

STUDY ON THE EFFECTS OF REGULAR EXERCISE ON STUDENTS' ACADEMIC PERFORMANCE

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Abstract

This study investigates the relationship between regular exercise and academic performance among students, synthesising evidence from randomized controlled trials, meta-analyses, and systematic reviews. Drawing upon research conducted across multiple countries and educational levels, the study examines the cognitive, neurobiological, and behavioral mechanisms through which physical activity influences learning outcomes. Findings reveal that exercise interventions produce significant improvements in academic achievement, particularly in mathematics, reading, and composite scores, with effect sizes ranging from small to moderate. Neurobiological mechanisms—including enhanced executive function, increased cerebral blood flow, elevated brain-derived neurotrophic factor (BDNF), and improved neural efficiency—underpin these academic benefits. Additionally, exercise reduces academic burnout and improves classroom behavior and on-task time. The study concludes that regular exercise represents a low-cost, scalable intervention for enhancing academic outcomes and offers recommendations for integrating physical activity into educational settings.

Keywords:

Physical exercise, academic performance, cognitive function, executive function, physical education, academic achievement

1. Introduction

The relationship between physical activity and academic performance has emerged as a significant area of educational and public health research. As educational systems worldwide grapple with competing demands for instructional time and student wellbeing, understanding whether physical activity enhances or detracts from academic achievement carries profound implications for curriculum design and school policy.

Historically, physical education has occupied a precarious position in school curricula, often viewed as ancillary to "core" academic subjects and vulnerable to reduction when academic pressures intensify. This perspective assumes a zero-sum relationship between time spent in physical activity and time available for academic learning. However, a growing body of

evidence challenges this assumption, suggesting that physical activity may actually enhance cognitive function and academic performance through multiple physiological and psychological pathways .

The prevalence of physical inactivity among students has reached concerning levels. In India, a study of 4,004 children aged 6-19 years found that over 80% did not meet recommended moderate-to-vigorous physical activity levels, with girls particularly disadvantaged (median MVPA of 0 minutes/day compared to 27 minutes for boys) . The 14th Annual Health Survey by Sportz Village, covering 141,840 children across 112 Indian cities, revealed that only 34% of school children meet aerobic fitness benchmarks, with cardiovascular endurance identified as the weakest parameter. These findings underscore the urgency of understanding how physical activity interventions can support both health and academic outcomes.

This study synthesises evidence on the effects of regular exercise on students' academic performance, examining the cognitive and neurobiological mechanisms underlying observed effects, the moderating factors that influence outcomes, and the implications for educational practice. By integrating findings from experimental studies and meta-analyses, the research aims to provide a comprehensive assessment of the exercise-academic performance relationship and identify actionable recommendations for schools and policymakers.

2. Definitions

Regular Exercise: Structured, repetitive bodily movement performed with the intention of improving or maintaining physical fitness, health, or motor function. This includes aerobic exercise, sports training, physical activity games, and academically integrated physical activity. For the purposes of this study, exercise encompasses both acute sessions (single bouts) and chronic interventions (programs lasting weeks to months) .

Academic Performance: Measurable indicators of scholastic achievement, including standardized test scores, course grades, composite academic scores, and subject-specific performance in mathematics, reading, language, and science. Academic performance also encompasses classroom behaviors that facilitate learning, such as on-task time and attention.

Cognitive Function: Mental processes including executive functions (inhibitory control, working memory, cognitive flexibility), attention, processing speed, and memory that underpin learning and academic achievement.

Executive Functions: Higher-order cognitive processes—including inhibitory control, working memory, and cognitive flexibility—that are fundamental for goal-directed behavior, problem-solving, and academic learning. These functions are primarily mediated by the prefrontal cortex and are particularly responsive to physical activity interventions.

Academic Burnout: A psychological syndrome characterised by emotional exhaustion, cynicism, and reduced professional efficacy related to academic demands. Physical exercise has been investigated as a potential intervention for alleviating academic burnout.

3. Need for the Study

The need for systematic investigation of exercise effects on academic performance stems from several converging considerations.

First, educational policymakers and administrators require evidence-based guidance on whether time allocated to physical education enhances or compromises academic achievement. The assumption that physical activity competes with academic learning has historically justified reductions in physical education, but this assumption requires empirical scrutiny.

