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Examining associations among physical activity, motivation, attitudes, physical activity behaviour, and perceived fitness

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ABSTRACT

Background: Elementary students' perceived fitness is an important marker of health, yet few studies have examined how school-based physical activity programmes are associated with perceived fitness through motivation, attitudes toward physical activity, and physical activity behaviour. **Objectives:** This study aimed to examine the structural relationships among school-based physical activity programmes, motivation, attitudes toward physical activity, physical activity behaviour, and perceived fitness, and to test whether motivation, attitudes, and physical activity behaviour statistically mediated these relationships. **Methods:** A cross-sectional design was employed involving 150 Grade IV-VI students from public primary schools in Indonesia selected via cluster sampling. Variables were measured using five-point Likert-scale self-report instruments. School-based physical activity referred to students' perceived engagement in existing programmes rather than exposure to an experimental intervention. Data were analysed using PLS-SEM. **Results:** School-based physical activity programmes were positively associated with students' motivation (β = 0.575) and attitudes (β = 0.482). Motivation (β = 0.400) and attitudes (β = 0.336) were associated with more frequent physical activity behaviour, which showed a strong association with perceived fitness (β = 0.600). The model explained variance in physical activity behaviour (R^2 = 0.344) and perceived fitness (R^2 = 0.360). **Conclusion:** Physical activity programmes, motivation, attitudes, behaviour, and perceived fitness were interrelated among elementary school students, with physical activity behaviour acting as a key link between psychological factors and perceived fitness. These findings should be interpreted in light of the study's cross-sectional design, reliance on self-report measures, and school sample, which limit causal inference and generalisability.

Keywords: Attitude; motivation; physical activity programs; physical activity behavior; student fitness

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INTRODUCTION

Physical activity is a pivotal foundation for the physical growth, cognitive development, and psychological well-being of school-aged children. More active children generally

display better physical health and more developed cognitive abilities. Several studies have also suggested that higher levels of physical activity are linked to better academic achievement (Donnelly et al., 2016). Research in physical education indicates that participation in physical activity, together with psychological factors such as motivation and positive attitudes toward learning, is related to student learning outcomes. These aspects can therefore be regarded as key components in achieving the learning objectives of physical education (Adi et al., 2025; Nugraha et al., 2025). The primary school years are an important developmental period, because in this phase children build basic movement skills, strengthen their cognitive abilities, and begin to form active lifestyle habits that may continue into adulthood.

The school environment provides the main context in which children move, learn, and interact on a daily basis. Long hours in school, frequent interactions with classmates, and continuous relationships with teachers make school a strategic setting for nurturing healthy movement habits (He et al., 2023). Physical education classes, recess, and other structured or semi-structured school activities offer concrete opportunities for students to engage in physical activity (Sevil-Serrano et al., 2020). School-based physical activity programmes have been reported to be associated with higher levels of motivation, enjoyment of movement, and students' perceptions that their surroundings support an active lifestyle, which may encourage greater participation in physical activity (Kelso et al., 2020). Physical education programmes that promote learning autonomy and explicitly teach self-regulation skills, such as action planning and coping planning, have the potential to strengthen students' self-efficacy and their intention to remain physically active (Coimbra et al., 2020; Knittle et al., 2018). Studies involving adolescents and university students also show that motivation and self-efficacy are important predictors of physical activity levels and are associated with better cardiorespiratory fitness (Li et al., 2022; Sheng et al., 2025).

A self-determination theory framework developed for primary school children indicates that when pupils feel autonomous, capable, and connected to others, they tend to display more self-determined motivation and engage more frequently in physical activity (Sebire et al., 2013). Structural equation modelling carried out in school contexts further shows that when pupils perceive support from their teachers, classmates, and parents, they tend to exhibit higher autonomous motivation and engage more frequently in physical activity of at least moderate intensity (Qi et al., 2024). These findings underline the significant role of psychological factors and social context in shaping children's activity patterns. However, the specific pathways through which school-based physical activity programmes and contexts are associated with children's perceived fitness through motivational and behavioural mechanisms have not been examined in great detail. Only a limited number of studies have positioned school-based physical activity programmes or school contexts as exogenous variables in structural models while simultaneously incorporating psychological and behavioural mediators (Demetriou et al., 2019; Kelso et al., 2020). Moreover, analyses of the relationships among motivation, attitudes, physical activity behaviours, and fitness outcomes have more often focused on adolescents and university students than on primary school children (Li et al., 2022).

