

Additional File 1.

Individual and Organizational Interventions to Reduce Burnout in Resident Physicians: A Systematic Review and Meta-analysis

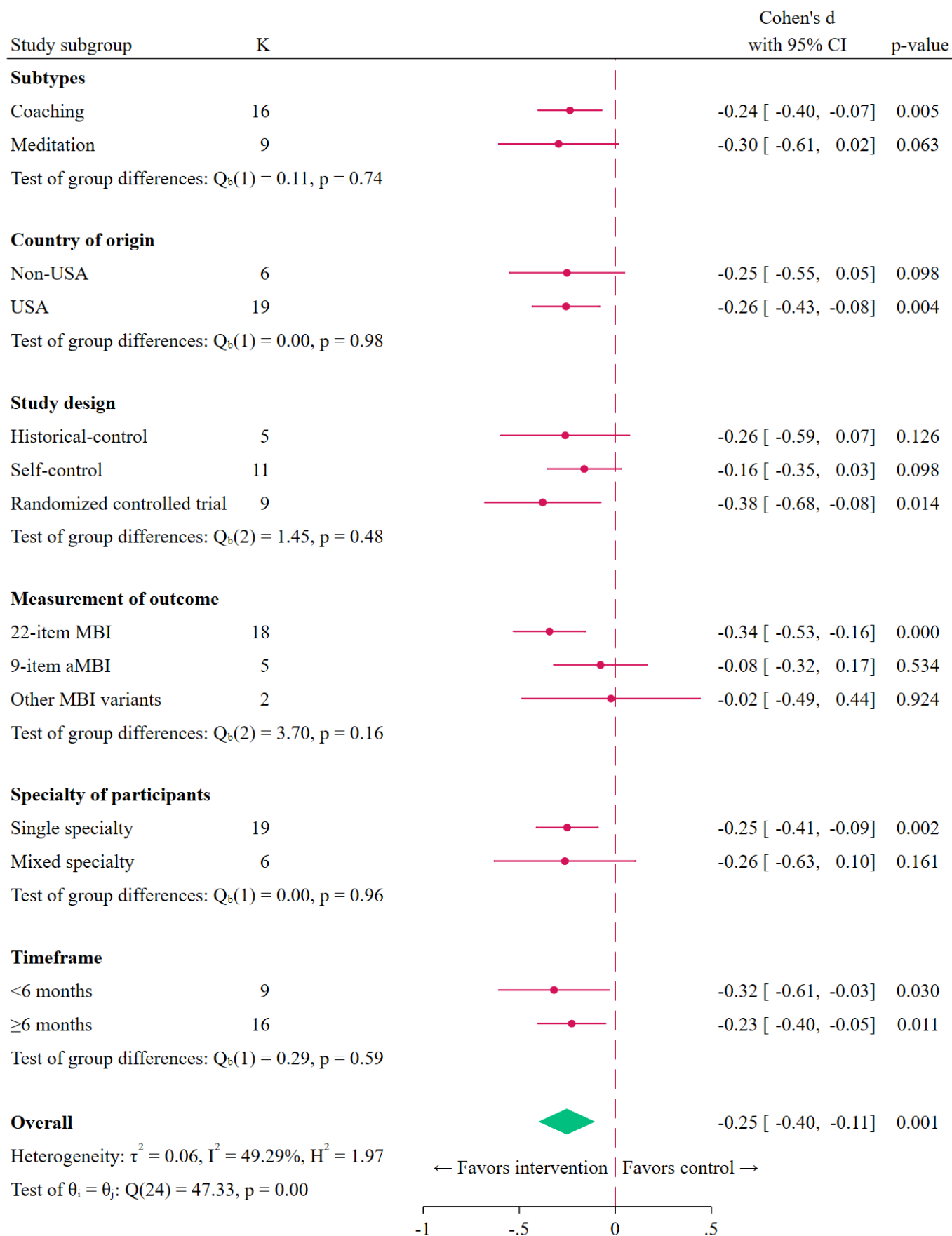
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Supplementary Appendix 1. Searching syntax from (A) PubMed, (B) Embase, (C) Cochrane Library, (D) Scopus, (E) Sciencedirect

Database	Step	Search algorithm	Items found (August 26, 2024)
(A) Pubmed			
Population	#1	(residen* OR (residen* AND train*)) AND physician*	47603
Outcome	#2	burnout*	30030
	#3	psycho* AND burnout*	21659
	#4	#1 AND (#2 OR #3)	1385
	#5	mbi	5051
	#6	maslach burnout inventor*	3750
	#7	#5 OR #6	7368
	#8	#4 AND #7	312
(B) Embase			
Population	#1	(residen* OR (residen* AND train*)) AND physician*	65555
Outcome	#2	burnout*	39909
	#3	psycho* AND burnout*	20516
	#4	#1 AND (#2 OR #3)	2132
	#5	mbi*	31681
	#6	Maslach AND burnout AND inventor*	5416
	#7	#5 OR #6	39909
	#8	#4 AND #7	717
Type of studies	#9	#8 AND ('cohort analysis'/de OR 'comparative study'/de OR 'controlled study'/de OR 'human experiment'/de OR 'prospective study'/de OR 'randomized controlled trial'/de)	236
Intervention and control	#10	#9	236
(C) Cochrane Library			
Population	#1	((residen* OR (residen* AND train*)) AND physician*)	2495
Outcome	#2	Burnout*	1862
	#3	Mbi*	1502
	#4	Maslach AND burnout AND inventor*	336
	#5	(#3 OR #4)	1694
	#6	(#1 AND #5) AND trials	32

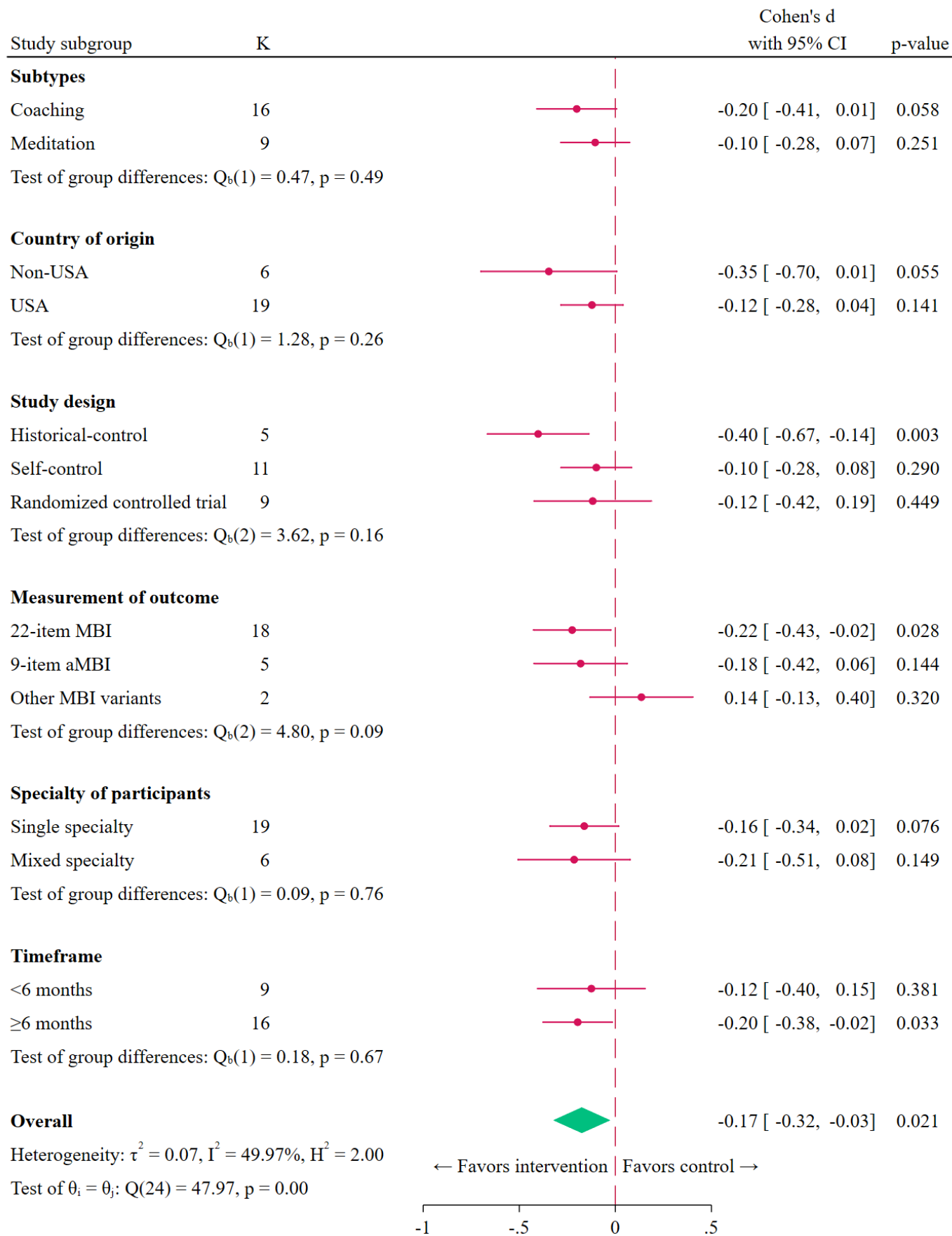
Database	Step	Search algorithm	Items found
(D) Scopus			
	#1	(residen* OR (residen* AND train*)) AND physician*	48582
	#2	burnout*	56756
	#3	psycho*	26501
	#4	#2 OR #3	26501
	#5	mbi*	18967
	#6	Maslach burnout inventor*	5997
	#7	#5 OR #6	6036
	#8	#1 AND (#4 OR #7)	361
	#9	#8 AND "Limited to Article"	325
(E) Sciencedirect			
	#1	resident	786408
	#2	burnout	55959
	#3	MBI	18117
	#4	Maslach burnout inventory	3929
	#5	#1 AND #2 AND (#3 OR #4)	1184
	#6	#5 AND research articles	700
	#7	#6 AND medicine and dentistry	589
	#8	#7 AND intervention	378

