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a systematic review and meta-analyses

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Effectiveness and Characteristics of School based Physical Activity Interventions in Adolescents

A systematic review and meta-analyses

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Rationale

To prevent health risks later in life, enhanced physical activity (PA) levels is recommended for adolescents. School based PA interventions vary widely in content and structure. The literature detailing the effectiveness of school based physical activity promotion interventions in adolescents is systematically reviewed to identify effective intervention characteristics.

Methods

Two independent reviewers assessed studies against the following inclusion criteria: study design (trials) published after 2000, study population (underserved adolescents), setting (school based), construct (PA level). The risk of bias was assessed including the following intervention characteristics: gender specificity, tailoring and participation of the target group, parent and personnel involvement, duration of the intervention, use of physical activities and digital technology, a multicomponent setup and intra or extra-curricular intervention. Within a random effect model, a meta-analysis was conducted to determine the pooled standardized mean effect (SMD) and to identify the effective intervention characteristics. Meta-regression analysis was performed with PA level (SMD) as dependent variable and intervention characteristics as covariates.

Results

School based physical activity promotion interventions increase the PA level of adolescents with the best effect estimate of 0.20 (0.11, 0.29), which corresponds to a small improvement. Effects do not vary between boys and girls. Curricula that contain PA customized to adolescents and where school staff is involved, increase mean effect sizes to a moderate level (SMD; 0.47-0.54). Sensitivity analyses show the effects to be robust while decreasing the heterogeneity.

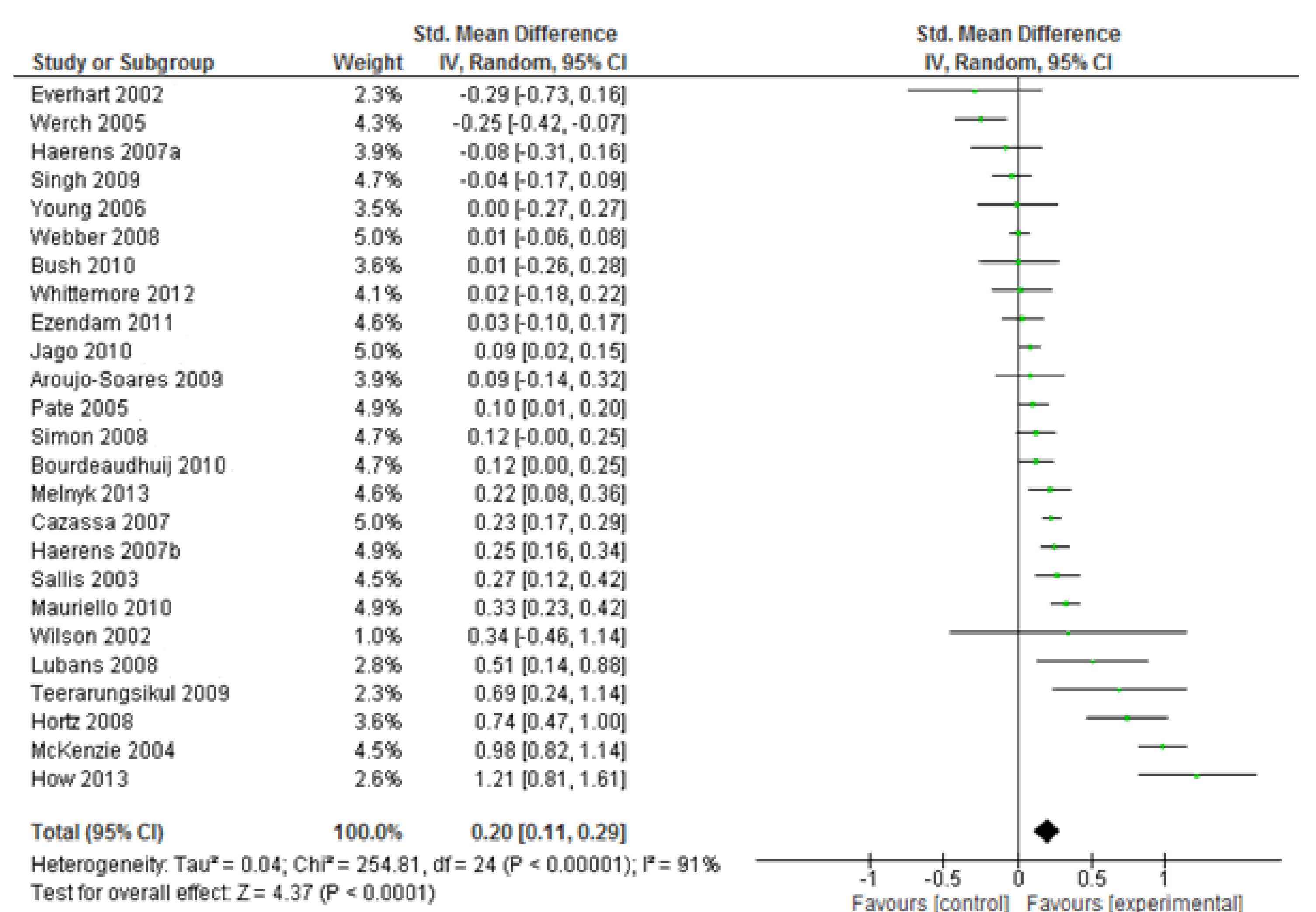


Figure 2: Forest plot of 25 school based intervention studies.

