**Appendix**

**Text A.1. References included in meta-analysis**

Barber A, Jacobson L, Wexler J, Nebel M, Caffo B, Pekar J, Mostofsky S. 2015. Connectivity supporting attention in children with attention deficit hyperactivity disorder. NeuroImage: Clinical. 7:68-81.

Cao X, Cao Q, Long X, Sun L, Sui M, Zhu C, Zuo X, Zang Y, Wang Y. 2009. Abnormal resting-state functional connectivity patterns of the putamen in medication-naïve children with attention deficit hyperactivity disorder. Brain Research. 1303:195-206.

Castellanos F, Margulies D, Kelly C, Uddin L, Ghaffari M, Kirsch A, Shaw D, Shehzad Z, Di Martino A, Biswal B et al. 2008. Cingulate-Precuneus Interactions: A New Locus of Dysfunction in Adult Attention-Deficit/Hyperactivity Disorder. Biological Psychiatry. 63:332-337.

Costa Dias T, Iyer S, Carpenter S, Cary R, Wilson V, Mitchell S, Nigg J, Fair D. 2015. Characterizing heterogeneity in children with and without ADHD based on reward system connectivity. Developmental Cognitive Neuroscience. 11:155-174.

Francx W, Oldehinkel M, Oosterlaan J, Heslenfeld D, Hartman C, Hoekstra P, Franke B, Beckmann C, Buitelaar J, Mennes M. 2015. The executive control network and symptomatic improvement in attention-deficit/hyperactivity disorder. Cortex. 73:62-72.

Hong S B, Harrison B J, Fornito A, Sohn C H, Song I C, & Kim J W. 2015. Functional dysconnectivity of corticostriatal circuitry and differential response to methylphenidate in youth with attention-deficit/hyperactivity disorder. Journal of psychiatry & neuroscience: JPN. 40:1-46.

Icer S, Benli S, Gumus K, Demirci E, Ozmen S, Doganay S. 2017. Can Functional Connectivity at Resting Brain in ADHD Indicate the Impairments in Sensory-Motor Functions and Face/Emotion Recognition?. Journal of Medical and Biological Engineering. 38:138-149.

Kumar U, Arya A, Agarwal V. 2020. Neural network connectivity in ADHD children: an independent component and functional connectivity analysis of resting state fMRI data. Brain Imaging and Behavior. 1-9.

Li F, He N, Li Y, Chen L, Huang X, Lui S, Guo L, Kemp G, Gong Q. 2014. Intrinsic Brain Abnormalities in Attention Deficit Hyperactivity Disorder: A Resting-State Functional MR Imaging Study. Radiology. 272:514-523.

Lin H, Gau S. 2015. Atomoxetine Treatment Strengthens an Anti-Correlated Relationship between Functional Brain Networks in Medication-Naïve Adults with Attention-Deficit Hyperactivity Disorder: A Randomized Double-Blind Placebo-Controlled Clinical Trial. International Journal of Neuropsychopharmacology. 19:pyv094.

Lin H, Tseng W, Lai M, Matsuo K, Gau S. 2015. Altered Resting-State Frontoparietal Control Network in Children with Attention-Deficit/Hyperactivity Disorder. Journal of the International Neuropsychological Society. 21:271-284.

McCarthy H, Skokauskas N, Mulligan A, Donohoe G, Mullins D, Kelly J, Johnson K, Fagan A, Gill M, Meaney J, Frodl T. 2013. Attention Network Hypoconnectivity With Default and Affective Network Hyperconnectivity in Adults Diagnosed With Attention-Deficit/Hyperactivity Disorder in Childhood. JAMA Psychiatry. 70:1329.

Posner J, Rauh V, Gruber A, Gat I, Wang Z, Peterson B. 2013. Dissociable attentional and affective circuits in medication-naïve children with attention-deficit/hyperactivity disorder. Psychiatry Research: Neuroimaging. 213:24-30.

Posner J, Siciliano F, Wang Z, Liu J, Sonuga-Barke E, Greenhill L. 2014. A multimodal MRI study of the hippocampus in medication-naive children with ADHD: What connects ADHD and depression?. Psychiatry Research: Neuroimaging. 224:112-118.

Shang C, Lin H, Gau S. 2020. Effects of the dopamine transporter gene on striatal functional connectivity in youths with attention-deficit/hyperactivity disorder. Psychological Medicine.:1-11.

Sun L, Cao Q, Long X, Sui M, Cao X, Zhu C, Zuo X, An L, Song Y, Zang Y, Wang Y. 2012. Abnormal functional connectivity between the anterior cingulate and the default mode network in drug-naïve boys with attention deficit hyperactivity disorder. Psychiatry Research: Neuroimaging. 201:120-127.

Tian L, Jiang T, Wang Y, Zang Y, He Y, Liang M, Sui M, Cao Q, Hu S, Peng M, Zhuo Y. 2006. Altered resting-state functional connectivity patterns of anterior cingulate cortex in adolescents with attention deficit hyperactivity disorder. Neuroscience Letters. 400:39-43.

Tomasi D, Volkow N. 2012. Abnormal Functional Connectivity in Children with Attention-Deficit/Hyperactivity Disorder. Biological Psychiatry. 71:443-450.

Yu X, Liu L, Chen W, Cao Q, Zepf F, Ji G, Wu Z, An L, Wang P, Qian Q et al. 2016. Integrity of Amygdala Subregion-Based Functional Networks and Emotional Lability in Drug-Naïve Boys With ADHD. Journal of Attention Disorders.:108705471666141.

Zhao Q, Li H, Yu X, Huang F, Wang Y, Liu L, Cao Q, Qian Q, Zang Y, Sun L, Wang Y. 2017. Abnormal Resting-State Functional Connectivity of Insular Subregions and Disrupted Correlation with Working Memory in Adults with Attention Deficit/Hyperactivity Disorder. Frontiers in Psychiatry. 8.

**Text A.2. References excluded in meta-analysis**

Akdeniz G. 2017. Complexity Analysis of Resting-State fMRI in Adult Patients with Attention Deficit Hyperactivity Disorder: Brain Entropy. Computational Intelligence and Neuroscience. 2017:1-6.

An L, Cao X, Cao Q, Sun L, Yang L, Zou Q, Katya R, Zang Y, Wang Y. 2013a. Methylphenidate Normalizes Resting-State Brain Dysfunction in Boys With Attention Deficit Hyperactivity Disorder. Neuropsychopharmacology. 38:1287-1295.

An L, Cao Q, Sui M, Sun L, Zou Q, Zang Y, Wang Y. 2013b. Local synchronization and amplitude of the fluctuation of spontaneous brain activity in attention-deficit/hyperactivity disorder: a resting-state fMRI study. Neuroscience Bulletin. 29:603-613.

Arfuso M, Salas R, Castellanos F, Krain Roy A. 2019. Evidence of Altered Habenular Intrinsic Functional Connectivity in Pediatric ADHD. Journal of Attention Disorders.:108705471984317.

Beare R, Adamson C, Bellgrove M, Vilgis V, Vance A, Seal M, Silk T. 2016. Altered structural connectivity in ADHD: a network based analysis. Brain Imaging and Behavior. 11:846-858.

Bellec P, Chu C, Chouinard-Decorte F, Benhajali Y, Margulies D, Craddock R. 2017. The Neuro Bureau ADHD-200 Preprocessed repository. NeuroImage. 144:275-286.

Biskup C, Helmbold K, Baurmann D, Klasen M, Gaber T, Bubenzer-Busch S, Königschulte W, Fink G, Zepf F. 2016. Resting state default mode network connectivity in children and adolescents with ADHD after acute tryptophan depletion. Acta Psychiatrica Scandinavica. 134:161-171.

Borlase N, Melzer T, Eggleston M, Darling K, Rucklidge J. 2019. Resting-state networks and neurometabolites in children with ADHD after 10 weeks of treatment with micronutrients: results of a randomised placebo-controlled trial. Nutritional Neuroscience.:1-11.

Bos D, Oranje B, Achterberg M, Vlaskamp C, Ambrosino S, de Reus M, van den Heuvel M, Rombouts S, Durston S. 2017. Structural and functional connectivity in children and adolescents with and without attention deficit/hyperactivity disorder. Journal of Child Psychology and Psychiatry. 58:810-818.

Cai W, Chen T, Szegletes L, Supekar K, Menon V. 2018. Aberrant Time-Varying Cross-Network Interactions in Children With Attention-Deficit/Hyperactivity Disorder and the Relation to Attention Deficits. Biological Psychiatry: Cognitive Neuroscience and Neuroimaging. 3:263-273.

Carmona S, Hoekzema E, Castellanos F, García-García D, Lage-Castellanos A, Van Dijk K, Navas-Sánchez F, Martínez K, Desco M, Sepulcre J. 2015. Sensation-to-cognition cortical streams in attention-deficit/hyperactivity disorder. Human Brain Mapping. 36:2544-2557.

