		
ADHD	Vloet et al. 2010 (63)	NA	X		X						
ADHD	von Rhein et al. 2015 (64)	0.76				X		X			
ADHD	Wang et al. 2013 (65)	0.00	X		X						
ADHD	Hegarty et al. 2021 (66)	0.00	X	X							
ADHD	Finger et al., 2008 (67)	0.71				X	X				
ADHD	Gatzke-Kopp et al. 2009 (68)	0.53				X		X			
ADHD	Bubenzer-Busch et al. 2016_1 (69)	0.85				X			X		
ADHD	Bubenzer-Busch et al. 2016_2 (69)	0.85				X		X			
CD/ODD	Banich et al. 2007 (70)	NA	X	X							
CD/ODD	Bjork et al. 2010 (71)	0.67				X		X			
CD/ODD	Crowley et al. 2010_1 (72)	0.30				X		X			
CD/ODD	Crowley et al. 2010_2 (72)	0.30				X			X		
CD/ODD	Dong et al. 2017 (73)	NA				X			X		
CD/ODD	Fairchild et al. 2014 (74)	NA				X			X		
CD/ODD	Fehlbaum et al. 2018 (75)	0.90	X	X		X			X		
CD/ODD	Finger et al. 2011_1 (76)	0.47				X		X			
CD/ODD	Finger et al. 2011_2 (76)	0.47				X			X		
CD/ODD	Herpertz et al. 2008 (77)	NA				X			X		
CD/ODD	Hwang et al. 2016 (A) (78)	0.24	X	X		X			X		
CD/ODD	Hwang et al. 2016 (B) (78)	0.28	X	X		X			X		
CD/ODD	Klapwijk et al., 2016a (79)	0.00				X			X		
CD/ODD	Klapwijk et al., 2016b (80)	0.00	X								
CD/ODD	Marsh et al., 2011 (81)	0.43	X								
CD/ODD	Marsh et al., 2013 (82)	0.14	X			X			X		
CD/ODD	Passamonti et al., 2010 (A) (83)	NA				X			X		
CD/ODD	Passamonti et al., 2010 (B) (83)	NA				X			X		
CD/ODD	Rubia et al. 2008 (40)	0.00	X	X							
CD/ODD	Rubia et al. 2009 (41)	0.00	X		X	X	X				
CD/ODD	Rubia et al. 2009 (42)	0.00	X	X							