An expanding body of literature shows that many children and adolescents perform less daily physical activity than current recommendations suggest. This inadequate level of activity can increase their vulnerability to health complications throughout their school years (Ghaffari et al., 2013). Data from multiple schools in Kediri also demonstrate that the majority of students have a normal body mass index. Consequently, normal body weight cannot be equated with fitness, underscoring the need for school programmes

specifically designed to enhance fitness (Allsabah et al., 2023). A multitude of studies have corroborated the notion that elevated levels of physical activity, in conjunction with psychological factors such as motivation, self-efficacy, and movement competence, are associated with enhanced perceived physical fitness. This phenomenon can serve as a crucial marker of health status in adolescents and children (Palacios-Cartagena et al., 2022; Pastor-cisneros et al., 2021).

A gap remains between the strong interest in physical activity and the limited number of structural models that simultaneously examine school-based physical activity programmes, psychological factors, physical activity behaviour, and fitness. Existing studies have largely focused on motivational or behavioural changes in isolation, without systematically examining the associations between school-based physical activity programmes and children's perceived fitness (Demetriou et al., 2019; Kelso et al., 2020; Qi et al., 2024; Sebire et al., 2013).

Moreover, prior research has predominantly investigated adolescents or university populations, leaving primary school contexts underexplored, particularly in developing educational settings such as Indonesia, where variations in school environments and curriculum implementation may shape children's physical activity experiences. Another limitation concerns the predominant reliance on objective fitness indicators, with fewer studies examining perceived fitness as a meaningful psychological marker reflecting students' subjective evaluation of their physical capability and vitality. In addition, limited structural models have positioned students' perceptions of school-based physical activity programmes as an exogenous determinant influencing motivational, attitudinal, and behavioural pathways toward perceived fitness. Therefore, the present study proposes an integrative structural model that positions school-based physical activity programmes as an exogenous variable while simultaneously incorporating motivation, attitudes toward physical activity, physical activity behaviour, and perceived fitness among primary school students in Indonesia. The conceptual model illustrates the hypothesised relationships among these variables and provides the theoretical basis for hypothesis development (**Figure 1**).

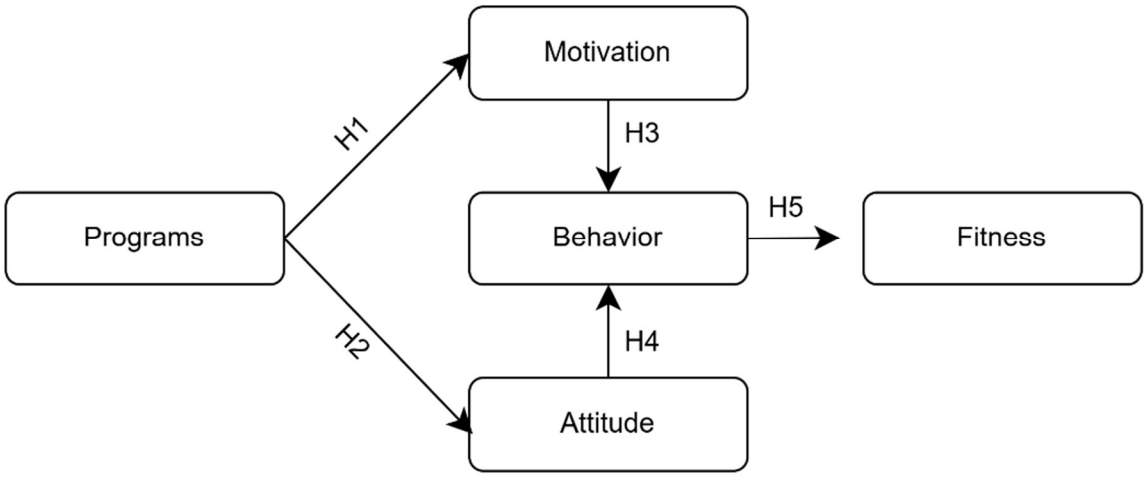

Figure 1. Conceptual Research Model

Figure 1 presents the conceptual model, in which school-based physical activity programmes are specified as an exogenous variable. In line with the cross-sectional design, this study aimed to examine the structural relationships among school-based physical activity programmes, motivation, attitudes toward physical activity, physical

activity behaviour, and perceived fitness among elementary school students using PLS-SEM.

