

Supplementary Online Content

García-Hermoso A, Alonso-Martínez AM, Ramírez-Vélez R, Pérez-Sousa MA, Ramírez-Campillo R, Izquierdo M. Association of physical education with improvement of health-related physical fitness outcomes and fundamental motor skills among youth: a systematic review and meta-analysis. *JAMA Pediatr*. Published online April 6, 2020. doi:10.1001/jamaneurol.2014.0223

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eReferences

This supplementary material has been provided by the authors to give readers additional information about their work.

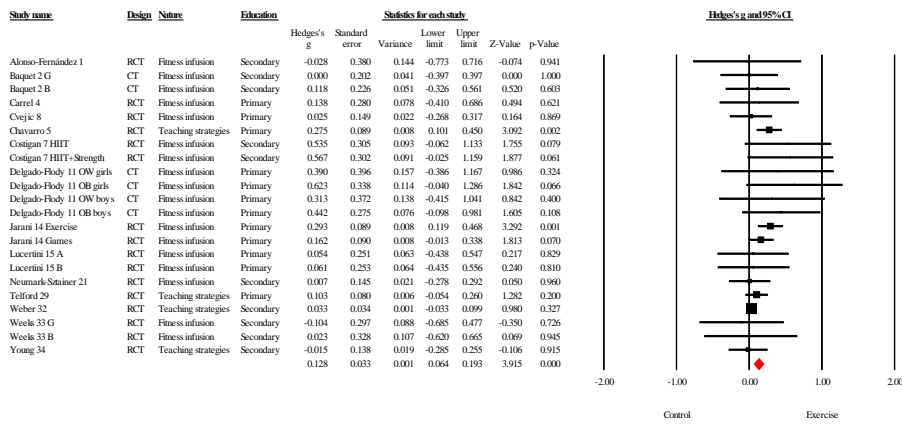
eTable 1. Risk of bias within studies											
	Random allocation	Concealed allocation	Baseline comparability	Blind subjects	Blind therapists	Blind assessors	Adequate follow-up	Intention-to-treat analysis	Between-group comparisons	Point estimates and variability	Total score
Quantity-based physical education											
Alonso-Fernández ¹	1	0	1	0	0	0	0	0	1	1	4
Baquet ²	0	0	1	0	0	0	0	0	1	1	3
Boyle-Holmes ³	0	0	1	0	0	0	1	0	1	1	4
Carrel ⁴	1	0	1	0	0	0	1	0	1	1	5
Chavarro ⁵	1	0	1	0	0	0	0	0	1	1	4
Cohen ⁶	1	1	1	0	0	1	1	1	1	1	8
Costigan ⁷	1	0	1	0	0	1	0	0	1	1	5
Cvejić ⁸	1	0	1	0	0	1	0	0	1	1	5
Daly ⁹	1	1	1	0	0	1	1	0	1	1	7
Dalziell ¹⁰	1	0	1	0	0	0	0	0	1	1	4
Delgado-Flody ¹¹	0	0	1	0	0	0	0	0	1	1	3
Faigenbaum and Mediate ¹²	0	0	1	0	0	0	0	0	1	1	3
Gallotta ¹³	1	0	1	0	0	1	0	0	1	1	5
Jarani ¹⁴	1	0	1	0	0	0	0	1	1	1	5
Lucertini ¹⁵	1	0	1	0	0	0	0	0	1	1	4
Marshall ¹⁶	1	0	1	0	0	1	0	0	1	1	5
Mayorga-Vega ¹⁷	0	0	1	0	0	1	0	0	1	1	4
Mayorga-Vega ¹⁸	1	0	1	0	0	0	0	0	1	1	4
McKay ¹⁹	1	0	1	0	0	0	1	0	1	1	5
McKenzie ²⁰	1	0	1	0	0	0	0	0	1	1	4
Neumark-Sztainer ²¹	1	0	0	0	0	0	1	0	1	1	4
Nogueira ²²	1	0	0	0	0	0	1	1	1	1	5
Pate ²³	1	0	0	0	0	0	0	0	1	1	3
Pesce ²⁴	0	0	1	0	0	0	0	0	1	1	4
Pesce ²⁵	1	0	1	0	0	0	0	0	1	1	4
Ramírez ²⁶	1	0	1	0	0	0	0	0	1	1	4
Sallis ²⁷	1	0	1	0	0	0	0	0	1	1	4
Schmidt ²⁸	1	0	0	0	0	0	0	0	1	1	3
Telford ²⁹	1	0	1	0	0	0	1	0	1	1	5
Teen Hoor ³⁰	1	0	1	0	0	0	0	0	1	1	4
van Beurden ³¹	1	0	1	0	0	0	1	0	1	1	5
Webber ³²	1	0	1	0	0	0	1	0	1	1	5
Weeks ³³	1	0	1	0	0	0	1	1	1	1	6
Young ³⁴	1	0	1	0	0	0	1	0	1	1	5
Quantity-based physical education											

