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Learning motivation and physical education learning outcomes among fifth-grade elementary school students: a correlational study

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ABSTRACT

Learning motivation is widely regarded as a key psychological driver of student achievement, yet evidence on its relationship with physical education outcomes at the elementary level remains limited. This study examined the relationship between learning motivation and Physical Education, Sport, and Health (PJOK) learning outcomes among fifth-grade students at a public elementary school in Tanah Datar Regency, West Sumatra, Indonesia. A quantitative correlational design was employed. All 27 fifth-grade students (15 boys, 12 girls) were recruited through total/purposive sampling. Learning motivation was measured using a 47-item four-point Likert questionnaire covering perseverance, resilience to difficulty, interest and attentiveness, and achievement orientation, while PJOK learning outcomes were operationalized as students' semester report-card scores. Data were analyzed using Liliefors normality tests, Pearson product-moment correlation, and t-test significance testing. A significant, positive, moderate correlation was found between learning motivation and PJOK learning outcomes ($r = 0.430$, $n = 27$, $p < 0.05$; $t = 2.38 > t_{table} = 1.70$), with motivation accounting for approximately 18.5% of the variance in outcomes ($r^2 = 0.185$). These findings indicate that motivation is a meaningful, though partial, correlate of PJOK achievement among young learners, consistent with self-determination theory. Implications for pedagogy and future research are discussed.



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Introduction

Physical education occupies a central place in national education systems because it is one of the few school subjects that simultaneously targets psychomotor, cognitive, and affective development (García-Hermoso et al., 2020; Dudley et al., 2022). Beyond fitness and motor competence, well-implemented physical education contributes to twenty-first-century competencies such as collaboration, critical thinking, and disciplined self-regulation, and it is formally mandated in Indonesia under Law No. 20/2003 on the National Education System as a compulsory subject at the primary and secondary levels (Badan Standar Nasional Pendidikan, 2006; Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi, 2022).

A substantial body of international evidence links structured physical education and physical activity to a broad range of developmental outcomes. Systematic reviews and meta-analyses have shown that physical

education interventions improve motor competence (García-Hermoso et al., 2020; Han et al., 2022), that classroom-based physical activity is associated with academic and behavioral gains (Watson et al., 2017; Norris et al., 2020), and that pedagogical models emphasizing student-centered, cooperative, or game-based approaches strengthen engagement and skill acquisition (González-Víllora et al., 2019; Casey & Goodyear, 2015). Within this literature, psychological engagement variables, especially motivation, are consistently identified as proximal determinants of participation, effort, and learning in physical education (Kingston et al., 2023; Dudley et al., 2022).

Self-determination theory (SDT) offers the most extensively tested theoretical account of this relationship. A large-scale meta-analysis of 265 studies in school physical education found that autonomous forms of motivation were consistently associated with adaptive outcomes, whereas controlled motivation and amotivation were associated with maladaptive outcomes (Vasconcellos et al., 2020). Complementary qualitative syntheses show that need-supportive teaching and positive peer relationships strengthen students' autonomous motivation and, in turn, their engagement in physical education (White et al., 2021). At the same time, evidence from the broader academic-achievement literature paints a more cautious picture: a meta-analysis of 79 studies on the motivation-performance link among mostly older students reported a pooled correlation of only $r = .12$, a small effect by conventional standards (Richardson, Abraham, & Bond, 2012).

This pattern reveals a research gap. Much of the quantitative SDT-in-PE evidence derives from secondary-school and Western samples, and general academic-motivation meta-analyses are dominated by university and secondary populations (Richardson et al., 2012; Vasconcellos et al., 2020). Comparatively little correlational evidence exists for elementary-age children, whose motivational profiles are shaped by developmentally distinct factors such as play, teacher warmth, and family involvement (Mahmudi et al., 2020; Kingston et al., 2023). A further knowledge gap concerns non-Western, rural, and small-school contexts, where most available Indonesian studies on this topic are institution-specific theses rarely indexed internationally (Asnaldi et al., 2018; Prastyo et al., 2020).

