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Citation:

Hobbs, M and Daly-Smith, A and McKenna, J and Quarmby, T and Morley, D (2017) Reconsidering current objectives for physical activity within physical education. *British Journal of Sports Medicine*. ISSN 1473-0480 DOI: <https://doi.org/10.1136/bjsports-2016-097328>

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1 **Article Title:** Reconsidering current objectives for physical activity within physical
2 education

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21
22 **Word count** (excluding abstract, tables and references): 798 words

23
24 **Key words:** children, health, physical activity, physical education,

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26 **Abstract**

27 Children's participation in physical activity (PA) has important positive benefits for their
28 health and academic outcomes. Within the school day, physical education (PE) is
29 increasingly endorsed as a key time for children to accumulate PA. Despite this
30 increasing emphasis, research papers and policy documents frequently identify PE
31 lessons as 'not active enough'. However, contemporary objectives for sufficient PA in
32 PE may not be based on the highest quality evidence. Furthermore, while the
33 objectives appear compatible, they contain profound differences. Continued pursuit of
34 these objectives may be detrimental to achieving positive experiences of PA in PE.
35 For instance, an exclusive focus on PA objectives may encourage teachers to prioritise
36 fitness-based activities over others that young people enjoy. Pursuing short-term goals
37 for PA also risks investing limited lesson time to develop important elements of
38 physical literacy that only become developed after prolonged engagement and
39 practice. Importantly, what is at stake is not only achieving sufficient PA in PE, but also
40 encouraging lifelong participation in PA and the long-term health of today's children.

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42 Even though physical activity (PA) contributes to better health, many young people fail
 43 to achieve the target of 60-minutes per day (1). The whole school day, and within that
 44 Physical Education (PE), are increasingly seen as important opportunities to
 45 accumulate PA (1-3). Paradoxically, even though school days including PE are more
 46 active than those that are not (3), PE is frequently identified as insufficiently active (4).
 47 Research papers and policy documents commonly use two objectives, advocated by
 48 organisations within the UK (3) and the USA (5), to ascertain if PE is active enough
 49 (Table 1). However, each objective lacks grounding in contemporary evidence and,
 50 despite assumptions of their equivalence, contain profound differences. Furthermore,
 51 over-diligent pursuit of these objectives by research and policy may result in teachers
 52 prioritising fitness-based activities over others, such as those that develop physical
 53 literacy (6). This is despite increased fundamental movement skill competency, a key
 54 component of physical literacy, predicting increased adolescent PA (6).

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Table 1: A summary of objectives to increase activity within physical education

Organisation	Objective for 'sufficient' PA
Association for Physical Education (AfPE) (3)	Students should be <i>actively moving</i> for at least 50-80% of the available learning time
The U.S. Department of Health and Human Services (HHS) (5)	Students should engage in moderate-to-vigorous physical activity (<i>MVPA</i>) for >50% of the time they spend in PE class

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The evidence underpinning current objectives (Table 1) is anachronistic, particularly as objective measures of PA are now used to evaluate PA in PE (4). The Association for Physical Education (AfPE) objective fails to cite evidence that informs the recommended duration and intensity of PA in PE (3). The US Department for Health and Human Services (HHS) objective is based on a combination of evidence - all of it low quality; self-reported time spent playing sport, expert advice, interpretations drawn from behavioural theory and a selection of exemplary practice (2,7). This misalignment, predominantly arising from the discrepancy between self-report and objective measurement of PA, may be one explanation why few contemporary PE lessons are deemed '*active enough*' (4,8).

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A plethora of research, including our own (8), fails to recognise and/or acknowledge these important differences between objectives. This issue is best illustrated by a recent meta-analysis (4), which concluded; objectively measured PA during PE met neither the HHS nor the AfPE objectives for >50% of PE in moderate-to-vigorous physical activity (MVPA). However, Table 1 clearly shows how only HHS specified a threshold of MVPA intensity.

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As we move towards research informed practice, it is essential that objectives for PA in PE are appropriate. The uncompromising pursuit of these objectives by research and policy (4,8) is concerning as it may cause teachers to focus on PA, at the expense of fostering an enjoyment of PA or developing physical literacy (2,6). This pursuit has already led to unsubstantiated calls by OFSTED (within the UK, 9) for teachers to engage pupils in sustained periods of high-intensity PA. However, adherence literature

83 demonstrates how sustained, high intensity PA can reduce subsequent motivation for
84 PA.

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86 A contextualised example highlights the difficulties a teacher may face when trying to
87 achieve the multifaceted outcomes of PE. Imagine this common lesson scenario; the
88 teacher asks pupils to consider how to effectively penetrate a defence in an invasion
89 game. In addition to being '*active enough*', children must consider a tactical
90 appreciation of the task, communicate with teammates, allocate roles and
91 responsibilities, and review their success. In this example, the teacher is pursuing an
92 appropriately wide range of learner experiences, alongside encouraging PA. While
93 some of this lesson content may have caused inactivity - and conflict with PA
94 objectives - it may be essential to develop the physical literacy that contributes to
95 adolescent PA (6).

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97 Current objectives for PA in PE need refining as they are underpinned by low-quality
98 evidence and contain unacknowledged differences in PA intensity and duration (2).
99 Research must move beyond considering levels of MVPA in isolation. Future research
100 may be warranted to develop an appreciation of how much objectively measured
101 MVPA can be achieved within a typical PE lesson, while meeting the other
102 multifaceted aims of PE, for instance, the need for developing physical literacy. While
103 the quest for PA is important, this must not be at the expense of developing physically
104 literate young people.

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106 Finally, while PE may be reasonably expected to make a substantial contribution to
107 children's daily PA, this must not sacrifice other important PE outcomes. Given their
108 long-term value, these other markers of PE quality - such as the enjoyment of PA, or
109 the development of physical literacy - need to be afforded renewed priority, perhaps
110 by explicit integration into future objectives (2,10). To support the development of
111 objectively determined PA objectives, in tandem with achieving the multifaceted
112 requirements of PE, it is essential that education makes a full contribution to these
113 public health debates. Acknowledging that interventions within PE generate only small
114 increases in PA (10), it is now time to look beyond PE as a "silver bullet" for resolving
115 the inactivity crisis, toward all segments of the school day. Importantly, what is at stake
116 is not just achieving PA in PE, but encouraging lifelong participation in PA and the
117 long-term health of children.

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