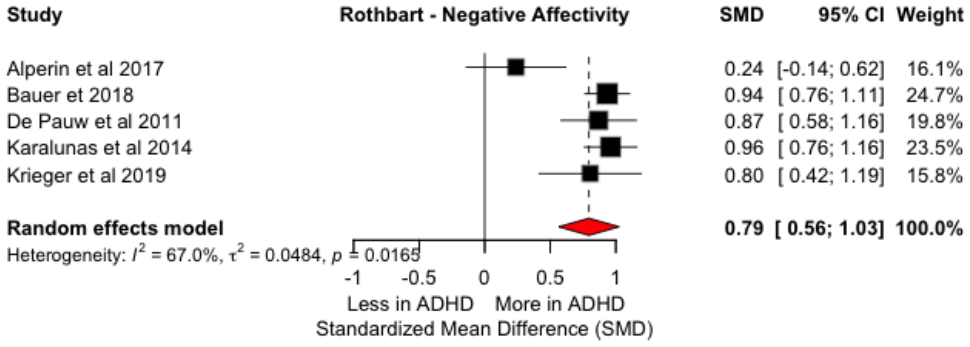
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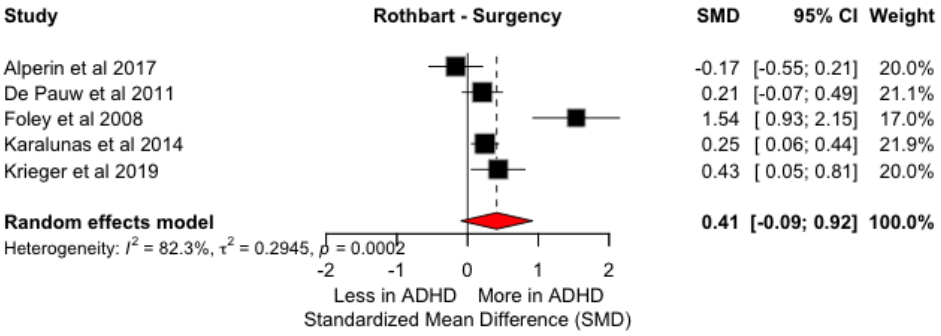
Supplementary Box S1 Search strategy

Database	Search strategy
PubMed	("Attention Deficit Disorder with Hyperactivity"[Mesh] OR adhd[tiab] OR hkd[tiab] OR addh[tiab] OR "attention deficit*"[tiab]) AND ("Child"[Mesh] OR "Adolescent"[Mesh] OR adolesc*[Title/Abstract] OR child*[Title/Abstract] OR youth*[Title/Abstract]) AND (temperament OR disposition OR regulation OR reactivity)
PsycINFO	(Any Field: "Attention Deficit Disorder with Hyperactivity" OR Any Field: adhd OR Any Field: hkd OR Any Field: addh OR Any Field: "attention deficit*") AND (Any Field: "Child" OR Any Field: "Adolescent" OR Any Field: adolesc* OR Any Field: child* OR Any Field: youth*) AND (Any Field: temperament OR Any Field: disposition OR Any Field: regulation OR Any Field: reactivity)
Web of Science	ALL=(("Attention Deficit Disorder with Hyperactivity" OR adhd OR hkd OR adhd OR "attention deficit*") AND ("Child" OR "Adolescent" OR adolesc* OR child* OR youth*) AND (temperament OR disposition OR regulation OR reactivity))