Arday ³⁵	1	0	1	0	0	0	0	1	1	1	5
Bugge ³⁶	1	0	1	0	0	0	1	0	1	1	5
Erfle and Gamble ³⁷	0	0	1	0	0	0	0	0	1	1	3
Ericsson and Karlsson ³⁸	0	0	1	0	0	0	1	0	1	1	4
Hansen ³⁹	1	0	1	0	0	0	1	1	1	1	6
Heidemann ⁴⁰	0	0	1	0	0	0	1	0	1	1	4
Jurak ⁴¹	0	0	1	0	0	0	1	0	1	1	3
Klakk ⁴²	0	0	1	0	0	0	1	0	1	1	4
Kriemler ⁴³	1	1	1	0	0	1	1	1	1	1	8
Learmonth ⁴⁴	0	0	1	0	0	1	1	0	1	1	5
Löfgren ⁴⁵	0	0	1	0	0	0	1	0	1	1	4
Lopes ⁴⁶	1	0	1	0	0	0	0	0	1	1	4
Meyer ⁴⁷	1	0	1	0	0	1	0	0	1	1	5
Piéron ⁴⁸	0	0	1	0	0	0	1	0	1	1	3
Reed ⁴⁹	0	0	1	0	0	0	1	0	1	1	4
Rexen ⁵⁰	0	0	1	0	0	0	1	1	1	1	5
Sacchetti ⁵¹	1	0	1	0	0	0	0	0	1	1	4
Shephard and Lavallée ^{52, 53, 54}	0	0	1	0	0	0	1	0	1	1	4
Sollerhed and Ejlertsson ⁵⁵	0	0	1	0	0	0	1	0	1	1	4

1, yes; 0, No

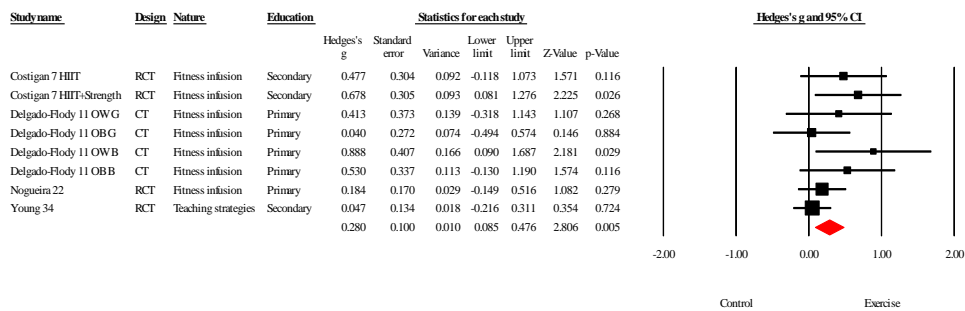
eTable 2. Synthesis of pooled results according to education level												
	Quality-based physical education						Quantity-based physical education					
	Studies (Participants)	Hedges g	95% CI	p	I ²	Egger test (p)	Studies (Participants)	Hedges g	95% CI	p	I ²	Egger test (p)
Primary education												
Health-related physical fitness												
Body mass index	7 (2,414)	-0.19	-0.27 to -0.12	<.001	0	.54	10 (4,081)	-0.01	-0.09 to 0.07	.81	34.15	.81
Waist circumference	-						4 (1,870)	-0.04	-0.14 to 0.07	.48	0	.88
Skinfolds thickness	3 (1,641)	-0.04	-0.23 to 0.14	.63	63.68	.37	4 (2,258)	-0.05	-0.16 to 0.06	.34	0	.07
Body fat	7 (2,024)	-0.26	-0.38 to -0.13	<.001	28.99	.47	3 (1,581)	0.16	-0.06 to 0.39	.16	77.09	.16
Lean body mass	-						-					
Cardiorespiratory fitness	15 (10,439)	0.24	0.15 to 0.33	<.001	58.17	.01	8 (3,346)	0.46	0.29 to 0.64	<.001	73.79	.05
Muscular strength	8 (3,914)	0.21	0.08 to 0.34	.001	68.99	.18	7 (2,907)	0.25	0.15 to 0.36	<.001	22.65	.99
Speed agility	3 (1,412)	0.11	-0.15 to 0.37	.39	77.13	.03	3 (2,013)	0.29	0.05 to 0.53	.02	80.05	.12
Fundamental motor skills	7 (3,873)	0.38	0.27 to 0.49	<.001	73.43	.002	4 (1,659)	0.20	-0.01 to 0.42	.06	79.03	.20
Secondary education												
Health-related physical fitness												
Body mass index	7 (2,875)	-0.04	-0.10 to 0.02	.20	0	.33	-					
Waist circumference	-						-					
Skinfolds thickness	-						-					
Body fat	4 (2,532)	-0.13	-0.29 to 0.02	.09	53.39	.24	-					
Lean body mass	-						-					
Cardiorespiratory fitness	5 (837)	0.29	0.10 to 0.47	.002	0	.04	3 (10,357)	0.37	0.07 to 0.67	.02	44.30	.76
Muscular strength	5 (944)						-					
Speed agility	-						-					
Fundamental motor skills	-						-					

Figure 1. Forest plot showing the effect size (Hedges *g*) of quality-based physical education interventions on body mass index between intervention and control groups for each study.



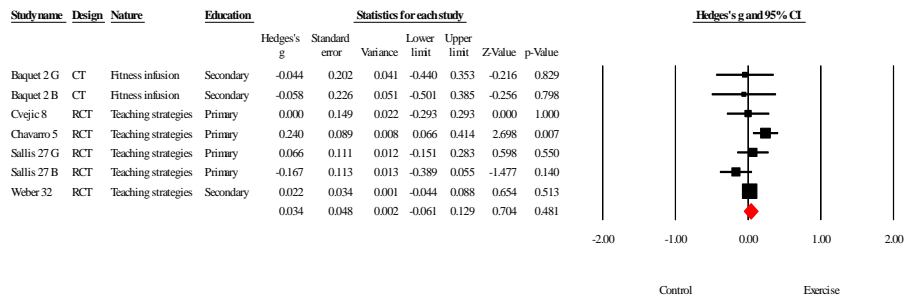
B, boys; G, girls; OB, obese; OW, overweight

eFigure 2. Forest plot showing the effect size (Hedges *g*) of quality-based physical education interventions on waist circumference between intervention and control groups for each study.