H1: Participation in school-based physical activity programmes is positively associated with students' motivation.

H2: Participation in school-based physical activity programmes is positively associated with students' attitudes toward physical activity.

H3: Students' motivation is positively associated with their physical activity behaviour.

H4: Students' attitudes toward physical activity are positively associated with their physical activity behaviour.

H5: Students' physical activity behaviour is positively associated with their perceived fitness.

H6: Motivation, attitudes toward physical activity, and physical activity behaviour are examined as potential statistical mediators in the relationship between participation in school-based physical activity programmes and students' perceived fitness.

METHOD

Research Design

This study employed a cross-sectional quantitative survey design (Cohen et al., 2018; Creswell, 2012). Classroom-based surveys were a suitable method for data collection. They allow researchers to collect responses from many students during the regular lesson schedule and classroom environment. A survey approach was used to examine students' attitudes, motivation, physical activity behaviour, and perceived fitness at a single point in time. Data were collected through structured questionnaires administered to students during regular classroom sessions, allowing efficient data collection within the natural school setting.

Participants

This study was conducted in public primary schools in Indonesia and involved 150 students from Grades IV-VI. A convenience cluster sampling approach was employed at the classroom level, in which intact classes were selected based on schedule availability and teacher approval rather than random selection. Therefore, the sample represents the participating classes and is not intended to be statistically representative of the broader primary school population. Participant characteristics are presented in **Table 1**.

Table 1. Participants Characteristics

Variable	Category	n (%)	Mean ± SD
Age (years)	Total Sample	150 (100%)	10.8 ± 0.9
BMI (kg/m^2)	Total Sample	150 (100%)	18.5 ± 2.0
Gender	Male	48 (32%)	-
	Female	102 (68%)	-
Grade Level	Grade IV	48 (32%)	-
	Grade V	51 (34%)	-
	Grade VI	51 (34%)	-
Sport Participation	Yes	90 (60%)	-
	No	60 (40%)	-
Health Status	Healthy	138 (92%)	-
	Minor Condition	12 (8%)	-

Instrument

The research instrument employed was a self-report questionnaire using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire

assessed five latent constructs: school-based physical activity programmes, motivation to exercise, attitude towards physical activity, physical activity behaviour, and perceived fitness. All constructs were specified as reflective measurement models within the PLS-SEM framework. This specification was theoretically grounded in the assumption that the indicators represent manifestations of an underlying latent construct. Thus, variations in the construct are expected to be reflected in corresponding changes across its indicators. Each construct was represented by four indicators formulated in short and concrete sentences appropriate for elementary school students.

Item development involved adapting constructs from multiple validated instruments, including the Physical Activity Questionnaire for Older Children (PAQ-C) (Kowalski et al., 2004), the Youth Physical Activity Attitude Scale (Simonton et al., 2020), the Sport Motivation Scale for Children (Zahariadis et al., 2005; Shirotriya et al., 2023), and the Self-Perception of Fitness Scale (Lamb & Haworth, 1998). Rather than combining items directly, each construct was first clearly defined at the conceptual level. Adapted items were then mapped to these definitions to ensure construct preservation and avoid conceptual overlap across domains. Expert review was conducted to confirm conceptual coherence within the integrated instrument.

The adaptation process included translation and linguistic simplification of item wording into Indonesian, followed by translation-back translation conducted by independent bilingual translators to ensure semantic and conceptual equivalence between the original and adapted versions. Discrepancies were resolved through discussion to preserve meaning rather than literal wording. Expert evaluation by physical education lecturers and educational measurement specialists assessed content relevance, clarity, and developmental appropriateness.