Cary R, Ray S, Grayson D, Painter J, Carpenter S, Maron L, Sporns O, Stevens A, Nigg J, Fair D. 2016. Network Structure among Brain Systems in Adult ADHD is Uniquely Modified by Stimulant Administration. Cerebral Cortex. 27(8):3970-3979.

Cao Q, Zang Y, Sun L, Sui M, Long X, Zou Q, Wang Y. 2006. Abnormal neural activity in children with attention deficit hyperactivity disorder: a resting-state functional magnetic resonance imaging study. NeuroReport. 17:1033-1036.

Chabernaud C, Mennes M, Kelly C, Nooner K, Di Martino A, Castellanos F, Milham M. 2012. Dimensional Brain-Behavior Relationships in Children with Attention-Deficit/Hyperactivity Disorder. Biological Psychiatry. 71:434-442.

Cocchi L, Bramati I, Zalesky A, Furukawa E, Fontenelle L, Moll J, Tripp G, Mattos P. 2012. Altered Functional Brain Connectivity in a Non-Clinical Sample of Young Adults with Attention-Deficit/Hyperactivity Disorder. Journal of Neuroscience. 32:17753-17761.

Choi J, Jeong B, Lee S, Go H. 2013. Aberrant Development of Functional Connectivity among Resting State-Related Functional Networks in Medication-Naïve ADHD Children. PLoS ONE. 8:12.

Dajani D, Burrows C, Nebel M, Mostofsky S, Gates K, Uddin L. 2019. Parsing Heterogeneity in Autism Spectrum Disorder and Attention-Deficit/Hyperactivity Disorder with Individual Connectome Mapping. Brain Connectivity. 9:673-691.

de Celis Alonso B, Hidalgo Tobón S, Dies Suarez P, García Flores J, de Celis Carrillo B, Barragán Pérez E. 2014. A Multi-Methodological MR Resting State Network Analysis to Assess the Changes in Brain Physiology of Children with ADHD. PLoS ONE. 9:6.

de Lacy N, Kodish I, Rachakonda S, Calhoun V. 2018. Novelin silicomultivariate mapping of intrinsic and anticorrelated connectivity to neurocognitive functional maps supports the maturational hypothesis of ADHD. Human Brain Mapping. 39:3449-3467.

Dias, T. G. C., Wilson, V. B., Bathula, D. R., Iyer, S. P., Mills, K. L., Thurlow, B. L., ... & Mitchell, S. H. (2013). Reward circuit connectivity relates to delay discounting in children with attention-deficit/hyperactivity disorder. European Neuropsychopharmacology, 23(1), 33-45.

Costa Dias T, Wilson V, Bathula D, Iyer S, Mills K, Thurlow B, Stevens C, Musser E, Carpenter S, Grayson D et al. 2013. Reward circuit connectivity relates to delay discounting in children with attention-deficit/hyperactivity disorder. European Neuropsychopharmacology. 23:33-45.

de Lacy N, Calhoun V. 2019. Dynamic connectivity and the effects of maturation in youth with attention deficit hyperactivity disorder. Network Neuroscience. 3(1):195-216.

Dipasquale O, Sethi A, Laganà M, Baglio F, Baselli G, Kundu P, Harrison N, Cercignani M. 2017. Comparing resting state fMRI de-noising approaches using multi- and single-echo acquisitions. PLOS ONE. 12:3.

Fair D, Nigg J, Iyer S, Bathula D, Mills K, Dosenbach N, Schlaggar B, Mennes M, Gutman D, Bangaru S et al. 2013. Distinct neural signatures detected for ADHD subtypes after controlling for micro-movements in resting state functional connectivity MRI data. Frontiers in Systems Neuroscience. 6:80.

Han D, Bae S, Hong J, Kim S, Son Y, Renshaw P. 2019. Resting-State fMRI Study of ADHD and Internet Gaming Disorder. Journal of Attention Disorders.:108705471988302.

Han D, Kim S, Bae S, Renshaw P, Anderson J. 2015. Brain connectivity and psychiatric comorbidity in adolescents with Internet gaming disorder. Addiction Biology. 22(3):802-812.

Hasler R, Preti M, Meskaldji D, Prados J, Adouan W, Rodriguez C, Toma S, Hiller N, Ismaili T, Hofmeister J et al. 2017. Inter-hemispherical asymmetry in default-mode functional connectivity and BAIAP2 gene are associated with anger expression in ADHD adults. Psychiatry Research: Neuroimaging. 269:54-61.

Hawkey E, Tillman R, Luby J, Barch D. 2018. Preschool Executive Function Predicts Childhood Resting-State Functional Connectivity and Attention-Deficit/Hyperactivity Disorder and Depression. Biological Psychiatry: Cognitive Neuroscience and Neuroimaging. 3(11):927-936.

Ho N, Chong J, Koh H, Koukouna E, Lee T, Fung D, Lim C, Zhou J. 2015. Intrinsic Affective Network Is Impaired in Children with Attention-Deficit/Hyperactivity Disorder. PLOS ONE. 10:9.

Hoekzema E, Carmona S, Ramos-Quiroga J, Richarte Fernández V, Bosch R, Soliva J, Rovira M, Bulbena A, Tobeña A, Casas M, Vilarroya O. 2013. An independent components and functional connectivity analysis of resting state fMRI data points to neural network dysregulation in adult ADHD. Human Brain Mapping. 35(4):1261-1272.

Park H, Hong J, Park B, Cho H. 2017. Age-related connectivity differences between attention deficit and hyperactivity disorder patients and typically developing subjects: a resting-state functional MRI study. Neural Regeneration Research. 12(10):1640.

Hyun G, Jung T, Park J, Kang K, Kim S, Son Y, Cheong J, Kim B, Han D. 2016. Changes in Gait Balance and Brain Connectivity in Response to Equine-Assisted Activity and Training in Children with Attention Deficit Hyperactivity Disorder. The Journal of Alternative and Complementary Medicine. 22(4):286-293.

Hulvershorn L, Mennes M, Castellanos F, Di Martino A, Milham M, Hummer T, Roy A. 2014. Abnormal Amygdala Functional Connectivity Associated With Emotional Lability in Children With Attention-Deficit/Hyperactivity Disorder. Journal of the American Academy of Child & Adolescent Psychiatry. 53(3):351-361.

Icer S, Gengec Benli S, Ozmen S. 2019. Differences in brain networks of children with ADHD: Whole‐brain analysis of resting‐state fMRI. International Journal of Imaging Systems and Technology. 29(4):645-662.

Janes A, Gilman J, Frederick B, Radoman M, Pachas G, Fava M, Evins A. 2018. Salience network coupling is linked to both tobacco smoking and symptoms of attention deficit hyperactivity disorder (ADHD). Drug and Alcohol Dependence. 182:93-97.

Jung M, Tu Y, Park J, Jorgenson K, Lang C, Song W, Kong J. 2018. Surface-based shared and distinct resting functional connectivity in attention-deficit hyperactivity disorder and autism spectrum disorder. The British Journal of Psychiatry. 214(6):339-344.

Kaboodvand N, Iravani B, Fransson P. 2020. Dynamic synergetic configurations of resting-state networks in ADHD. NeuroImage. 207:116347.

Kelly C, Castellanos F, Tomaselli O, Lisdahl K, Tamm L, Jernigan T, Newman E, Epstein J, Molina B, Greenhill L et al. 2017. Distinct effects of childhood ADHD and cannabis use on brain functional architecture in young adults. NeuroImage: Clinical. 13:188-200.

Kernbach J, Satterthwaite T, Bassett D, Smallwood J, Margulies D, Krall S, Shaw P, Varoquaux G, Thirion B, Konrad K, Bzdok D. 2018. Shared endo-phenotypes of default mode dysfunction in attention deficit/hyperactivity disorder and autism spectrum disorder. Translational Psychiatry. 8(1):1-11.

Kessler D, Angstadt M, Welsh R, Sripada C. 2014. Modality-Spanning Deficits in Attention-Deficit/Hyperactivity Disorder in Functional Networks, Gray Matter, and White Matter. Journal of Neuroscience. 34(50):16555-16566.

Kim S, Hyun G, Jung T, Son Y, Cho I, Kee B, Han D. 2017. Balance Deficit and Brain Connectivity in Children with Attention-Deficit/Hyperactivity Disorder. Psychiatry Investigation. 14(4):452.

Kim J, Yoo J, Kim D, Jeong B, Kim B. 2017. The effects of GRIN2B and DRD4 gene variants on local functional connectivity in attention-deficit/hyperactivity disorder. Brain Imaging and Behavior. 12(1):247-257.

Kucyi A, Hove M, Biederman J, Van Dijk K, Valera E. 2015. Disrupted functional connectivity of cerebellar default network areas in attention-deficit/hyperactivity disorder. Human Brain Mapping. 36(3):3373-3386.

Kyeong S, Park S, Cheon K, Kim J, Song D, Kim E. 2015. A New Approach to Investigate the Association between Brain Functional Connectivity and Disease Characteristics of Attention-Deficit/Hyperactivity Disorder: Topological Neuroimaging Data Analysis. PLOS ONE. 10:9.