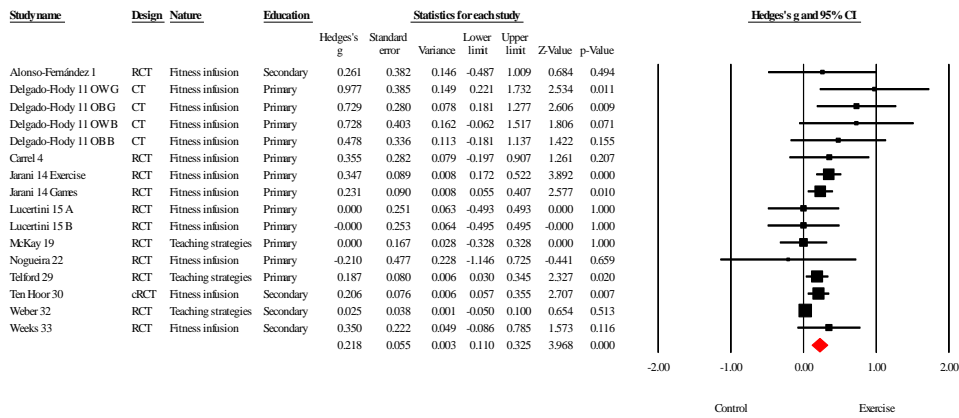
B, boys; G, girls; HIIT, high-intensity interval training; OB, obese; OW, overweight

eFigure 3. Forest plot showing the effect size (Hedges *g*) of quality-based physical education interventions on skinfolds thickness between intervention and control groups for each study.



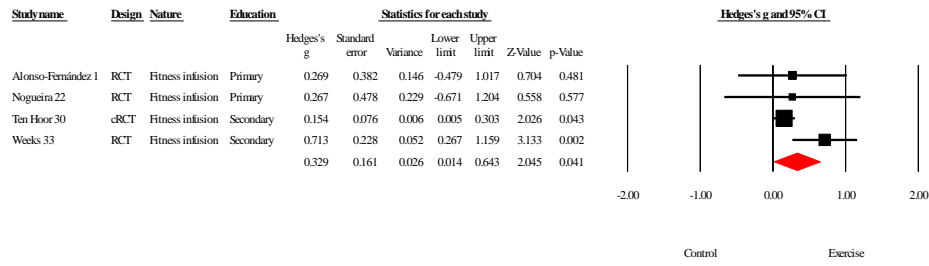
B, boys; G, girls

eFigure 4. Forest plot showing the effect size (Hedges *g*) of quality-based physical education interventions on body fat between intervention and control groups for each study.

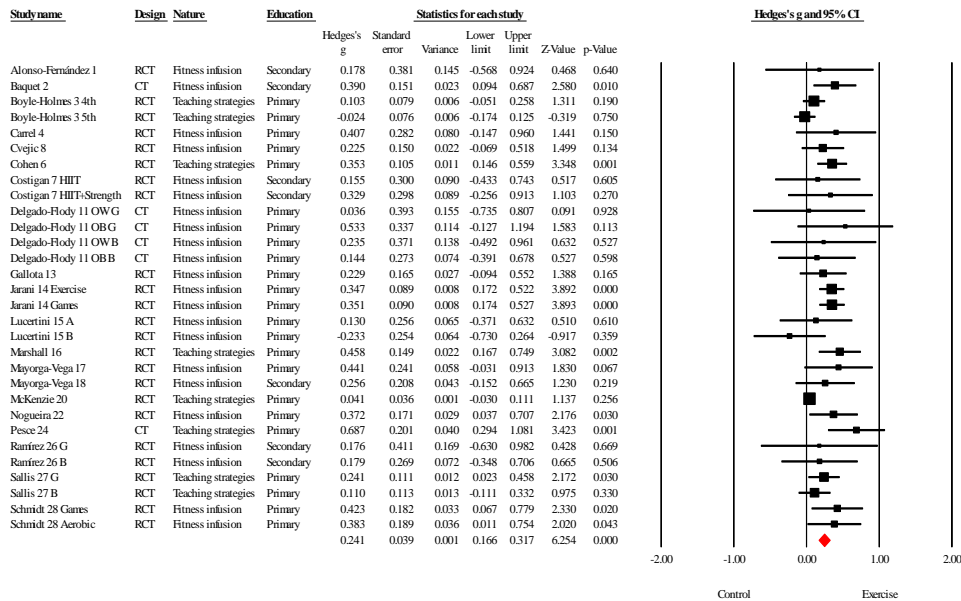


B, boys; G, girls; OB, obese; OW, overweight

eFigure 5. Forest plot showing the effect size (Hedges *g*) of quality-based physical education interventions on lean body mass between intervention and control groups for each study.