Supplementary Appendix 2.1. Subgroup meta-analysis of post-intervention standardized mean difference of EE score in individual intervention studies



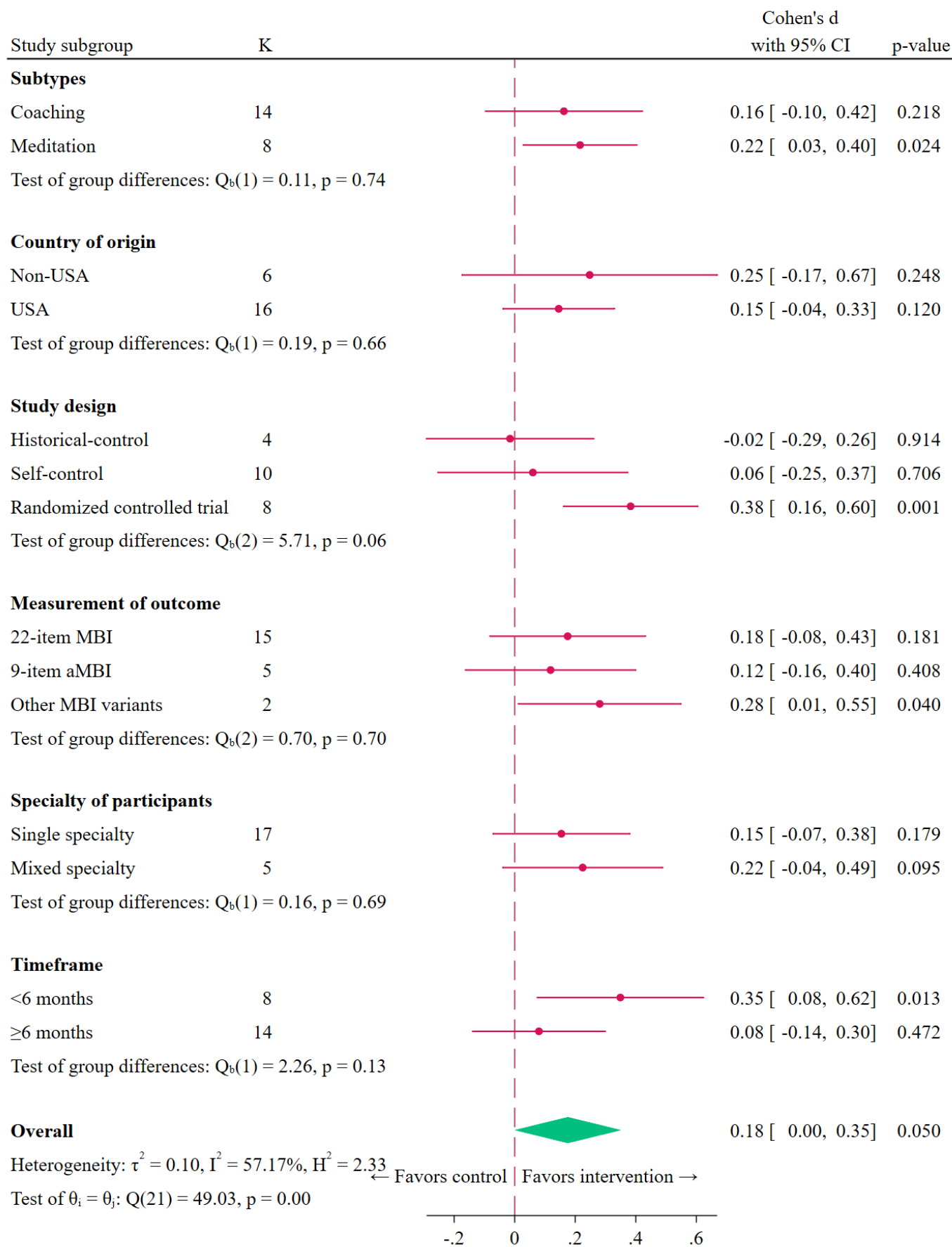
Random-effects DerSimonian–Laird model

Supplementary Appendix 2.2. Subgroup meta-analysis of post-intervention standardized mean difference of DP score in individual intervention studies



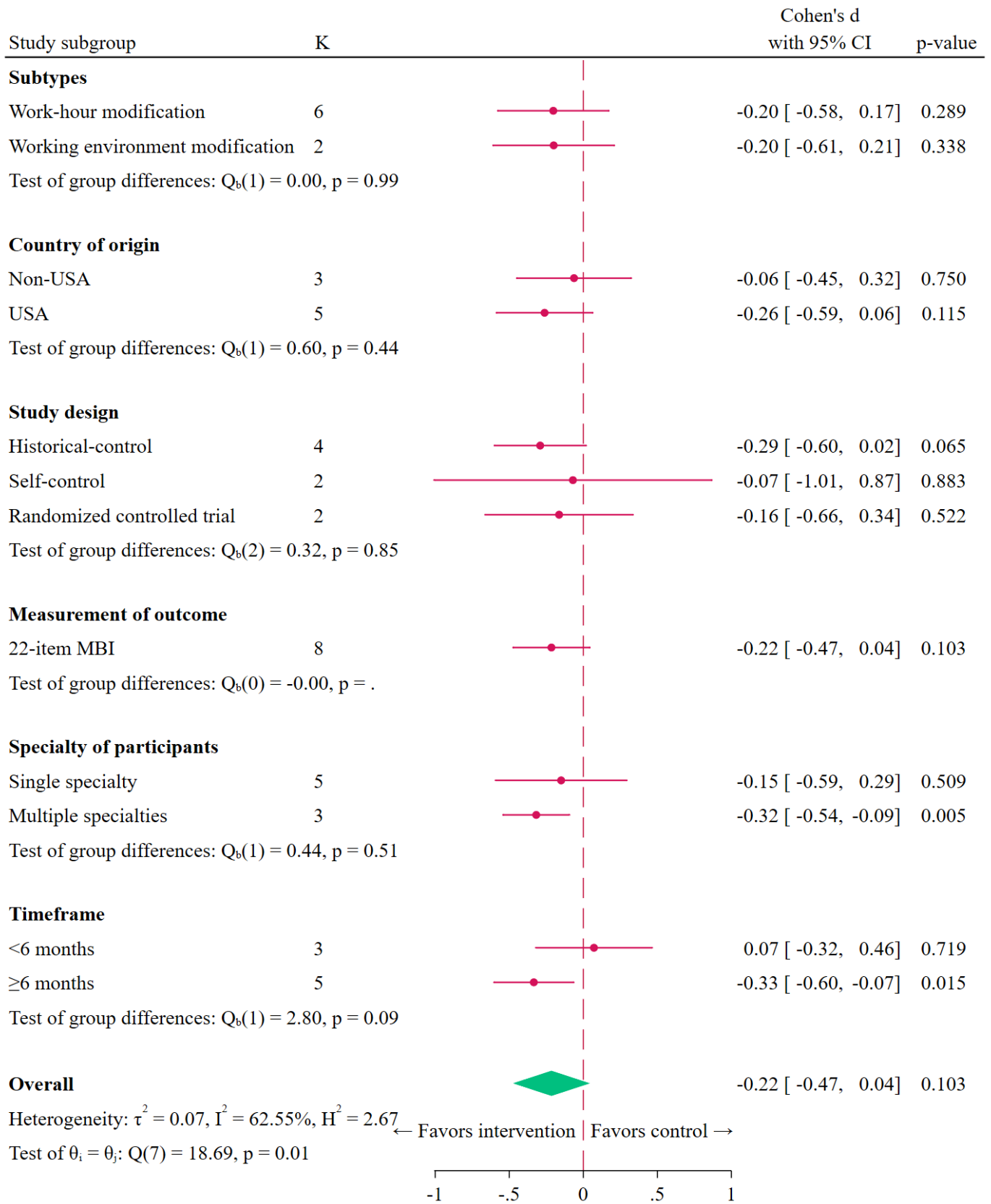
Random-effects DerSimonian–Laird model

Supplementary Appendix 2.3. Subgroup meta-analysis of post-intervention standardized mean difference of PA score in individual intervention studies



