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Sport-confidence and learning motivation as joint predictors of basketball skill-learning outcomes in physical education

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ABSTRACT

Sport-confidence was assessed through the 13-item Trait Sport-Confidence Inventory (TSCI), learning motivation through the 18-item Sport Motivation Scale-II (SMS-II), and basketball skill-learning outcomes through the AAHPERD Basketball Skills Test (speed spot shooting, passing, and control dribble), combined into a composite T-score. Data were studied using Pearson product-moment correlation and multiple correlation with an F-test of significance. Descriptive outcomes showed a high level of confidence ($M = 48.69$, $SD = 8.57$) and a high level of motivation ($M = 50.93$, $SD = 6.04$) mainly. Sport-confidence was not significantly linked to basketball skill outcomes when taken alone ($r = .239$, $p = .212$), and the same for learning motivation ($r = -.224$, $p = .243$). However, the two psychological variables taken together predicted a significant portion of variance in skill outcomes ($R = .461$, $R^2 = .212$, $F(2, 26) = 3.502$, $p = .045$), which accounted for 21.2% of the variance. These results indicate that confidence and motivation function as complementary rather than independent predictors of motor-skill learning, and that their combined psychological profile, rather than either construct alone, has substantial educational meaning. Since the sample size was quite small (only 29), we consider results from the study as preliminary evidence rather than a thorough test of the hypotheses; however, the fact that 21.2% of the joint variance was explained means that instruction in PE that deals with both confidence and motivation at the same time, rather than treating them as separate targets, could be the one that ultimately results in the greatest practical benefit when it comes to skill acquisition. A discussion of the implications for psychologically informed PE pedagogy and directions for confirmatory research with larger samples is provided.



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Introduction

Educational systems throughout the world are currently dealing with many pressures together that, among other things, make the psychological aspect of learning harder and harder to disregard. On the one hand, they are expected to produce learning content and performance indicators that could be quantified. On the other hand, the well-being of the youngsters, their engagement, and their motivation, especially considering that adolescent mental health problems have been documented in high-, middle-, and low-income settings, are decreased, quite often, in a situation that corresponds to real life. Within this setting, Physical Education has a distinctive role in schools. Besides the fact that a subject like music or drama that is knowledge-based primarily relies on acquiring

knowledge, PE is one of the few subjects in schools where the mental, emotional, and manual aspects are all engaged interactively at the same time (Rosdiani, 2014). Therefore, PE is not placed above but amongst other experiential subjects, yet it is the combination of the psychomotor demands and the curriculum-wide reach that makes it an especially fitting context for examining the relationship between psychological factors and skill learning. Worldwide education policy is increasingly viewing PE not as a fringe or extra activity but rather as the key touchpoint for adolescent wellbeing, considering that psychological problems in school-age populations have intensified all over the world according to statistics that have recently been reported. In fact, the latest data of epidemiological surveillance show that a high percentage of teenagers are now that referring to being seriously anxious, less well or happy, and that they do not like or hate attending really structured schools (Ferreira Díaz, 2026). Also, reviews that look at the mental health of the youth sector over time identify physical education within the school context as one of the few scalable, low-cost interventions that help to counteract these patterns (Li et al., 2024). Considering this change in the order, PE results should also be realized differently: being able to move skillfully is not just a physical demonstration, but combining both the physical being and the mental being that are operating during the work and skill development times is the jointly produced result of the two continuous processes that are most relevant.