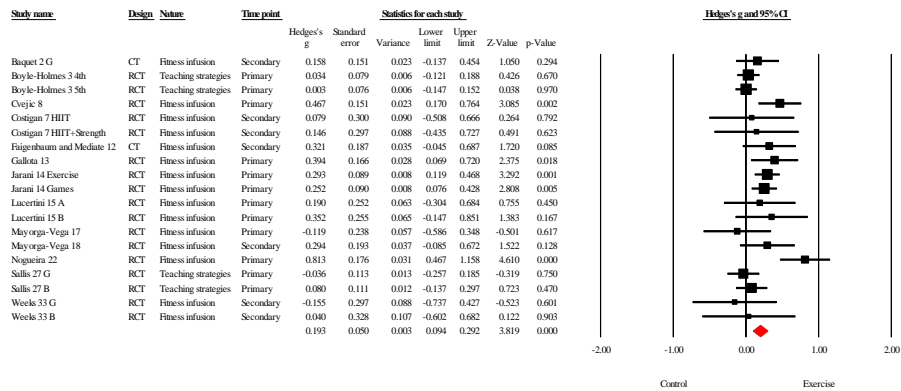


eFigure 6. Forest plot showing the effect size (Hedges *g*) of quality-based physical education interventions on cardiorespiratory fitness between intervention and control groups for each study.



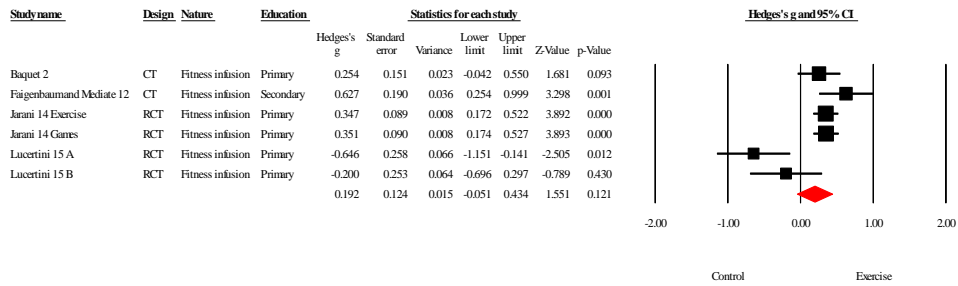
B, boys; G, girls; HIIT, high-intensity interval training; OB, obese; OW, overweight

eFigure 7. Forest plot showing the effect size (Hedges *g*) of quality-based physical education interventions on muscular strength between intervention and control groups for each study.

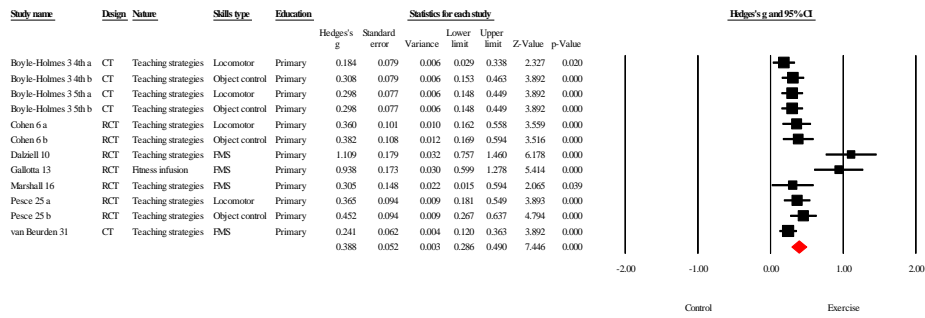


B, boys; G, girls; HIIT, high-intensity interval training

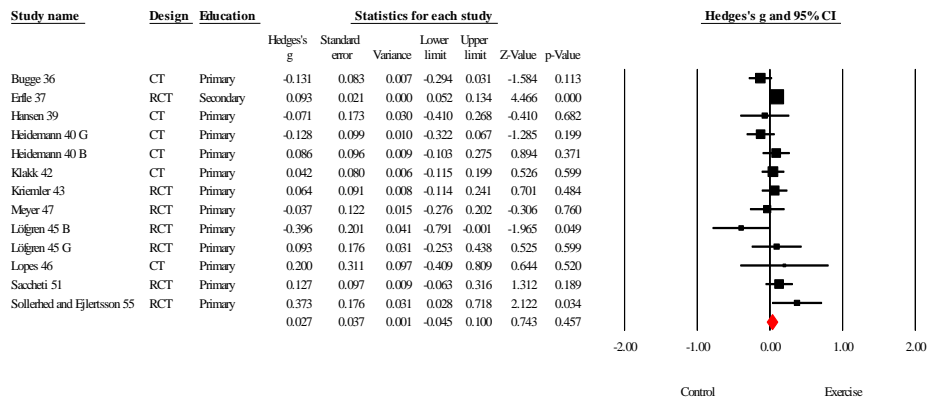
eFigure 8. Forest plot showing the effect size (Hedges *g*) of quality-based physical education interventions on speed agility between intervention and control groups for each study.



eFigure 9. Forest plot showing the effect size (Hedges *g*) of quality-based physical education interventions on fundamental motor skills between intervention and control groups for each study.

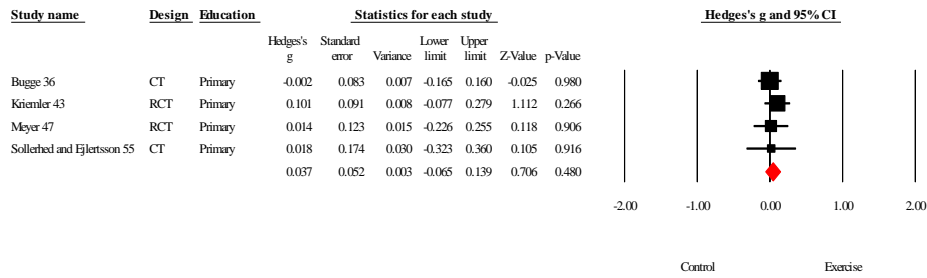


eFigure 10. Forest plot showing the effect size (Hedges *g*) of quantity-based physical education interventions on body mass index between intervention and control groups for each study.

