



## School Physical Activity Culture and Fundamental Motor Skills: A Comparative Analysis Across Socioeconomic Backgrounds

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### ABSTRACT

The decline in children's participation in regular physical activity has become an international concern due to its association with health and motor development problems. Schools play a strategic role in fostering a culture of physical activity to support students' fundamental motor skills (FMS). This research examined how school movement culture is associated with students' fundamental motor skills (FMS) across diverse socioeconomic backgrounds. Using purposive sampling, we recruited 60 elementary students from six different schools. Data were collected using socioeconomic questionnaires, Fundamental Motor Skill (FMS) assessments, and observational sheets for physical activity culture. The collected data were processed using descriptive statistics, independent-samples t-tests, and Pearson correlation. The findings indicated that schools with higher socioeconomic backgrounds demonstrated stronger physical activity cultures and higher FMS scores than schools with lower socioeconomic backgrounds. In addition, a strong and statistically significant association ( $r = 0.68$ ,  $p < 0.05$ ) was identified between school movement culture and students' motor skill competence, school physical activity culture and students' FMS. These findings suggest that supportive school environments are associated with better motor skill development and may help reduce disparities among students from different socioeconomic backgrounds. Therefore, strengthening school-based physical activity programs is recommended to support equitable motor development and active lifestyles among children.

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## INTRODUCTION

The transformation of contemporary lifestyles, coupled with the rapid advancement of digital technology, has fundamentally altered the manner in which physical activity is perceived and practised among children and adolescents. This phenomenon has generated widespread concern due to the escalating prevalence of sedentary behaviour, which is characterised by minimal energy expenditure and closely associated with prolonged screen time and constrained opportunities for active movement (Pinto et al., 2023; Bertuol et al., 2023). Physical activity is recognised as an indispensable contributor to children's biological growth, as well as to their cognitive, social, and emotional development (Zubko & Kachalov, 2025). Evidence further points to a deepening physical inactivity crisis among school-aged populations, reinforced by recent data documenting declining physical activity participation in educational settings during the sedentary lifestyle era (Wargama et al., 2026). International guidelines recommend a minimum of 60 minutes of daily moderate-to-vigorous physical activity, supplemented by aerobic and muscle- and bone-strengthening exercises performed at least three times per week (Chen et al., 2023).

In response to this challenge, schools have emerged as one of the most strategically significant environments for promoting active lifestyles among children and adolescents (Tafari et al., 2024). As institutional settings in which students spend a considerable portion of their daily lives, schools are uniquely positioned to provide both structured and unstructured opportunities for physical engagement (Kiviranta et al., 2024). Physical activity within schools extends well beyond Physical Education classes to encompass active recess, extracurricular sport, and movement-oriented social interaction (Erwin et al., 2022; Suga et al., 2021). The cultivation of a positive school physical activity culture is therefore considered essential for fostering sustainable movement behaviour among students across diverse developmental contexts.

A school physical activity culture refers to the extent to which the school environment supports and encourages active participation through institutional policies, facility provision, teacher engagement, and social support structures. Schools characterised by strong physical activity cultures are understood to generate more inclusive opportunities for students to engage in movement experiences and develop their physical competencies (Wintle, 2022; Aartun et al., 2022). A central developmental outcome of sustained active movement experiences is the acquisition of fundamental motor skills (FMS), encompassing locomotor, non-locomotor, and manipulative skills, that constitute the foundation for lifelong participation in physical activity and sport (Spring et al., 2023; Irawan et al., 2021).

Despite growing scholarly attention to physical activity and motor development, prior research has predominantly examined individual-level activity participation, physical education interventions, or biological dimensions of motor skill acquisition in isolation. Comparatively limited investigation has been directed toward understanding how school physical activity culture, as a broader environmental and institutional construct, relates to students' fundamental motor skill development. Socioeconomic background, moreover, has frequently been treated as a demographic descriptor rather than as a comparative variable that may differentially shape access to movement opportunities and motor development trajectories.

This evidence gap is consequential: students from higher socioeconomic backgrounds generally possess greater access to sports facilities, supportive home environments, and parental encouragement for physical activity, while those from lower socioeconomic settings frequently encounter constrained opportunities for active participation. Such disparities may contribute to inequitable motor skill development across children. Schools, however, may

serve as an equalising environment capable of attenuating these inequalities through the systematic implementation of inclusive physical activity cultures.