At the study site, preliminary observation and semester report-card data indicated that 12 of 27 fifth-grade students (44.4%) had not reached the minimum mastery criterion in PJOK, alongside behavioral indicators of low enthusiasm such as poor attendance, passive participation, and reluctance to complete assigned tasks. Because motivation is theorized to be a proximal, modifiable driver of such engagement patterns (Rahman, 2021), establishing whether and how strongly it relates to actual outcomes in this setting is a necessary first step before designing motivational interventions.

Accordingly, this study aimed to examine the relationship between learning motivation and PJOK learning outcomes among fifth-grade students at SDN 16 Padang Magek, West Sumatra, Indonesia, using a quantitative correlational design.

Method

Research Design

This study used a quantitative correlational design intended to determine the direction and magnitude of association between two variables without manipulating either one (Sudaryono, 2017). The independent variable was students' learning motivation (X); the dependent variable was PJOK learning outcomes (Y).

Participants and Setting

The study was conducted in June 2025 at SDN 16 Padang Magek, a public elementary school in Tanah Datar Regency, West Sumatra, Indonesia. The accessible population comprised all fifth-grade students at the school ($N = 27$). Sixth-grade students were excluded because the school principal did not permit their participation during a period of final-examination preparation.

Sampling Technique

A purposive (total) sampling technique was used: because the eligible population was small ($n = 27$) and fully accessible, all fifth-grade students were included as the study sample, consistent with methodological guidance that populations below 100 are generally sampled in full rather than through probability subsampling (Arikunto, 2010). The final sample consisted of 15 boys and 12 girls aged approximately 10–12 years.

Research Instrument

Learning motivation was measured using a structured, closed-ended questionnaire developed from four theoretically derived dimensions: (a) perseverance in learning, (b) resilience when facing difficulty, (c) interest and attentiveness during lessons, and (d) achievement orientation (adapted from Slameto, 2010). The instrument comprised 47 items rated on a four-point Likert scale (Strongly Agree to Strongly Disagree), with the neutral midpoint deliberately omitted to encourage a more definite response (Joshi et al., 2015). PJOK learning

outcomes were operationalized as students' semester report-card scores for the 2025/2026 even semester, computed by the classroom PJOK teacher as a weighted composite of attitude, skill/practice, and knowledge-test scores according to standard school assessment procedures.

Validity and Reliability

The motivation questionnaire was constructed from an established theoretical blueprint (kisi-kisi) mapping each item to a specific motivational sub-indicator, providing content validity through expert-guided item-domain alignment during thesis supervision. The PJOK outcome measure is a routinely administered, school-standardized assessment rather than a study-specific instrument. The original thesis did not report empirical item-level validity coefficients or an internal-consistency reliability coefficient (e.g., Cronbach's alpha) for the motivation questionnaire; this is acknowledged as a methodological limitation.

Data Collection

Questionnaires were distributed directly to students in a single classroom session. Prior to completion, the researcher explained the purpose of the study and the instructions for responding, and students completed the questionnaire independently. Completed questionnaires were checked for completeness before scoring. PJOK outcome scores were obtained from existing school administrative records for the same cohort and time period.

Statistical Analysis

Data were analyzed descriptively (mean, standard deviation, frequency distribution) for each variable. Prior to hypothesis testing, normality of each variable's distribution was assessed using the Liliefors test. The relationship between learning motivation and PJOK outcomes was then tested using Pearson product-moment correlation, and the significance of the correlation coefficient was evaluated using a t-test (Abdurahman & Muhidin, 2007), with the decision rule that the null hypothesis of no relationship is rejected when r -calculated exceeds r -table, and confirmed when t -calculated exceeds t -table, at $\alpha = 0.05$.

Ethical Considerations

Institutional permission was obtained from the school principal prior to data collection, and participation was voluntary. Because participants were minors, parental/guardian awareness was mediated through the school, and no personally identifying information beyond what was necessary for linking questionnaire and report-card records was retained. As this manuscript is derived from an undergraduate thesis, formal review by an independent institutional ethics committee was not documented in the original study; this is noted as a limitation.