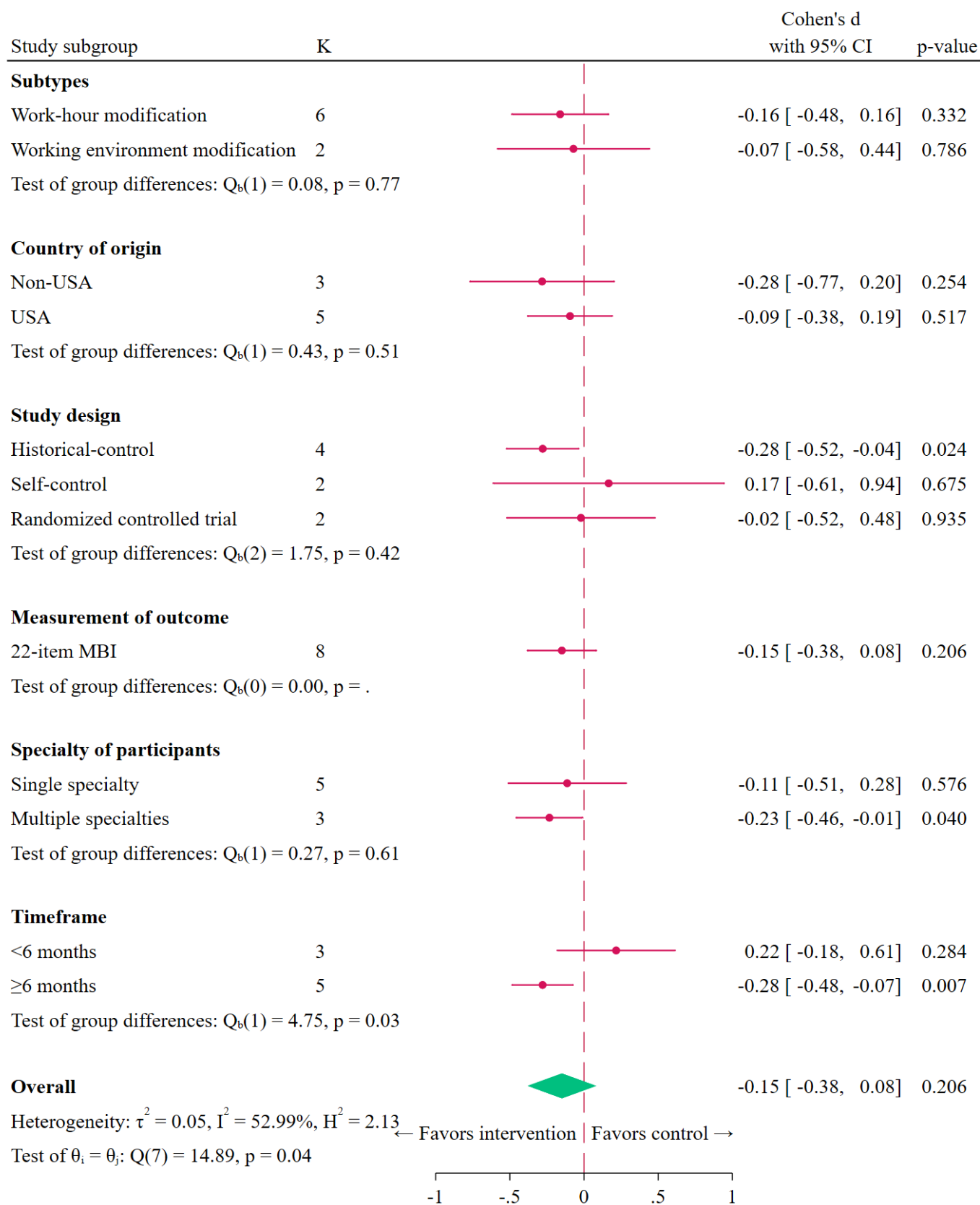
Random-effects DerSimonian–Laird model

Supplementary Appendix 2.4. Subgroup meta-analysis of post-intervention standardized mean difference of EE score in organizational intervention studies



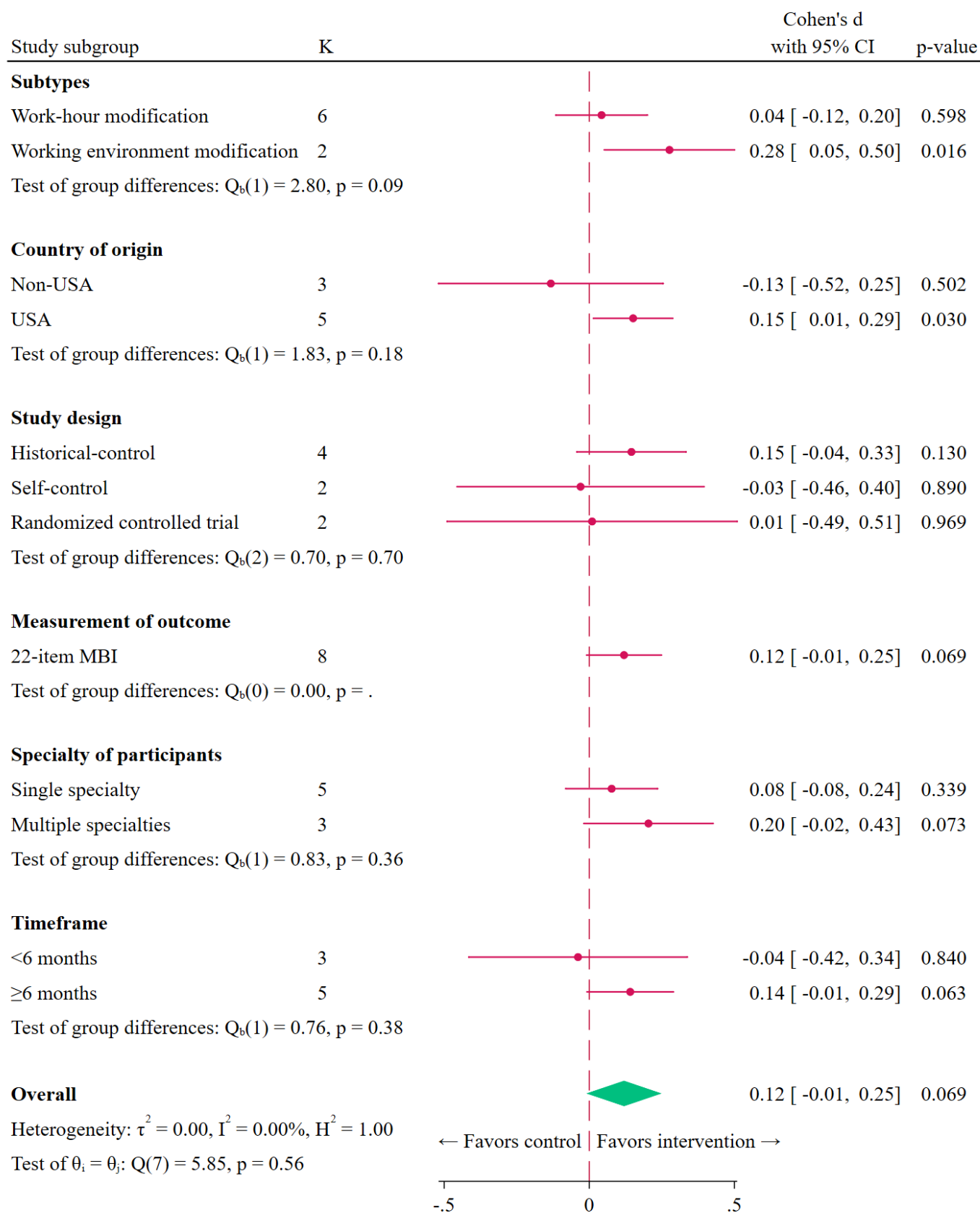
Random-effects DerSimonian–Laird model

Supplementary Appendix 2.5. Subgroup meta-analysis of post-intervention standardized mean difference of DP score in organizational intervention studies