CD/ODD	Rubia et al. 2010 (44)	0.00	X		X				
CD/ODD	Schwenck et al., 2017 (84)	0.33				X			X
CD/ODD	Thornton et al., 2017 (85)	0.14	X		X				
CD/ODD	White et al., 2012a (86)	0.12	X		X	X			X
CD/ODD	White et al., 2012b (87)	0.12				X			X
CD/ODD	White et al., 2013_1 (88)	0.10				X		X	
CD/ODD	White et al., 2013_2 (88)	0.10				X			X
CD/ODD	White et al., 2014 (89)	0.20				X	X		
CD/ODD	Zhang et al., 2015 (90)	0.00	X	X					
CD/ODD	Zhu et al. 2014 (91)	0.00	X	X					
CD/ODD	Raschle et al. 2019 (92)	NA				X			X
ANX	Yang et al. 2004 (93)	0.00				X			X
ANX	Carrion et al. 2008 (94)	0.00	X	X					
ANX	Keding-Herringa et al. 2016 (95)	0.00				X	X		
ANX	Hart et al. 2018 (96)	0.00				X			X
ANX	Carlisi et al. 2017 (97)	0.00				X			X
ANX	Gold et al. 2020 (98)	0.00				X			X
ANX	Thomas et al. 2001 (99)	0.00				X			X
ANX	Monk et al. 2006 (100)	0.00				X			X
ANX	Monk et al. 2008 (101)	0.00				X			X
ANX	Strawn et al. 2012 (102)	0.00	X		X	X	X		
ANX	Yin et al. 2017 (103)	0.00				X			X
ANX	Burkhouse et al. 2018 (104)	0.00				X			X
ANX	Blair et al. 2011 (105)	0.00				X			X
DEP	Chantiluke et al. 2012_1 (106)	0.00	X		X	X		X	
DEP	Chantiluke et al. 2012_2 (106)	0.00	X		X	X		X	
DEP	Colich et al. 2015 (107)	0.39	X	X		X			X
DEP	Davey et al. 2011 (108)	0.47				X			
DEP	Diler et al. 2013 (109)	0.60				X	X		
DEP	Diler et al. 2014 (110)	0.47	X	X					
DEP	Gaffrey et al. 2013 (111)	0.00				X	X		
DEP	Halari et al. 2009_1 (112)	0.00	X	X					
DEP	Halari et al. 2009_2 (112)	0.00	X		X				
DEP	Halari et al. 2009_3 (112)	0.00	X	X					
DEP	Hall et al. 2014 (113)	0.00				X			X
DEP	Roberson-Nay et al. 2006 (114)	0.00	X			X	X		
DEP	Sharp et al. 2014 (115)	0.00				X		X	
DEP	Tao et al. 2012 (116)	0.00				X			X
DEP	Yang et al. 2009 (117)	0.00	X	X					
DEP	Yang et al. 2010 (118)	0.00				X	X		
DEP	Pan et al. 2011 (119)	0.47	X	X					
DEP	Pan et al. 2013 (A) (120)	0.67				X	X		
DEP	Pan et al. 2013 (B) (120)	0.43				X	X		
DEP	Groschwitz et al. 2016 (121)	0.36				X			X
DEP	Suzuki et al. 2014 (A) (122)	NA				X			X
DEP	Suzuki et al. 2014 (B) (122)	NA				X			X
DEP	De Bellis et Hooper 2013 (123)	0.00	X		X	X			X