Lake E, Finn E, Noble S, Vanderwal T, Shen X, Rosenberg M, Spann M, Chun M, Scheinost D, Constable R. 2019. The Functional Brain Organization of an Individual Allows Prediction of Measures of Social Abilities Transdiagnostically in Autism and Attention-Deficit/Hyperactivity Disorder. Biological Psychiatry. 86(4):315-326.

Lee D, Lee J, Lee J, Jung Y. 2017. Altered functional connectivity in default mode network in Internet gaming disorder: Influence of childhood ADHD. Progress in Neuro-Psychopharmacology and Biological Psychiatry. 75:135-141.

Li D, Li T, Niu Y, Xiang J, Cao R, Liu B, Zhang H, Wang B. 2018. Reduced hemispheric asymmetry of brain anatomical networks in attention deficit hyperactivity disorder. Brain Imaging and Behavior. 13(3):669-684.

Lin H, Lin Q, Li H, Wang M, Chen H, Liang Y, Bu X, Wang W, Yi Y, Zhao Y et al. 2018. Functional Connectivity of Attention-Related Networks in Drug-Naïve Children With ADHD. Journal of Attention Disorders.:108705471880201.

Lorenzen A, Scholz-Hehn D, Wiesner C, Wolff S, Bergmann T, van Eimeren T, Lentfer L, Baving L, Prehn-Kristensen A. 2016. Chemosensory processing in children with attention-deficit/hyperactivity disorder. Journal of Psychiatric Research. 76:121-127.

Marcos‐Vidal L, Martínez‐García M, Pretus C, Garcia‐Garcia D, Martínez K, Janssen J, Vilarroya O, Castellanos F, Desco M, Sepulcre J, Carmona S. 2018. Local functional connectivity suggests functional immaturity in children with attention‐deficit/hyperactivity disorder. Human Brain Mapping. 39(6):2442-2454.

Mattfeld A, Gabrieli J, Biederman J, Spencer T, Brown A, Kotte A, Kagan E, Whitfield-Gabrieli S. 2014. Brain differences between persistent and remitted attention deficit hyperactivity disorder. Brain. 137(9):2423-2428.

McCarthy H, Stanley J, Piech R, Skokauskas N, Mulligan A, Donohoe G, Mullins D, Kelly J, Johnson K, Fagan A et al. 2016. Childhood-Diagnosed ADHD, Symptom Progression, and Reversal Learning in Adulthood. Journal of Attention Disorders. 22(6):561-570.

McLeod K, Langevin L, Dewey D, Goodyear B. 2016. Atypical within- and between-hemisphere motor network functional connections in children with developmental coordination disorder and attention-deficit/hyperactivity disorder. NeuroImage: Clinical. 12:157-164.

McLeod K, Langevin L, Goodyear B, Dewey D. 2014. Functional connectivity of neural motor networks is disrupted in children with developmental coordination disorder and attention-deficit/hyperactivity disorder. NeuroImage: Clinical. 4:566-575.

Mennes M, Vega Potler N, Kelly C, Di Martino A, Castellanos F, Milham M. 2012. Resting State Functional Connectivity Correlates of Inhibitory Control in Children with Attention-Deficit/Hyperactivity Disorder. Frontiers in Psychiatry. 2:83.

Mills K, Bathula D, Dias T, Iyer S, Fenesy M, Musser E, Stevens C, Thurlow B, Carpenter S, Nagel B et al. 2012. Altered Cortico-Striatal–Thalamic Connectivity in Relation to Spatial Working Memory Capacity in Children with ADHD. Frontiers in Psychiatry. 3:2.

Mills B, Miranda-Dominguez O, Mills K, Earl E, Cordova M, Painter J, Karalunas S, Nigg J, Fair D. 2018. ADHD and attentional control: Impaired segregation of task positive and task negative brain networks. Network Neuroscience. 2(02):200-217.

Mizuno Y, Jung M, Fujisawa T, Takiguchi S, Shimada K, Saito D, Kosaka H, Tomoda A. 2017. Catechol-O-methyltransferase polymorphism is associated with the cortico-cerebellar functional connectivity of executive function in children with attention-deficit/hyperactivity disorder. Scientific Reports. 7(1):1-8.

Mostert J, Shumskaya E, Mennes M, Onnink A, Hoogman M, Kan C, Arias Vasquez A, Buitelaar J, Franke B, Norris D. 2016. Characterising resting-state functional connectivity in a large sample of adults with ADHD. Progress in Neuro-Psychopharmacology and Biological Psychiatry. 67:82-91.

Mowinckel A, Alnæs D, Pedersen M, Ziegler S, Fredriksen M, Kaufmann T, Sonuga-Barke E, Endestad T, Westlye L, Biele G. 2017. Increased default-mode variability is related to reduced task-performance and is evident in adults with ADHD. NeuroImage: Clinical. 16:369-382.

Nomi J, Schettini E, Voorhies W, Bolt T, Heller A, Uddin L. 2018. Resting-State Brain Signal Variability in Prefrontal Cortex Is Associated With ADHD Symptom Severity in Children. Frontiers in Human Neuroscience. 12:90.

Oldehinkel M, Beckmann C, Pruim R, van Oort E, Franke B, Hartman C, Hoekstra P, Oosterlaan J, Heslenfeld D, Buitelaar J, Mennes M. 2016. Attention-Deficit/Hyperactivity Disorder Symptoms Coincide With Altered Striatal Connectivity. Biological Psychiatry: Cognitive Neuroscience and Neuroimaging. 1(4):353-363.

Pan X, Jiang Z, Bi H, Wang S, Zou L. 2019. Brain Function Network Analysis of Children with Attention-Deficit/Hyperactivity Disorder Based on Adaptive Sparse Representation Method. Journal of Medical Imaging and Health Informatics. 9(8):1655-1662.

Park B Y, Kim, J, & Park H. 2016a. Differences in connectivity patterns between child and adolescent attention deficit hyperactivity disorder patients. In 2016 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) (pp. 1127-1130). IEEE.

Park H, Park B. 2016b. Connectivity differences between adult male and female patients with attention deficit hyperactivity disorder according to resting-state functional MRI. Neural Regeneration Research. 11(1):119.

Peterson A, Zhang S, Hu S, Chao H, Li C. 2017. The Effects of Age, from Young to Middle Adulthood, and Gender on Resting State Functional Connectivity of the Dopaminergic Midbrain. Frontiers in Human Neuroscience. 11:52.

Picon F, Sato J, Anés M, Vedolin L, Mazzola A, Valentini B, Cupertino R, Karam R, Victor M, Breda V et al. 2020. Methylphenidate Alters Functional Connectivity of Default Mode Network in Drug-Naive Male Adults With ADHD. Journal of Attention Disorders. 24(3):447-455.

Pironti V, Vatansever D, Sahakian B. 2019. Shared alterations in resting-state brain connectivity in adults with attention-deficit/hyperactivity disorder and their unaffected first-degree relatives. Psychological Medicine.:1-11.

Poldrack R, Congdon E, Triplett W, Gorgolewski K, Karlsgodt K, Mumford J, Sabb F, Freimer N, London E, Cannon T, Bilder R. 2016. A phenome-wide examination of neural and cognitive function. Scientific Data. 3(1):1-12.

Pretus C, Marcos‐Vidal L, Martínez‐García M, Picado M, Ramos‐Quiroga J, Richarte V, Castellanos F, Sepulcre J, Desco M, Vilarroya Ó, Carmona S. 2019. Stepwise functional connectivity reveals altered sensory‐multimodal integration in medication‐naïve adults with attention deficit hyperactivity disorder. Human Brain Mapping. 40(16):4645-4656.

Pruim R, Beckmann C, Oldehinkel M, Oosterlaan J, Heslenfeld D, Hartman C, Hoekstra P, Faraone S, Franke B, Buitelaar J, Mennes M. 2019. An Integrated Analysis of Neural Network Correlates of Categorical and Dimensional Models of Attention-Deficit/Hyperactivity Disorder. Biological Psychiatry: Cognitive Neuroscience and Neuroimaging. 4(5):472-483.

Qian A, Tao J, Wang X, Liu H, Ji L, Yang C, Ye Q, Chen C, Li J, Cheng J et al. 2018b. Effects of the 2-Repeat Allele of the DRD4 Gene on Neural Networks Associated With the Prefrontal Cortex in Children With ADHD. Frontiers in Human Neuroscience. 12:279.

Qian A, Wang X, Liu H, Tao J, Zhou J, Ye Q, Li J, Yang C, Cheng J, Zhao K, Wang M. 2018c. Dopamine D4 Receptor Gene Associated with the Frontal-Striatal-Cerebellar Loop in Children with ADHD: A Resting-State fMRI Study. Neuroscience Bulletin. 34(3):497-506.

Qian X, Loo B, Castellanos F, Liu S, Koh H, Poh X, Krishnan R, Fung D, Chee M, Guan C et al. 2018a. Brain-computer-interface-based intervention re-normalizes brain functional network topology in children with attention deficit/hyperactivity disorder. Translational Psychiatry. 8(1):1-11.