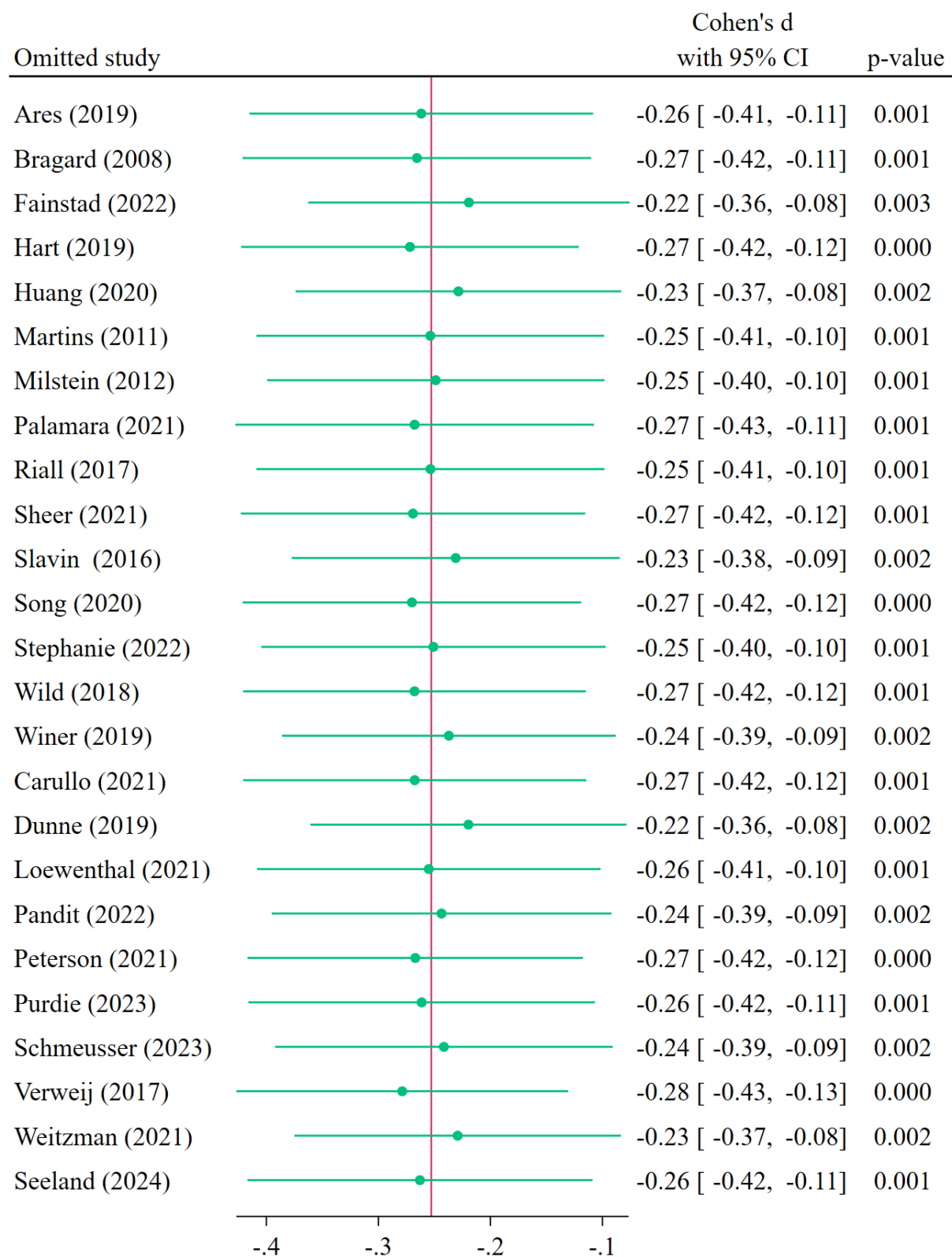
Random-effects DerSimonian–Laird model

Supplementary Appendix 2.6. Subgroup meta-analysis of post-intervention standardized mean difference of PA score in organizational intervention studies



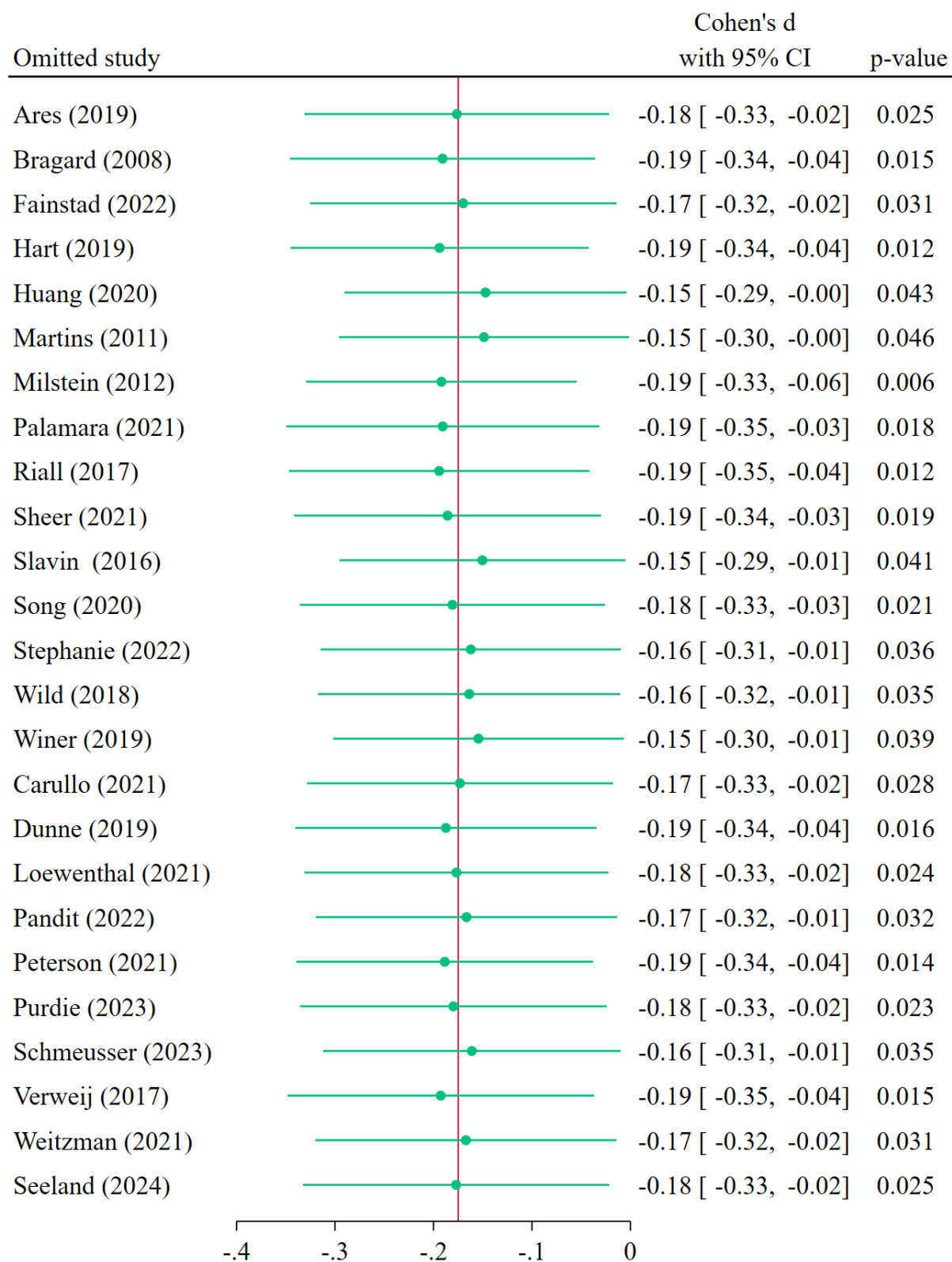
Random-effects DerSimonian–Laird model

Supplementary Appendix 3.1. Sensitivity analyses by leave-one-out method for standardized mean difference of EE score in individual intervention studies