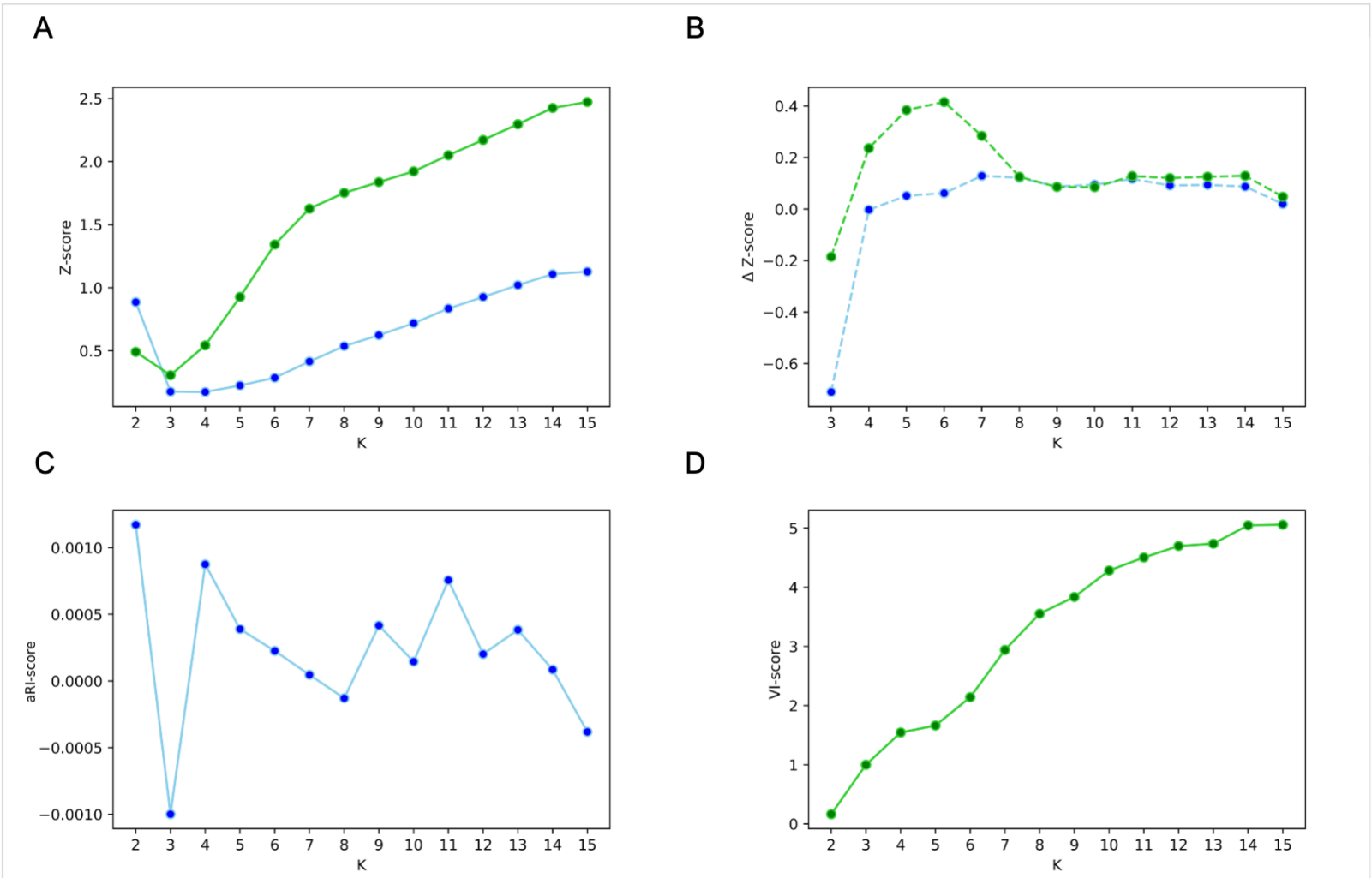
Note. (A)(B) = distinct samples from the same study. $_{1\text{-}2}$ = distinct task contrasts or fMRI task from the same study. MED = Medication (in %); COG = Cognitive; RI = Response Inhibition; ATTN = Attention; EMO = Emotional; BOTH = Both Positive and Negative Emotion; POS = Positive; NEG = Negative;

Additional information about the Correlation-Matrix Hierarchical Clustering.