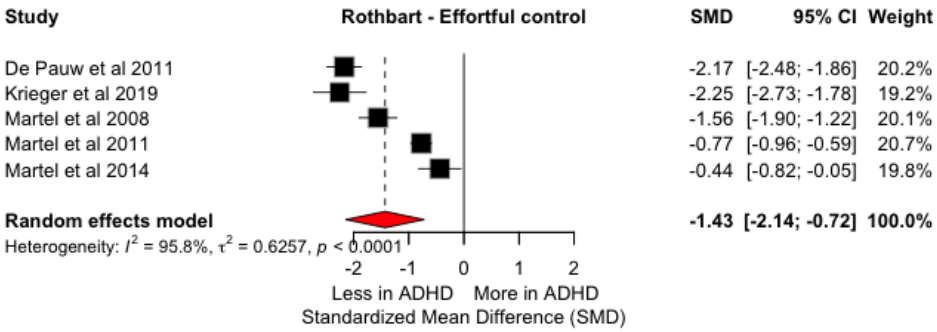
Supplementary Results

Rothbart construct

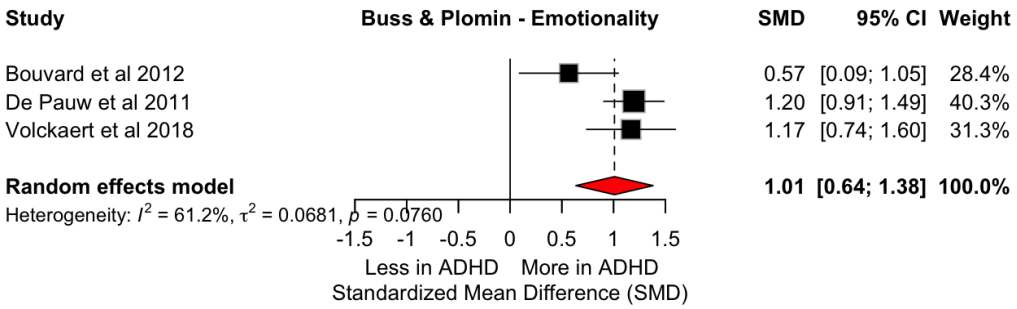


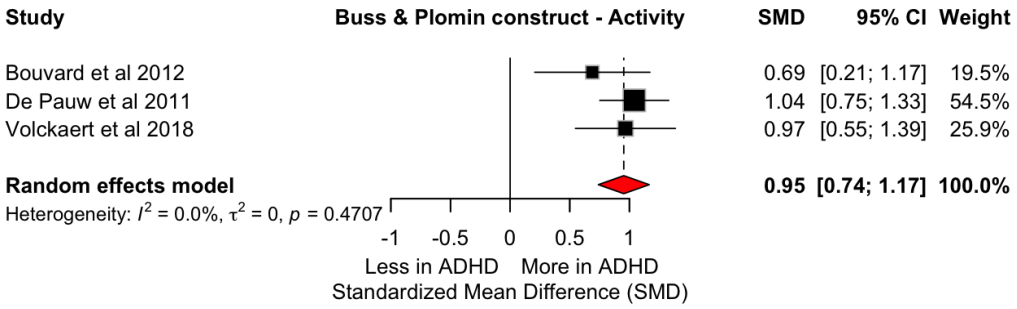


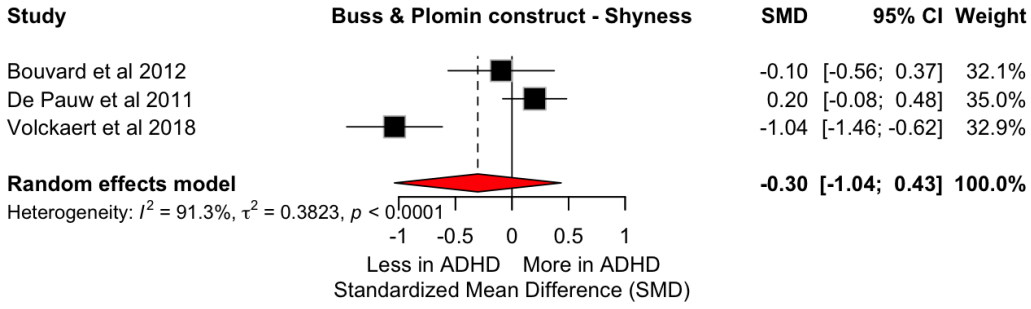
http://doi.org/10.47626/1516-4446-2025-4330