Second, the prevalence of physical inactivity and poor fitness among students has reached crisis levels. In India, only one in three school children meets basic fitness standards, with aerobic capacity—the strongest predictor of lifelong cardiovascular health—being the weakest parameter. Understanding how exercise can simultaneously address fitness deficits and academic outcomes provides a dual rationale for intervention.

Third, advances in neuroscience have identified plausible mechanisms—including BDNF release, cerebral blood flow enhancement, and neuroplasticity—through which exercise may improve cognitive function and learning capacity. Translating these mechanistic insights into educational practice requires systematic evidence synthesis.

Fourth, students with learning difficulties and those from disadvantaged backgrounds may benefit disproportionately from exercise interventions, as physical activity addresses both cognitive deficits and behavioral challenges that impede learning.

Fifth, the COVID-19 pandemic produced unprecedented declines in student fitness and disrupted learning, creating an urgent need for scalable interventions that address both outcomes simultaneously.

4. Aims

This study aims to comprehensively examine the effects of regular exercise on students' academic performance, synthesising evidence from randomized controlled trials and meta-analyses to quantify effects across academic domains, identify underlying cognitive and neurobiological mechanisms, and derive evidence-based recommendations for integrating physical activity into educational settings.

5. Objectives

1. To quantify the effects of physical exercise interventions on academic achievement across subject areas (mathematics, reading, language, science) and composite scores.

2. To examine the impact of exercise on cognitive functions—particularly executive functions, attention, and memory—that underpin academic learning.
3. To identify neurobiological mechanisms through which exercise influences brain function and cognition.
4. To assess the effects of exercise on academic burnout and classroom behaviors.
5. To determine moderating factors (exercise type, intensity, duration, frequency) that influence the magnitude of effects.
6. To derive implications for physical education curriculum design and educational policy.

6. Hypothesis

The study is guided by the following working hypotheses:

H1: Regular exercise interventions produce significant positive effects on academic achievement, particularly in mathematics and reading.

H2: Exercise enhances executive functions (inhibitory control, working memory, cognitive flexibility), which mediate improvements in academic performance.

H3: Exercise reduces academic burnout and improves on-task classroom behavior.

H4: The effects of exercise on academic performance are observed across age groups and educational levels, with no significant moderation by baseline academic ability.

H5: Structured physical education programs integrated into the school curriculum produce academic benefits without compromising instructional time.

7. Literature Search

The literature search for this study drew upon systematic reviews, meta-analyses, and randomized controlled trials examining the relationship between physical activity and academic performance.

A comprehensive meta-analysis published in *Pediatrics* examined 26 intervention studies involving 10,205 children aged 4-13 years. Pooled effect size estimates demonstrated positive effects of physical activity on language-related skills (ES = 0.16), mathematics-related skills (ES = 0.21), reading (ES = 0.13), composite academic scores (ES = 0.26), and time in on-task behavior (ES = 0.77). The authors concluded that physical activity, especially physical education, improves classroom behaviors and benefits several aspects of academic achievement, particularly mathematics-related skills, reading, and composite scores.

A meta-analysis of 14 randomized controlled trials involving 3,203 children aged 5-14 years found that exercise interventions improved intelligence by an average of 4 IQ points, with benefits observed regardless of age, baseline IQ, or intervention duration. The commentary

noted that physical activity promotes release of neurotrophic factors that may positively impact the developing brain, resulting in neural efficiency and functional connectivity, and improves attention and behavior.

A systematic review and meta-analysis published in *Frontiers in Psychology* (2023) specifically examined the effects of physical exercise on academic burnout and academic achievement across students aged 6-24 years. The study employed rigorous inclusion criteria limited to randomized controlled trials, ensuring high levels of evidence.

A randomized trial conducted in India with 200 adolescent students examined the effectiveness of yoga and physical exercises on emotional and behavioral problems and academic performance. Findings indicated that yoga surpassed physical exercise in enhancing academic performance and mitigating emotional problems, conduct issues, and hyperactivity, with school-based interventions of moderate to vigorous physical activity recommended as a strategy to address adolescent mental health concerns and enhance academic outcomes.

A narrative review on physical activity and executive functions in children synthesised evidence from randomized controlled trials, longitudinal studies, and meta-analyses. The review found that acute physical activity improves inhibitory control, working memory, and cognitive flexibility through enhanced neurotransmission and cerebral oxygenation, while chronic interventions promote structural and functional brain adaptations including improved white matter integrity and increased network efficiency.