Among these psychological states, confidence and motivation have been the most studied in sport and exercise psychology; however, they remain seldom researched simultaneously in real school-based skill-learning contexts. Self-confidence in sport, often referred to as sport-confidence, following Vealey's (1986) multidimensional model, is an individual's level of belief in their ability to perform a sport-related task successfully. Internationally, a majority of research links higher self-efficacy and sport-confidence to better technical performances in training and competitive situations. For instance, a systemic review and meta-analysis of self-efficacy studies in high-performance sport found that efficacy beliefs are very positively and consistently related to objective performance indicators in both individual and team sports (López-Rodríguez et al., 2025). Besides, in basketball, players with higher self-efficacy also report greater shooting success (Santua, 2020), while psychological skill interventions, self-talk among them, can maintain shot accuracy in pressure situations (Yang et al., 2024), indicating that the psychological aspect of shooting may not be just correlate but even causally linked. This study considers learning motivation as its second focus. Self-Determination Theory (SDT; Ryan & Deci, 2017) is the most popular framework used for interpreting the quality of human motivation in educational and sport settings. It identifies amotivation, several types of extrinsic regulation, and intrinsic motivation as existing along one continuum of self-determination. On the level of physical education, the psychological needs of autonomy, competence, and relatedness have been demonstrated to be a basis for more autonomous types of motivation, which, in turn, lead to higher engagement with motor activities (Hsu et al., 2023). Teaching methods and programs that are purposefully structured to nurture these needs have achieved observable improvements in student involvement in basketball units among other things: self-confidence, power, and knowledge of technical content (Bessa et al., 2021; Liu et al., 2023; Sukiri et al., 2024; Zhang, Xiao, et al., 2024). A latest meta-analysis of SEM reveals that it is intervention qualities, not motivation alone, which control these results to a significant degree, therefore, it can be inferred that motivational quality depends on up structural and contextual factors of the learning environment which can be seen even in interactions rather than being a solo determinant of skill outcomes (Zhang, Soh, et al., 2025). Similarly, studies on competitive basketball players show motivation and psychological needs satisfaction not only in association with each other predicting athlete commitment and resilience but also all pointing out a multivariate rather than single-factor of the psychological influence on basketball-specific results (Kostopoulos et al., 2024).

However, the evidence presented so far has revealed three major areas of concern: firstly, the majority of studies on psychological aspects related to basketball rely on the evidence of athletes training within a team or involved at quite high levels, and such factors as motivation and self-confidence of these athletes are known to be systematically different from those of general students who attend PE classes for the purpose of fulfilling the requirements of the curriculum only (Franco et al., 2021). Secondly, sport-confidence and motivation are generally considered two separate predictors in research, but only a handful of studies examine their combined effect on outcomes of motor skill learning, although theoretically there are good reasons to think that these two may be correlated and interact in influencing performance (Kostopoulos et al., 2024; Weinberg & Gould, 2018). Third, Southeast Asian secondary school PE settings have not yielded much empirical research; the few Indonesian studies on sport-confidence and basketball have primarily employed qualitative methods or literature review rather than quantitative correlate analysis with objectively scored motor tests (Hasan & Priana, 2025; Shapie et al., 2023). This is a particularly significant deficiency given that motor skill outcomes are consistently associated with broader academic and developmental paths (Wang & Wang, 2024) which means psychological factors influencing skill development in PE can have implications not only for sport-science but also for education."

Another point to be considered is the pedagogy through which psychological resources in PE are developed. Based on comparison and meta-analysis of the Sport Education Model (SEM), a curriculum that follows seasons, involves team affiliation, and formal competition instead of isolated skill drills, research that structurally integrates psychological need support within PE units has consistently documented that students' self-confidence, empowerment, and technical content knowledge can be significantly increased by such a psychologically-need-supportive PE instructional model compared to the conventional technique-only teaching method (Zhang, Geok Soh, et al., 2024; Zhang, Xiao, et al., 2024). However, most of this support has come from studies that assessed an instructional model in its entirety and not the process through which the psychological variables it aims to nurture, confidence and motivation in particular, are linked to skill outcomes in a single, non-intervention snapshot of typical PE practice. This difference is important for practitioners: a teacher who is unable to change a whole semester of curriculum to follow SEM principles still needs to understand whether, and to what extent, the confidence and motivation that their students presently possess are linked to the skill results that those students are already demonstrating. The current research is geared towards such an immediate, diagnostic question.