Buss & Plomin construct

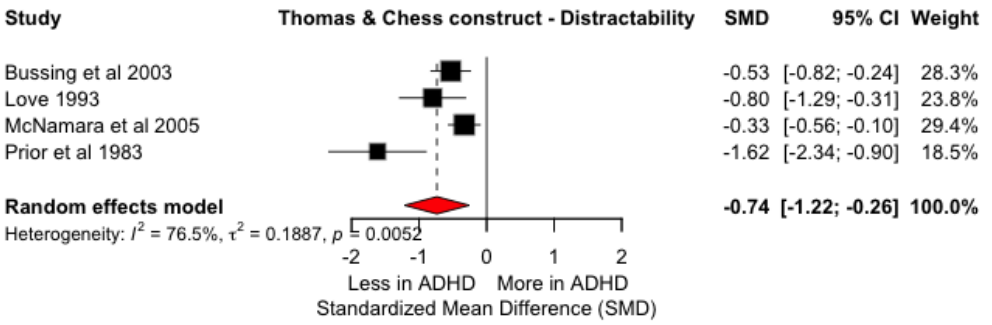


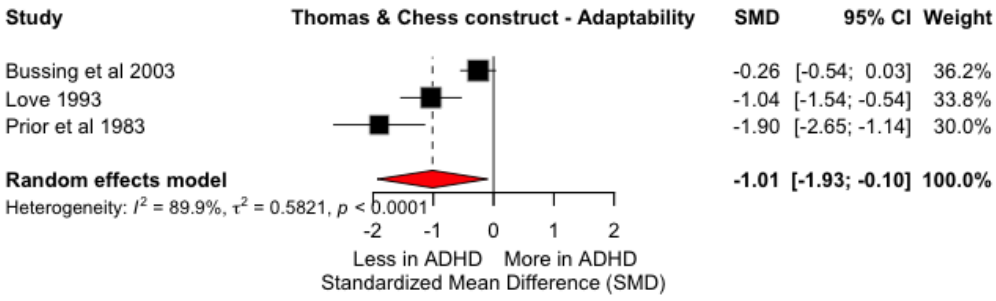


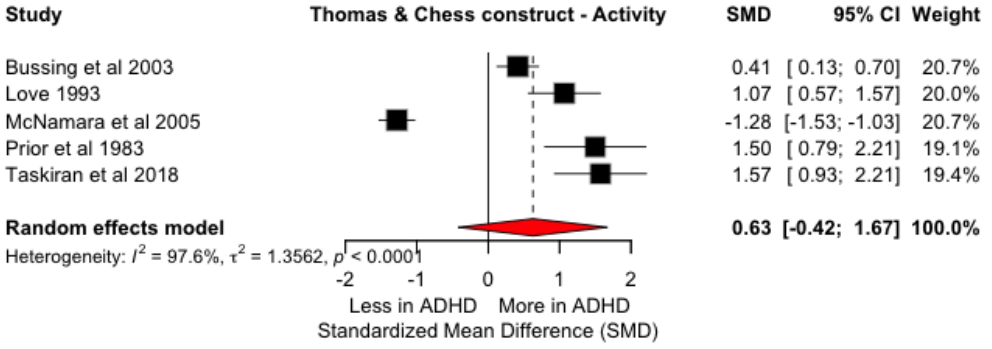


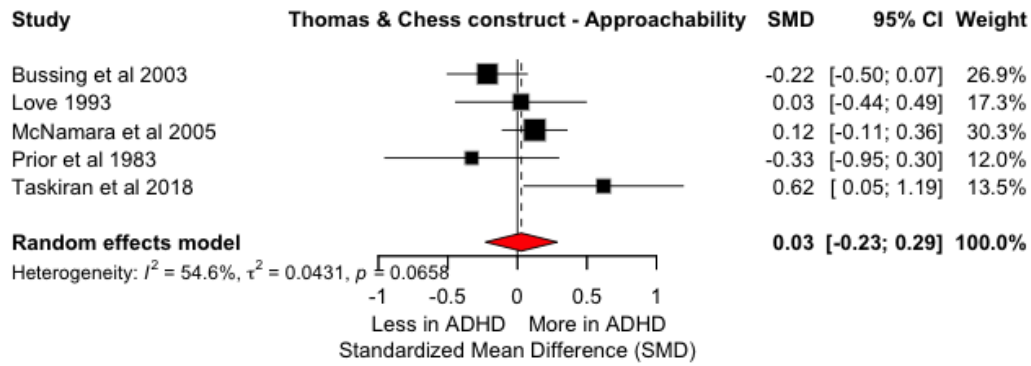
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Thomas & Chess construct