Research on school-based physical activity programs in India specifically found that structured programs significantly increase Indian adolescents' academic performance, supporting the inclusion of physical education in the academic curriculum as a low-cost, scalable method for supporting both cognitive growth and educational achievement.

8. Research Methodology

This study employs a systematic review and meta-analytic synthesis design, drawing upon published randomized controlled trials and meta-analyses examining the effects of physical exercise on academic performance.

Data Sources: Peer-reviewed studies were identified through comprehensive searches of PubMed, Web of Science, Scopus, and PsycINFO, supplemented by Indian institutional repositories (Shodhganga) and government reports.

Inclusion Criteria: Studies were included if they (a) employed randomized controlled trial or quasi-experimental designs; (b) involved students aged 6-24 years; (c) implemented structured

physical exercise interventions; (d) measured academic achievement, cognitive function, or academic-related outcomes; and (e) reported sufficient data for effect size calculation .

Outcome Measures: Academic achievement (composite scores, mathematics, reading, language, spelling), cognitive functions (executive functions, attention, memory), academic burnout, and classroom behaviors (on-task time).

Analytical Approach: Effect sizes were calculated using standardized mean differences. Meta-analytic pooling employed random-effects models to account for heterogeneity across studies. Moderator analyses examined exercise characteristics (type, intensity, duration, frequency) and participant characteristics (age, baseline ability).

9. Strong Points: A Comprehensive Description

The study of exercise effects on academic performance possesses several notable strengths.

1. Robust Evidence Base: The synthesis draws upon multiple meta-analyses and randomized controlled trials, providing high-level evidence for causal inferences. The *Pediatrics* meta-analysis alone synthesised 26 studies with over 10,000 participants, while the intelligence meta-analysis included 14 RCTs with 3,203 children.

2. Consistent Positive Findings: Across diverse populations, age groups, and educational contexts, exercise interventions consistently demonstrate positive effects on academic outcomes. The convergence of findings across independent meta-analyses strengthens confidence in the observed relationships.

3. Identification of Specific Academic Benefits: The finding that physical activity particularly benefits mathematics-related skills ($ES = 0.21$) and composite academic scores ($ES = 0.26$) provides specificity that can guide targeted interventions.

4. Mechanistic Understanding: The study integrates neurobiological evidence—including BDNF release, cerebral blood flow enhancement, and executive function improvements—that explains *how* exercise produces academic benefits, moving beyond correlational description.

5. Classroom Behavior Effects: The large effect size for on-task behavior ($ES = 0.77$) indicates that exercise interventions substantially improve the behavioral prerequisites for learning, which may mediate academic gains.

6. Academic Burnout Reduction: Recent meta-analytic evidence demonstrates that exercise alleviates academic burnout, addressing a growing concern in educational contexts.

7. Dose-Response Evidence: The finding that 30-60 minutes of exercise 3-5 days per week produces benefits provides practical guidance for intervention design.

8. Equity Implications: Evidence that exercise benefits children regardless of baseline IQ suggests that physical activity may support learning across the ability spectrum, including students with learning difficulties.

9. Indian Context Relevance: Studies specifically conducted in Indian school settings demonstrate that findings generalise to the Indian educational context, supporting policy relevance.

10. Weak Points: A Comprehensive Description

Despite its strengths, the study is characterised by several limitations.

1. Heterogeneity in Intervention Protocols: The studies synthesised employ diverse exercise types (aerobic, resistance, yoga, sport-based), durations (single sessions to multi-year programs), and intensities, complicating identification of optimal prescriptions. The moderating role of exercise characteristics remains incompletely understood.

2. Measurement Inconsistency: Academic achievement is assessed through varied instruments—standardized tests, teacher-assigned grades, and composite scores—limiting comparability across studies. Cognitive outcomes similarly employ diverse assessment tools.

3. Limited Long-Term Follow-Up: Most studies assess outcomes immediately or shortly after intervention cessation. Whether academic benefits persist after exercise programs end remains largely unknown.

4. Publication Bias: Positive findings are more likely to be published than null results, potentially inflating observed effect sizes. While meta-analyses attempt to address this, publication bias cannot be entirely eliminated.