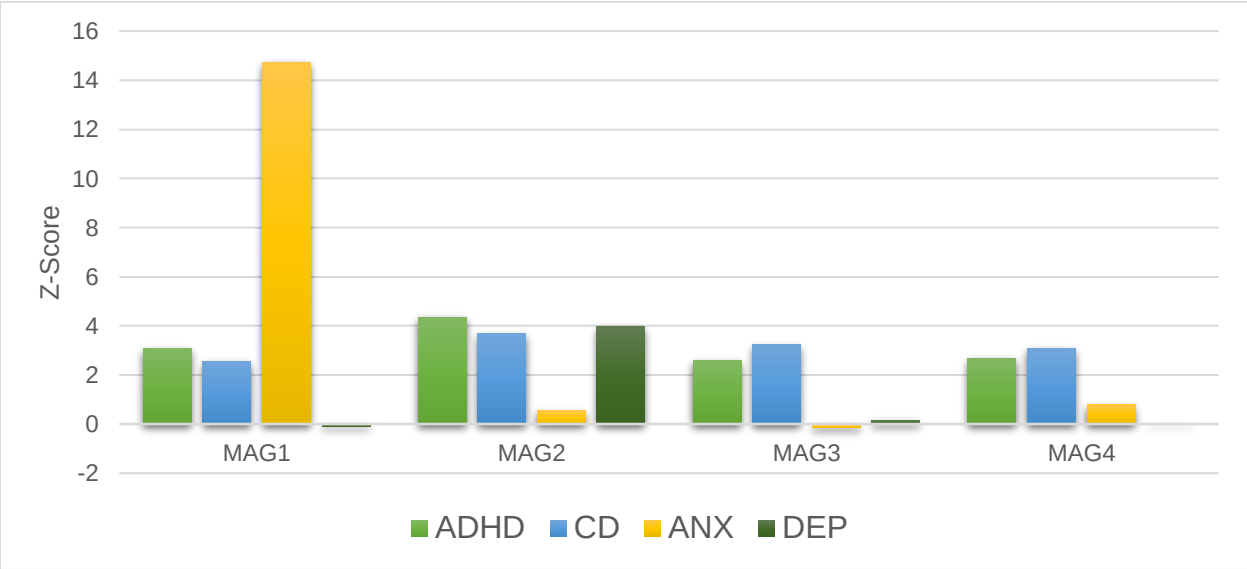
We thus repeated the CMHC for a range of 2 to 15 MAGs. The optimal number of MAGs was determined by comparing frequently used metrics in fMRI clustering (i.e., silhouette and calinski-harabasz indices, variation of information & adjusted rand index) (55), for each of the 2-15 MAGs (See Supplementary Material for more information). More precisely, we used a 90% subsampling resample strategy (without replacement, 5000 iterations). This implied that we randomly removed 10% of experiments, iteratively, to perturbate the ability to group the most correlated experiments with each other, successively. Then, for K range, each metric was compared against a null distribution. To do so, 5,000 datasets were created artificially by shuffling foci locations across experiments but preserving original experiments' properties (e.g., number of foci, sample size). The average of each metric (i.e., silhouette and calinski-harabasz indices) derived from *true* dataset, was normalized using this null distribution ($Average_{TRUE} - Average_{NULL} / STD_{NULL}$) and then plotted for K range (2-15 MAGs). This improves our ability to select the optimal K by taking into account the probabilities of getting a certain metric value in a random spatial arrangement. Given that the ground truth class labels are unknown, we compared, for each K, the consistency (adjusted rand index) and shared information distance (variation of information) between $Label_{TRUE}$ with the $Label_{NULL}$ then averaged across the 5000 iterations. These metrics were then plotted for K range. A local minimum in the plot suggests a decrease in overlap between both sets of labels. After finding the optimal number of MAGs, the most stable label solution was found by grouping experiments that were labelled similarly across the 5,000 subsampling iterations. More precisely, we calculated the hamming distance between each experiment's label ids (147 experiments by 5000 iterations ids) to calculate the proportion of disagreement between two experiments' set of labels. A CMHC was performed on a final 147-by-147 experiments'

distance matrix, representing the distance between each pair of experiments. We then used the determined most optimal number of MAGs to extract the most stable label ids.