Results and Discussions

Participant Characteristics

The final sample comprised all 27 fifth-grade students at SDN 16 Padang Magek.

Table 1. Participant Characteristics (N = 27)

Characteristic	Category	n	%
Gender	Male	15	55.6
	Female	12	44.4
Grade level	Grade V (elementary)	27	100.0
Age range	10–12 years	27	100.0

Descriptive Statistics

Descriptive statistics for learning motivation and PJOK learning outcomes are presented.

Table 2. Descriptive Statistics for Learning Motivation and PJOK Learning Outcomes

Variable	n	M	SD	Min	Max
Learning motivation (X)	27	225.30	14.40	201	250
PJOK learning outcome (Y)	27	89.11	1.42	87	92

The mean motivation score (225.3) falls in the moderate category according to the study's classification bands. For PJOK outcomes, all students exceeded the passing threshold, with scores clustering in the "good" (80–89, 63.0%) and "very good" (90–100, 37.0%) bands, reflecting the generally high and range-restricted nature of teacher-assigned report-card scores.

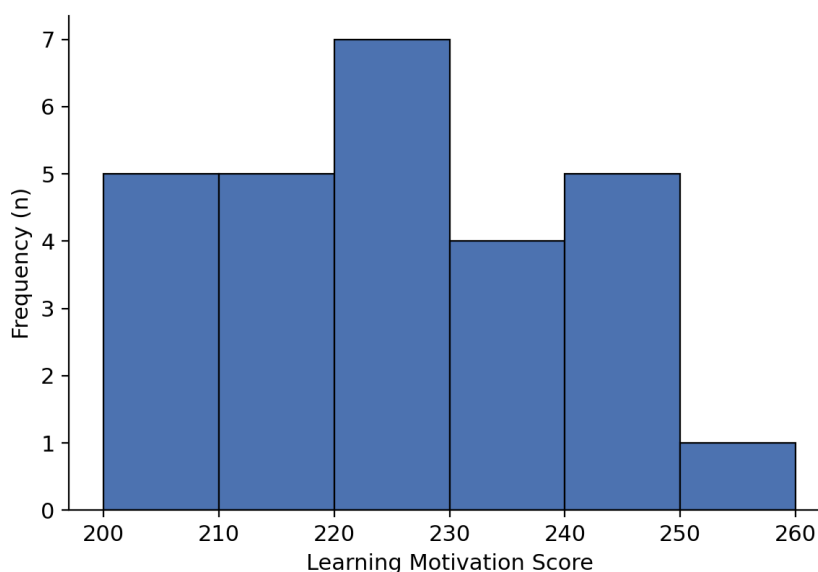


Figure 1. Distribution of Learning Motivation Scores (N = 27)

The distribution of motivation scores is approximately symmetric around the mean ($M = 225.3$, $SD = 14.4$), with most students clustering in the 210–240 range and a small number of students scoring above 245 or below 205, consistent with the Liliefors normality result reported below.

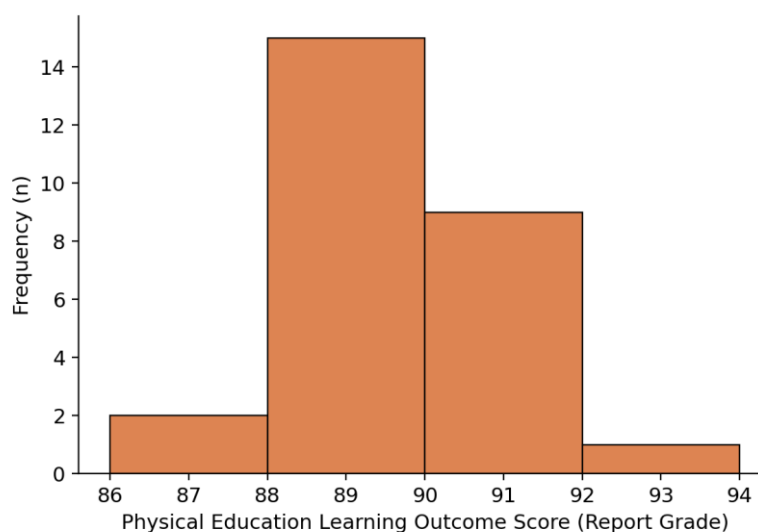


Figure 2. Distribution of PJOK Learning Outcome Scores (N = 27)

PJOK outcome scores are concentrated between 87 and 92, reflecting a ceiling-influenced, narrow-range measure typical of school report-card grading; despite this restriction of range, meaningful variation remains sufficient to detect a significant correlation with motivation.