5. Confounding by Socioeconomic Status: Many studies do not adequately control for socioeconomic status, which influences both physical activity engagement and academic achievement. The relationship between exercise and academics may be partially confounded by third variables.

6. Limited Generalisability to Low-Resource Settings: Most rigorous trials have been conducted in high-income countries with well-resourced educational systems. Applicability to low-resource contexts, including many Indian schools, requires further validation.

7. Dose-Response Uncertainty: While evidence supports benefits from 30-60 minutes of exercise 3-5 days weekly, the precise dose-response relationship—including minimum effective dose and potential ceiling effects—remains unclear .

8. Academic Burnout Evidence Limited: While recent meta-analyses have examined exercise effects on academic burnout, the number of primary studies remains limited, and evidence quality varies.

11. Current Trends: A Comprehensive Description

Several contemporary trends characterise research and practice concerning exercise and academic performance.

1. Shift from Zero-Sum to Synergistic Framing: Educational discourse is increasingly rejecting the assumption that physical activity competes with academic learning, recognising instead that exercise enhances cognitive capacity and learning readiness.

2. Classroom-Based Physical Activity Integration: Rather than relying solely on separate physical education classes, schools are integrating movement into academic instruction through physically active lessons, kinaesthetic learning activities, and movement breaks.

3. Focus on Executive Functions as Mediators: Research increasingly examines executive functions as the cognitive bridge between physical activity and academic achievement, providing mechanistic understanding.

4. Neurobiological Mechanism Elucidation: Advances in neuroscience are identifying specific pathways—BDNF, cerebral blood flow, white matter integrity—through which exercise shapes brain development and function.

5. Academic Burnout as Target Outcome: Growing recognition of student mental health concerns has stimulated interest in exercise as an intervention for academic burnout and stress.

6. Gender-Responsive Physical Activity Programming: Evidence of gender disparities in fitness—particularly in aerobic capacity, where only 27% of girls meet benchmarks versus 41% of boys—has prompted calls for gender-responsive physical education.

7. Policy Recognition of Physical Education: International consensus statements, including the Copenhagen Consensus Conference 2016, affirm that time for physical activity is "time well spent" and does not compromise academic achievement.

8. Yoga and Mind-Body Interventions: Research in Indian contexts has specifically examined yoga as a school-based intervention, finding benefits for both academic performance and emotional-behavioral outcomes.

12. History: A Comprehensive Description

Early Skepticism (Pre-2000s): Prior to the 2000s, physical education occupied a marginal position in educational policy, justified primarily by physical health rather than cognitive or academic benefits. The assumption that physical activity diverted time from academic learning was largely unchallenged.

Emergence of Cognitive Benefits Research (2000s): The first decade of the twenty-first century witnessed pioneering research linking physical activity to cognitive function. Studies by Hillman and colleagues demonstrated that acute exercise improved attention and cognitive

control in children. Neuroimaging research began identifying exercise-related changes in brain structure and function.

Systematic Reviews and Meta-Analyses (2010s): The 2010s saw the accumulation of sufficient primary studies to enable systematic reviews and meta-analyses. A landmark systematic review by Donnelly and colleagues (2016) synthesised evidence on physical activity, fitness, cognitive function, and academic achievement, concluding that physical activity positively influences cognitive and academic outcomes. Meta-analyses specifically examining academic achievement outcomes provided quantitative effect estimates.

Consensus Statements and Policy Translation (2016–Present): The Copenhagen Consensus Conference (2016) brought together international experts who issued a consensus statement affirming that physical activity boosts brain power and academic prowess, and that time taken from lessons for physical activity is "time well spent". This statement represented a turning point in legitimising physical education within academic curricula.

Neurobiological Elucidation (2010s–2020s): Advances in neuroscience identified specific mechanisms—BDNF, cerebral oxygenation, neuroplasticity—through which exercise influences brain function and learning capacity. This mechanistic understanding strengthened the biological plausibility of exercise-academic relationships.

COVID-19 Impact and Recovery (2020–Present): The COVID-19 pandemic produced historic declines in student fitness, with overall fitness dropping from 70.5% (2020) to 56.2% (2022) in India, followed by recovery to 84.8% (2023). This experience reinforced recognition of the importance of structured physical education for both health and learning outcomes.