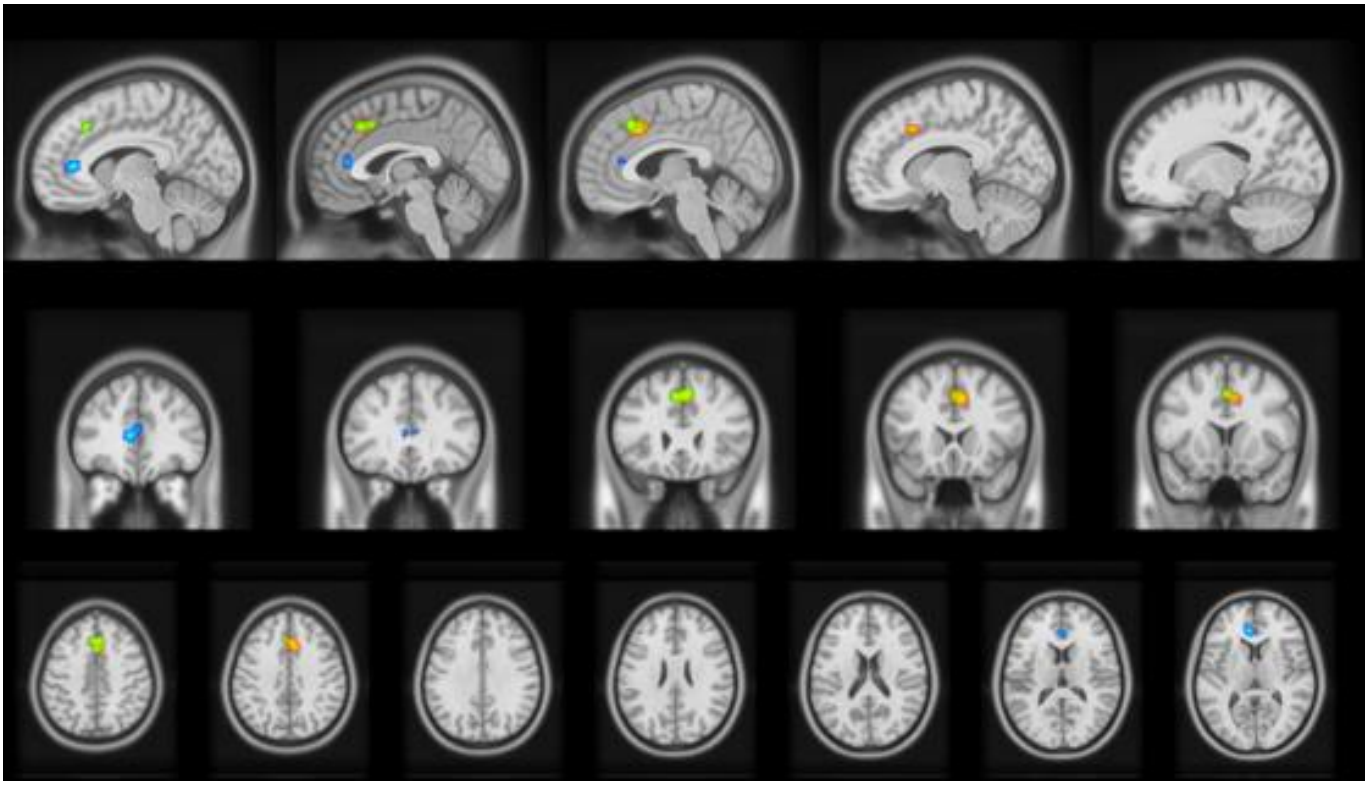
Supplementary Figure 1. Metrics computed for K=2 to 15 clustering solutions. **A.** This line graph represents silhouette (Rousseeuw, 1986) and calinski-harabasz (Calinski et Harabasz, 1974) metrics averaged over 5,000 subsampling iterations and then normalized against a null distribution. Green line = Silhouette metric, Blue line = Calinski-Harabasz metric. **B.** Line graph refers to changes in silhouette and calinski-harabasz values from K to K+1 (i.e. (K+1) – 1). Silhouette metrics (green) show a stable solution at k=8, while calinski-harabasz metric was monotonic. **C.** Adjusted Rand Indices between K_{TRUE} - K_{NULL}. This plot shows lowest scores at K=3, K=8. **D.** Variation of Information between K_{TRUE} - K_{NULL}. Although scores are rather monotonic, greatest increases moving from K=2 to 3, K=6 to K=7 and K=7 to K=8.



Supplementary Figure 2. Z-scores of probabilities of aberrant MAG per disorder class. For each disorder class, z-score was calculated by subtracting the average voxelwise ALE probability (whole brain) from the average ALE probability within MAG divided by the standard deviation of the whole-brain ALE probabilities.



Supplementary Figure 3. Results from the forward (classical) ALE meta-analysis. Red cluster = Transdiagnostic Neurobiological Marker when pooling ADHD, CD/ODD, ANX and ADHD (x=4, y=24, z=42, ALE score=0.021, 323 voxels). Green Cluster = Externalizing Disorders (x=4, y=26, z=44, maximum ALE score=0.0279, 147 voxels); Blue Cluster = Internalizing Disorders (x=-8, y=38, z=8, maximum ALE score = 0.0167, 129 voxels).