Test of Analysis Assumptions

Normality of both variables was assessed prior to correlational testing.

Table 3. Normality Test Results (Liliefors)

Variable	n	Lo (calculated)	Ltable ($\alpha = .05$)	Conclusion
Learning motivation	27	0.082	0.173	Normal
PJOK learning outcome	27	0.041	0.173	Normal

Because $Lo < Ltable$ for both variables, the assumption of normally distributed data was satisfied, justifying the use of Pearson product-moment correlation for hypothesis testing.

Hypothesis Testing

Pearson product-moment correlation was computed between learning motivation and PJOK learning outcomes, followed by a t-test of the correlation coefficient's significance.

Table 4. Correlation Between Learning Motivation and PJOK Learning Outcomes

Relationship	n	r-calculated	r-table ($\alpha = .05$)	t-calculated	t-table (df = 25)	p
Motivation (X) - PJOK outcome (Y)	27	0.430	0.381	2.38	1.70	< 0.05

Because r-calculated (.430) exceeded r-table (0.381) and t-calculated (2.38) exceeded t-table (1.70) at $\alpha = 0.05$ (df = 25), the null hypothesis was rejected: there is a statistically significant, positive relationship between learning motivation and PJOK learning outcomes among fifth-grade students at SDN 16 Padang Magek. The coefficient of determination ($r^2 = 0.185$) indicates that learning motivation accounts for approximately 18.5% of the variance in PJOK outcomes, with the remaining 81.5% attributable to other unmeasured factors.

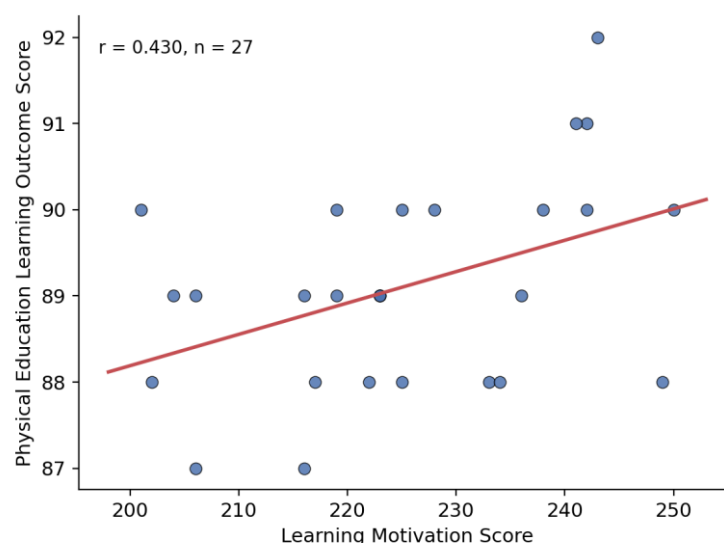


Figure 3. Scatter Plot of Learning Motivation and PJOK Learning Outcome Scores with Regression Line

Each point represents one student ($N = 27$). The fitted regression line ($Y = 80.91 + 0.036X$) illustrates the positive linear trend: higher motivation scores tend to co-occur with higher PJOK outcome scores, consistent with the moderate positive correlation reported above ($r = .430$).

Summary of Findings

This study found a statistically significant, positive, and moderate correlation ($r = 0.430$) between learning motivation and PJOK learning outcomes among fifth-grade elementary students, with motivation explaining approximately 18.5% of outcome variance. The discussion below interprets the finding and situates it within the international literature.