Indonesian sports science literature provides a partial, indirect answer. Local research has linked confidence to free-throw shooting ability of extracurricular basketball players (Setianovan et al., 2022) and qualitatively compiled evidence that low confidence through anxiety results in deterioration of motor skills (Mukhtarsyaf et al., 2022), and some local works have combined anxiety and motivation as the two correlated factors to the results of motor-skill learning in swimming (Hasan & Priana, 2025) and gymnastics (Lesmana & Raharja, 2025). On the whole, these studies lend empirical support to the idea that the relationship between confidence, motivation and performance exists in Indonesian physical education (PE) environments, but none has used validated multidimensional instruments in combination with a criterion-referenced motor battery that was specifically for basketball skill acquisition among general (non-extracurricular) PE students, nor have the two psychological predictors as a whole, rather than separately, been statistically tested. That is exactly the gap this study set out to address. This makes the current research stand apart from previous works like Li et al. (2024), who conducted a narrative review to position PE as a scalable intervention for adolescent mental health at the population level; the present study, on the other hand, offers a quantitative, instrument-based examination of how two specific psychological predictors relate, in isolation, as well as in combination, to a objectively measured skill outcome in one PE class.

The current research attempts to fill these gaps by assessing in one research, the links between sport confidence, learning motivation, and objectively measured basketball skills learning outcomes of Grade 10 students at a public senior high school in West Sumatra, Indonesia. Its markedness is three features: (a) the concurrent application of internationally validated psychological instruments (the Trait Sport-Confidence Inventory and the Sport Motivation Scale-II) to a standardized, criterion-referenced motor performance battery (the AAHPERD Basketball Skills Test) in a compulsory PE context rather than in an athletic training one; (b) the direct testing of both the separate and the joint (multiple-correlation) contribution of confidence and motivation to skill outcomes, thus making it possible to reveal complementary or suppressor effects that single-predictor designs cannot; and (c) providing context-specific, contribution from a semi-rural Indonesian secondary school, a population that is underrepresented in the international sport-psychology literature. Thus the aims of this research were to (1) characterize the level of sport confidence, learning motivation, and basketball skills learning outcomes of the students sampled; (2) analyze the individual relationships of sport-confidence and learning motivation with basketball skills learning outcomes; and (3) investigate the joint relationship of sport-confidence and learning motivation, taken collectively, with basketball skills learning outcomes. Figure 1 depicts the conceptual model tested in this research, outlining the expected separate and combined effects of sport-confidence and learning motivation on basketball skill-learning achievements.

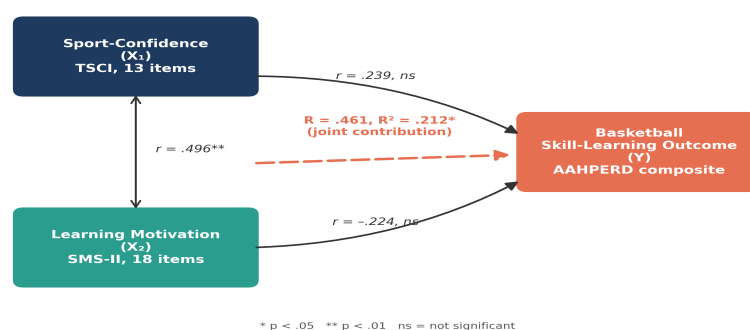


Figure 1. Conceptual model of the individual and joint associations of sport-confidence and learning motivation with basketball skill-learning outcomes.

Method

Study Design

This research utilized cross-sectional, correlational (ex post facto) design. Measurement of predictor variables (sport-confidence and learning motivation) and criterion variable (basketball skill-learning outcomes) was done at one time point only. The study did not manipulate variables; thus, the design is correlational and allows for determining the strength and direction of the naturally occurring associations between the psychological and psychomotor variables (Maksum, 2018).