Supplementary Table 3. Results from classical meta-analysis on nosological categories

Diagnosis Category	MNI Coordinates			ALE	Cluster Size
	X	Y	Z		
ADHD					
dACC	-2	12	22	0.0198	51
vlPFC (BA47)	50	14	-4	0.0179	35
CD/ODD					
Caudate	12	8	0	0.0118	40
pre-SMA	-6	26	42	0.0113	28
ANX					
N.S.	-	-	-	-	-
DEP					
N.S.	-	-	-	-	-

Note. These results were performed using liberal threshold (p=0.001 uncorrected at a voxel-level). ADHD = Attention deficit hyperactivity disorder; CD/ODD = Conduct Disorder / Oppositional Defiant Disorder; ANX = Anxiety Disorder; DEP = Depressive Disorder. MNI = Montreal Neurological Institute; N.S. = Not Statistically Significant. dACC = dorsal Anterior Cingulate Cortex; vlPFC = ventrolateral Prefrontal Cortex; pre-SMA = pre-Supplementary Motor Area.

Supplementary Table 4. List of fMRI tasks per MAGs.

MAG1
N-Back
Go-No/Go
Go-No/Go
Reversal Learning Task
Rewarded Go-No/Go
Rewarded Stroop Task
Response Inhibition Task
Stop Task
Simon Task
Go-No/Go
Spatial span task
monetary incentive delay task
Emotional face probe detection task
Continuous Performance Task with emotional distractors
face-attention paradigm
Colorado Balloon Game
Colorado Balloon Game
Probabilistic Reversal Task
Monetary Incentive task
Simon Task
Probabilistic Reversal Task

MAG2
Go-No/Go
Spatial Working Memory Task
Go-No/Go
Cued Target Detection
Stroop Task
Continuous Performance Task
Sustained Attention Task
Go-No/Go
Stroop Task
Stop Task
Speeded Flanker Task
Speeded Flanker Task
Stop-Signal Task
Attention Network Test
Recognition Test
N-Back
N-Back
Spatial Attention Paradigm
Sustained Attention Task
Iowa Gambling Task
Visual Search Task
Auditory Oddball Attention Task
N-Back
Emotional Valence Stroop Task
Subliminal Presentation of Fearful Faces
Emotional Stroop Task
Visual–Spatial Switch Task
Stop Task
Switch Task
Raven's Progressive Matrices Task
Go/NoGo
Time Discrimination
Monetary incentive delay task
Monetary incentive delay task
Monetary incentive delay task

monetary incentive delay task
Go-No/Go
Stop-Signal Task
Continuous Performance Task
Passive-Viewing Emotional Face Task
Emotional Face visual probe task
Valence Evaluation Task
Emotional Conflict Task
Emotional Face Task
Reward Continuous Performance Task
modified affective Go/No-Go
Being-Liked Task (Emotional Face)
emotional facial expression gender labeling task
Go/No-Go
Simon Task
Stop Task
Emotional Faces Task
Emotional Face Task: Encoding
Modified card-guessing game (monetary reward)
Emotional Face Task (gender labelling)
Parametric inhibitory task (Stop task)
facial-emotion matching task
Go/No-Go task
Iowa Gambling Task
Iowa Gambling Task
Emotional Perception
Go-No/Go
Dynamic Face Task
Emotional oddball task
Emotional oddball task
Cyberball Task
Stop-Signal Task
GoStop Task
Stroop Task
Monetary Incentive Delay (MID) task
Point Subtraction Aggression Game
Point Subtraction Aggression Game
Affective Stroop Task
Passive-Viewing Emotional Stimuli Task
Affective Stroop Task
Affective Stroop Task
Empathic Emotional Face Task
Dictator Game
Empathic Situation of Pain Task
Emotional Face Task
Emotional Face Task
Monetary gambling task
Animacy Attention Task
Passive Avoidance Task
Passive Avoidance Task
GoStop Task
Stroop Task