Item reduction was carried out based on theoretical representativeness, clarity for young respondents, and avoidance of redundancy, resulting in four indicators per construct while maintaining adequate construct coverage. A pilot test with students of similar grade levels was conducted to examine face validity and feasibility, including clarity of instructions, item comprehension, and response patterns. Measurement validity was subsequently evaluated through PLS-SEM procedures, including indicator reliability and construct validity assessment. A summary of the measurement structure, including latent variables and their corresponding indicators, is presented in **Table 2**.

Table 2. Instrument Variables and Indicators

Variable	Indicators
Physical Activity Programmes	PRG1: Students' routine participation in the school physical activity programme.
	PRG2: Clarity and ease of instructions in the physical activity sessions.
	PRG3: Perceived intensity of the physical activity programme by students.
	PRG4: Level of challenge of the physical activity programme that still matches students' abilities.
Exercise Motivation	MOT1: Students' perception that exercise is important for themselves.
	MOT2: Enjoyment experienced by students when doing physical activity.
	MOT3: Desire to maintain and improve regular exercise habits.
	MOT4: Positive feelings after completing physical activity.
Attitude Toward Physical Activity	ATT1: Students' evaluation that physical activity is enjoyable.
	ATT2: Belief that physical activity provides important health benefits.
	ATT3: Perception that physical activity is a positive and necessary behaviour.

Variable	Indicators
Physical Activity Behaviour	ATT4: Preference to engage in physical activity rather than passive behaviors (e.g., just sitting).
	BEH1: Frequency of students engaging in physical activity per week.
	BEH2: Intensity of movement during physical activity (e.g., running, jumping, strength exercise).
	BEH3: Usual duration of physical activity in one session (at least 20–30 minutes).
	BEH4: Level of activeness during physical education or school sports sessions.
Perceived Fitness	FIT: Students' perception that their body feels fitter than before.
	FIT2: Students' perception of not getting tired easily during physical activity.
	FIT3: Feeling of having more energy in daily school activities.
	FIT4: Perception that their physical ability has improved after engaging in physical activity.

Data Analysis

The initial phase of data analysis involved calculating descriptive statistics for each research construct, including means, standard deviations, and minimum and maximum values. The statistical analysis was conducted by calculating the mean values for each construct of the school-based physical activity programmes, motivation to exercise, attitude towards physical activity, physical activity behaviour, and perceived fitness. This preliminary step provides an overview of the data's general trend prior to implementing structural modelling.

The data analysis employed Partial Least Squares Structural Equation Modelling (PLS-SEM) through SmartPLS 4. PLS-SEM was chosen because it allows the analysis of latent constructs, mediation effects, and relatively complex models without requiring normally distributed data (Hair et al., 2019). For the purposes of this study, the data analysis was divided into two parts. First, the measurement model was evaluated by examining factor loadings, Average Variance Extracted (AVE ≥ 0.50), composite reliability (CR ≥ 0.70), and Cronbach's alpha (≥ 0.70). Discriminant validity was assessed using the HTMT criterion with a cut-off value of 0.85 (Henseler et al., 2015), and the Fornell-Larcker criterion, where the square root of the AVE for each construct must be greater than its correlations with other constructs.

Second, the structural model was evaluated. The size and significance of the path coefficients were examined using t-statistics greater than 1.96 and p-values below 0.05. R^2 was used to judge the explanatory power of the endogenous variables, while f^2 and Q^2 were used to assess effect sizes and predictive relevance (Hair et al., 2017). Multicollinearity was assessed using VIFs, with a conservative threshold of < 5 (Hair et al., 2011). Model fit was examined using SRMR and NFI. In line with Hu and Bentler (1999), an SRMR value of 0.08 or lower and an NFI in an acceptable range were taken to indicate an adequate model fit for social and educational research.

RESULTS AND DISCUSSION

Results

This section reports the results of the data analysis obtained from 150 students. The presentation of the results is methodical, with descriptive statistics for the five research constructs presented in **Table 3**.