Participants and Setting

The research was carried out in a public senior high school (SMA Negeri 1 Lembah Gumanti) situated in Lembah Gumanti District, Solok Regency, West Sumatra Province, Indonesia, during the even semester of the 2025/2026 academic year. The accessible population consisted of all 324 Grade 10 students distributed across nine parallel classes. Due to scheduling limitations and the condition that the basketball-specific PE lesson had been already given to the sampled class, a purposive sampling method was employed to choose one intact class ($n = 36$) which is representative of the whole Grade 10 population in terms of curriculum exposure and demographic composition. Only 29 out of the 36 enrolled students (80.6%) who were present for both the psychological questionnaires and the full motor performance battery were retained for analysis ($n = 29$). This effective sample is smaller than the sample of 72 originally planned across two classes. A sensitivity power analysis was performed with the settings: alpha at .05, two predictors, the df equaled to 26. It showed that with a sample size of 29, the power of the multiple-regression design was sufficient ($\geq .80$) to detect only medium-to-large joint effects ($f^2 \approx .30$ and above). In other words, the study did not have sufficient power to detect smaller effects, and this limitation of the study, as well as its impact on the bivariate correlations, is further elaborated below. The resulting implications for statistical power are addressed further in the Discussion.

Instruments

Sport-confidence (X_1). Sport-confidence was assessed through a 13-item modified version of Vealey's (1986) Trait Sport-Confidence Inventory (TSCI). It was translated into Bahasa Indonesia and tailored for a school PE setting. Items were categorized into three conceptually derived sub-dimensions: confidence in physical skills and training (5 items), cognitive efficiency (4 items), and resilience (4 items). Each item was scored using a 5-point Likert scale (1 = very low to 5 = very high), where the respondents had to compare their confidence to that of the most competent peer they knew in a sporting environment, according to Vealey's original comparative-referent format. Overall scores could be anywhere between 13 and 65.

Learning motivation (X_2). Learning motivation was assessed by an 18-item modification of the Sport Motivation Scale-II (SMS-II; Pelletier et al., 2013), which is based on the motivational regulation continuum suggested by Self-Determination Theory. This includes intrinsic motivation, three types of extrinsic regulation (external, introjected, identified), and amotivation. The items were rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). A total composite score was calculated and used as the motivation measure in the current study (range 18, 90).

Basketball skill-learning outcomes (Y). Basketball skill was measured using the AAHPERD Basketball Skills Test Battery, which consists of three standardized items: (1) The Speed Spot Shooting Test, which evaluates shooting accuracy and speed from five marked spots within 60 seconds; (2) the Passing Test, which measures chest-pass accuracy and lateral movement speed against wall targets within 30 seconds; and (3) the Control Dribble Test, which measures dribbling speed and directional control through a six-cone slalom course, timed to the nearest tenth of a second. Since the three items are expressed in non-commensurable units (points for shooting and passing; seconds for dribbling), the raw scores were converted to standardized T-scores ($M = 50$, $SD = 10$) with the dribble T-score being inverted so that higher values consistently pointed to better performance in all three items (formula $T = 50 + 10 \times [(X, M)/SD]$; $T = 100$, T for dribble). The final basketball skill-learning composite score (Y) was the sum of the three item T-scores.

Reliability and Validity

The TSCI and SMS-II are internationally recognized instruments with established psychometric properties from previous sport psychology researches; especially, the SMS-II has proven its factorial validity and internal consistency in its original validation study (Pelletier et al., 2013). Content validity for the Indonesian-language adaptations of the versions used in this study was obtained by the expert review of sport-pedagogy and measurement specialists at the researchers' institution, who first studied the match between the items and the indicators with respect to the theoretical blueprint (kisi-kisi) of each instrument before the test administration. AAHPERD Basketball Skills Test is a criterion-referenced (performance level determination) set of tests that has been widely used in schools and youth-sport assessment contexts for a long time and was conducted following standardized procedural conditions (fixed distances, timing protocols, and scoring criteria) to ensure

measurement consistency across participants. We did not calculate the sample-specific internal-consistency coefficients (i.e., Cronbach's α) for the TSCI and SMS-II using this cohort; this is recognized as a limitation, and further studies employing these Indonesian adapted instruments in PE settings should report sample-specific reliability in addition to the already verified psychometric evidence mentioned above.