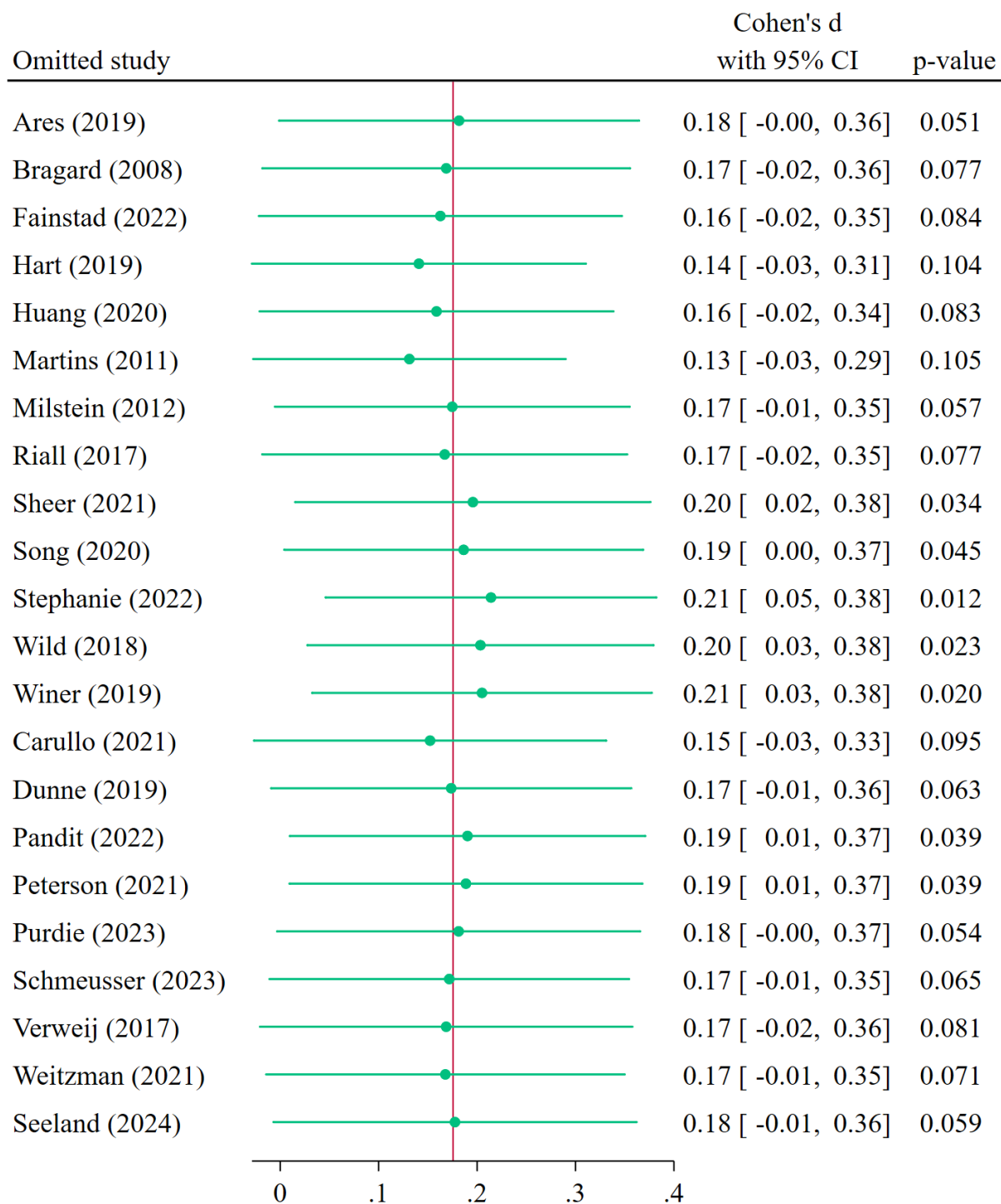
Random-effects DerSimonian–Laird model

Supplementary Appendix 3.2. Sensitivity analyses by leave-one-out method for standardized mean difference of DP score in individual intervention studies



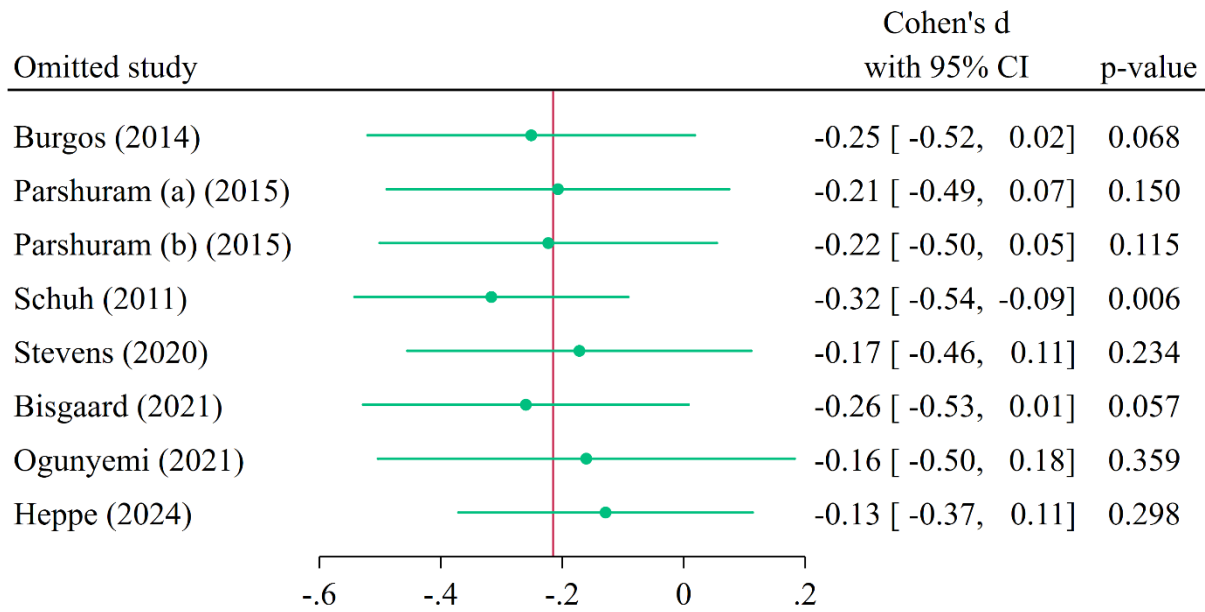
Random-effects DerSimonian–Laird model

Supplementary Appendix 3.3. Sensitivity analyses by leave-one-out method for standardized mean difference of PA score in individual intervention studies



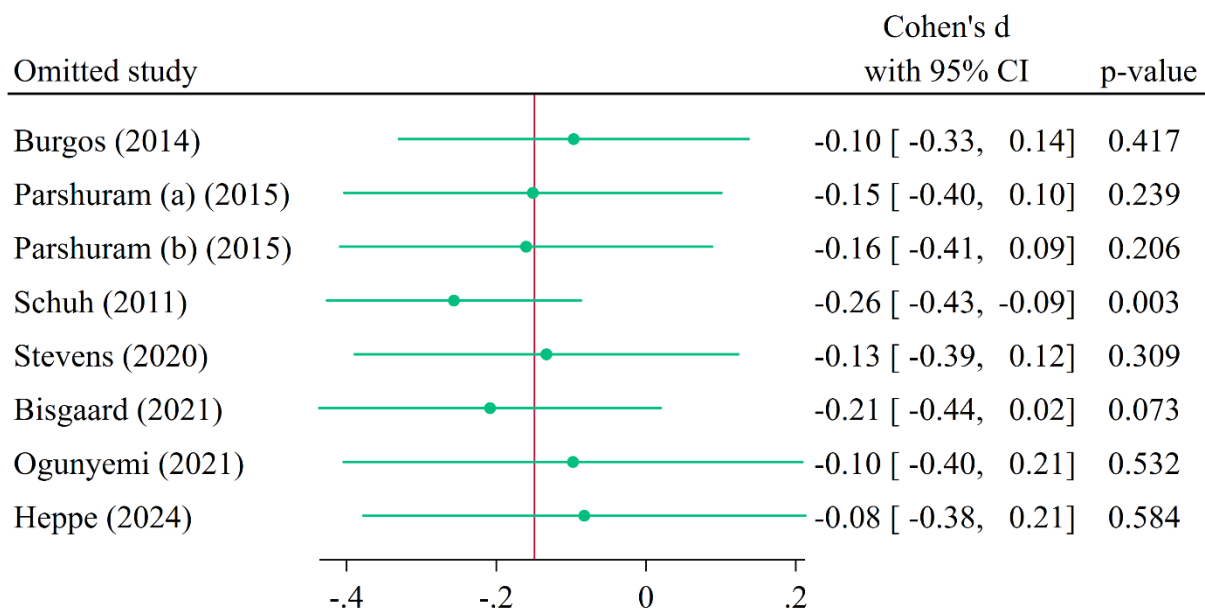
Random-effects DerSimonian–Laird model

Supplementary Appendix 3.4. Sensitivity analyses by leave-one-out method for standardized mean difference of EE score in organizational intervention studies



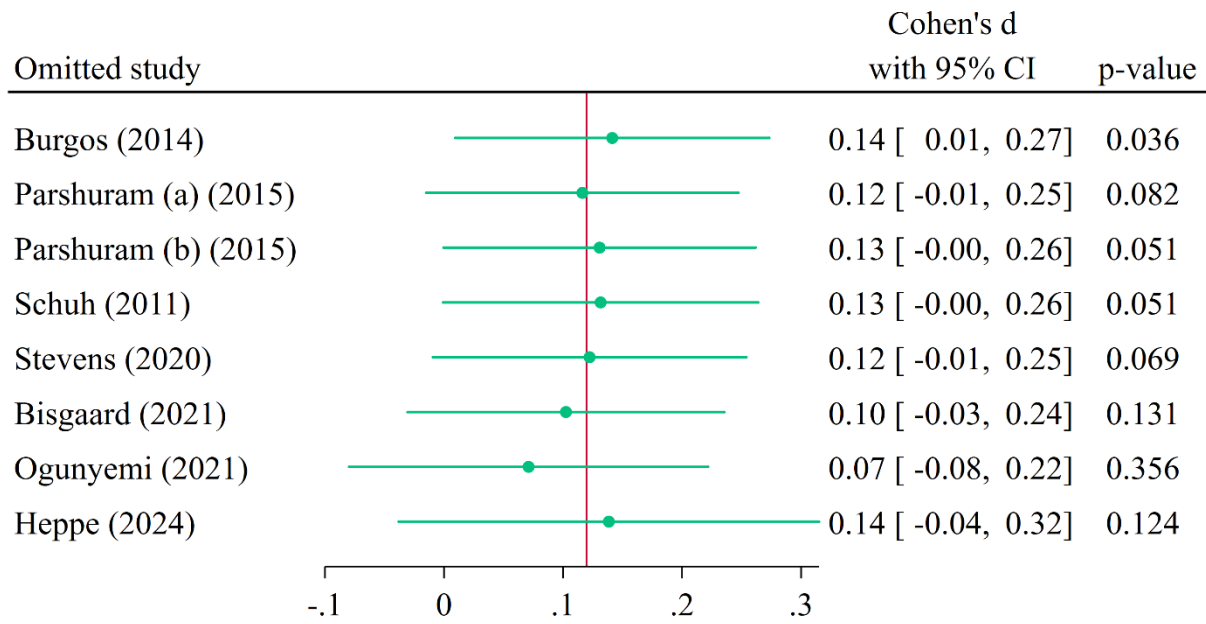
Random-effects DerSimonian–Laird model

Supplementary Appendix 3.5. Sensitivity analyses by leave-one-out method for standardized mean difference of DP score in organizational intervention studies