The novelty of the present study therefore resides in the simultaneous integration of three interconnected dimensions, school physical activity culture, fundamental motor skills, and socioeconomic background, within a single comparative framework. Unlike preceding research that has predominantly focused on individual-level activity participation, this investigation positions the school environment as a strategic social context capable of shaping motor skill development across socioeconomic groups. The study thus aims to examine the association between school movement culture and students' fundamental motor skills across diverse socioeconomic settings, with the expectation that findings will contribute both theoretical insight and practical guidance for school-based physical activity programme design and equitable educational policy.

## **METHODS**

This study applied a cross-sectional comparative-correlational design with an observational method to examine the association between school physical activity culture and students' FMS across varying socioeconomic backgrounds. A cross-sectional approach was selected because data were gathered at a single point in time without intervention or variable manipulation, enabling description of existing conditions and group comparison based on socioeconomic status (Creswell & Creswell, 2017). The correlational component enabled analysis of the association between school physical activity culture and students' motor competence.

### **Participants**

Participants comprised elementary school students drawn from six public primary schools in Ngawi Regency, Indonesia, categorised into two socioeconomic groups: three higher-SES schools and three lower-SES schools. A total of 60 students participated, with 30 from each group. Participants were in Grades IV-VI, aged 10-12 years, with both male and female students included to ensure balanced representation. Inclusion criteria required active school enrolment, physical ability to complete motor skill assessments, and written parental or guardian consent. Students with medical conditions precluding assessment participation, absences during data collection, or incomplete questionnaire data were excluded.

### **Sampling Procedure**

Purposive sampling was employed, with schools and participants selected based on criteria directly relevant to the research objectives. Socioeconomic categorisation was determined using parental education level, occupation, and access to physical activity resources as composite indicators. Schools were deliberately selected to represent clearly distinct socioeconomic environments, and student participants were proportionally sampled from each.

### **Research Instruments and Materials**

Three primary instruments were used.

*The School Physical Activity Culture Observation Sheet* was developed based on the Whole School Physical Activity framework, adapted to the Indonesian elementary school context, and assessed school policies, facilities and environment, teacher support, student participation, and social climate using a 5-point Likert scale. Content validation was conducted by three physical education and educational research experts, and internal consistency was confirmed through a Cronbach's alpha coefficient of 0.87.

Students' motor competence was assessed using an *FMS Test Battery* adapted from the Test of Gross Motor Development (TGMD; Ulrich, 2000), covering locomotor skills (running, jumping), non-locomotor skills (balancing, bending), and manipulative skills (throwing, catching). A performance-based scoring rubric evaluated movement quality against standardised criteria. Assessors received prior training, and inter-rater reliability reached 0.85. A structured *Socioeconomic Background Questionnaire* distributed to parents or guardians collected data on parental education, occupation, and access to physical activity facilities, adapted from established socioeconomic and physical activity instruments.

### Data Collection Procedures

Following school approval and parental consent, data collection proceeded in three sequential phases. First, school physical activity culture was assessed through structured observations during Physical Education classes, recess periods, and extracurricular activities. Second, students completed the FMS assessment battery under standardised conditions, administered by trained evaluators to ensure scoring consistency. Third, socioeconomic data were collected through parent-completed questionnaires. All data collection was conducted within school environments to maintain ecological validity across participating schools.

### Data Analysis

Data were analysed quantitatively using descriptive and inferential statistical methods. Descriptive statistics (means and standard deviations) characterised physical activity culture and motor skill levels. Independent-samples t-tests assessed differences in FMS between socioeconomic groups. Pearson correlation analysis examined the association between school physical activity culture and students' FMS. All analyses were conducted in SPSS with a significance threshold of  $p < 0.05$ .

## RESULTS

### Sample Distribution

This study was conducted across six elementary schools representing two socioeconomic categories—three higher-SES and three lower-SES schools—classified on the basis of environmental conditions, parental educational and occupational backgrounds, and the availability of physical activity-supporting facilities. Table 1 presents the distribution of schools and respondents across socioeconomic categories.