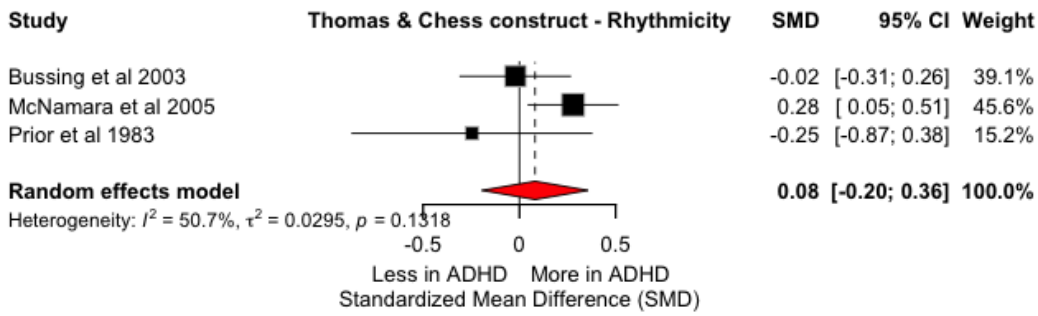


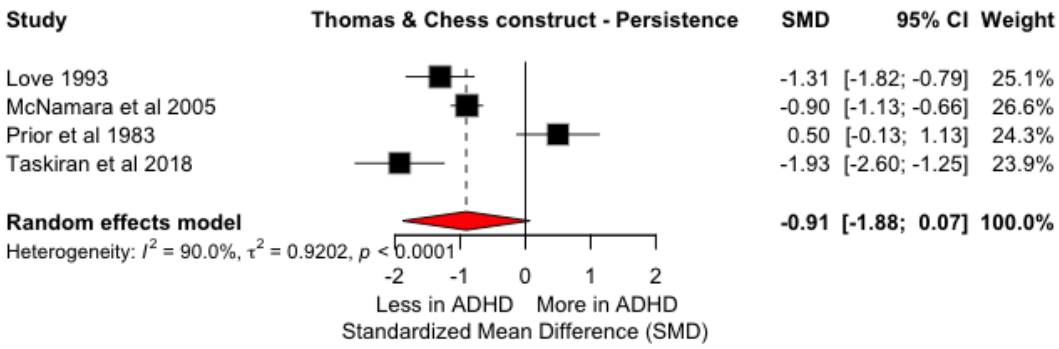




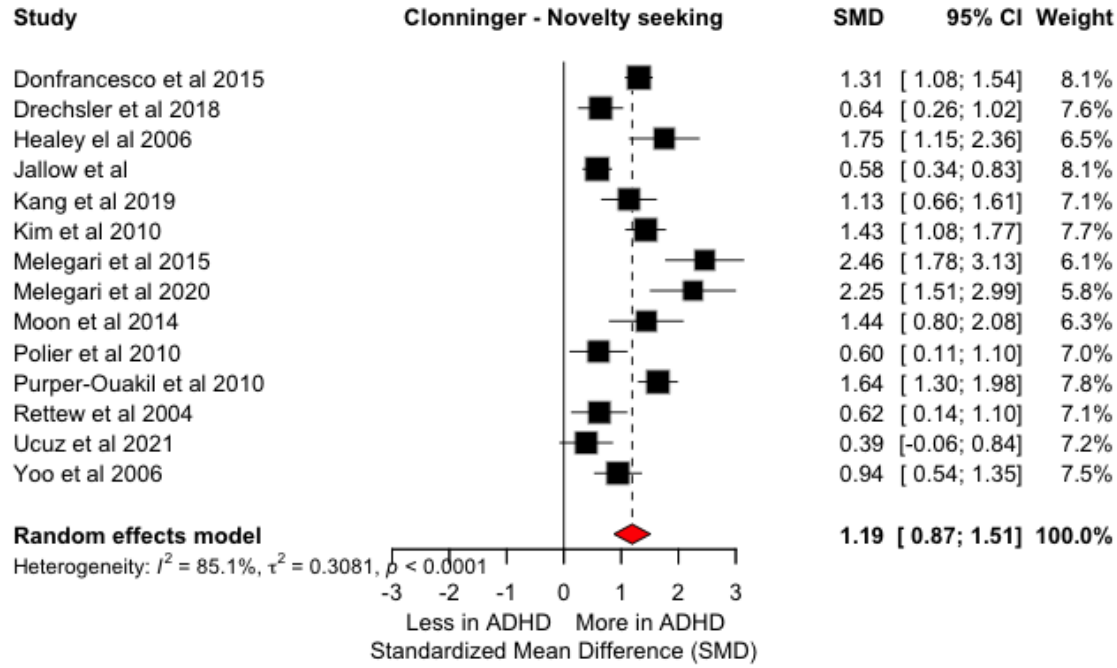


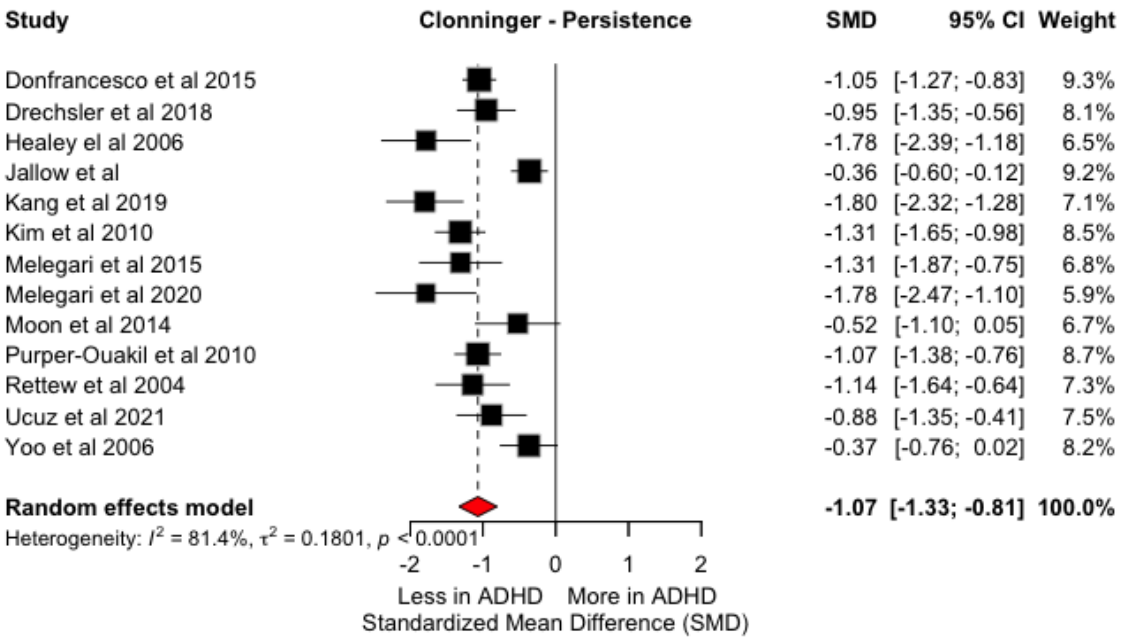
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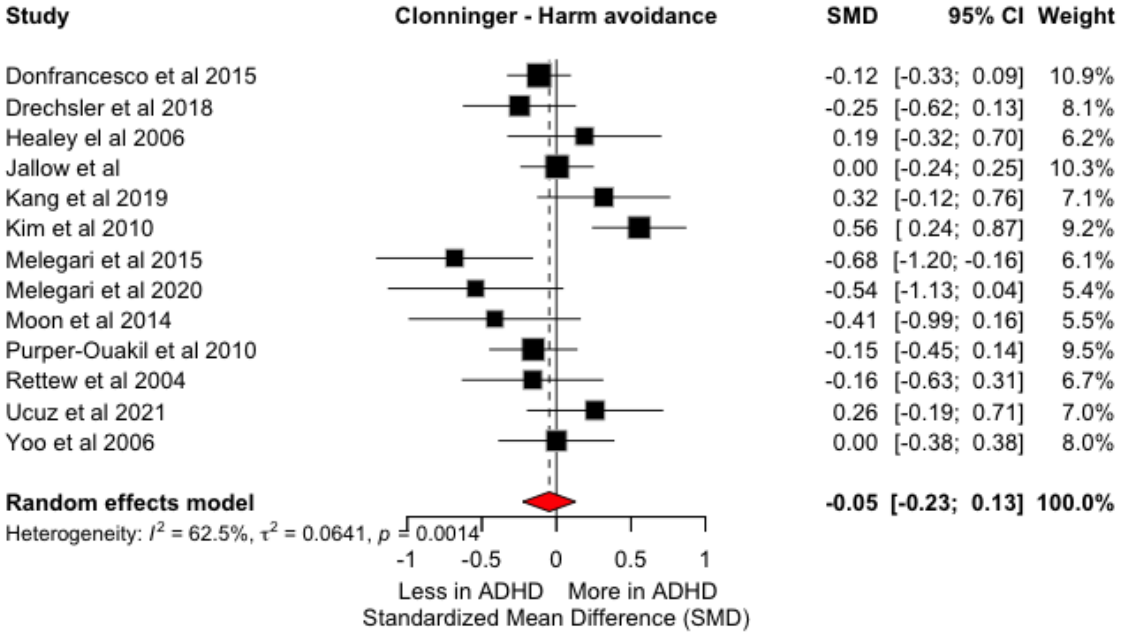