MAG3

N-Back
Finger Sequencing Paradigm
Stop Task
Simon Task
Anti-Saccade and Fixation Trials
Match-to-Sample Task
Oddball Task
Mental Rotation Task

Facial Emotion Viewing Task
Stop Task
Visual–Spatial Switch Task
Eye Gaze Task
Doors Task

MAG4

Go-No/Go
Stop Task
Stroop Paradigm
Go-No/Go
Pictures Story
Reward Continuous Performance Task
Fluid Reasoning Task
Visual Oddball Task
Threat conditioning
Emotional Face Task
Implicit Association Test (words)
Rewarded Continuous Performance Test (CPT)

Supplementary Phenotype Assessment: Literature Bias & Subanalyses

We tested if fMRI literature showed differences between nosological categories regarding the choice of neurocognitive task domains, average of sex ratio, and the average of prescribed medication per samples. Literature showed significant differences in cognitive tasks (X_2=23.75, p<0.001), general emotional tasks (X_2=42.11, p<0.001) but more specifically in tasks using simultaneously positive and negative stimuli (X_2=7.85, p=0.049) and negative stimuli only (X_2=53.69, p<0.001). Biases were also observed in the average of sex ratio (X_2=64.69, p<0.001) and the average of sample with prescribed medication (X_2=18.02, p<0.001).

Given that these factors may alter the relationships between nosological categories and MAGs, further analyses were performed by restricting experiments using specific cognitive task contrasts, emotional task contrasts, medication naïve and mixed sex samples. Subanalyses on emotion-specific stimuli (e.g., positive, negative or both) could not be performed due to the limited sample size across MAGs. First, the lower rates of DEP samples across MAG1 compared to other MAGs was only replicated when restricting experiments to those using an emotional task contrast (X_2=4.34, p=0.037) and a mixed sex samples (X_2=3.89, p=0.049). Furthermore, MAG1 had higher rates of ADHD samples in experiments with an emotional task contrast (X_2=3.18, p=0.050).

Finally, the relationship between MAG2 and DEP samples was replicated when restricting experiments to those using a cognitive task contrast (X_2=5.53, p=0.019), an emotional task contrast (X_2=5.22, p=0.022), but also in experiments with only medication naïve sample (X_2=5.70, p=0.017) and in mixed sex samples (X_2=7.54, p=0.006).

Supplementary Table 5. Disorder-specific sample and task characteristics

Characteristics	ADHD	CD/ODD	ANX	DEP
Task-domain				
Cognitive	60 (75.9%)	15 (46.9%)	2 (14.3%)	11 (50.0%)
RI	29 (36.7%)	8 (25%)	1 (7.1%)	6 (27.3%)
Attention	14 (17.7%)	4 (12.5%)	1 (7.1%)	4 (18.2%0
Emotion	19 (24.1%)	23 (71.9%)	13 (92.9%)	16 (72.7%)
Positive	10 (12.7%)	4 (12.5%)	0 (0%)	3 (13.6%)
Negative	3 (3.8%)	17 (53.1%)	11 (78.6%)	6 (27.3%)
Both	6 (7.6%)	2 (6.3%)	2 (14.3%)	6 (27.3%)
Sample				
Average Med per sample (Mean, SD)	35.5 (33.9)	21.5 (23.7)	0	19.26 (25.0)
Average Boys per Sample (Mean, SD)	82.2 (21.4)	81.4 (27.3)	44.4 (14.7)	37.5 (15.2)

Note. RI = Response Inhibition; Both = Both Positive and Negative Emotional Stimuli; Med = Medication