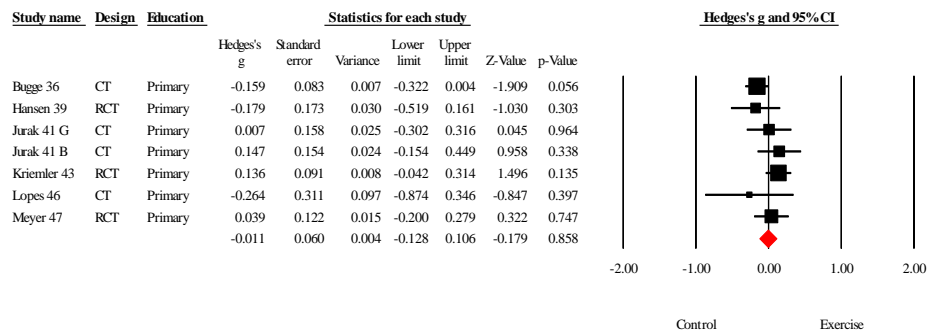


B, boys; G, girls.

eFigure 11. Forest plot showing the effect size (Hedges *g*) of quantity-based physical education interventions on waist circumference between intervention and control groups for each study.

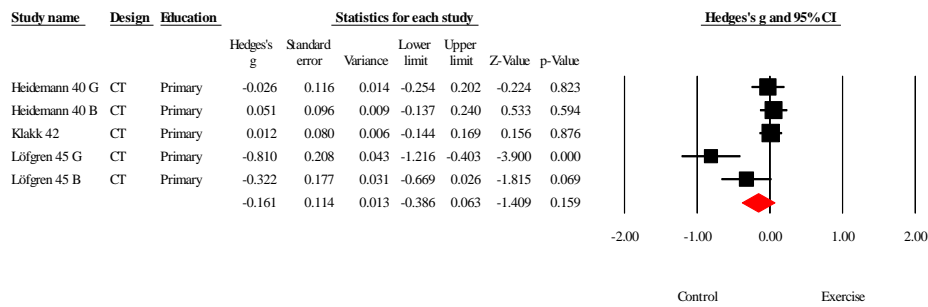


eFigure 12. Forest plot showing the effect size (Hedges *g*) of quantity-based physical education interventions on skinfolds thickness between intervention and control groups for each study.



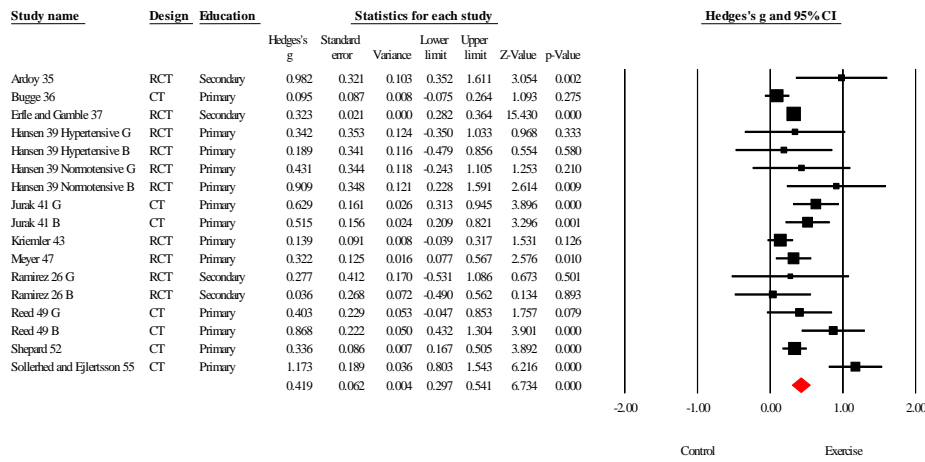
B, boys; G, girls.

eFigure 13. Forest plot showing the effect size (Hedges *g*) of quantity-based physical education interventions on body fat between intervention and control groups for each study.



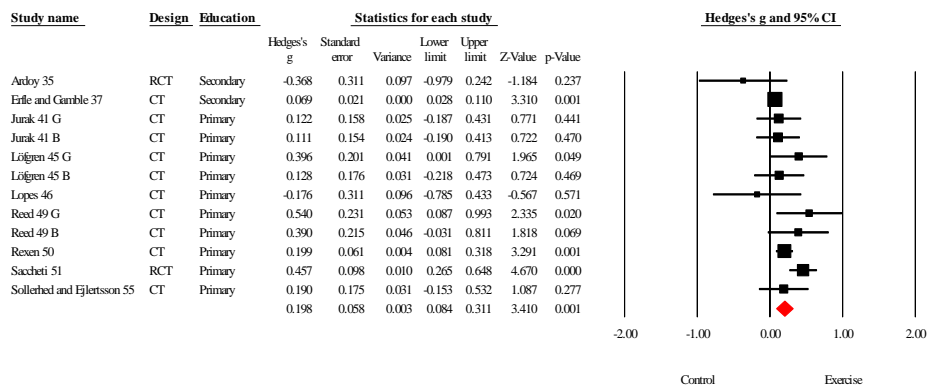
B, boys; G, girls.

eFigure 14. Forest plot showing the effect size (Hedges *g*) of quantity-based physical education interventions on cardiorespiratory fitness between intervention and control groups for each study.