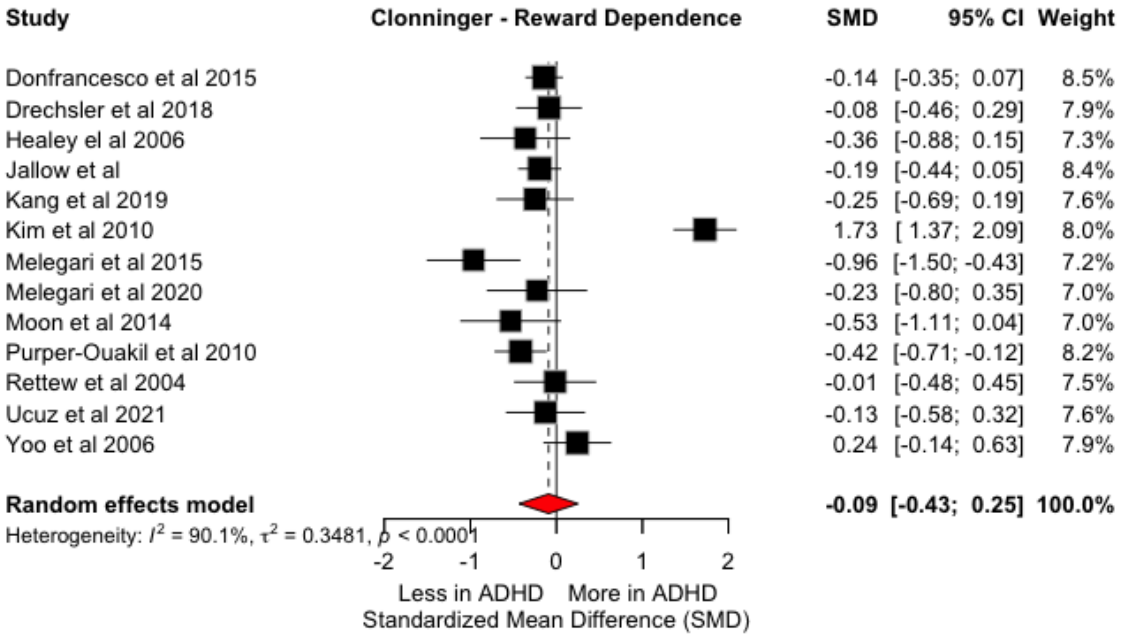
Cloninger



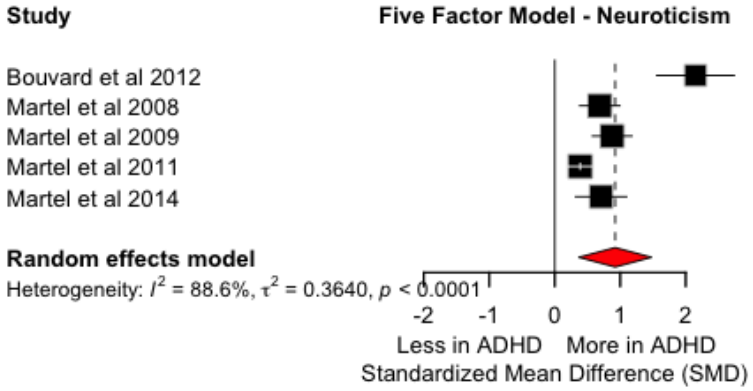

Study
Clonninger - Persistence
SMD
95% CI
Weight
Donfrancesco et al 2015 -1.05 [-1.27; -0.83] 9.3%
Drechsler et al 2018 -0.95 [-1.35; -0.56] 8.1%
Healey el al 2006 -1.78 [-2.39; -1.18] 6.5%
Jallow et al -0.36 [-0.60; -0.12] 9.2%
Kang et al 2019 -1.80 [-2.32; -1.28] 7.1%
Kim et al 2010 -1.31 [-1.65; -0.98] 8.5%
Melegari et al 2015 -1.31 [-1.87; -0.75] 6.8%
Melegari et al 2020 -1.78 [-2.47; -1.10] 5.9%
Moon et al 2014 -0.52 [-1.10; 0.05] 6.7%
Purper-Ouakil et al 2010 -1.07 [-1.38; -0.76] 8.7%
Rettew et al 2004 -1.14 [-1.64; -0.64] 7.3%
Ucuz et al 2021 -0.88 [-1.35; -0.41] 7.5%
Yoo et al 2006 -0.37 [-0.76; 0.02] 8.2%
Random effects model -1.07 [-1.33; -0.81] 100.0%
Heterogeneity: I^2 = 81.4%, τ^2 = 0.1801, p < 0.0001
-2
-1
0
1
2
Less in ADHD
More in ADHD
Standardized Mean Difference (SMD)