Table 3. Descriptive Statistics

Variable	N	Mean	Standard Deviation	Min	Max
Physical Activity Programmes	150	3.02	0.92	1.00	5.00
Exercise Motivation	150	3.00	0.86	1.25	5.00
Attitude toward Physical Activity	150	2.99	0.86	1.00	5.00
Physical Activity Behaviour	150	3.00	0.88	1.00	5.00
Perceived Fitness	150	3.02	0.88	1.00	4.75

The evaluation of the measurement model commences with the presentation of the outer loading value for each indicator on the latent construct. This value shows how closely each indicator is associated with the latent variable it is intended to represent. The subsequent figure illustrates the outer loading values for all variables.

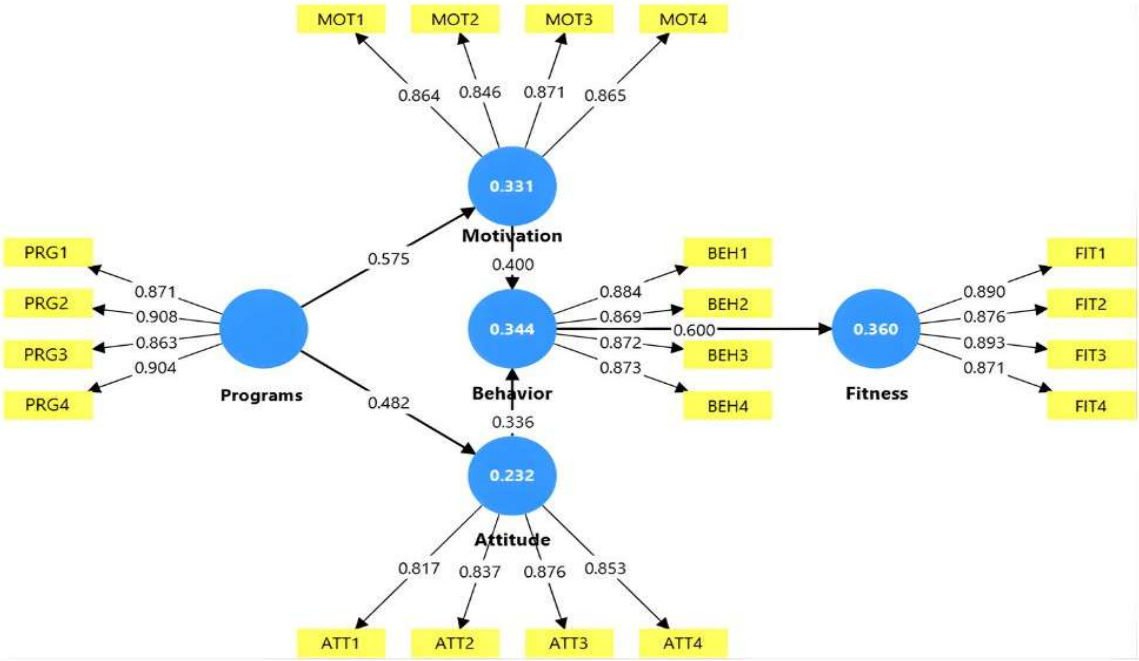

Figure 2. Measurement Model

All indicators for the variables of physical activity programmes, motivation to exercise, attitude towards physical activity, physical activity behaviour, and perceived fitness demonstrated outer loadings above 0.80. The ranges of programme indicators were 0.863-0.908, motivation 0.846-0.871, attitudes 0.817-0.876, physical activity behaviour 0.869-0.884, and perceived fitness 0.871-0.893. This pattern indicates that each indicator makes a significant contribution to representing its respective latent construct and meets the criteria for indicator adequacy in the PLS-SEM model. At the outset, all indicators satisfied the loading criteria, thereby ensuring the retention of all items in the model.

Table 4. Reliability and Convergent Validity Results

Variable	Cronbach's Alpha	Composite Reliability	AVE
Attitude	0.868	0.910	0.716
Behaviour	0.898	0.929	0.765
Fitness	0.905	0.934	0.778
Programmes	0.909	0.936	0.786
Motivation	0.885	0.920	0.742

All constructs showed high reliability and satisfactory convergent validity, as indicated by Cronbach's alpha and composite reliability values above 0.85 and AVE values above

0.70, suggesting that a substantial proportion of the variance in the indicators is explained by their respective latent constructs.