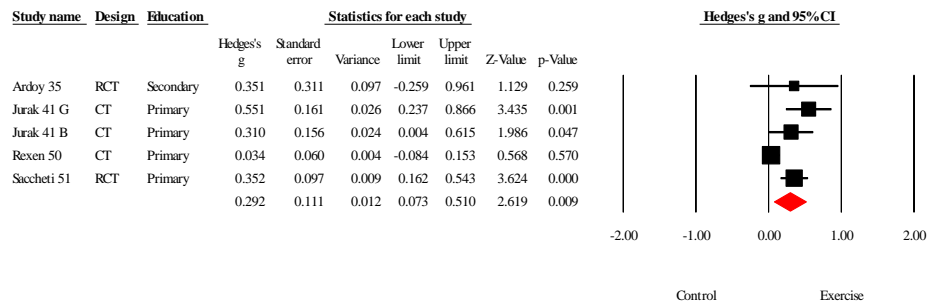
B, boys; G, girls.

eFigure 15. Forest plot showing the effect size (Hedges *g*) of quantity-based physical education interventions on muscular strength between intervention and control groups for each study.



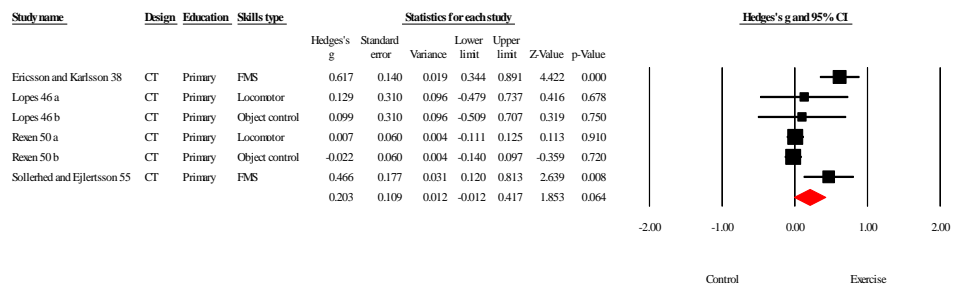
B, boys; G, girls.

eFigure 16. Forest plot showing the effect size (Hedges *g*) of quantity-based physical education interventions on speed agility between intervention and control groups for each study.

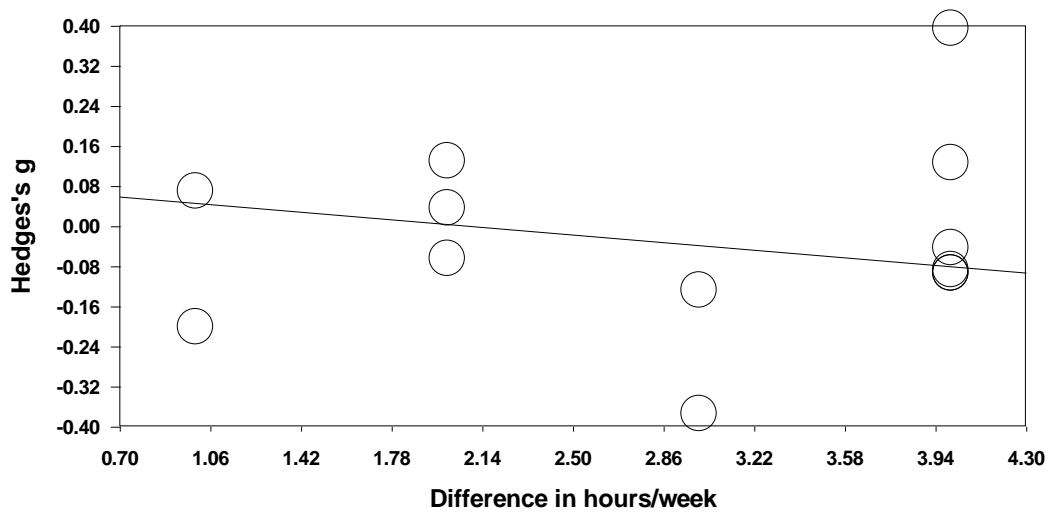


B, boys; G, girls.

eFigure 17. Forest plot showing the effect size (Hedges *g*) of quantity-based physical education interventions on fundamental motor skills between intervention and control groups for each study.

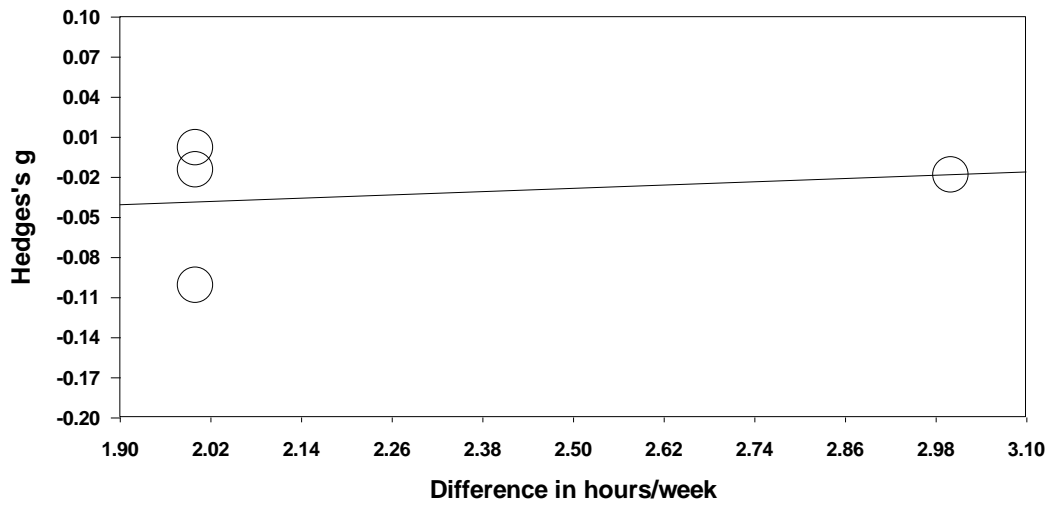


eFigure 18. Meta-regression analysis of the association between difference in hours of physical education per week of intervention group vs control group with body mass index changes.