Qian X, Castellanos F, Uddin L, Loo B, Liu S, Koh H, Poh X, Fung D, Guan C, Lee T et al. 2019. Large-scale brain functional network topology disruptions underlie symptom heterogeneity in children with attention-deficit/hyperactivity disorder. NeuroImage: Clinical. 21:101600.

Qiu M, Ye Z, Li Q, Liu G, Xie B, Wang J. 2011. Changes of Brain Structure and Function in ADHD Children. Brain Topography. 24(3-4):243-252.

Querne L, Fall S, Le Moing A, Bourel-Ponchel E, Delignières A, Simonnot A, de Broca A, Gondry-Jouet C, Boucart M, Berquin P. 2017. Effects of Methylphenidate on Default-Mode Network/Task-Positive Network Synchronization in Children With ADHD. Journal of Attention Disorders. 21(14):1208-1220.

Qureshi M. 2017. Corrigendum: Multi-modal, Multi-measure, and Multi-class Discrimination of ADHD with Hierarchical Feature Extraction and Extreme Learning Machine Using Structural and Functional Brain MRI. Frontiers in Human Neuroscience. 11:157.

Richards T, Abbott R D, & Berninger V W. 2016. Relationships between presence or absence of ADHD and fMRI connectivity writing tasks in children with dysgraphia. Journal of nature and science. 2:12.

Rosch K, Mostofsky S, Nebel M. 2018. ADHD-related sex differences in fronto-subcortical intrinsic functional connectivity and associations with delay discounting. Journal of Neurodevelopmental Disorders. 10(1):34.

Rosenberg M, Finn E, Scheinost D, Papademetris X, Shen X, Constable R, Chun M. 2016. A neuromarker of sustained attention from whole-brain functional connectivity. Nature Neuroscience. 19(1):165.

Rubia K, Criaud M, Wulff M, Alegria A, Brinson H, Barker G, Stahl D, Giampietro V. 2019. Functional connectivity changes associated with fMRI neurofeedback of right inferior frontal cortex in adolescents with ADHD. NeuroImage. 188:43-58.

Sanefuji M, Craig M, Parlatini V, Mehta M, Murphy D, Catani M, Cerliani L, Thiebaut de Schotten M. 2017. Double-dissociation between the mechanism leading to impulsivity and inattention in Attention Deficit Hyperactivity Disorder: A resting-state functional connectivity study. Cortex. 86:290-302.

Sato J, Hoexter M, Castellanos X, Rohde L. 2012. Abnormal Brain Connectivity Patterns in Adults with ADHD: A Coherence Study. PLoS ONE. 7(9).

Scofield J, Johnson J, Wood P, Geary D. 2019. Latent resting-state network dynamics in boys and girls with attention-deficit/hyperactivity disorder. PLOS ONE. 14:6.

Shehzad Z, Kelly C, Reiss P, Cameron Craddock R, Emerson J, McMahon K, Copland D, Xavier Castellanos F, Milham M. 2014. A multivariate distance-based analytic framework for connectome-wide association studies. NeuroImage. 93:74-94.

Sidlauskaite J, Sonuga-Barke E, Roeyers H, Wiersema J. 2016a. Altered intrinsic organisation of brain networks implicated in attentional processes in adult attention-deficit/hyperactivity disorder: a resting-state study of attention, default mode and salience network connectivity. European Archives of Psychiatry and Clinical Neuroscience. 266(4):349-357.

Sidlauskaite J, Sonuga-Barke E, Roeyers H, Wiersema J. 2016b. Default mode network abnormalities during state switching in attention deficit hyperactivity disorder. Psychological Medicine. 46(3):519-528.

Silk T, Malpas C, Vance A, Bellgrove M. 2017. The effect of single-dose methylphenidate on resting-state network functional connectivity in ADHD. Brain Imaging and Behavior. 11(5):1422-1431.

Son Y, Han D, Kim S, Min K, Renshaw P. 2017. A functional connectivity comparison between attention deficit hyperactivity disorder and bipolar disorder in medication-naïve adolescents with mood fluctuation and attention problems. Psychiatry Research: Neuroimaging. 263:1-7.

Sotnikova A, Soff C, Tagliazucchi E, Becker K, Siniatchkin M. 2017. Transcranial Direct Current Stimulation Modulates Neuronal Networks in Attention Deficit Hyperactivity Disorder. Brain Topography. 30(5):656-672.

Sörös P, Hoxhaj E, Borel P, Sadohara C, Feige B, Matthies S, Müller H, Bachmann K, Schulze M, Philipsen A. 2019. Hyperactivity/restlessness is associated with increased functional connectivity in adults with ADHD: a dimensional analysis of resting state fMRI. BMC Psychiatry. 19(1):43.

Sripada C, Kessler D, Angstadt M. 2014. Lag in maturation of the brain’s intrinsic functional architecture in attention-deficit/hyperactivity disorder. Proceedings of the National Academy of Sciences. 111(39):14259-14264.

Sudre G, Choudhuri S, Szekely E, Bonner T, Goduni E, Sharp W, Shaw P. 2017. Estimating the Heritability of Structural and Functional Brain Connectivity in Families Affected by Attention-Deficit/Hyperactivity Disorder. JAMA Psychiatry. 74(1):76-84.

Tan Y, Liu L, Wang Y, Li H, Pan M, Zhao M, Huang F, Wang Y, He Y, Liao X, Qian Q. 2020. Alterations of cerebral perfusion and functional brain connectivity in medication‐naïve male adults with attention‐deficit/hyperactivity disorder. CNS Neuroscience & Therapeutics. 26(2):197-206.

Tang C, Wei Y, Zhao J, Nie J. 2018. Different Developmental Pattern of Brain Activities in ADHD: A Study of Resting-State fMRI. Developmental Neuroscience. 40(3):246-257.

Tao J, Jiang X, Wang X, Liu H, Qian A, Yang C, Chen H, Li J, Ye Q, Wang J, Wang M. 2017. Disrupted Control-Related Functional Brain Networks in Drug-Naive Children with Attention-Deficit/Hyperactivity Disorder. Frontiers in Psychiatry. 8:246.

Tomasi D, Volkow N. 2012. Abnormal Functional Connectivity in Children with Attention-Deficit/Hyperactivity Disorder. Biological Psychiatry. 71(5):443-450.

Uytun M, Karakaya E, Oztop D, Gengec S, Gumus K, Ozmen S, Doğanay S, Icer S, Demirci E, Ozsoy S. 2017. Default mode network activity and neuropsychological profile in male children and adolescents with attention deficit hyperactivity disorder and conduct disorder. Brain Imaging and Behavior. 11(6):1561-1570.

Vatansever D, Bozhilova N, Asherson P, Smallwood J. 2019. The devil is in the detail: exploring the intrinsic neural mechanisms that link attention-deficit/hyperactivity disorder symptomatology to ongoing cognition. Psychological Medicine. 49(7):1185-1194.

von Rhein D, Beckmann C, Franke B, Oosterlaan J, Heslenfeld D, Hoekstra P, Hartman C, Luman M, Faraone S, Cools R et al. 2017. Network-level assessment of reward-related activation in patients with ADHD and healthy individuals. Human Brain Mapping. 38(5):2359-2369.

Wang B, Wang G, Wang X, Cao R, Xiang J, Yan T, Li H, Yoshimura S, Toichi M, Zhao S. 2019c. Rich-Club Analysis in Adults With ADHD Connectomes Reveals an Abnormal Structural Core Network. Journal of Attention Disorders.:108705471988303.

Wang C, Yang B, Fang D, Zeng H, Chen X, Peng G, Cheng Q, Liang G. 2018. The impact of SNAP25 on brain functional connectivity density and working memory in ADHD. Biological Psychology. 138:35-40.

Wang J, Zheng L, Cao Q, Wang Y, Sun L, Zang Y, Zhang H. 2017a. Inconsistency in Abnormal Brain Activity across Cohorts of ADHD-200 in Children with Attention Deficit Hyperactivity Disorder. Frontiers in Neuroscience. 11:320.

Wang R, Lin P, & Wu Y. 2015. Exploring dynamic temporal-topological structure of brain network within ADHD. In Advances in Cognitive Neurodynamics (IV) (pp. 93-98). Springer, Dordrecht.

Wang W, Hu B, Yao Z, Jackson M, Liu R. & Liang C. 2013a. Dysfunctional neural activity and connection patterns in attention deficit hyperactivity disorder: A resting state fMRI study. In The 2013 International Joint Conference on Neural Networks (IJCNN) (pp. 1-6). IEEE.

Wang X, Jiao Y, Li L. 2017b. Predicting clinical symptoms of attention deficit hyperactivity disorder based on temporal patterns between and within intrinsic connectivity networks. Neuroscience. 362:60-69.

Wang X, Jiao Y, Tang T, Wang H, Lu Z. 2013b. Altered regional homogeneity patterns in adults with attention-deficit hyperactivity disorder. European Journal of Radiology. 82(9):1552-1557.

