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

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<td>Complete List of Authors:</td>
<td>Benjamin Neelon, Sara; Johns Hopkins University, Department of Health, Behavior and Society; University of Cambridge, Centre for Diet and Activity Research, MRC Epidemiology Unit Hesketh, Kathryn; University of Cambridge, Centre for Diet and Activity Research, MRC Epidemiology Unit; University College London, Institute of Child Health van Sluijs, Esther; University of Cambridge, Centre for Diet and Activity Research, MRC Epidemiology Unit</td>
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Will physically active lessons improve academic achievement for all or widen the achievement gap?

Sara E Benjamin Neelon\textsuperscript{a,b}, PhD, MPH, RD, Kathryn R Hesketh\textsuperscript{b,c}, PhD, Esther M van Sluijs, PhD\textsuperscript{b}

\textbf{Affiliations:} \textsuperscript{a}Department of Health, Behavior and Society, Johns Hopkins University, Baltimore, Maryland, USA; \textsuperscript{b}Centre for Diet and Activity Research, MRC Epidemiology Unit, University of Cambridge, Cambridge, UK; and \textsuperscript{c}Institute of Child Health, University College London, London, UK

\textbf{Address correspondence to:} Sara E Benjamin Neelon, Department of Health, Behavior and Society, Johns Hopkins Bloomberg School of Public Health, 624 N Broadway, Baltimore, Maryland, USA.

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\textbf{Abbreviations:} Physical Activity Across the Curriculum (PAAC)
In this issue of *Pediatrics*, Mullender-Wijnsma et al.\(^1\) report findings from an intervention to evaluate the effects of physically active lessons on enhancing children’s academic achievement. Conducted in primary schools in the Netherlands, results of the study are promising. After two years, intervention children showed greater gains in standardized mathematics and spelling test scores compared to control children. To what extent overall activity levels and health of the children have been affected is unknown, and we look forward to results from children’s fitness tests, which are likely forthcoming.

Globally, rates of physical activity in children are low,\(^2-3\) and schools are one potential setting for health promotion efforts. Indeed, physical activity interventions in primary schools have been implemented with some success.\(^4\) Though physically active lessons are one example of how children’s physical activity might be increased,\(^5\) it is imperative that these lessons do not detract from children’s learning and overall educational attainment. The paper by Mullender-Wijnsma et al.\(^1\) adds to a growing body of evidence demonstrating that physically active lessons in schools may actually improve academic test scores.\(^5\) Previously, the large-scale US-based Physical Activity Across the Curriculum (PAAC) trial reported improvement on children’s academic achievement using standardized tests following implementation of physically active lessons over multiple academic years.\(^6\) They also showed positive effects on body mass index. Thus, two large-scale trials have now shown positive effects on test scores for children participating in physically active lessons. Based on this evidence, wider-scale implementation of physically active lessons in schools may warrant consideration.
It is important, however, to consider the context of these studies and the children who participated. Mullender-Wijnsma et al.\(^1\) do not report racial or sociodemographic information about the children in their study, but given the geographic location in the Northern Netherlands, we may assume that the majority of children are white. Seventy-seven percent of the children in the PAAC study were white, and more than half were from middle to higher income families.\(^6\) Of the studies included in a recent systematic review on physically active lessons by Norris and colleagues,\(^5\) most were also conducted in small samples of predominantly white children. Physically active lessons for children therefore appear to improve the academic outcomes of more advantaged white children, but are these effects similar across population subgroups and what is the feasibility of implementing active lessons in schools serving disadvantaged children?

The existence of socioeconomic,\(^7-9\) racial and ethnic,\(^10,11\) and gender\(^12\) inequalities in academic achievement is well documented. School-level factors\(^7,8\) and children’s health status\(^13\) also impact cognition and academic performance, potentially acting as important mediators between socioeconomic status and educational attainment.\(^8,14\) Interventions that incorporate physical activity into the school day must therefore strive for effectiveness across all population sub-groups and be mindful that they do not widen existing achievement gaps. Results from Mullender-Wijnsma et al.’s earlier pilot study suggested that the intervention positively affected time-on-task in both socially disadvantaged children and children without social disadvantage.\(^15\) Whether this observation holds for actual academic attainment in the larger trial published in this issue has yet to be investigated.
Interventions may need to be adapted or tailored to be suitable for wider implementation. Poverty is suggested to influence brain development, and has been associated with lower neurocognitive functioning, negatively affecting children’s executive function, language ability, and recall.\textsuperscript{16-19} Poverty and social disadvantage can also create adverse home environments (e.g., food insecurity, violence in the home), and children from lower income families have been shown to have more behavioural problems.\textsuperscript{20,21} These conditions may affect children’s ability to benefit from physically active lessons. Moreover, already-stretched teachers in disadvantaged schools may find it difficult to implement physically active lessons in their classrooms.

Yet despite these potential difficulties, such interventions may be of great benefit to young children from less advantaged backgrounds, improving not only their academic attainment and physical activity levels and but also their overall health.\textsuperscript{22} The study by Mullender-Wijnsma et al.\textsuperscript{1} adds to the increasing body of evidence supporting the potential of physically active lessons in schools. Although there may be cause for cautious optimism, further work is required to assess their potential to reach large populations and positively affect inequalities in health and educational attainment. Until such evidence exists, it may be preliminary to advocate for wider implementation.
References

1. Mullender-Wijnsma et al. (Physically active math and language lessons improve academic achievement: A cluster RCT) IN PRESS this issue Pediatrics.