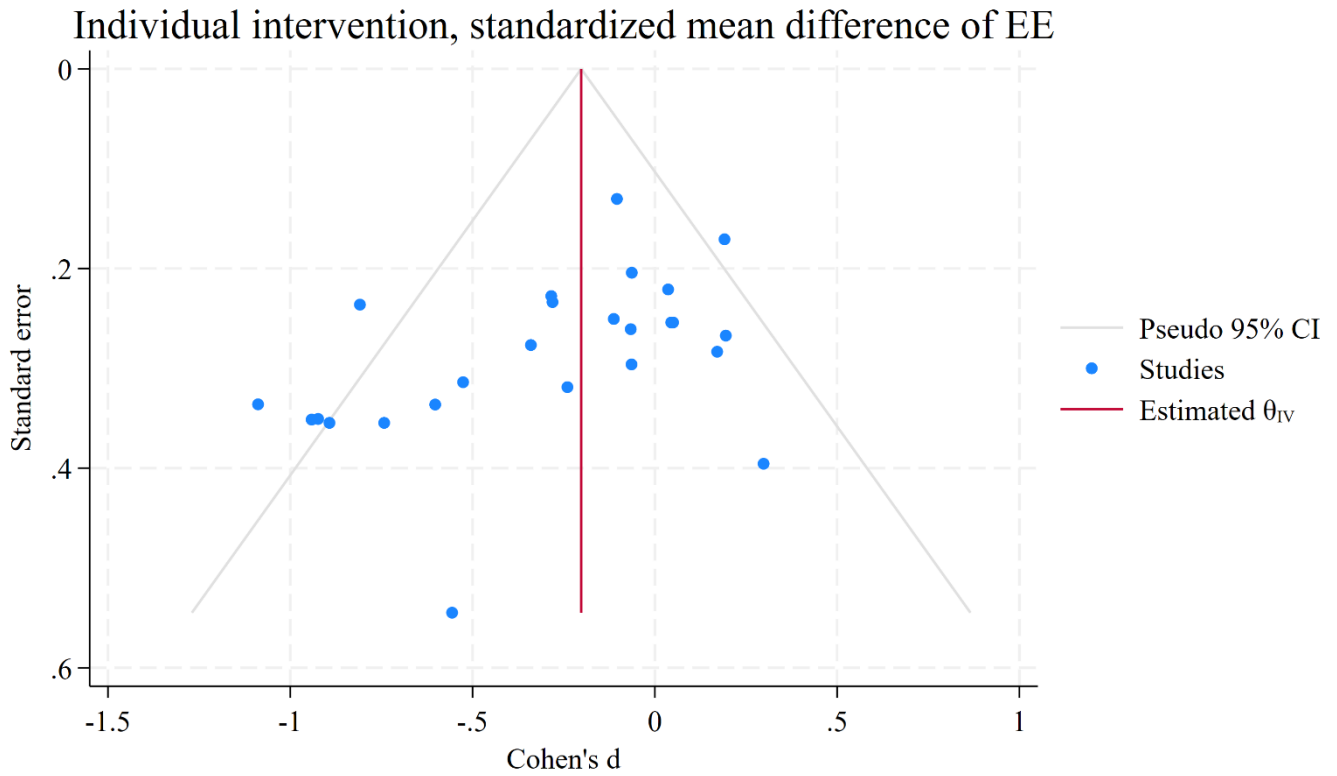
Random-effects DerSimonian–Laird model

Supplementary Appendix 3.6. Sensitivity analyses by leave-one-out method for standardized mean difference of PA score in organizational intervention studies