**Table 1.** Distribution of Schools and Respondents by Socioeconomic Status

| School Category | Number of Schools | Number of Students | Percentage (%) |
|-----------------|-------------------|--------------------|----------------|
| High SES        | 3                 | 30                 | 50             |
| Low SES         | 3                 | 30                 | 50             |
| <b>Total</b>    | <b>6</b>          | <b>60</b>          | <b>100</b>     |

### School Physical Activity Culture

Table 2 presents mean scores and standard deviations for each assessed dimension of school physical activity culture, with p-values from independent-samples t-tests.

**Table 2.** Distribution of Schools and Respondents by Socioeconomic Status

| Assessed Aspect      | High SES (M ± SD) | Low SES (M ± SD) | p-value |
|----------------------|-------------------|------------------|---------|
| Policies and Support | 4.3 ± 0.42        | 3.5 ± 0.51       | 0.003*  |

| Assessed Aspect            | High SES (M ± SD) | Low SES (M ± SD) | p-value |
|----------------------------|-------------------|------------------|---------|
| Facilities and Environment | 4.5 ± 0.38        | 3.2 ± 0.47       | 0.001*  |
| Social Climate             | 4.2 ± 0.45        | 3.6 ± 0.49       | 0.007*  |
| Student Participation      | 4.4 ± 0.40        | 3.7 ± 0.46       | 0.005*  |
| Overall Mean               | 4.35 ± 0.41       | 3.50 ± 0.48      | 0.002*  |

Significant at  $p < 0.05$ . Higher-SES schools demonstrated significantly stronger physical activity cultures across all assessed dimensions. The largest between-group disparity was observed in the Facilities and Environment dimension (High SES:  $4.5 \pm 0.38$  vs. Low SES:  $3.2 \pm 0.47$ ;  $p = 0.001$ ), reflecting unequal resource access. Notably, lower-SES schools still achieved mean scores within the ‘good’ classification for Student Participation and Social Climate.

### Fundamental Motor Skills

Table 3 presents mean FMS scores by component and socioeconomic group. Students from higher-SES schools significantly outperformed those from lower-SES schools across all three FMS components.

**Table 3.** Mean Scores and Standard Deviations of Students’ Fundamental Motor Skills by SES Group

| FMS Component        | High SES (M ± SD) | Low SES (M ± SD) | p-value |
|----------------------|-------------------|------------------|---------|
| Locomotor Skills     | 3.6 ± 0.44        | 2.9 ± 0.50       | 0.004*  |
| Non-locomotor Skills | 3.5 ± 0.39        | 2.8 ± 0.46       | 0.006*  |
| Manipulative Skills  | 3.7 ± 0.41        | 2.7 ± 0.52       | 0.001*  |
| Overall Mean         | 3.6 ± 0.41        | 2.8 ± 0.49       | 0.003*  |

The most pronounced between-group difference was observed in manipulative skills (High SES:  $3.7 \pm 0.41$  vs. Low SES:  $2.7 \pm 0.52$ ;  $p = 0.001$ ), suggesting that access to play experiences and physical activity equipment is a particularly important determinant of object-control skill development.

### Comparative Analysis and Correlation

**Table 4.** Independent-Samples t-Test of FMS Scores by Socioeconomic Group

| Group    | Mean ± SD  | t-value | p-value | Category   |
|----------|------------|---------|---------|------------|
| High SES | 3.6 ± 0.41 | 3.87    | 0.003*  | Good       |
| Low SES  | 2.8 ± 0.49 | -       | -       | Sufficient |

The independent-samples t-test confirmed a statistically significant difference in overall FMS scores between socioeconomic groups ( $t = 3.87$ ;  $p = 0.003$ ). Furthermore, Pearson correlation analysis revealed a strong and statistically significant positive association between school physical activity culture and students’ FMS ( $r = 0.68$ ;  $p < 0.05$ ). These results confirm that schools with stronger physical activity cultures tend to foster higher levels of motor skill development, and that the school environment constitutes a meaningful social context for students’ physical development regardless of socioeconomic background.

## DISCUSSION

### School Physical Activity Culture as a Driver of Motor Development

The findings of this study affirm the role of school physical activity culture as a meaningful contextual determinant of children’s motor skill development. Rather than

merely reflecting students' pre-existing physical activity participation, the results suggest that a positive school physical activity culture actively generates conditions that encourage children to engage more fully in movement-related activities. This aligns with prior perspectives emphasising that motor development is substantively shaped by the quality of environmental stimulation and active engagement opportunities available in everyday educational settings (James et al., 2023; Lubis & Yustika, 2025; Mombarg et al., 2023).