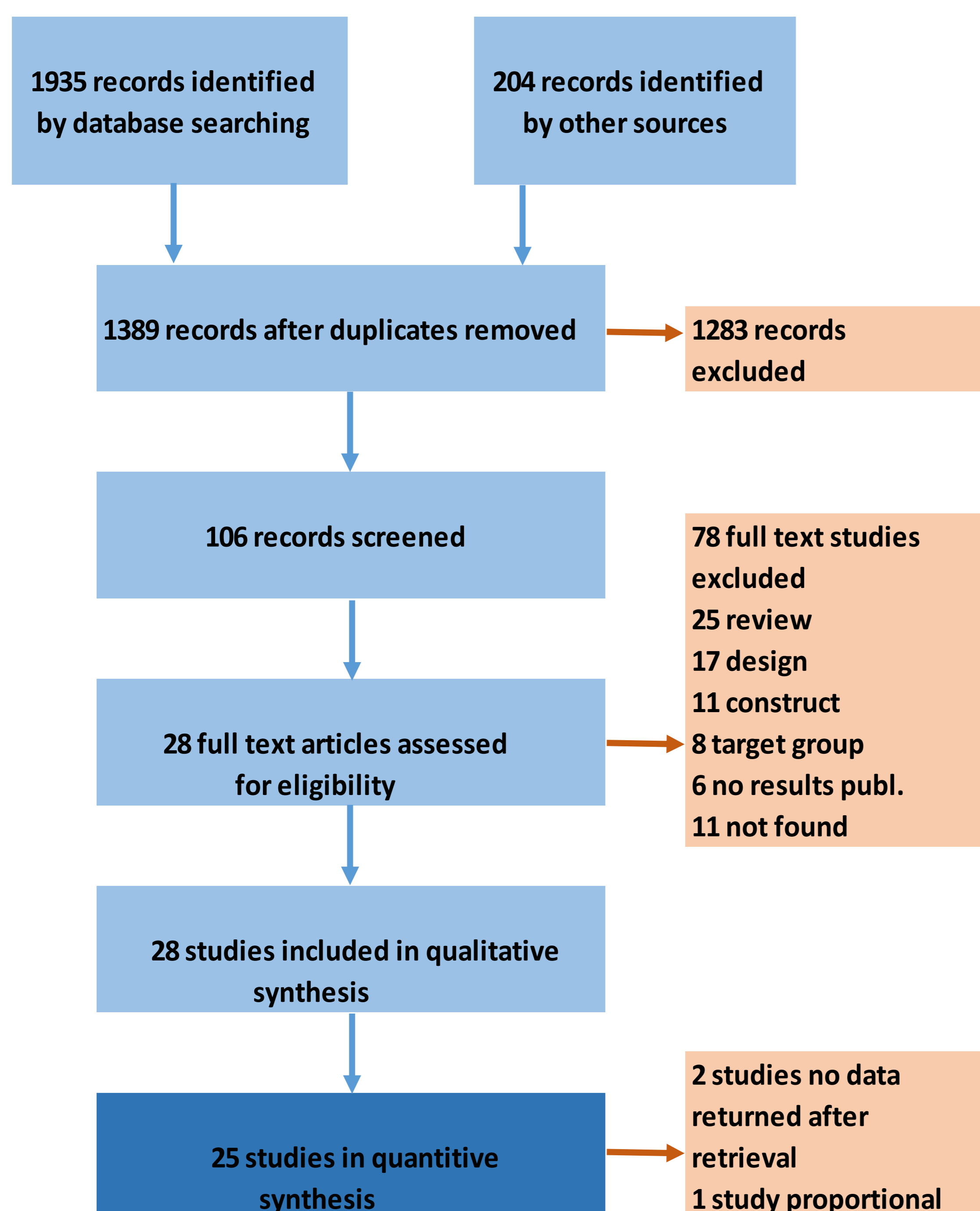


Figure 1: Flow diagram of the study selection process.

meta-analysis			meta-regression	
Characteristic(s)	SMD (95% CI)	I ² (%)	Characteristic(s)	regression equation
INTRA + PA	0.54 [0.21, 0.88] *	96	PA + MULTI	SMD = 0.97 + 1.44PA - 1.51MULTI *
TAIL + PA	0.49 [0.17, 0.81] *	96		
TAIL + STAFF	0.47 [0.02, 0.91] *	97		
STAFF + INTRA	0.39 [0.11, 0.67] *	95		
TAIL + INTRA	0.32 [0.08, 0.57] *	94		
PA	0.30 [0.17, 0.44] *	93		
INTRA	0.28 [0.14, 0.41] *	92		
STAFF	0.25 [0.10, 0.40] *	94		
TAIL	0.24 [0.08, 0.40] *	93		
PARENT	0.20 [0.10, 0.29] *	76		

Characteristic(s)	β	(95% CI)
PA	0.99	[0.03, 1.95] *
MULTI	-1.03	[-2.04, -0.03] *
INTRA dum1	0.71	[-1.86, 0.45]
INTRA dum2	0.30	[-2.21, 1.61]
ICT	-0.60	[-1.64, 0.44]
STAFF	0.36	[-0.66, 1.37]

Table 1: Meta-analyses and meta-regression performed for identification of the most effective intervention characteristics.

Conclusion

School based PA promotion interventions are effective to enhance the PA level of adolescents. Effects are small, but increase when specific organizational and social environment characteristics are respected. The recommendations arising from this systematic review are used in the design of interventions in Dutch prevocational schools.

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