Wang Y, Qin Y, Li H, Yao D, Sun B, Li Z, Li X, Dai Y, Wen C, Zhang L et al. 2019a. Abnormal Functional Connectivity in Cognitive Control Network, Default Mode Network, and Visual Attention Network in Internet Addiction: A Resting-State fMRI Study. Frontiers in Neurology. 10.

Wang Y, Tao F, Zuo C, Kanji M, Hu M, Wang D. 2019b. Disrupted Resting Frontal–Parietal Attention Network Topology Is Associated With a Clinical Measure in Children With Attention-Deficit/Hyperactivity Disorder. Frontiers in Psychiatry. 10:300.

Wolfers T, van Rooij D, Oosterlaan J, Heslenfeld D, Hartman C, Hoekstra P, Beckmann C, Franke B, Buitelaar J, Marquand A. 2016. Quantifying patterns of brain activity: Distinguishing unaffected siblings from participants with ADHD and healthy individuals. NeuroImage: Clinical. 12:227-233.

Wu Z, Bralten J, An L, Cao Q, Cao X, Sun L, Liu L, Yang L, Mennes M, Zang Y et al. 2017. Verbal working memory-related functional connectivity alterations in boys with attention-deficit/hyperactivity disorder and the effects of methylphenidate. Journal of Psychopharmacology. 31(8):1061-1069.

Wu Z, Llera A, Hoogman M, Cao Q, Zwiers M, Bralten J, An L, Sun L, Yang L, Yang B et al. 2019. Linked anatomical and functional brain alterations in children with attention-deficit/hyperactivity disorder. NeuroImage: Clinical. 23:101851.

Xia S, Foxe J, Sroubek A, Branch C, Li X. 2014. Topological organization of the “small-world” visual attention network in children with attention deficit/hyperactivity disorder (ADHD). Frontiers in Human Neuroscience. 8:162.

Yang H, Wu Q, Guo L, Li Q, Long X, Huang X, Chan R, Gong Q. 2011. Abnormal spontaneous brain activity in medication-naïve ADHD children: A resting state fMRI study. Neuroscience Letters. 502(2):89-93.

Yang Z, Kelly C, Castellanos F, Leon T, Milham M, Adler L. 2016. Neural Correlates of Symptom Improvement Following Stimulant Treatment in Adults with Attention-Deficit/Hyperactivity Disorder. Journal of Child and Adolescent Psychopharmacology. 26(6):527-536.

Yang Z, Li H, Tu W, Wang S, Ren Y, Yi Y, Wu T, Jiang K, Shen H, Wu J, Dong X. 2018. Altered patterns of resting-state functional connectivity between the caudate and other brain regions in medication-naïve children with attention deficit hyperactivity disorder. Clinical Imaging. 47:47-51.

Yoo J, Kim D, Choi J, Jeong B. 2018. Treatment effect of methylphenidate on intrinsic functional brain network in medication-naïve ADHD children: A multivariate analysis. Brain Imaging and Behavior. 12(2):518-531.

Yu B, Sun H, Ma H, Peng M, Kong F, Meng F, Liu N, Guo Q. 2013. Aberrant Whole-Brain Functional Connectivity and Intelligence Structure in Children with Primary Nocturnal Enuresis. PLoS ONE. 8(1).

Yu X, Yuan B, Cao Q, An L, Wang P, Vance A, Silk T, Zang Y, Wang Y, Sun L. 2016. Frequency-specific abnormalities in regional homogeneity among children with attention deficit hyperactivity disorder: a resting-state fMRI study. Science Bulletin. 61(9):682-692.

Yu-Feng Z, Yong H, Chao-Zhe Z, Qing-Jiu C, Man-Qiu S, Meng L, Li-Xia T, Tian-Zi J, Yu-Feng W. 2007. Altered baseline brain activity in children with ADHD revealed by resting-state functional MRI. Brain and Development. 29(2):83-91.

Zamorano F, Billeke P, Kausel L, Larrain J, Stecher X, Hurtado J, López V, Carrasco X, Aboitiz F. 2017. Lateral prefrontal activity as a compensatory strategy for deficits of cortical processing in Attention Deficit Hyperactivity Disorder. Scientific Reports. 7(1):1-10.

Zepf F, Bubenzer-Busch S, Runions K, Rao P, Wong J, Mahfouda S, Morandini H, Stewart R, Moore J, Biskup C et al. 2019. Functional connectivity of the vigilant-attention network in children and adolescents with attention-deficit/hyperactivity disorder. Brain and Cognition. 131:56-65.

Zhan C, Liu Y, Wu K, Gao Y, Li X. 2017. Structural and Functional Abnormalities in Children with Attention-Deficit/Hyperactivity Disorder: A Focus on Subgenual Anterior Cingulate Cortex. Brain Connectivity. 7(2):106-114.

Zhou M, Yang C, Bu X, Liang Y, Lin H, Hu X, Chen H, Wang M, Huang X. 2019. Abnormal functional network centrality in drug-naïve boys with attention-deficit/hyperactivity disorder. European Child & Adolescent Psychiatry. 28(10):1321-1328.

Zhou Z, Fang Y, Lan X, Sun L, Cao Q, Wang Y, Luo H, Zang Y, Zhang H. 2019. Inconsistency in Abnormal Functional Connectivity Across Datasets of ADHD-200 in Children With Attention Deficit Hyperactivity Disorder. Frontiers in Psychiatry. 10:692.

Figure A.1. Flowchart of literature search and study selection

1484 articles identified in Pubmed

2248 articles identified in Web of Science

3732 articles in initial search

Name filtering

1759 articles after name filtering

Abstact screening

320 articles after abstract screening

Full text screening

148 articles after full text screening

Removing non-seed-based correlation analyses

33 articles after seed-based studies screening

Eliminating non-focused networks

20 articles are eligible

Note. The literature search was made to include previous studies published prior to 27.01.2020.

Table A.1. Summary of demographic characteristics of studies included in meta-analysis

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Paper | Comparison | N | Mean  Age (sd) | Mean IQ | % Male | % Right  Handed | % Med Naïve | Those  not niave | Comorbidity | ADHD  C | ADHD  I | ADHD  HI |
| Tian et al 06 | ADHD | 8 | 14.9(0.3) | >80 | all | all | 100 |  | 0 | 1 | 7 | 0 |
| Con | 8 | 13.3(0.5) | >80 | all |  |  |  |  |  |  |
| Castellanos et al 08 | ADHD | 20 | 34.9(9.9) | nr | 80 | all | 55 | 9 free >24h | 0 | 20 | 0 | 0 |
| Con | 20 | 31.2(9.0) | nr | 14 |  |  |  |  |  |  |
| Cao et al 09 | ADHD | 19 | 13.4(1.5) | 101 | all | all | 100 |  | 7 | 7 | 12 | 0 |
| Con | 23 | 13.3(0.9) | 115 | all |  |  |  |  |  |  |
| Sun et al 12 | ADHD | 19 | 13.3(1.3) | 102 | all | all | 100 |  | 7 | 7 | 12 | 0 |
| Con | 23 | 13.2(0.9) | 113 | all |  |  |  |  |  |  |
| McCarthy et al 13 | ADHD | 16 | 24.5(8.3) | 100 | 69 | 75  right | 12.5 | 14 free >48h | 0 | 16 | 0 | 0 |
| Con | 16 | 24.4(8.0) | 104 | 69 |  |  |  |  |  |  |
| Posner et al ]13 | ADHD | 22 | 10.0(1.6) | 96 | 77 | nr | 100 |  | 7 | 19 | 3 | 0 |
| Cont | 20 | 10.5(1.4) | 100 | 75 |  |  |  |  |  |  |
| Li et al 14 | ADHD | 33 | 10.1(2.6) | >90 | all | all | 100 |  | 0 | 22 | 0 | 11 |
| Con | 32 | 10.9(2.6) | >90 | all |  |  |  |  |  |  |
| Posner et al 14 | ADHD | 30 | 9.83(2.1) | 99 | 80 | nr | 100 |  | 11 | 24 | 5 | 1 |
| Con | 31 | 10.7(2.0) | 109 | 68 |  |  |  |  |  |  |
| Tomasi et al 14 | ADHD | 247 | 12.0(3.0) | nr | 80 | nr | 100 |  | nr | nr | nr | nr |
| Con | 459 | 12.0(3.0) | nr | 53 |  |  |  |  |  |  |
| Barber et al 15 | ADHD | 50 | 9.8(1.3) | 112 | 64 | 90  right |  | 35 free >48h | 17 | 39 | 10 | 1 |
| Con | 50 | 10.0(1.0) | 113 | 62 |  |  |  |  |  |  |
| Costa Dias et al 15 | ADHD | 41 | 9.6(1.4) | 110 | 75 | all | nr | All free>24-48h | 14 | 27 | 14 | 1 |
| Con | 63 | 9.1(1.1) | 117 | 59 |  |  |  |  |  |  |
| Francx et al 15 | ADHD | 129 | 11.7(2.3) | 100 | 78 | 89%  right | 100 |  | 43 | 129 | 0 | 0 |
| Con | 100 | 11.9(3.1) | 107 | 34 |  |  |  |  |  |  |
| Hong et al 2015 | ADHD | 83 | 9.6(2.6) | 106 | 78 | 90%  right | nr | All free >4 wks | 18 | 44 | 32 | 1 |
| Con | 22 | 9.8(2.5) | 115 | 63 |  |  |  |  |  |  |
| Lin et al 15 | ADHD | 25 | 9.9(1.7) | 110 | 80 | all | 0 | All free 7d | 8 | nr | nr | nr |
| Con | 25 | 10.0(2.1) | 114 | 78 |  |  |  |  |  |  |
| Lin at al 16 | ADHD | 12 | 32.5(9.8) | 120 | 41 | all | 100 |  | 0 | nr | nr | nr |
| Con | 24 | 30.4(8.9) | 117 | 44 |  |  |  |  |  |  |
| Yu et al 2016 | ADHD | 35 | 10.3(1.8) | 106 | all | all | 100 |  | 11 | 16 | 18 | 1 |
| Con | 30 | 10.3(1.7) | 121 | all |  |  |  |  |  |  |
| Zhao et al 17 | ADHD | 28 | 27.1(5.5) | 123 | 53 | all | 22 |  | 0 | 7 | 21 | 0 |
| Con | 30 | 25.9(3.8) | 123 | 57 |  |  |  |  |  |  |
| Icer et al 18 | ADHD | 15 | 11.6(2.5) | >85 | 80 | all | 100 |  | 0 | nr | nr | nr |
| Con | 15 | 13.4(1.8) | >85 | 67 |  |  |  |  |  |  |
| Kumar et al 20 | ADHD | 16 | 9.6(1.8) | 93 | all | all | 100 |  | nr | nr | nr | nr |
| Con | 16 | 9.7(1.9) | 109 | all |  |  |  |  |  |  |
| Shang et al 20 | ADHD | 96 | 11.5(2.3) | 105 | 85 | 93%  right | 96 | 0 | 0 | 30 | 66 | 0 |
| Con | 114 | 12.3(2.9) | 110 | 65 |  |  |  |  |  |  |