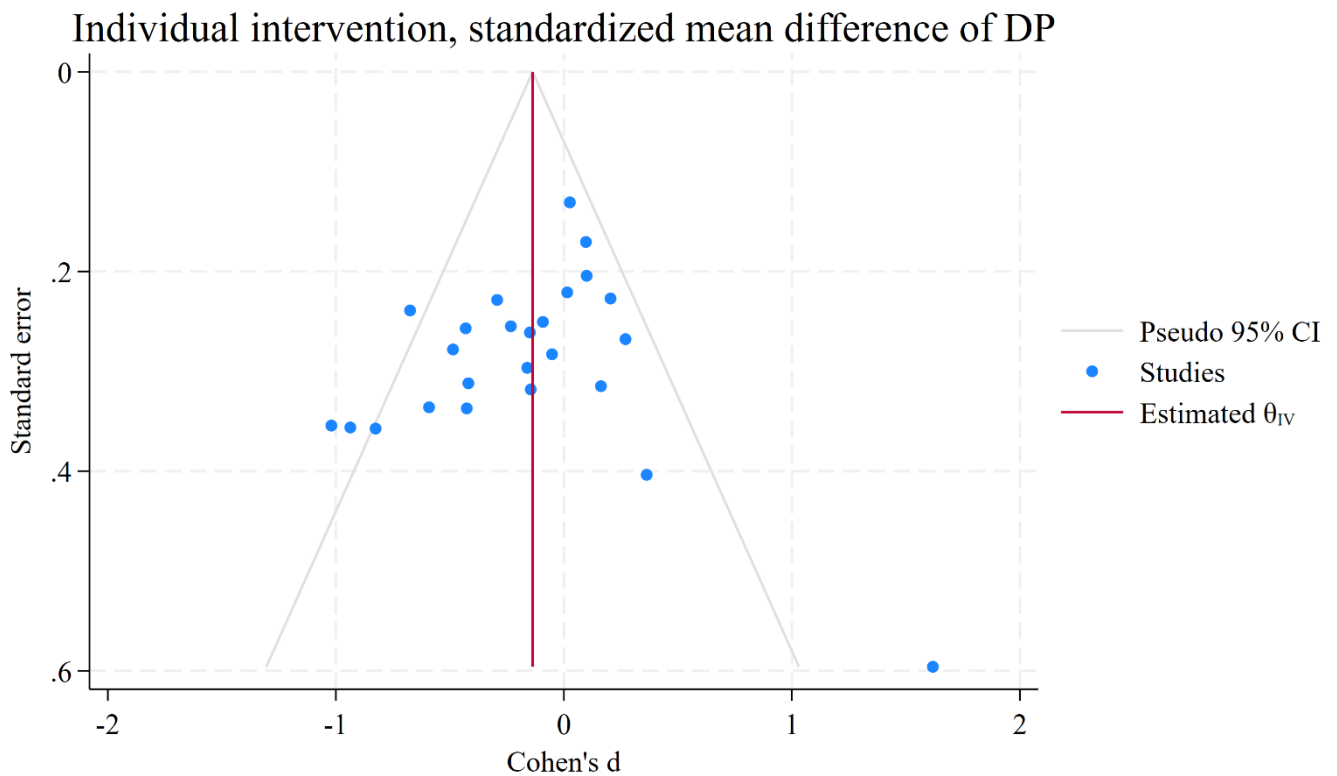


Random-effects DerSimonian–Laird model

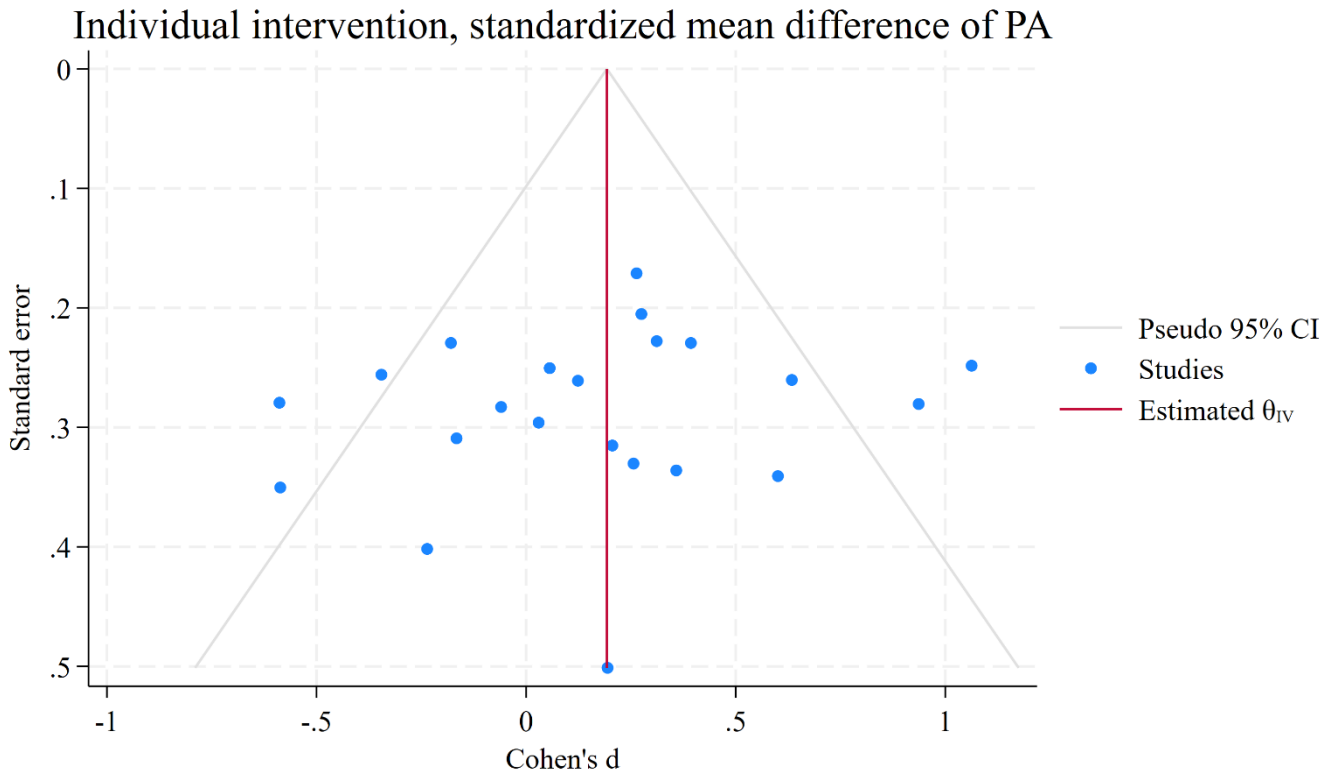
Supplementary Appendix 4.1. Funnel plot of standardized mean difference of EE score in individual intervention studies



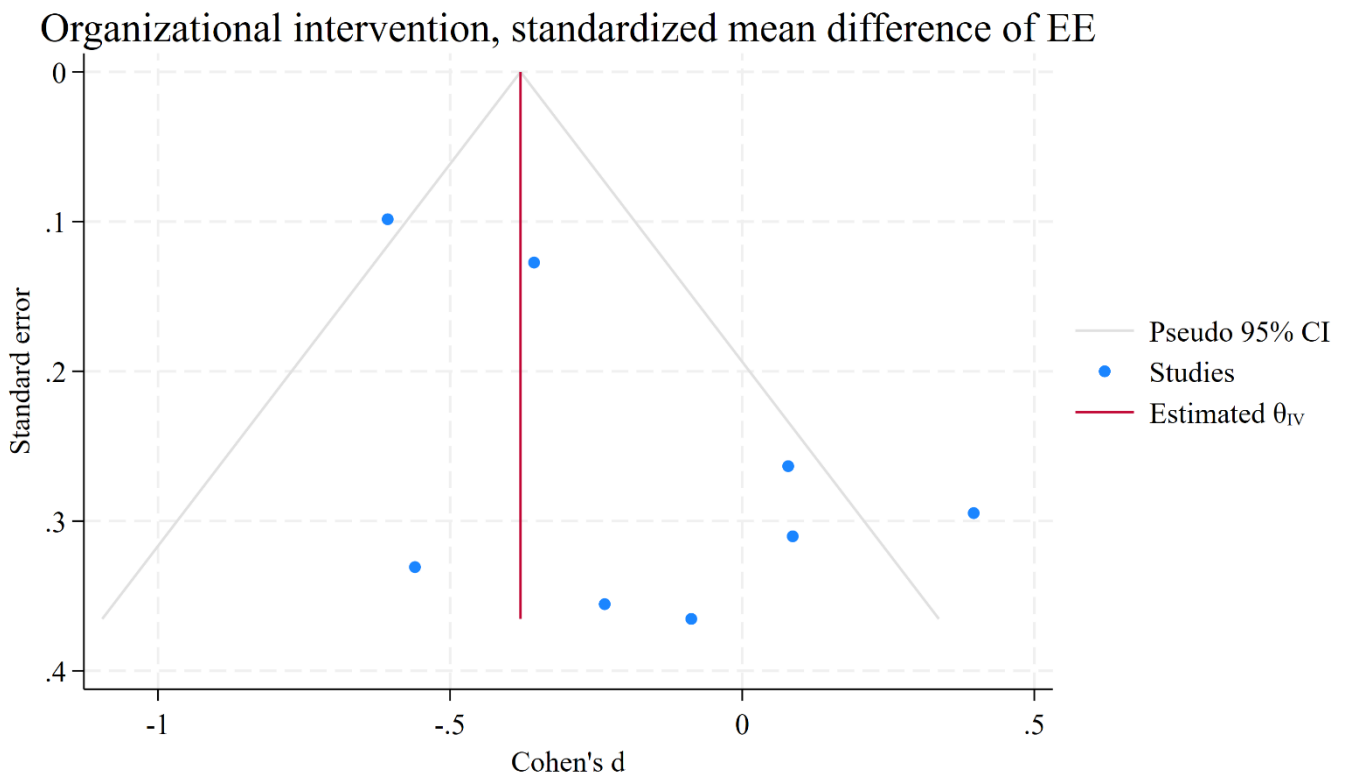
Supplementary Appendix 4.2. Funnel plot of standardized mean difference of DP score in individual intervention studies



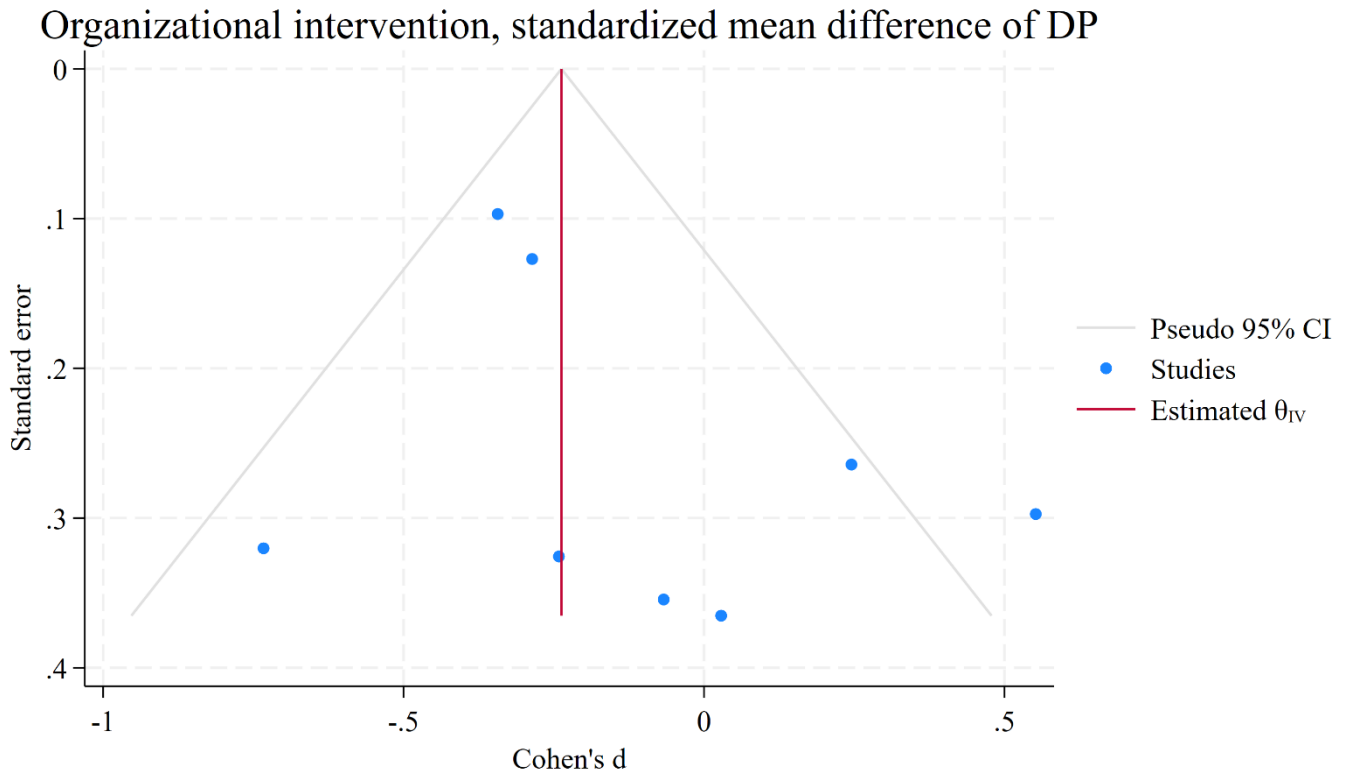
Supplementary Appendix 4.3. Funnel plot of standardized mean difference of PA score in individual intervention studies