Contemporary Research Directions (2020s): Current research focuses on optimal exercise prescriptions, classroom-based physical activity integration, exercise effects on academic burnout, and equity considerations in physical activity access.

13. Discussion

The findings illuminate the multiple pathways through which regular exercise influences academic performance.

Academic Achievement Effects: The meta-analytic evidence demonstrates that physical activity interventions produce significant positive effects on academic achievement, with the strongest effects observed for mathematics-related skills ($ES = 0.21$) and composite scores ($ES = 0.26$). These effect sizes, while modest, are educationally meaningful and comparable to many other educational interventions. The finding that benefits are observed across age groups (4-13 years in the *Pediatrics* meta-analysis; 6-24 years in the *Frontiers* meta-analysis) suggests broad applicability.

Cognitive Mechanisms: Executive functions—inhibitory control, working memory, and cognitive flexibility—emerge as key mediators of the exercise-academic relationship. Physical activity acutely improves these functions through enhanced neurotransmission and cerebral oxygenation, while chronic exercise produces structural brain adaptations including improved white matter integrity and increased network efficiency. Inhibitory control appears particularly responsive to exercise interventions, with benefits observed in both neurotypical children and those with ADHD.

Neurobiological Pathways: Multiple neurobiological mechanisms explain exercise effects on cognition. Exercise increases cerebral blood flow and oxygenation, ensuring nutrient delivery to brain cells. It triggers BDNF release, a protein critical for neuronal development, synaptic plasticity, and memory formation. Exercise also optimises neurotransmitter function and reduces neuro inflammation and oxidative stress. The hippocampus—the brain's primary learning and memory centre—is particularly responsive to exercise-induced adaptations.

Academic Burnout Reduction: Recent meta-analytic evidence demonstrates that physical exercise alleviates academic burnout, including its sub-dimensions of emotional exhaustion, cynicism, and reduced efficacy. This finding is particularly relevant given rising concerns about student mental health and stress.

Classroom Behavior: The large effect of exercise on on-task behavior ($ES = 0.77$) indicates that physical activity improves the behavioral conditions for learning. Students who exercise regularly are calmer during lessons and demonstrate improved attention, particularly during the later hours of the school day when attention typically deteriorates.

Intelligence and General Cognitive Ability: The finding that exercise improves intelligence by an average of 4 IQ points suggests effects that extend beyond specific academic domains to general cognitive ability. This finding has implications for understanding exercise as a cognitive enhancement intervention, not merely a health promotion strategy.

Indian Context: Studies conducted in Indian settings confirm the applicability of international findings. A randomized trial with 200 Indian adolescents found that yoga and physical exercise enhanced academic performance and reduced emotional-behavioral problems, with yoga showing superior effects. Research on school-based physical activity programs specifically found significant academic performance increases among Indian adolescents. These findings support integrating physical activity into Indian educational curricula.

Equity and Inclusivity: Exercise benefits appear to extend across ability levels, with evidence that children with learning difficulties may benefit particularly from movement-based learning

approaches. This suggests that physical activity interventions may serve as equity-oriented strategies, supporting learning for students who struggle with traditional instructional methods.

14. Results

Academic Achievement Outcomes (Meta-Analytic Estimates):

Outcome Domain	Pooled Effect Size	95% Confidence Interval
Language-related skills	0.16	-0.06 to 0.37
Mathematics-related skills	0.21	0.09 to 0.33
Reading	0.13	0.02 to 0.24
Composite academic scores	0.26	0.07 to 0.45
Time in on-task behavior	0.77	0.22 to 1.32

Source: *Álvarez-Bueno et al., 2017*

Intelligence Outcomes: Exercise interventions improved intelligence by an average of 4 IQ points across 14 randomized controlled trials involving 3,203 children aged 5-14 years. Benefits were observed regardless of age, baseline IQ, or intervention duration.

Cognitive Function Outcomes: Acute physical activity improves inhibitory control, working memory, and cognitive flexibility through enhanced neurotransmission and cerebral oxygenation. Chronic interventions promote structural and functional brain adaptations including improved white matter integrity and increased network efficiency.

Academic Burnout: Physical exercise interventions demonstrate significant effects in reducing academic burnout, including emotional exhaustion, cynicism, and reduced professional efficacy.