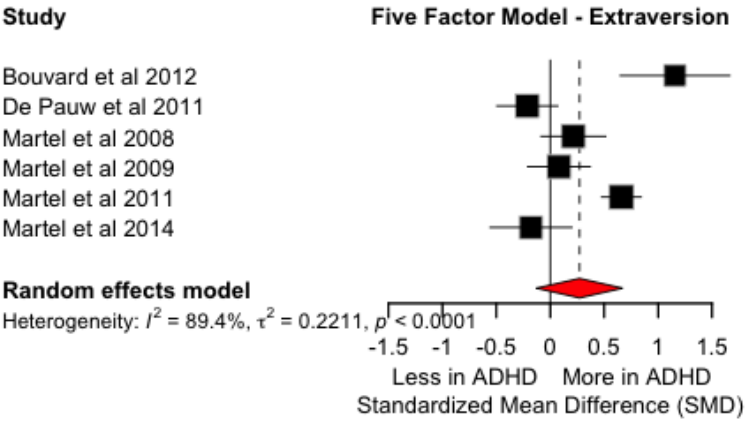

Study
Clonninger - Harm avoidance
SMD
95% CI
Weight
Donfrancesco et al 2015 -0.12 [-0.33; 0.09] 10.9%
Drechsler et al 2018 -0.25 [-0.62; 0.13] 8.1%
Healey el al 2006 0.19 [-0.32; 0.70] 6.2%
Jallow et al 0.00 [-0.24; 0.25] 10.3%
Kang et al 2019 0.32 [-0.12; 0.76] 7.1%
Kim et al 2010 0.56 [0.24; 0.87] 9.2%
Melegari et al 2015 -0.68 [-1.20; -0.16] 6.1%
Melegari et al 2020 -0.54 [-1.13; 0.04] 5.4%
Moon et al 2014 -0.41 [-0.99; 0.16] 5.5%
Purper-Ouakil et al 2010 -0.15 [-0.45; 0.14] 9.5%
Rettew et al 2004 -0.16 [-0.63; 0.31] 6.7%
Ucuz et al 2021 0.26 [-0.19; 0.71] 7.0%
Yoo et al 2006 0.00 [-0.38; 0.38] 8.0%
Random effects model -0.05 [-0.23; 0.13] 100.0%
Heterogeneity: I^2 = 62.5%, τ^2 = 0.0641, p = 0.0014
-1
-0.5
0
0.5
1
Less in ADHD
More in ADHD
Standardized Mean Difference (SMD)

http://doi.org/10.47626/1516-4446-2025-4330

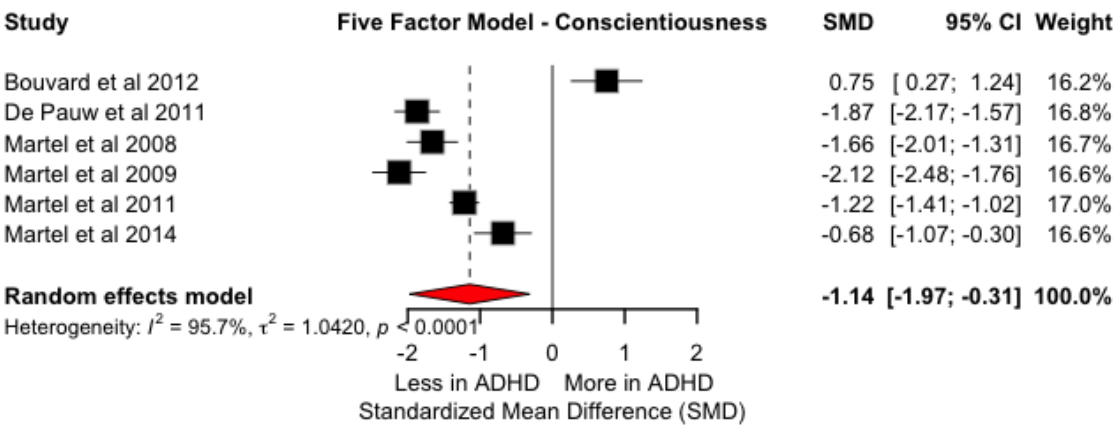


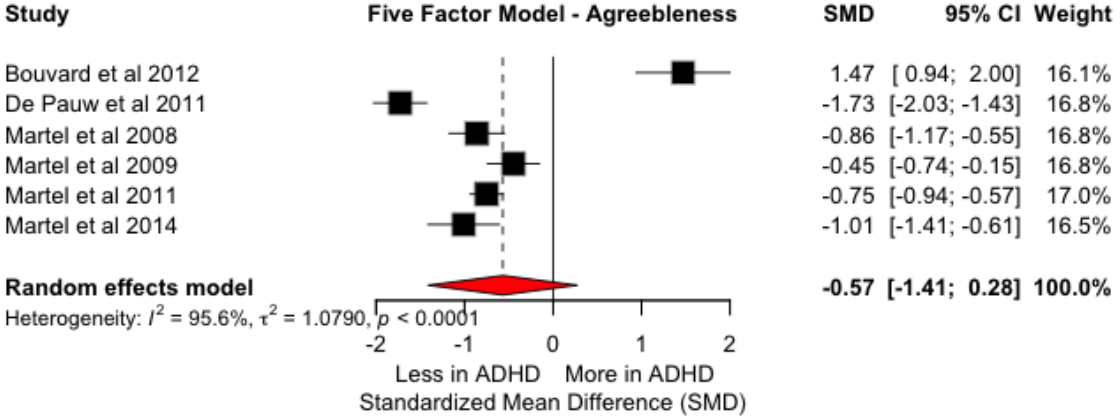
Five-factor model





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Supplementary Table S1 Newcastle-Ottawa Scale for Case-Control Studies