Table 5. Discriminant Validity Based on the Fornell-Larcker Criterion

Construct	Programmes	Motivation	Attitude	Behaviour	Fitness
Programmes	0.887				
Motivation	0.575	0.862			
Attitude	0.482	0.266	0.846		
Behaviour	0.386	0.489	0.442	0.875	
Fitness	0.267	0.340	0.323	0.600	0.882

Table 6. Discriminant Validity Based on the HTMT Ratio

Construct	Programs	Motivation	Attitude	Behaviour	Fitness
Programmes	-	0.638	0.536	0.425	0.292
Motivation		-	0.290	0.538	0.371
Attitude			-	0.498	0.363
Behaviour				-	0.663
Fitness					-

Discriminant validity was assessed using both the Fornell-Larcker criterion and the HTMT ratio, with the results presented in **Tables 5** and **6**. Fornell-Larcker analysis shows that the square root of the AVE for each construct exceeds its correlations with other constructs. In addition, all HTMT values are below the recommended threshold of 0.85. These results indicate that the constructs are empirically distinct and demonstrate satisfactory discriminant validity. Following the establishment of measurement validity, the structural model was evaluated. The structural model results summarise the strength and significance of the relationships among latent variables. **Table 7** presents the path coefficients, t-statistics, and p-values for the direct effects tested in this study.

Table 7. Path Coefficients Results

Path	β (O)	T	P
Attitude → Behaviour	0.336	5.201	0.000
Behaviour → Fitness	0.600	12.073	0.000
Programmes → Attitude	0.482	7.708	0.000
Programmes → Motivation	0.575	10.442	0.000
Motivation → Behaviour	0.400	6.565	0.000

Programme perceptions were positively associated with psychological factors. Specifically, perceived programme quality showed significant positive associations with motivation (β = 0.575) and attitude (β = 0.482). In turn, both motivation and attitude were positively associated with students' physical activity behaviour, with motivation demonstrating a stronger association (β = 0.400) than attitude (β = 0.336). Physical activity behaviour was positively associated with perceived fitness (β = 0.600), indicating that students who reported more active behaviour also tended to report higher perceived fitness.

Table 8. Indirect Effects

Relationship	β (O)	T	P
Attitude → Behaviour → Fitness	0.202	4.514	0.000
Programmes → Attitude → Behaviour	0.097	3.649	0.000
Programmes → Motivation → Behaviour	0.230	5.484	0.000

Relationship	β (O)	T	P
Motivation → Behaviour → Fitness	0.240	5.680	0.000
Programmes → Attitude → Behaviour Fitness	0.162	4.048	0.000
Programmes → Motivation → Behaviour → Fitness	0.138	4.901	0.000

Indirect effect analysis indicates that all mediated relationships are statistically significant ($p < 0.001$). Attitude is indirectly associated with perceived fitness through physical activity behaviour ($\beta = 0.202$, $t = 4.514$), while motivation also shows a significant indirect association with perceived fitness via behaviour ($\beta = 0.240$, $t = 5.680$). School-based physical activity programmes are indirectly associated with physical activity behaviour through attitude ($\beta = 0.097$, $t = 3.649$) and motivation ($\beta = 0.230$, $t = 5.484$), with the pathway through motivation demonstrating a stronger effect. Furthermore, programmes show significant sequential indirect associations with perceived fitness through attitude and behaviour ($\beta = 0.162$, $t = 4.048$) and through motivation and behaviour ($\beta = 0.138$, $t = 4.901$), confirming the mediating role of psychological factors and behavioural engagement in the model.

Table 9. Result of Coefficient of Determination (R^2), Predictive Relevance (Q^2), Variance Inflation Factor (VIF), and Effect Size (f^2)

Variable	R^2	Q^2	Construct Relationship	VIF	f^2
Attitude	.232	0.220	Programmes → Attitude	1.000	0.302
Motivation	0.331	0.319	Programmes → Motivation	1.000	0.494
Behaviour	0.344	0.141	Attitude → Behaviour	1.076	0.160
Fitness	0.360	0.065	Motivation → Behaviour	1.076	0.227
			Behaviour → Fitness	1.000	0.563