Supplementary Table 6. Disorder-specific comorbidities

	Comorbidities							
	ADHD		CD/ODD		ANX		DEP	
Primary Diagnosis	n	mean %	n	mean %	n	mean %	n	mean %
ADHD (n=79)	-	-	65	14.4 (16.3)	64	1.7 (4.6)	65	1.2 (4.7)
CD/ODD (n=32)	29	33,4 (24.1)	-	-	31	1.0 (3.1)	31	5.9 (19.6)
ANX (n=14)	6	10.5 (15.6)	10	6.7 (14.9)	-	-	12	12 (28.2)
DEP (n=22)	20	7.2 (9.0)	20	4.1 (8.8)	21	23.6 (27.1)	-	-

Note. n = the number of samples with available data.

Supplementary Table 7. Disorder-specific comorbidities per MAGs

	MAG1 (k=21)		MAG2 (k=87)		MAG3 (k=13)		MAG4 (k=12)	
Characteristics	n	%	n	%	n	%	n	%
ADHD samples								
ANX	12	3.33%	32	1.53%	8	1.13%	7	1.14%
DEP	11	3.46%	34	0.65%	8	2.25%	7	0%
CD/ODD	12	23.58%	33	15.50%	8	6.63%	7	5.14%
ANX samples								
ADHD	0	0%	4	4.50%	0	0%	1	4%
DEP	2	46.50%	8	18.13%	0	0%	1	0%
CD/ODD	2	0%	6	2.50%	0	0%	1	4%
DEP samples								
ADHD	0	0%	16	6.75%	1	13%	0	0%
ANX	0	0%	18	24.50%	1	30%	0	0%
CD/ODD	0	0%	16	2.06%	1	17%	0	0%
CD/ODD samples								
ADHD	2	33.50%	16	36.19%	4	25%	3	26.30%
ANX	4	0%	16	1.25%	4	0%	3	1.67%
DEP	4	0%	16	1.69%	4	0%	3	15%

Note. n = the number of samples with available data. The only analyses were performed in samples with ADHD and revealed marginally significant differences between MAGs relatively to comorbidities with CD/ODD (H=7.11, p=0.068). Post-hoc tests suggested that in ADHD samples, rate of CD/ODD comorbidity was higher is MAG1 compared to MAG3 (p=0.012) and MAG4 (p=0.011) but not compared to MAG2 (p=0.142). No differences were observed for ANX or DEP comorbidities in ADHD samples

Disorder-Specific ALE Meta-analyses

Meta-analyses were performed across all foci, independently of the activation direction, for ANX (46 foci, 14 experiments, 293 subjects), DEP (103 foci, 22 experiments, 388 subjects), ADHD (700 foci, 79 experiments, 1892 subjects) and CD (197 foci, 32 experiments, 626 subjects). However, each disorder-specific meta-analysis revealed no significant spatial convergence (See Supplementary Material for results using uncorrected threshold). Nonetheless, we observed peak convergence in dorsal/perigenual ACC (MNI x=-8, y=38, z=8, maximum ALE score = 0.0167, 129 voxels) for the internalizing category (ANX+DEP) and pre-SMA (x=4, y=26, z=44, maximum ALE score=0.0279, 147 voxels) for the externalizing category (ADHD+CD/ODD). Additionally, merging experiments across pediatric psychiatric disorders, we observed a significant cluster that included voxels of the right anterior MCC and the pre-supplementary motor area (x=4, y=24, z=42, ALE score=0.021, 323 voxels). Despite the fact that ADHD (57.14%) and CD/ODD (35.71%) largely contributed to this specific brain region, proportions did not significantly differ from their respective base rate. Furthermore, no significant differences were observed regarding nosological categories nor task-characteristics. However, Mann-Whitney U revealed a significant sex effect, indicating that the aMCC/pre-SMA may be associated with higher average rates of boys across samples (M=69.7% versus M=91.77%; U=479.0; p=0.003). No other significant differences were observed.

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