From a theoretical standpoint, these findings can be interpreted through ecological and motor development frameworks, which posit that motor competence develops through continuous interaction between individual capacities and environmental affordances. Schools equipped with supportive policies, adequate facilities, active teacher engagement, and positive social climates may provide richer movement ecosystems in which children practise and refine motor skills more effectively (Lafave et al., 2021; Ourda et al., 2025). Higher-SES schools in this study demonstrated stronger physical activity cultures overall, suggesting that environmental resources and institutional support collectively contribute to the creation of more active school communities.

### **Socioeconomic Background and Motor Skill Disparities**

The significant between-group differences in FMS scores documented in this study are consistent with the existing literature demonstrating that socioeconomic conditions shape children's access to physical activity resources, parental support, and extracurricular engagement (Capp et al., 2022; Tan, 2024; Wargama et al., 2024). Students from higher-SES schools demonstrated superior FMS across all three components, with the greatest disparity observed in manipulative skills, those most directly dependent on access to appropriate equipment and structured play experiences. However, the strong positive correlation between school physical activity culture and FMS ( $r = 0.68$ ) indicates that institutional support, rather than socioeconomic status alone, constitutes a critical mediating factor. This finding implies that schools may function as important equalising environments capable of attenuating socioeconomic disparities in motor development through the deliberate cultivation of inclusive, movement-rich learning cultures.

### **Schools as Equitable Spaces for Physical Development**

This study further reinforces the broader developmental role of schools that extends beyond academic attainment. A school culture that systematically encourages movement participation may help children cultivate physical confidence, active habitual behaviours, and foundational motor competencies essential for lifelong physical activity engagement. Schools therefore represent strategic institutional sites for promoting equitable physical development, particularly for students whose movement opportunities outside school hours are constrained by socioeconomic circumstance.

### **Limitations and Directions for Future Research**

Several methodological constraints should be acknowledged. The cross-sectional design captures a single temporal snapshot and precludes causal inference between school physical activity culture and motor skill development. The relatively modest sample of 60 students drawn from six schools within a single regency limits the statistical power and generalisability of the findings to broader populations. Although the instruments demonstrated adequate validity and reliability, observational assessments retain the possibility of evaluator subjectivity. Additionally, factors external to the school environment—including parental support, community resources, and students' habitual physical activity outside school—were not systematically examined and may have confounded observed relationships. Future

research is encouraged to employ larger and more diverse samples, longitudinal designs capable of establishing temporal relationships, and broader contextual variables to achieve a more comprehensive understanding of the determinants of motor skill development in elementary school populations.

## CONCLUSION

This study demonstrates that school physical activity culture is strongly and significantly associated with students' fundamental motor skill development across diverse socioeconomic settings ( $r = 0.68$ ;  $p < 0.05$ ). Schools characterised by more supportive physical activity environments were associated with higher levels of motor competence among students, while higher-SES school affiliation was additionally linked to superior FMS performance. These findings underscore the strategic role of schools in providing inclusive movement opportunities capable of mitigating socioeconomic disparities in children's motor development. Strengthening school-based physical activity programmes-through policy development, facility investment, and teacher capacity building-is recommended as a priority strategy for promoting equitable motor development and active lifestyles among all children, irrespective of socioeconomic background.

## IMPLICATION

The findings of this study carry practical implications for physical education practice and school-based policy development. The strong association identified between school physical activity culture and students' FMS suggests that school-based physical activity initiatives may constitute an effective strategy for promoting motor development and cultivating active lifestyles from an early age. These results emphasize the importance of creating supportive school environments through institutional policies, facility provision, and movement-oriented learning experiences-that are accessible to students across the full spectrum of socioeconomic backgrounds.

At the classroom level, teachers and school administrators should integrate physical activity into daily school culture beyond the boundaries of formal Physical Education lessons, through active breaks, structured recess activities, and inclusive extracurricular programmes that support motor development. At the policy level, educational stakeholders are encouraged to adopt a whole-school approach that embeds physical activity into daily routines, improves access to basic facilities, and strengthens teachers' capacity to create active learning environments. Particular priority should be directed toward schools in lower-SES settings to address entrenched disparities in movement opportunities and motor development outcomes.

## AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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