*Note.* The references included in meta-analysis are listed in Text A.1.; ADHD: Attention-deficit Hyperactivity Disorder; N: number; SD: standard deviation; IQ: intelligence quotient; ADHD-C: combined type of ADHD; ADHD-I: inattentive type of ADHD; ADHD-H: hyperactivity type of ADHD; Y: yes; N: no; R: right; L: left; perf: performance score of IQ, nr: not reported.

Table A.2. Studies Excluded From Meta-analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Reference | Sample | Analysis | Reason for Exclusion | Details on Exclusion |
| Shehzad et. al, 2014 | ADHD vs TDC | MDMR | Not SCA | The study used a method called multivariate distance matrix regression and is outside the boundaries of SCA |
| Rosenberg et al., 2016 | ADHD vs HC | Graph based analysis | Not SCA | The analysis used graph theory instead of SCA to examine ROIs |
| Kyeong et al., 2015 | ADHD vs HC | Topological | Topological | The study used topological analysis instead of SCA |
| Poldrack et al., 2016 | ADHD or BP or S vs HC | Data descriptor | Not SCA | Not an analysis but a data descriptor |
| Choi et al., 2013 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Yu et al., 2013 | PNE | z-score correlation | Not ADHD patients | Study exclusively excluded ADHD patients |
| Hulvershorn et al., 2014 | ADHD vs HC | demeaned scale scores | Not ADHD | The participants divided into subgroups according their scores of emotional lability scale. |
| Sato et al., 2012 | ADHD vs HC | One class SVM | Not SCA | The study examined machine learning method (one class-SVM) to observe the differences in results from Pearson correlation-based analyses |
| Tomasi et al., 2012 | ADHD vs HC | Graph based analysis | Not SCA | The analysis used graph metrics instead of seed-based functional connectivity analysis (SCA) to examine ROIs. |
| Cao et al., 2006 | ADHD vs HC | ReHo | Not SCA | The study used ReHo instead of SCA |
| Qui et al., 2011 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Yang et al., 2011 | ADHD vs HC | ALFF | Not SCA | The study used ALFF instead of SCA |
| Yu-Feng et al., 2007 | ADHD vs HC | Conjunction Analysis | Not SCA | The study used conjunction analysis instead of SCA |
| Mills et.al, 2012 | ADHD vs HC | SCA | Data missing | Coordinates were given after SCA but authors do not state whether those are ADHD>HC or vice versa |
| Cocchi et al., 2012 | ADHD vs HC | NBS, ReHo, CNM | Not SCA | Characterized multivariate (CNM), bivariate (NBS), and univariate (ReHo) properties of brain networks instead of SCA |
| Lee et al., 2017 | IGD or IGD+ADHD vs HC | SCA | Not ADHD | The participants have only childhood history of ADHD and are not diagnosed with ADHD |
| Wang et al., 2013a | ADHD vs HC | ALFF | Not SCA | The study used ALFF instead of SCA |
| Wang et al., 2013b | ADHD vs HC | ReHo | Not SCA | The study used ReHo instead of SCA |
| Hoekzema et.al,2013 | ADHD vs HC | ICA & SCA | Not significant | No significant difference was found between ADHD and controls at the corrected level |
| Oldehinkel et al., 2016 | ADHD vs HC | SCA | Dimensional analysis | The study used dimensional analysis instead of categorical |
| McLeod et al., 2016 | DCD or ADHD or ADHD+ DCD vs HC | SCA | Not between group contrast | Comparisons of connectivity were not between disease groups but hemispheres within each group |
| Han et al., 2017 | IGD or IGD+ADHD or IGD+MDD vs HC or ADHD or MDD | ROI-to-ROI | Not whole brain | Analyses tested connectivity among a set of a priori ROIs |
| Mattfeld et al., 2014 | Persistent or Remittent ADHD vs HC | SCA | Data missing | Coordinates of regions of interest were not given |
| Lorenzen et. al.,2016 | ADHD vs HC | SCA | Task-based analysis | The study did not use resting state FC for between-group comparisons |
| McCarthy et al., 2016 | Persistent or Remittent ADHD vs HC | ROI to whole-brain functional connectivity | Task-based analysis | The study used task-based FC for between-group comparisons |
| Dipasquale et al., 2017 | ADHD vs HC | SCA | Data missing | Coordinates of ROIs associated with the seed region was not found |
| Park et al., 2016a | ADHD (children) vs ADHD (adolescent) | DC | Not SCA | The analysis used DC analysis to study connectivity |
| Park & Park, 2016b | ADHD vs HC | Graph based analysis | Not SCA | The analysis used graph theory instead of SCA to examine ROIs |
| Sidlauskaite et al., 2016a | ADHD vs HC | ROI-to-ROI | Not SCA | Analysis conducted rest-to-task and task-to-rest experiments to study default mode network; also the analysis did not use SCA for FC differences between HC and ADHD groups |
| Sidlauskaite et al., 2016b | ADHD vs HC | ROI-to-ROI | Not SCA | The analysis was restricted to four networks |
| Uytun et. al., 2017 | ADHD vs ADHD+CD vs HC | SCA | Data missing | Coordinates of significant voxels were not given |
| Chabernaud et al., 2012 | ADHD vs HC | SCA | Dimensional Analysis | The study used dimensional analysis instead of categorical |
| Kucyi et. al, 2015 | ADHD vs HC | SCA | Data missing | The resulting coordinates were not given fully |
| Sripada et. al, 2014 | ADHD vs HC | NBS | Not SCA | The study used NBS instead of SCA |
| Fair et. al, 2013 | ADHD vs HC | SVM-based multivariate pattern analysis & graph based analysis | Not SCA | SVM - based multivariate pattern analysis & graph-theory are used for the analysis instead of SCA |
| Wang et al., 2015 | ADHD vs HC | Topological | Not SCA | The study used topological analysis for ROIs instead of SCA |
| Yu et al., 2016 | ADHD vs HC | ReHo | Not SCA | The study used ReHo instead of SCA |
| Biskup et al., 2016 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Ho et al., 2015 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| An et al., 2013a | ADHD vs HC | ReHo | Not SCA | The study used ReHo instead of SCA |
| An et al., 2013b | ADHD vs HC | ALFF | Not SCA | The study used ALFF instead of SCA |
| Kessler et. al,2014 | ADHD vs HC | Joint ICA | Not SCA | The study used ICA instead of SCA |
| Yang et al., 2016 | ADHD vs HC | SCA | Drug Treatment | The study analysed only stimulant-induced FC changes |
| Mennes et. al,2012 | ADHD vs HC | SCA | Not resting | There was only the relationship between rsFC and behavioral and diagnostic variables. |
| Costa Dias 2013 | ADHD vs HC | SCA | Data missing | The resulting coordinates were not given fully |
| Alonso et al., 2014 | ADHD vs HC | ReHo, ALFF, ICA | Not SCA | The study used ReHo, ALFF, and ICA instead of SCA |
| Cormana et. al. 2015 | ADHD vs HC | Graph based analysis | Not SCA | The study used graph theory instead of SCA |
| Peterson et. al, 2017 | ADHD or SC or Addiction vs HC | SCA | Mixed samples | Study mixed the samples obtained from ADHD200 dataset with other FCON100 data |
| Xia et al.,2014 | ADHD vs HC | Graph based analysis and NBS | Not SCA | The analysis used graph theory and NBS instead of SCA |
| Yoo et al., 2017 | ADHD vs HC | ALFF, ICA, Graph based analysis | Not SCA | The study used ALFF, ICA, graph theory instead of SCA |
| Hyun et al., 2016 | ADHD vs HC | RFC | Not predefined ROI | The study had not any seed within our predefined regions of interest |
| Mostert et al., 2016 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| McLeod et al., 2014 | DCD or ADHD or ADHD+ DCD vs HC | SCA | Not predefined ROI | The study had not any seed within our predefined regions of interest |
| Qian et al., 2018b | ADHD | ICA | Not SCA, not healthy group | The study had not any healthy group and used ICA instead of seed-based analysis |
| Qian et al., 2018c | ADHD | ReHo | Not healthy group | The study had not any healthy group |
| Kernbach et al., 2018 | ADHD, ASD vs HC | Hierarchical Bayesian modeling | Not SCA | The study used hierarchical Bayesian modeling instead of seed-based analysis |
| Wang et al., 2018 | ADHD | functional connectivity density mapping | Not SCA, not healthy group | The study had not any healthy group and used functional connectivity density mapping instead of seed-based analysis |