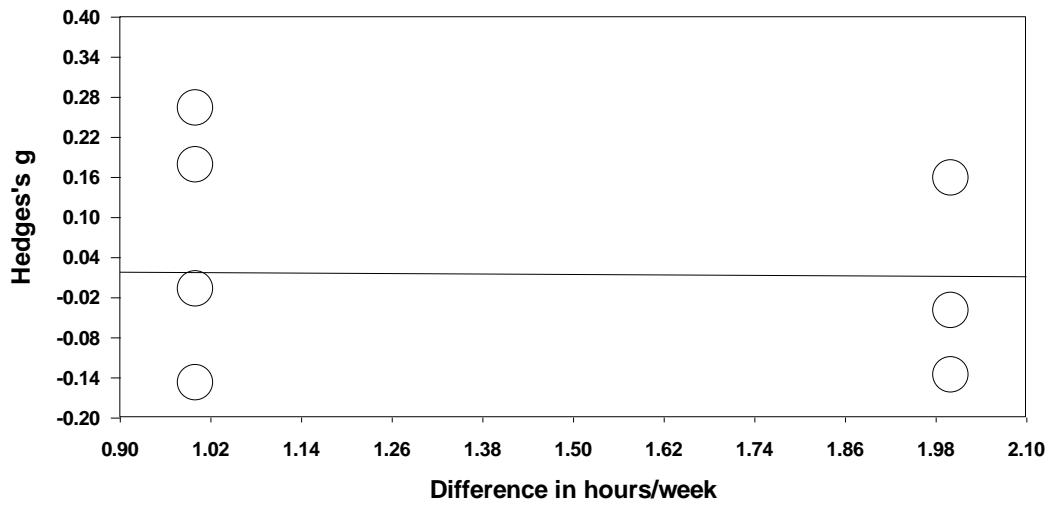
$\beta = -0.04$, 95% CI -0.09 to 0.01, $p = 0.092$

eFigure 19. Meta-regression analysis of the association between difference in hours of physical education per week of intervention group vs control group with waist circumference changes.



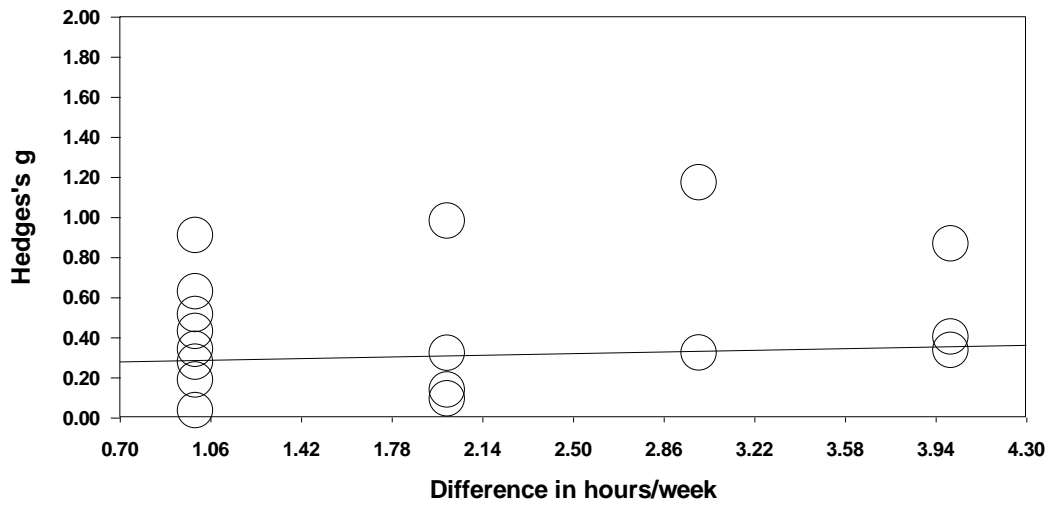
$\beta=0.02$, 95% CI -0.34 to 0.38, $p=0.911$

eFigure 20. Meta-regression analysis of the association between difference in hours of physical education per week of intervention group vs control group with skinfolds thickness changes.