The R^2 values show that the model has a moderate ability to account for variance in both behaviour and perceived fitness outcomes. The Q^2 values greater than zero serve as an indication of the model's predictive relevance. The largest effects were found for the paths from behaviour to perceived fitness ($f^2 = 0.563$) and from programmes to motivation ($f^2 = 0.494$). Based on common benchmarks for f^2 (around 0.02 small, 0.15 medium, and 0.35 large), the effects of programmes on motivation ($f^2 = 0.494$) and of behaviour on perceived fitness ($f^2 = 0.563$) can be considered large, while the paths from intervention to attitude and from motivation to behaviour fall in the medium range. These magnitudes indicate that differences in how the school physical activity programme is perceived are meaningfully related to students' motivation and behaviour, and that variation in activity levels is clearly reflected in how fit students feel in their daily school lives.

Multicollinearity is unlikely to be a problem, as the VIF values range from 1.000 to 1.076. Overall, these findings suggest that, in this sample, students who perceive stronger school physical activity programmes also tend to report higher motivation and more positive attitudes, which in turn are associated with more frequent physical activity and higher levels of perceived fitness. The overall fit of the model was evaluated using several goodness-of-fit indices in the PLS-SEM analysis. The SRMR value of 0.061, which falls under the commonly used 0.08 cut-off, suggests that the model fits the data reasonably well. The NFI value of 0.861 also indicates an acceptable level of fit, although it does not meet the stricter 0.95 criterion. This finding supports the model's utility in clarifying the links among the constructs in this investigation.

Discussion

The structural model showed that the school-based physical activity programmes were positively associated with students' motivation and attitudes toward physical activity, with a stronger effect on motivation. This finding indicates that students' experiences in school physical activity programmes are closely related to their psychological readiness to be active. Well-structured learning activities that are clear, appropriate in challenge, and aligned with students' abilities can support feelings of autonomy and competence, which are essential for the development of intrinsic motivation according to self-determination theory (Shannon et al., 2018). Previous studies have shown that autonomy-supportive teaching strategies and positive learning climates in physical education are linked to higher student motivation and enjoyment (Sevil-Serrano et al., 2020). That model-based practices such as sport education and teaching games for understanding foster intrinsic motivation and active participation (Sierra-Díaz et al., 2019; Spittle & Byrne, 2009).

Consistent with this theoretical perspective, motivation emerged as a stronger predictor of physical activity behaviour than attitudes. Research with primary school children has demonstrated that psychological need fulfillment is associated with higher autonomous motivation and greater physical activity participation (Sebire et al., 2013). Similar results have been reported in school contexts, where autonomous motivation mediated the relationship between social support and moderate-to-vigorous physical activity (Qi et al., 2024). The present findings suggest that students who perceive physical activity as meaningful and enjoyable are more likely to engage in higher levels of physical activity. These results highlight the importance of addressing students' internal motivational processes, as interventions that focus solely on increasing activity time without considering students' experiences may have limited long-term effects.

In this model, physical activity behaviours are significantly correlated with perceived fitness levels. The result is consistent with earlier evidence showing that how often and how vigorously children move is related to their cardio respiratory fitness and other components of physical fitness (Emeljanovas et al., 2020). Research conducted with primary school students has indicated a correlation between weekly activity patterns and fitness categories. Specifically, students who engage in more physical activity tend to demonstrate higher levels of fitness (Ma'arif & Hasmara, 2023; Wahid & Kurniawan, 2023). Systematic reviews indicate that higher fitness levels are associated with superior health profiles and academic performance (Donnelly et al., 2016; Latino & Tafuri, 2023). In this study, fitness was measured using perceived fitness, defined as students' self-assessment of their daily physical fitness, vigour, and resistance to physical activity. The analysis showed that students with higher physical activity levels generally rated their fitness more positively. It is imperative to interpret such findings as reflecting perceptions of fitness rather than as direct evidence of changes in objective fitness measured by physical tests.

The indirect effect findings further clarify the mechanism underlying these relationships. School-based physical activity programmes were indirectly associated with physical activity behaviour through both motivation and attitude, with the pathway through motivation demonstrating a stronger magnitude. In addition, the association between psychological factors and perceived fitness was mediated by physical activity behaviour. These results indicate that programme perceptions relate to perceived fitness primarily through motivational processes and subsequent behavioural engagement rather than through a direct pathway.