Table 5. Summary of Key Findings

Finding	Statistic	Interpretation
Distribution of motivation and outcome scores	Both variables normal ($Lo < L_{table}$)	Parametric correlation analysis appropriate
Association between motivation and outcomes	$r = 0.430, p < 0.05$	Significant, positive, moderate correlation (Cohen, 1988)
Explained variance	$r^2 = 0.185$	Motivation explains ~18.5% of outcome variance
Significance test	$t = 2.38 > t_{table} = 1.70$	Relationship is statistically reliable, not attributable to chance

First, the magnitude of the association is notably larger than the pooled effect reported for motivation-achievement links in the broader academic literature. Richardson, Abraham, and Bond's (2012) meta-analysis of psychological correlates of university students' GPA reported an average correlation of only $r = 0.12$, a small

effect by Cohen's (1988) conventions. The present $r = 0.430$ falls instead in the medium-to-moderate range, suggesting that the motivation-outcome link may be tighter in physical education specifically, and among younger children specifically, than in general academic subjects among older students. This is consistent with self-determination theory, which posits that physical education because it is behaviorally observable, effortful, and socially situated offers a domain in which motivational states translate more directly into visible performance than domains relying primarily on covert cognitive processing (Vasconcellos et al., 2020).

Second, the finding aligns with, and extends, the self-determination theory evidence base. Vasconcellos et al.'s (2020) meta-analysis of 265 studies found that autonomous motivation was consistently associated with adaptive outcomes in school physical education, while White et al. (2021) showed qualitatively that need-supportive teaching and positive peer relationships cultivate this autonomous motivation. Although the present study did not disaggregate motivation into SDT's autonomous-controlled continuum, the overall positive association is consistent with this broader pattern and suggests that mechanisms documented in predominantly Western, secondary-school samples may generalize, at least in direction, to an Indonesian elementary-school context.

Third, the result should be interpreted through a developmental lens. At the elementary level, motivation is shaped less by abstract future-oriented goals and more by immediate experiences of enjoyment, teacher warmth, and family encouragement (Kingston et al., 2023; Mahmudi et al., 2020). Descriptively, the sample's motivation scores clustered in the moderate range, with a secondary group (29.6%) falling in the "good" category; this suggests headroom for motivational intervention, since students in the "less" and "very less" bands (each 7.4%) may be particularly responsive to increased teacher support or family engagement.

Fourth, the modest explained variance (18.5%) is itself an important and honest finding: it indicates that motivation is a real but partial correlate of PJOK achievement, not its dominant determinant. The remaining ~81.5% of variance likely reflects factors such as motor ability, physical fitness, health status, instructional quality, availability of sporting facilities, and out-of-school practice opportunities consistent with reviews showing that physical education outcomes are multiply determined by fitness, motor competence, and contextual/curricular factors as much as by psychological engagement (García-Hermoso et al., 2020; Han et al., 2022; Dudley et al., 2022). This reinforces that motivational interventions alone are unlikely to close the achievement gap without complementary attention to instructional and resource conditions.

Fifth, the restricted range in the outcome variable (87–92) merits comment. Because PJOK grades are computed from teacher-assessed attitude, skill, and knowledge components rather than a single objective test, some range restriction is expected and typically attenuates observed correlations (Richardson et al., 2012). That a significant, moderate correlation was nonetheless detected despite this attenuation suggests the true population relationship may be at least as strong, underscoring the practical relevance of motivation even under conservative measurement conditions.

Sixth, the composition of the motivation construct perseverance, resilience to difficulty, interest, and achievement orientation maps closely onto behavioral indicators repeatedly identified as central to physical education engagement in the literature: active participation, willingness to attempt and repeat challenging movements, and sustained attention during instruction (Kingston et al., 2023; González-Víllora et al., 2019). This convergence strengthens confidence that the observed relationship reflects a substantively meaningful psychological process rather than an artifact of instrument idiosyncrasy.