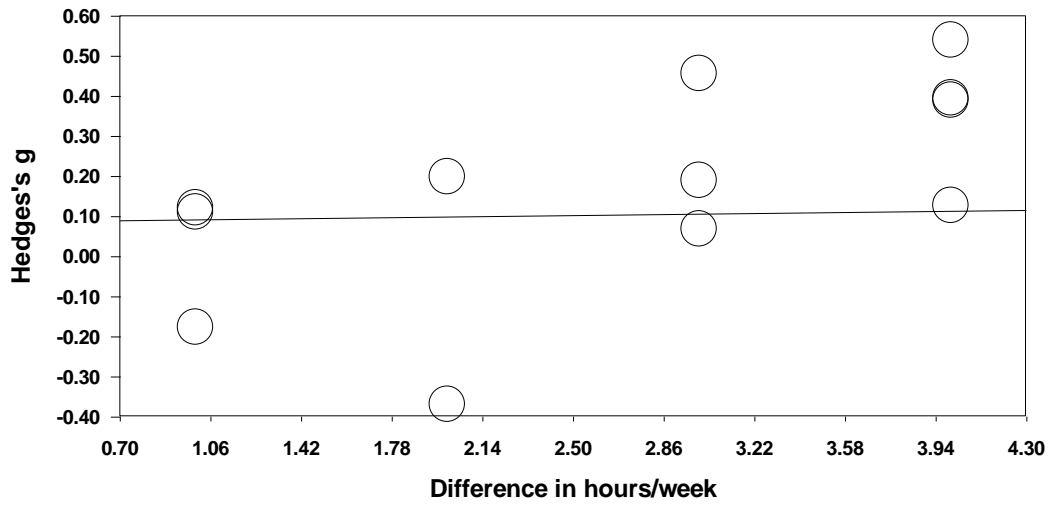
$\beta = -0.01$, 95% CI -0.21 to 0.20, $p = 0.957$

eFigure 21. Meta-regression analysis of the association between difference in hours of physical education per week of intervention group vs control group with cardiorespiratory fitness changes.



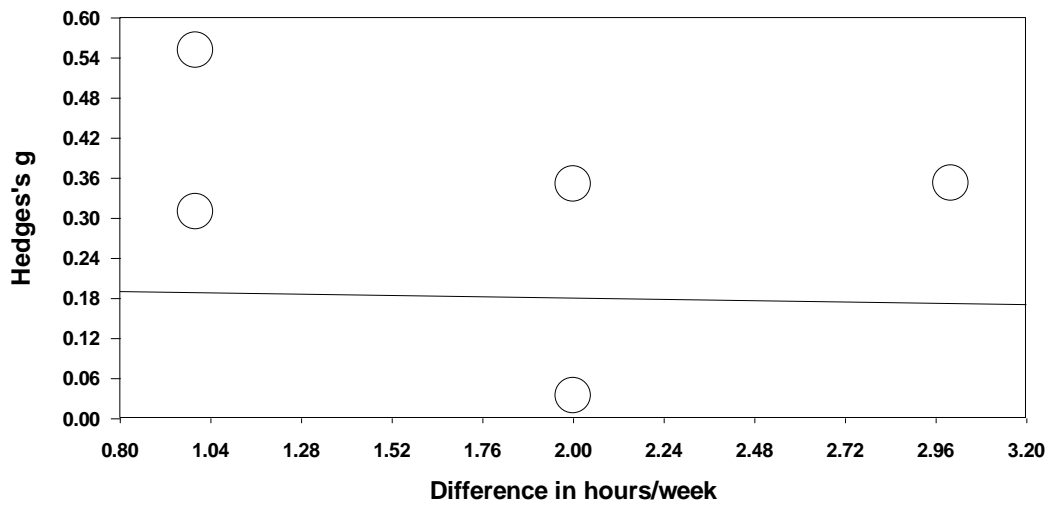
$\beta=0.02$, 95% CI -0.04 to 0.08, $p=0.473$

eFigure 22. Meta-regression analysis of the association between difference in hours of physical education per week of intervention group vs control group with muscular strength changes.



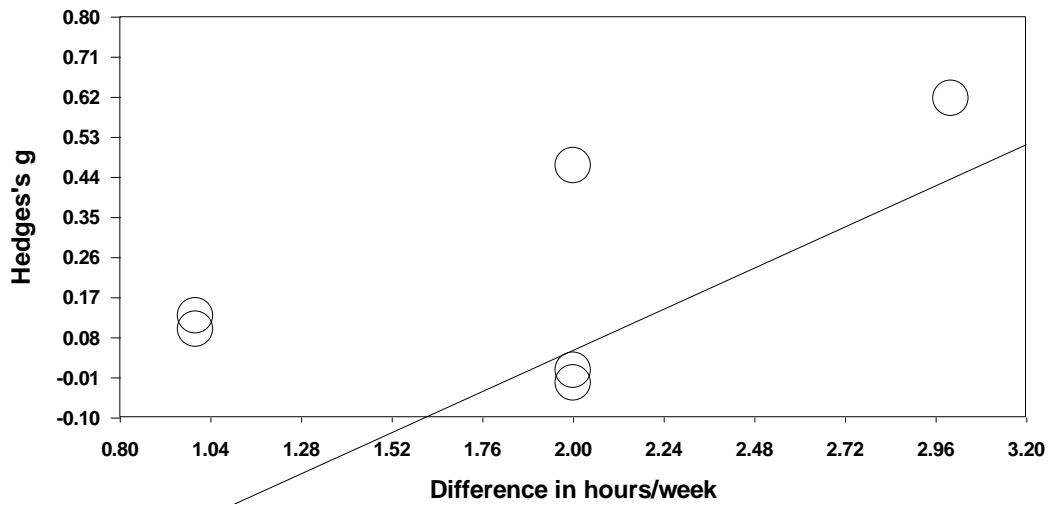
$\beta=0.01$, 95% CI -0.07 to 0.08, $p=0.848$

eFigure 23. Meta-regression analysis of the association between difference in hours of physical education per week of intervention group vs control group with speed-agility changes.



$\beta=-0.01$, 95% CI -0.15 to 0.14, $p=0.912$

eFigure 24. Meta-regression analysis of the association between difference in hours of physical education per week of intervention group vs control group with fundamental motor skills changes.



$\beta=0.38$, 95% CI 0.15 to 0.62, $p=0.001$

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