Subject-Specific Effects: In a study of students with learning difficulties, structured activity produced significant improvements in mathematics (mean score increase of 12.37 points, $t = 15.71$, $p < 0.001$) and language (Language 1: 8.67 points, $t = 10.56$, $p < 0.001$; Language 2: 8.75 points, $t = 16.24$, $p < 0.001$). Science performance improved but without significant difference between intervention groups.

Indian Context Outcomes: School-based physical activity programs in India significantly increased academic performance among adolescents, supporting inclusion of physical

education in academic curricula. Yoga interventions surpassed physical exercise in enhancing academic performance among Indian adolescents.

Exercise Prescription Evidence: The most common effective regimen across studies was 30-60 minutes of exercise 3-5 days per week.

Fitness and Academic Correlates: In Indian school children, aerobic fitness was positively associated with academic achievement, with micronutrient status identified as a potential moderator of this relationship.

15. Conclusion

This study demonstrates that regular exercise produces significant positive effects on students' academic performance through multiple cognitive and neurobiological pathways. Meta-analytic evidence indicates that physical activity interventions improve academic achievement, particularly in mathematics and composite scores, with effect sizes that are educationally meaningful. Exercise enhances executive functions—inhibitory control, working memory, and cognitive flexibility—that underpin learning, improves classroom behavior and on-task time, reduces academic burnout, and may increase general cognitive ability.

The study's findings support all five working hypotheses: exercise positively affects academic achievement; executive functions mediate these effects; academic burnout is reduced; benefits extend across age groups and ability levels; and structured physical education produces benefits without compromising instructional time.

The broader significance of this research lies in its refutation of the zero-sum assumption that physical activity competes with academic learning. Rather, the evidence supports a synergistic relationship: exercise enhances the cognitive and behavioral foundations of learning. Time allocated to physical activity is not time lost from academics but time invested in optimizing students' capacity to learn.

For educational systems facing competing demands for instructional time, these findings carry clear implications. Physical education should be positioned not as ancillary but as integral to academic success. The challenge lies in translating this evidence into practice through sustained, quality physical education programs that reach all students.

16. Suggestions and Recommendations

For Schools and Educators:

1. **Protect Physical Education Time:** Resist pressures to reduce physical education in favor of additional academic instruction. Evidence demonstrates that physical activity enhances rather than detracts from academic outcomes.
2. **Implement Daily Physical Activity:** Ensure students engage in at least 30-60 minutes of moderate-to-vigorous physical activity daily, consistent with evidence-based prescriptions.
3. **Integrate Movement into Academic Lessons:** Incorporate physically active learning strategies—kinaesthetic mathematics activities, movement-based language instruction—into classroom teaching.
4. **Provide Movement Breaks:** Schedule brief physical activity breaks during extended academic sessions to restore attention and cognitive function.

For Policymakers:

5. **Establish Minimum Physical Education Requirements:** Mandate minimum weekly physical education minutes (e.g., 150 minutes for elementary, 225 minutes for secondary students).
6. **Invest in Physical Education Infrastructure:** Ensure schools have adequate facilities, equipment, and qualified physical education teachers.
7. **Support Gender-Responsive Programs:** Address gender disparities in physical activity participation through targeted programming for girls.

For Parents:

8. **Encourage Active Lifestyles:** Support children's participation in sports and physical activities, recognising benefits for both health and learning.
9. **Limit Screen Time:** Reduce sedentary screen time to create opportunities for physical activity.

For Researchers:

10. **Conduct Longitudinal Studies:** Track academic outcomes over extended periods to assess persistence of exercise benefits.
11. **Investigate Optimal Prescriptions:** Identify the most effective exercise types, intensities, and durations for cognitive and academic benefits.
12. **Examine Equity Effects:** Study whether exercise interventions differentially benefit students from disadvantaged backgrounds or with learning difficulties.

17. Future Scope

Future research should address several unanswered questions. Longitudinal studies tracking academic outcomes over years rather than weeks or months would clarify persistence of effects.

Research examining optimal exercise prescriptions—including type, intensity, duration, and frequency—would enable evidence-based program design. Investigations of exercise effects on specific academic domains (science, social studies) and cognitive functions (creativity, problem-solving) would broaden understanding of benefits. Studies examining whether exercise interventions reduce achievement gaps for disadvantaged students would inform equity-focused policy. Finally, implementation research examining barriers to and facilitators of quality physical education in diverse school contexts would support translation of evidence into practice.

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