Seventh, students exhibiting higher motivation likely benefit from a self-reinforcing cycle: greater willingness to attempt movements leads to more practice repetitions, which builds competence, which in turn strengthens intrinsic motivation a feedback loop consistent with competence-need satisfaction pathways in SDT (Vasconcellos et al., 2020; White et al., 2021). Conversely, low-motivation students may experience a converse cycle of avoidance, reduced practice, slower skill acquisition, and further motivational decline, a pattern the present cross-sectional design cannot directly test but which is consistent with longitudinal reciprocal-effects research in the broader literature.

Eighth, family and school-environment factors, though not directly measured here, plausibly moderate the observed relationship. Prior evidence indicates that parental attention and encouragement shape children's engagement in physical activity and school-based learning more broadly (Mahmudi et al., 2020), while institutional quality and school climate influence the conditions under which motivation can translate into performance (Minsih et al., 2019). Future multivariate work that includes these contextual variables alongside motivation would help clarify how much of the unexplained variance is attributable to family and institutional factors versus purely physical/motor determinants.

Ninth, the significance test result ($t = 2.38 > t_{table} = 1.70$) confirms that the observed association is unlikely to be a chance finding given the sample size, even though $n = 27$ is modest. This statistical reliability, combined with the theoretical plausibility of the mechanism and its consistency with the broader SDT-in-PE literature, provides converging evidence that the relationship is genuine rather than an artifact of a small, single-school sample though replication in larger, multi-school samples remains necessary.

Tenth, taken together, these findings support a nuanced practical message for physical education stakeholders: motivation matters, and is a legitimate, evidence-based lever for improving PJOK learning outcomes among young learners, but it should be pursued as one component of a broader strategy that also addresses instructional quality, facilities, and family engagement, rather than as a stand-alone solution.

Practical Implications

For classroom practice, PJOK teachers can strengthen student motivation through variety in teaching methods, the use of educational games, constructive feedback, and recognition of effort and improvement rather than only outcome, strategies broadly consistent with need-supportive teaching approaches shown to foster autonomous motivation in physical education (White et al., 2021; Kingston et al., 2023). For school leadership, ensuring adequate sports facilities and equipment removes a structural barrier to the enactment of motivated behavior, complementing psychological intervention with the material conditions needed for practice and skill development (García-Hermoso et al., 2020). For families, encouraging out-of-school physical activity and expressing interest in children's PJOK progress can reinforce classroom-based motivational strategies, consistent with evidence on the role of parental attention in children's learning engagement (Mahmudi et al., 2020). For curriculum designers and policymakers, the moderate but partial explanatory role of motivation suggests that motivational programming should be integrated within, rather than substituted for, broader efforts to strengthen instructional quality and resource provision in elementary PJOK programs.

Limitations

Several limitations should be considered when interpreting these findings. First, the cross-sectional correlational design precludes causal inference; motivation and PJOK outcomes may influence one another reciprocally over time, a possibility this design cannot disentangle. Second, the sample was drawn from a single class at a single elementary school ($N = 27$), limiting statistical power and generalizability to other schools, regions, or age groups. Third, the original thesis did not report empirical validity or reliability coefficients (e.g., Cronbach's alpha) for the motivation questionnaire, so measurement precision cannot be independently verified. Fourth, the outcome measure teacher-assigned report-card scores combines subjective and more objective components and exhibited a narrow range (87–92), which may have attenuated the observed correlation. Fifth, potential confounding variables such as motor ability, physical fitness, socioeconomic status, and teacher characteristics were not measured or statistically controlled, so the true unique contribution of motivation net of these factors remains unknown. Finally, formal independent ethical review was not documented for the original data collection, which is noted for transparency.

Conclusions

This study found a statistically significant, positive, moderate correlation ($r = .430, p < .05$) between learning motivation and PJOK learning outcomes among fifth-grade students at SDN 16 Padang Magek, Indonesia, with motivation accounting for approximately 18.5% of outcome variance. The finding supports self-determination theory's prediction that motivation is meaningfully linked to engagement and achievement in physical education, while also indicating that most outcome variance remains attributable to other factors. Fostering learning motivation through need-supportive teaching, adequate facilities, and family engagement represents one evidence-based strategy among several that schools can pursue to strengthen PJOK learning outcomes in elementary settings.

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