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**Will physically active lessons improve academic achievement for all or widen the achievement gap?**

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3 **Will physically active lessons improve academic achievement for all or widen the**  
4 **achievement gap?**  
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36 **Abbreviations:** Physical Activity Across the Curriculum (PAAC)  
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3 In this issue of *Pediatrics*, Mullender-Wijnsma et al.<sup>1</sup> report findings from an intervention  
4 to evaluate the effects of physically active lessons on enhancing children's academic  
5 achievement. Conducted in primary schools in the Netherlands, results of the study are  
6 promising. After two years, intervention children showed greater gains in standardized  
7 mathematics and spelling test scores compared to control children. To what extent  
8 overall activity levels and health of the children have been affected is unknown, and we  
9 look forward to results from children's fitness tests, which are likely forthcoming.  
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22 Globally, rates of physical activity in children are low,<sup>2-3</sup> and schools are one potential  
23 setting for health promotion efforts. Indeed, physical activity interventions in primary  
24 schools have been implemented with some success.<sup>4</sup> Though physically active lessons  
25 are one example of how children's physical activity might be increased,<sup>5</sup> it is imperative  
26 that these lessons do not detract from children's learning and overall educational  
27 attainment. The paper by Mullender-Wijnsma et al.<sup>1</sup> adds to a growing body of evidence  
28 demonstrating that physically active lessons in schools may actually improve academic  
29 test scores.<sup>5</sup> Previously, the large-scale US-based Physical Activity Across the  
30 Curriculum (PAAC) trial reported improvement on children's academic achievement  
31 using standardized tests following implementation of physically active lessons over  
32 multiple academic years.<sup>6</sup> They also showed positive effects on body mass index. Thus,  
33 two large-scale trials have now shown positive effects on test scores for children  
34 participating in physically active lessons. Based on this evidence, wider-scale  
35 implementation of physically active lessons in schools may warrant consideration.  
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3 It is important, however, to consider the context of these studies and the children who  
4 participated. Mullender-Wijnsma et al.<sup>1</sup> do not report racial or sociodemographic  
5 information about the children in their study, but given the geographic location in the  
6 Northern Netherlands, we may assume that the majority of children are white. Seventy-  
7 seven percent of the children in the PAAC study were white, and more than half were  
8 from middle to higher income families.<sup>6</sup> Of the studies included in a recent systematic  
9 review on physically active lessons by Norris and colleagues,<sup>5</sup> most were also conducted  
10 in small samples of predominantly white children. Physically active lessons for children  
11 therefore appear to improve the academic outcomes of more advantaged white children,  
12 but are these effects similar across population subgroups and what is the feasibility of  
13 implementing active lessons in schools serving disadvantaged children?  
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32 The existence of socioeconomic,<sup>7-9</sup> racial and ethnic,<sup>10,11</sup> and gender<sup>12</sup> inequalities in  
33 academic achievement is well documented. School-level factors<sup>7,8</sup> and children's health  
34 status<sup>13</sup> also impact cognition and academic performance, potentially acting as important  
35 mediators between socioeconomic status and educational attainment.<sup>8,14</sup> Interventions  
36 that incorporate physical activity into the school day must therefore strive for  
37 effectiveness across all population sub-groups and be mindful that they do not widen  
38 existing achievement gaps. Results from Mullender-Wijnsma et al.'s earlier pilot study  
39 suggested that the intervention positively affected time-on-task in both socially  
40 disadvantaged children and children without social disadvantage.<sup>15</sup> Whether this  
41 observation holds for actual academic attainment in the larger trial published in this issue  
42 has yet to be investigated.  
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6 Interventions may need to be adapted or tailored to be suitable for wider implementation.  
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8 Poverty is suggested to influence brain development, and has been associated with lower  
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10 neurocognitive functioning, negatively affecting children's executive function, language  
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12 ability, and recall.<sup>16-19</sup> Poverty and social disadvantage can also create adverse home  
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14 environments (e.g., food insecurity, violence in the home), and children from lower  
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16 income families have been shown to have more behavioural problems.<sup>20,21</sup> These  
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18 conditions may affect children's ability to benefit from physically active lessons.  
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20 Moreover, already-stretched teachers in disadvantaged schools may find it difficult to  
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22 implement physically active lesson in their classrooms.  
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29 Yet despite these potential difficulties, such interventions may be of great benefit to  
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31 young children from less advantaged backgrounds, improving not only their academic  
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33 attainment and physical activity levels and but also their overall health.<sup>22</sup> The study by  
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35 Mullender-Wijnsma et al.<sup>1</sup> adds to the increasing body of evidence supporting the  
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37 potential of physically active lessons in schools. Although there may be cause for  
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39 cautious optimism, further work is required to assess their potential to reach large  
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41 populations and positively affect inequalities in health and educational attainment. Until  
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43 such evidence exists, it may be preliminary to advocate for wider implementation.  
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