| Lacy et al., 2018b | ADHD vs HC | ALFF, ICA | Not SCA | The study used ALFF and ICA instead of SCA |
| Qian et al., 2018a | ADHD | Graph based analysis | Not SCA | The study used graph based analysis instead of seed-based analysis |
| Cai et al., 2018 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Tao et al., 2017 | ADHD vs HC | Graph-based approaches | Not SCA | The study used graph based approaches instead of seed-based analysis |
| Hong et al., 2017 | ADHD vs HC | DC | Not SCA | The study used DC instead of SCA |
| Sudre et al., 2017 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Hasler et al., 2017 | ADHD | Inter-hemispherical asymmetry | Not SCA, not healthy group | The study had not any healthy group and used inter-hemispherical asymmetry measures instead of seed-based analysis |
| Wang et al., 2017a | ADHD vs HC | ALFF, ReHo, DC | Not SCA | The study did not use SCA |
| Wang et al., 2017b | ADHD vs HC | Entropy, phase synchronization | Not SCA | The study used entropy and phase synchronization instead of SCA |
| Yoo et al., 2018 | ADHD vs HC | ALFF | Not SCA | The study used ALFF instead of SCA |
| Mowinckel et al., 2017 | ADHD vs HC | ICA, dual regression, and Bayesian linear mixed models | Not SCA | The study used ICA, dual regression, and Bayesian linear mixed models instead of SCA |
| Bos et al., 2017 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Zamorano et al., 2017 | ADHD vs HC | SCA | Task-based analysis | The study did not use resting state FC for between-group comparisons |
| Wu et al., 2017 | ADHD vs HC | ICA | Task-based analysis | The study did not use resting state FC for between-group comparisons |
| Sotnikova et al., 2017 | ADHD | Functional connectivity density | Not SCA, not healthy control | The study did not use SCA and had not any healthy group |
| Zhan et al., 2017 | ADHD vs HC | NBS | Not SCA | The study used NBS instead of SCA |
| Kelly et al., 2017 | ADHD used cannabis/not cannabis vs HC used cannabis/not cannabis | ICA | Not SCA | The study used ICA instead of SCA |
| Richards et al., 2016 | Dysgraphia with and without ADHD | SCA | Not healthy control | The study had not any healthy group |
| Silk et al., 2017 | ADHD vs HC | NBS | Not SCA | The study used NBS instead of SCA |
| Bellec et al., 2017 | ADHD vs HC | ALFF, ReHo | Not SCA | The study used ALFF and ReHo instead of SCA |
| Cary et al., 2017 | ADHD vs HC | Node dissociation index | Not SCA | The study used graph measure, called node dissociation index instead of SCA |
| Sanefuji et al., 2017 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Beare et al., 2017 | ADHD vs HC | NBS | Not SCA | The study used NBS instead of SCA |
| Lin et al., 2018 | ADHD vs HC | CCA | Not SCA | The study used CCA instead of SCA |
| Marcos-Vidal et al., 2018 | ADHD vs HC | Graph based analysis | Not SCA | The study used graph based analysis instead of SCA |
| Nomi et al., 2018 | ADHD vs HC | Whole brain voxel wise analysis | Not SCA | The study used whole brain voxel wise analysis instead of SCA |
| Kim et al., 2018 | ADHD vs HC | ReHo | Not SCA | The study used ReHo instead of SCA |
| Janes et al., 2018 | Smoker vs non-smokers with ADHD symptoms | SCA | Not ADHD | The participants were not diagnosed as ADHD |
| Querne et al., 2017 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Wolfers et al., 2016 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Von Rhein et al., 2017 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Akdeniz G.,  2017 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Qureshi et al., 2017 | ADHDI vs ADHDC vs HC | Global connectivity measure | Not SCA | The study used global connectivity measure instead of SCA |
| Kim et al., 2017 | ADHD vs HC | SCA | Not predefined ROI | The study had not any seed within our predefined regions of interest |
| Son et al., 2017 | ADHD vs BP vs HC | ROI to ROI | Not SCA | Coordinates of significant regions of interest were not given |
| Yang et al., 2018 | ADHD vs HC | SCA | Data missing | Coordinates of significant voxels were not given |
| Zepf et al., 2019 | ADHD vs HC | ROI to ROI | Not SCA | Coordinates of significant regions of interest were not given |
| Mizuno et al., 2017 | ADHD vs HC | SCA | Not predefined ROI | The study had not any seed within our predefined regions of interest |
| Dajani et al., 2019 | ADHD vs HC | Network connectivity analysis | Not SCA | The study used network connectivity metrics instead of SCA |
| Wang et al., 2019b | ADHD vs HC | Graph analysis | Not SCA | The study used graph metrics instead of SCA |
| Hawkey et al., 2018 | HC | Global efficiency, SCA | Not ADHD | The full study sample included 83 preschool children, not real ADHD |
| Borlase et al., 2019 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Mills et al., 2018 | ADHD vs HC | Network based analysis | Not SCA | The analyses were restricted to task-positive and  task-negative network regions |
| Rubia et al., 2019 | ADHD vs HC | SCA | Neurofeedback treatment | The study analysed only treatment-induced FC changes |
| Han et al., 2019 | IGD or IGD+ADHD or ADHD vs HC | ReHo, SCA | No significant findings | No significant findings for pure ADHD compared to HC |
| Arfuso et al., 2019 | ADHD vs HC | SCA | Not predefined ROI | The study had not any seed within our predefined regions of interest |
| Picon et al., 2020 | ADHD | SCA | Drug treatment | The study analysed only treatment-induced FC changes and did not include HCs |
| Pretus et al., 2019 | ADHD vs HC | Stepwise FC analysis | Not SCA | The study used stepwise FC analysis instead of SCA |
| Jung et al., 2018 | ADHD vs HC | Machine learning | Not SCA | The study used machine learning techniques instead of SCA |
| Rosch et al., 2018 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Tan et al., 2020 | ADHD vs HC | SCA | Data missing | The resulting coordinates were not given fully |
| Tang et al., 2018 | ADHD vs HC | ALFF, fALFF, and ReHo | Not SCA | The study used ALFF, fALFF, and ReHo instead of SCA |
| Wang et al., 2019a | ADHD vs HC | Local functional connectivity  density | Not SCA | The study used local functional connectivity density analysis instead of SCA |
| Zhou et al., 2019a | ADHD vs HC | SCA | Overlapping sample | The sample of study obtained from public dataset namely ADHD200 |
| Vatansever et al., 2019 | HC | SCA | Not ADHD | The study investigated ADHD symptomatology in healthy group, rather than in a clinical population |
| Pironti et al., 2019 | ADHD vs their relatives vs HC | SCA | Not pure ADHD vs HC comparison | The study did not include any results for ADHD compared to HC contrast |
| Kaboodvand et al., 2020 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Icer et al., 2019 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Wang et al., 2019c | ADHD vs HC | Graph analysis | Not SCA | The study used graph metrics instead of SCA |
| Zhou et al., 2019b | ADHD vs HC | DC | Not SCA | The study used DC instead of SCA |
| Pan et al., 2019 | ADHD vs HC | Graph analysis | Not SCA | The study used graph metrics instead of SCA |
| Lake et al., 2019 | ADHD vs ASD vs HC | Graph analysis | Not SCA | The study used graph metrics instead of SCA |
| Scofield et al., 2019 | ADHD vs HC | Hidden Markov Modeling | Not SCA | The study used Hidden Markov Modeling instead of SCA |
| Li et al., 2019 | ADHD vs HC | Graph analysis | Not SCA | The study used graph metrics instead of SCA |
| Pruim et al., 2019 | ADHDvs siblings vs rem-ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Sörös et al., 2019 | ADHD vs HC | ICA | Not SCA, not HC | The study used ICA instead of SCA and had not any healthy group. |
| Wu et al., 2019 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Lacy et al., 2018a | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |
| Qian et al., 2019 | ADHD vs HC | ICA | Not SCA | The study used ICA instead of SCA |