Study	Selection				Comparability		Exposure			Final score
NOS criteria	Case definition	Representativeness	Selection	Definition	Control for important factor	Control for other factors	Ascertainment	Same method	Non-response rate	
Alperin et al.[1]	★	★	★	★	★	-	★	★	-	7
Bauer et al. [2]	★	★	★	★	-	★	★	★	-	7
Bouvard et al. [3]	★	-	★	★	-	-	★	★	-	5
Bussing et al.[4]	★	★	★	★	★	★	★	★	★	9
De Pauw et al. [5]	★	★	★	★	★	-	★	★	-	7
Donfrancesco et al.[6]	★	★	★	★	★	★	★	★	-	9
Drechsler et al.[7]	★	★	★	★	-	-	★	★	-	6
Foley et al.[8]	★	-	★	★	-	-	★	★	-	5
Healey & Rucklidge.[9]	★	-	★	★	★	-	★	★	-	6
Jallow et al. [10]	★	★	★	★	★	-	★	★	★	8
Kang & Kwack.[11]	★	-	★	★	★	-	★	★	-	6
Karalunas et al.[12]	★	★	★	★	★	★	★	★	★	9
Kim et al.[13]	★	★	★	★	★	-	★	★	-	7
Krieger et al.[14]	★	★	★	★	-	-	★	★	-	6
Love et al.[15]	★	-	★	★	★	-	★	★	-	6
Martel et al.[16]	★	★	★	★	★	-	★	★	-	7
Martel et al.[17]	★	★	★	★	-	-	★	★	-	6
Martel et al.[18]	★	★	★	★	-	-	★	★	-	6
Martel et al.[19]	★	★	★	★	★	-	★	★	-	7

Study	Selection				Comparability		Exposure			Final score
NOS criteria	Case definition	Representativeness	Selection	Definition	Control for important factor	Control for other factors	Ascertainment	Same method	Non-response rate	
McNamara et al.[20]	★	-	★	★	★	★	★	★	-	7
Melegari et al.[21]	★	★	★	★	-	-	★	★	-	6
Melegari et al.[22]	★	-	★	★	-	-	★	★	-	5
Moon et al.[23]	★	-	★	★	-	-	★	★	-	5
Polier et al.[24]	★	-	★	★	-	-	★	★	-	5
Prior et al.[25]	★	-	★	★	★	-	★	★	-	6
Purper-Ouakil et al.[26]	★	★	★	★	★	-	★	★	-	7
Rettew et al.[27]	★	★	★	★	★	-	★	★	-	7
Taskiran et al.[28]	★	-	★	★	-	-	★	★	-	5
Ucuz el al.[29]	★	-	★	★	-	-	★	★	-	5
Volckaert & Noël.[30]	★	-	★	★	★	-	★	★	-	6
Yoo et al.[31]	★	★	★	★	★	-	★	★	-	7