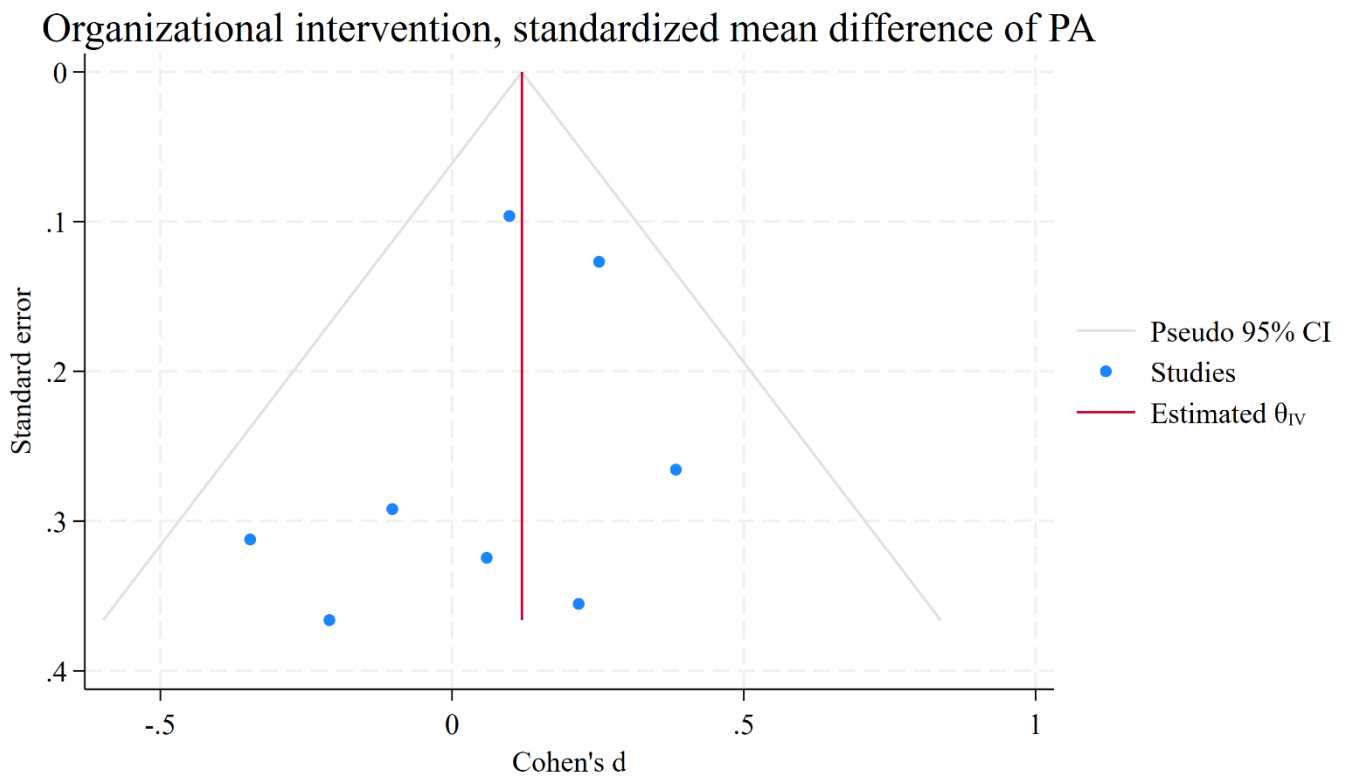
Supplementary Appendix 4.4. Funnel plot of standardized mean difference of EE score in organizational intervention studies



Supplementary Appendix 4.5. Funnel plot of standardized mean difference of DP score in organizational intervention studies



Supplementary Appendix 4.6. Funnel plot of standardized mean difference of PA score in organizational intervention studies

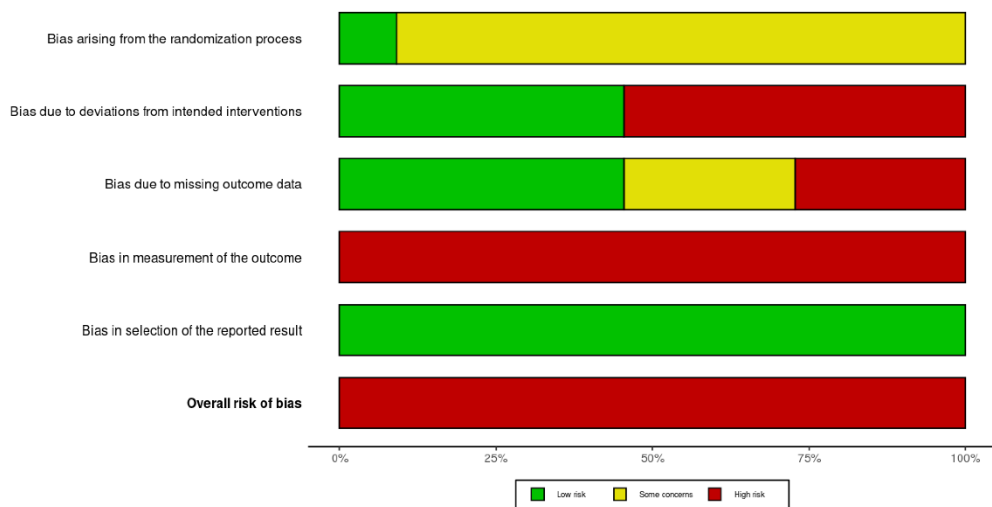


Supplementary Appendix 5.1. Summary of the risk of bias assessment by Cochrane's RoB2 across 11 randomized controlled concurrent studies

Study	Risk of bias domains					Overall
	D1	D2	D3	D4	D5	
Bragard (2008)	⊖	⊗	⊖	⊗	⊕	⊗
Dunne (2019)	⊖	⊗	⊗	⊗	⊕	⊗
Fainstad (2022)	⊖	⊕	⊕	⊗	⊕	⊗
Huang (2020)	⊖	⊕	⊕	⊗	⊕	⊗
Loewenthal (2021)	⊖	⊗	⊗	⊗	⊕	⊗
Martins (2011)	⊖	⊕	⊕	⊗	⊕	⊗
Milstein (2012)	⊖	⊕	⊕	⊗	⊕	⊗
Parshuram (a) (2015)	⊖	⊗	⊖	⊗	⊕	⊗
Parshuram (b) (2015)	⊖	⊗	⊖	⊗	⊕	⊗
Purdie (2023)	⊖	⊕	⊕	⊗	⊕	⊗
Verweij (2017)	⊕	⊗	⊗	⊗	⊕	⊗

Domains:
D1: Bias arising from the randomization process.
D2: Bias due to deviations from intended intervention.
D3: Bias due to missing outcome data.
D4: Bias in measurement of the outcome.
D5: Bias in selection of the reported result.

Judgement
⊗ High
⊖ Some concerns
⊕ Low



Supplementary Appendix 5.2. Summary of the risk of bias assessment by Cochrane’s ROBINS-I across 22 non-randomized studies

Study	Risk of bias domains							Overall
	D1	D2	D3	D4	D5	D6	D7	
Ares (2019)	⊗	+	+	+	-	⊗	+	⊗
Bateman (2024)	-	+	+	+	-	⊗	+	⊗
Bisgaard (2021)	⊗	+	+	+	-	⊗	+	⊗
Burgos (2014)	⊗	+	+	+	⊗	⊗	+	⊗
Carullo (2021)	-	+	+	+	⊗	⊗	+	⊗
Hart (2019)	-	+	+	+	⊗	⊗	+	⊗
Heppe (2024)	-	+	+	+	-	⊗	+	⊗
Ogunyemi (2021)	-	+	+	+	-	⊗	+	⊗
Palamara (2021)	-	+	+	+	-	⊗	+	⊗
Pandit (2022)	-	+	+	+	+	⊗	+	⊗
Peterson (2021)	-	+	+	+	-	⊗	+	⊗
Riall (2017)	-	+	+	+	-	⊗	+	⊗
Schmeusser (2023)	⊗	+	+	+	-	⊗	+	⊗
Schuh (2011)	-	+	+	+	⊗	⊗	+	⊗
Sheer (2021)	-	+	+	+	-	⊗	+	⊗
Slavin (2016)	⊗	+	+	+	+	⊗	+	⊗
Song (2020)	-	+	+	+	+	⊗	+	⊗
Stephanie (2022)	⊗	+	+	+	⊗	⊗	+	⊗
Stevens (2020)	-	+	+	+	+	⊗	+	⊗
Weitzman (2021)	-	+	+	+	⊗	⊗	+	⊗
Wild (2018)	⊗	+	+	+	-	⊗	+	⊗
Winer (2019)	-	+	+	+	⊗	⊗	+	⊗

Domains:
D1: Bias due to confounding.
D2: Bias due to selection of participants.
D3: Bias in classification of interventions.
D4: Bias due to deviations from intended interventions.
D5: Bias due to missing data.
D6: Bias in measurement of outcomes.
D7: Bias in selection of the reported result.

Judgement
⊗ Serious
- Moderate
+ Low