*Note.* The references excluded in meta-analysis are listed in Text A.2.; ADHD: Attention-deficit Hyperactivity Disorder; HC: Healthy Control; BP: Bipolar Disorder; CD: Conduct Disorder; DCD: Development coordination disorder; MDD: Major Depressive Disorder; ADHDI: ADHD inattentive type; ADHDI: ADHD combined type; FC: functional connectivity; ROI : Region of Interest; MDMR: Multivariate distance matrix regression; SCA: Seed-based Connectivity Analysis; S: Schizophrenia; ICA: Independent Component Analysis; PNE: Primary Nocturnal Enuresis, SVM: Support Vector Machine; ReHo: Regional Homogeneity; ALFF: Amplitude of low frequency fluctuation; NBS: Network-Based Statistics; CNM: Complex Neural Measures; IGD: Internet gaming disorder; RFC: Regional Functional Connectivity; CPRS: Conners’ Parent Rating Scale-Revised, Long Version; EL: Emotional Liability; VMHC: voxel-mirrored homotopic connectivity; CCA: canonical correlation analysis; DC: degree centrality analysis; fALFF: Fractional amplitude of low frequency fluctuation.

Table A.3. Summary of Seed-Networks and Anatomical Regions of Studies Included in Meta-analysis

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| References | Network and direction of effect | | | | | | | |
| **AMN** | | **DMN** | | **CCN** | | **SN** | |
| ADHD  <  HC | ADHD  > HC | ADHD  <  HC | ADHD  > HC | ADHD  <  HC | ADHD  > HC | ADHD  <  HC | ADHD  > HC |
| Posner et al., 2014 |  |  | hipp | hipp |  |  |  |  |
| Sun et al., 2012 |  |  |  |  |  |  | dACC | dACC |
| Cao et al., 2009 | putamen | putamen |  |  |  |  |  |  |
| Lin et al., 2015 |  |  |  |  | aPFC |  |  |  |
| Tian et al., 2006 |  |  |  |  |  |  |  | dACC |
| Lin & Gau, 2016 |  |  | DMN |  | dlPFC, IPS, FEF, ACC | dlPFC, IPS, FEF, ACC |  |  |
| McCarthy et al., 2013 |  | ACC |  | prec | dlPFC, IPS, FEF, ACC | dlPFC, IPS, FEF, ACC | TPJ, VFC |  |
| Costa Dias et al., 2015 | NAcc | NAcc |  |  |  |  |  |  |
| Castellanos et al., 2008 |  |  | prec |  |  |  |  | dACC |
| Barber et al., 2015 |  |  |  | DMN |  |  |  | CON |
| Posner et al., 2013 | striatum |  |  |  | dlPFC | dlPFC |  |  |
| Tomasi & Volkow, 2014 | VTA, SubN |  |  |  |  |  |  |  |
| Yu et al., 2016 | amygdala | amygdala |  |  |  |  |  |  |
| Francx et al., 2015 |  |  |  |  |  | CCN |  |  |
| Icer et al., 2018 |  |  |  | MTG, PCC, TPA, AG, IPL, mPFC | premotor, IFC, dlPFC |  |  |  |
| Zhao et al., 2017 |  |  |  |  |  |  | insula | insula |
| Li et al., 2014 | Globus pallidus, OFC | Globus pallidus, OFC |  |  | SFG | SFG |  |  |
| Hong et al., 2015 | putamen, caudate |  |  |  |  |  |  |  |
| Kumar et al., 2020 |  |  |  |  |  |  |  | dACC |
| Shang et al., 2020 | caudate, putamen, striatum |  |  |  |  |  |  |  |

*Note.* Only seeds, which had significant results, were listed. AMN, affective/motivational network; DMN, default mode network; CCN, cognitive control network; SN, salience network; ADHD, attention-deficit hyperactivity disorder; HC, healthy controls; hipp, hippocampus; dACC, dorsal anterior cingulate cortex; aPFC, anterior prefrontal cortex; dlPFC, dorsolateral prefrontal cortex; IPS, intraparietal sulcus; FEF, frontal eye field; ACC, anterior cingulate cortex; prec, precuneus; TPJ, temporaparietal junction; VFC, ventral frontal cortex; NAcc, nucleus accumbens; CON, cingulo-opercular network; VTA, ventral tegmental area; SubN, substantia nigra; IFC, inferior frontal cortex; MTG, middle temporal gyrus; PCC, posterior cingulate cortex; TPA, temporopolar area; AG, angular gyrus; IPL, inferior parietal lobe; mPFC, medial prefrontal cortex; OFC, orbitofrontal cortex; SFG, superior frontal gyrus.

Table A.4. Summary of Methods Implemented in Studies Included in Meta-analysis

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Reference | Scanner | Dur(min) | TR/TE (ms) | EO/C | seed type | Physiological Regressors | | | | | Motion correction | | | | FWE-corrected |
| global | GM | WM | CSF | HM | despk | 6-param | scrub | group t-test |  |
| Posner et al., 2014 | 3T | 2x5m | 2200/30 | C | mask (a priori) |  |  |  |  | x |  |  | x |  | x |
| Sun et al., 2012 | 3T | nr | 2000/30 | C | mask (a priori) | x |  | x | x | x |  |  |  | x | x |
| Cao et al., 2009 | 3T | nr | 2000/30 | C | mask (a priori) | x |  | x | x |  |  | x |  |  | x |
| Lin et al., 2015 | 3T | 6 | 2000/24 | C | 4-mm sphere | x |  | x | x |  |  | x |  | x | gaussian random field |
| Tian et al., 2006 | 3T | 8 | 2000/30 | C | manual | nr | | | | | |  |  | x | x |
| Lin & Gau, 2016 | 3T | 6 | 2000/24 | C | mask (a priori) |  |  | x | x |  |  | x |  |  | x |
| McCarthy et al., 2013 | 3T | 7.2 | 2000/28 | nr | mask (a priori) |  |  | x | x |  |  | x |  |  | x |
| Costa Dias et al., 2015 | 3T | 3 x 3.5 | 2500/30 | O | mask (a priori) | nr | | | | | | x | x |  | x |
| Castellanos et al., 2008 | 3T | 6.5 | 2000/25 | O | 3.5-mm sphere | x |  | x | x |  |  | x |  |  | gaussian random field |
| Barber et al., 2015 | 3T | 5 min 20 s | 2500/30 | O | 6-mm sphere |  |  | x | x |  |  | x |  | x | gaussian random field |
| Posner et al., 2013 | 3T | 2 x 5m | 2200/30 | C | 4-mm sphere or mask (a priori) | nr | | | | | | x |  | x | x |
| Tomasi & Volkow, 2014 | 3T | nr | TR<3000 | nr | mask (a priori) | nr | | | | | | x | x |  | x |
| Yu et al., 2016 | 3T | 8 | 2000/30 | C | mask (a priori) | x |  | x | x |  |  | x | x | x | x |
| Francx et al., 2015 | 1.5 T | 9 | 1960/40 | O | ICA mask (a priori) |  |  | x | x |  |  |  |  | x | x |
| Icer et al., 2018 | 1.5 T | 9 min 44 s | 2800/25 | C | mask (atlas) |  |  | x | x | x |  | x |  |  | x |
| Zhao et al., 2017 | 3T | 8 | 2000/30 | C | 6-mm sphere | x |  |  | x | x |  | x |  | x | x |
| Hong et al., 2015 | 3T | 6 min 24 s | 3000/40 | C | 3.5-mm sphere |  |  | x | x |  |  | x |  |  | x |
| Li et al., 2014 | 3T | nr | 2000/30 | C | mask (a priori) | x |  | x | x | x |  |  |  | x | x |
| Kumar et al., 2020 | 3T | nr | 2000/30 | nr | ICA mask (a priori) |  |  | x | x | x |  | x |  | x | FDR |
| Shang et al., 2020 | 3T | 6 | 2000/24 | C | 4-mm sphere | x |  | x | x | x |  |  |  |  | x |

*Note.* dur: duration; TR/TE: repetition time/echo time; nr: not reported; EO/C: participants’ eyes were open or closed during the resting state imaging; O: eyes open; C: eyes closed; GM: gray matter; WM: white matter; CSF: cerebrospinal fluid; HM: head motion; despk: despiking; 6-param: including motion parameters in statistical modeling; scrub: scrubbing to remove outlier volumes; FEW, family wise error; FDR, false discovery rate; nr, not reported.