References

1. Alperin BR, Gustafsson H, Smith C, Karalunas SL. The relationship between early and late event-related potentials and temperament in adolescents with and without ADHD. PLoS One. 2017;12:e0180627.
2. Bauer BW, Gustafsson HC, Nigg J, Karalunas SL. Working memory mediates increased negative affect and suicidal ideation in childhood attention-deficit/hyperactivity disorder. J Psychopathol Behav Assess. 2018;40:180-93.
3. Bouvard M, Sigel L, Laurent A. [A study of temperament and personality in children diagnosed with attention-deficit hyperactivity disorder (ADHD)]. Encephale. 2012;38:418-25.
4. Bussing R, Gary FA, Mason DM, Leon CE, Sinha K, Garvan CW. Child temperament, ADHD, and caregiver strain: exploring relationships in an epidemiological sample. J Am Acad Child Adolesc Psychiatry. 2003;42:184-92.
5. De Pauw SSW, Mervielde I. The role of temperament and personality in problem behaviors of children with ADHD. J Abnorm Child Psychol. 2011;39:277-91.
6. Donfrancesco R, Di Trani M, Porfirio MC, Giana G, Miano S, Andriola E. Might the temperament be a bias in clinical study on attention-deficit hyperactivity disorder (ADHD)? Novelty Seeking dimension as a core feature of ADHD. Psychiatry Res. 2015;227:333-8.
7. Drechsler R, Zulauf Logoz M, Walitza S, Steinhausen HC. The relations between temperament, character, and executive functions in children with ADHD and clinical controls. J Atten Disord. 2018;22:764-75.
8. Foley M, McClowry SG, Castellanos FX. The relationship between attention deficit hyperactivity disorder and child temperament. J Appl Dev Psychol. 2008;29:157-69.
9. Healey D, Rucklidge JJ. An investigation into the relationship among ADHD symptomatology, creativity, and neuropsychological functioning in children. Child Neuropsychol. 2006;12:421-38.
10. Jallow J, Halt AH, Kerkelä M, Hurtig T, Miettunen J. Association of temperament and character traits with ADHD and its comorbidities. Nord J Psychiatry. 2024;78:64-70.
11. Kang NR, Kwack YS. Temperament and character profiles associated with internalizing and externalizing problems in children with attention deficit hyperactivity disorder. Psychiatry Investig. 2019;16:206-12.
12. Karalunas SL, Fair D, Musser ED, Aykes K, Iyer SP, Nigg JT. Subtyping attention-deficit/hyperactivity disorder using temperament dimensions: toward biologically based nosologic criteria. JAMA Psychiatry. 2014;71:1015-24.
13. Kim HW, Cho SC, Kim BN, Kim JW, Shin MS, Yeo JY. Does oppositional defiant disorder have temperament and psychopathological profiles independent of attention deficit/hyperactivity disorder? Compr Psychiatry. 2010;51:412-8.
14. Krieger V, Amador-Campos JA, Gallardo-Pujol D. Temperament, executive function, and attention-deficit/hyperactivity disorder (ADHD) in adolescents: the mediating role of effortful control. J Clin Exp Neuropsychol. 2019;41:615-33.
15. Love ASC. Differential diagnosis of attention deficit hyperactivity disordered and emotionally/behaviorally disordered children using the temperament assessment battery for children [thesis]. Stillwater: Oklahoma State University; 1993.
16. Martel MM, Nigg JT, Lucas RE. Trait mechanisms in youth with and without attention-deficit/hyperactivity disorder. J Res Pers. 2008;42:895-913.
17. Martel MM, Nigg JT, von Eye A. How do trait dimensions map onto ADHD symptom domains? J Abnorm Child Psychol. 2009;37:337-48.
18. Martel MM, Roberts B, Gremillion M, von Eye A, Nigg JT. External validation of bifactor model of ADHD: explaining heterogeneity in psychiatric comorbidity, cognitive control, and personality trait profiles within DSM-IV ADHD. J Abnorm Child Psychol. 2011;39:1111-23.

19. Martel MM, Gremillion ML, Tackett JL. Personality traits elucidate sex differences in attention-deficit/hyperactivity disorder comorbidity during early childhood. J Psychopathol Behav Assess. 2014;36:237-45.
20. McNamara JK, Willoughby T, Chalmers H, Ylc-Cura. Psychosocial status of adolescents with learning disabilities with and without comorbid attention deficit hyperactivity disorder. Learn Disabil Res Pract. 2005;20:234-44.
21. Melegari MG, Nanni V, Lucidi F, Russo PM, Donfrancesco R, Cloninger CR. Temperamental and character profiles of preschool children with ODD, ADHD, and anxiety disorders. Compr Psychiatry. 2015;58:94-101.
22. Melegari MG, Sette S, Vittori E, Mallia L, Devoto A, Lucidi F, et al. Relations between sleep and temperament in preschool children with ADHD. J Atten Disord. 2020;24:535-44.
23. Moon E, Ghim HR, Cheon Y, Son JW, Kim TH [Internet]. Difference in theory of mind and reading the facial expression between ADHD and typical children. In: Proceedings of the International Psychological Applications Conference and Trends (InPACT 2014) Lisbon: World Institute for Advanced Research and Science; 2024. https://eric.ed.gov/?id=ED563377
24. Polier GG, Herpertz-Dahlmann B, Matthias K, Konrad K, Vloet TD. Associations between trait anxiety and psychopathological characteristics of children at high risk for severe antisocial development. Atten Defic Hyperact Disord. 2010;2:185-93.
25. Prior M, Leonard A, Wood G. A comparison study of preschool children diagnosed as hyperactive. J Pediatr Psychol. 1983;8:191-207.
26. Purper-Ouakil D, Cortese S, Wohl M, Aubron V, Orejarena S, Michel G, et al. Temperament and character dimensions associated with clinical characteristics and treatment outcome in attention-deficit/hyperactivity disorder boys. Compr Psychiatry. 2010;51:286-92.
27. Rettew DC, Copeland W, Stanger C, Hudziak JJ. Associations between temperament and DSM-IV externalizing disorders in children and adolescents. J Dev Behav Pediatr. 2004;25:383-91.
28. Taskiran C, Karaismailoglu S, Cak Esen HT, Tuzun Z, Erdem A, Balkanci ZD, et al. Clinical features and subjective/physiological responses to emotional stimuli in the presence of emotion dysregulation in attention-deficit hyperactivity disorder. J Clin Exp Neuropsychol. 2018;40:389-404.
29. Ucuz I, Uzun Cicek A, Cansel N, Kilic B, Colak C, Percinel Yazici I, et al. Can temperament and character traits be used in the diagnostic differentiation of children with ADHD? J Nerv Ment Dis. 2021;209:905-10.
30. Volckaert A, Noël MP. Executive function, chaos and temperament: specificities in preschoolers with externalizing behaviors. Psychol Belg. 2018;58:222-42.
31. Yoo HJ, Kim M, Ha JH, Chung A, Sim ME, Kim SJ, et al. Biogenetic temperament and character and attention deficit hyperactivity disorder in Korean children. Psychopathology. 2006;39:25-31.