The observed pattern of results suggests a correlation between perceptions of the school programme, students' attitudes and behaviours towards physical activity, their daily activities, and their self-assessment of fitness. Students who perceive the school's physical activity programme to be clear, regular, and challenging yet commensurate with their abilities tend to report on more positive motivations and attitudes. These more positive motivations and attitudes were associated with more frequent and more active physical activity behaviours, and more active students reported higher levels of perceived fitness. This phenomenon aligns with research findings indicating that school learning environments that promote autonomy and competence are associated with heightened motivation and increased engagement in physical activity (Knittle et al., 2018; Shannon et al., 2018).

The potential for psychological mechanisms to elucidate these relationships is a promising avenue for future research. Instructional strategies that provide opportunities for choice, clear feedback, and measurable challenge have been shown to fulfil needs for autonomy, competence, and social connectedness, thereby rendering physical activity more personally meaningful and less of an external demand (Sevil-Serrano et al., 2020). Recent reviews have positioned self-determination theory as a significant framework for understanding how social support, psychological need fulfilment, and more autonomous regulation contribute to health behaviours, including physical activity in school settings (Qi et al., 2024). The experience of feeling capable and valued in physical activity has been shown to associate movement with positive emotions and self-esteem. This, in turn, has been demonstrated to strengthen motivation and improve perceptions of fitness. Repeated completion of physical activities has been shown to lead to the development of a schema portraying the self as a fit and active individual. This, in turn, fosters the establishment of long-term movement habits.

The results of this research add new insight into how school-based physical activity programmes that support movement behaviour and perceived fitness in primary school students. Longitudinal studies and school-based fitness assessments highlight the importance of tracking physical activity and fitness as key indicators of children's population health (Emeljanovas et al., 2020; Ingvarsdottir et al., 2024). The present research advances current understanding by showing that perceived programme quality, motivation, attitudes, physical activity behaviour, and perceived fitness can be incorporated within a single structural model. The practical implications of this study indicate the need to develop physically active, psychologically sensitive educational programmes in primary schools.

From a theoretical perspective, this study extends self-determination theory by integrating school-based physical activity programmes, motivational processes, physical activity behaviour, and perceived fitness within a single structural model among primary school students. Programmes should not only increase exercise intensity or duration but also organise learning experiences that foster students' feelings of engagement, value, and competence. Evidence indicates that a substantial proportion of primary school students demonstrate low to moderate fitness levels (He et al., 2023; Ma'arif & Hasmara, 2023; Wahid & Kurniawan, 2023), highlighting the importance of embedding physical activity programmes within the school curriculum and culture rather than treating them as supplementary activities. Programmes that are implemented consistently, perceived as enjoyable, and supportive of daily movement habits may enhance students' motivation, physical activity behaviour, and perceived fitness. Nevertheless, this study relied on self-report measures collected at a single time point, which may introduce common-method bias. Future research should incorporate objective indicators of physical activity and fitness to strengthen the interpretation of these findings.

CONCLUSION

The present study indicates that school-based physical activity programmes, motivation, attitudes, physical activity behaviour, and perceived fitness are interconnected among primary school students. Students who perceive school physical activity programmes more positively tend to report higher motivation and more positive attitudes, and those with stronger motivation and attitudes tend to be more active; in turn, physical activity behavior emerges as the strongest correlate of perceived fitness. Physical education should therefore be recognised as a core curricular component and supported by pedagogical strategies that promote motivation, enjoyment, and appropriate challenges. From an education policy perspective, these findings support the integration of psychologically informed physical activity programs into the primary school curriculum to foster sustainable movement behaviours and positive fitness perceptions. This study is limited by its cross-sectional, self-report design, the relatively small single-school sample, and the lack of control for demographic factors such as gender, grade level, and body mass index. Future research is recommended to use longitudinal or experimental designs, combine perceived fitness with objective measures of physical activity and physical fitness, and test and refine this model in more diverse school settings to better understand the development of children's physical activity and fitness habits.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest related to this study.

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