Data Collection Procedures

Data collection occurred in two stages. In the first stage of preparation, research permits were secured from the Faculty of Sport Science and the participating school. Coordination of data collection schedule with the class PE teacher was done in order to avoid disruption of the core instruction, and the testing materials (questionnaires, basketballs, stopwatches, measuring tapes, and cones) were readied. During the second stage, the participants were first administered the TSCI and the SMS-II questionnaires in a classroom setting after a brief standardized explanation of the study purpose and response procedures. After this, the participants were taken to the basketball court, performed a structured warm-up, and did the three AAHPERD test items in a predetermined sequence, with two scored trials being recorded per item after an initial practice trial.

Ethical Considerations

First, the researcher's faculty and the administration of the participating school were consulted, and they gave permission for institutional research. Instructions about the voluntary nature of participation, the aim of the research, and the confidentiality of individual answers were delivered to students before they filled out the questionnaires. Participation in the regular PE program, including the AAHPERD skills assessment, was not a condition for completing the questionnaire. Apart from a numeric code, no personally identifying information was kept in the analytic dataset.

Statistical Analysis

The data were processed in SPSS. Before testing the hypotheses, two assumption checks were completed: a one-sample Kolmogorov-Smirnov test was used to check if the distribution of each variable was normal ($\alpha = .05$, with $p > .05$ means normal), and a linearity test through simple regression was performed in order to rule out non-linear relationships between the predictors and the criterion. Descriptive statistics (means, standard deviations, minima, maxima, and frequency distributions based on Mean \pm 1 SD categorical banding) were prepared for all three variables. The first two research hypotheses (individual relationships of X_1 and X_2 with Y) were examined through Pearson product-moment correlation, with the test of significance based on the critical r -value corresponding to $df = n, 2 = 27$ ($r_{\text{critical}} = .367$ at $\alpha = .05$, two-tailed), and also with the help of the related t -test. The third hypothesis (combined relationship of X_1 and X_2 with Y) was examined by a multiple correlation analysis, with the significance of R being tested by an F -test: $F = [R^2/k] / [(1, R^2)/(n, k, 1)]$, where k is the number of predictors. The critical F -value was found for $df_1 = 2, df_2 = 26$ at $\alpha = .05$.

Results and Discussions

Descriptive Statistics

Table 1 shows the descriptive statistics of three study variables: sport-confidence (X_1), learning motivation (X_2), and basketball skill-learning outcome (Y). All variables were reported as T-score composites ($M = 50, SD = 10$), for the analysis sample ($n = 29$).

Table 1. Descriptive Statistics and Categorical Distribution of Study Variables ($n = 29$)

Variable	M	SD	Min	Max	High n (%)	Moderate n (%)	Low n (%)
Sport-confidence (X_1)	48.69	8.57	34	62	4 (13.8%)	18 (62.1%)	7 (24.1%)
Learning motivation (X_2)	50.93	6.04	43	68	6 (20.7%)	20 (69.0%)	3 (10.3%)
Basketball skill outcome (Y , T-score composite)	150.00	26.80	112.71	200.04	7 (24.1%)	15 (51.7%)	7 (24.1%)

Note. Categorical bands are based on Mean \pm 1 SD for each variable. For Y , "High" = Good, "Moderate" = Adequate, "Low" = Below adequate, following the T-score composite of the three AAHPERD subtests.

Most students showed moderate levels of sport-confidence (62.1%) and learning motivation (69.0%), with basketball skill-learning outcomes being in the adequate range for the highest proportion of the students (51.7%). However, roughly one-quarter of the students ended up in the low-outcome group, reflecting considerable differences between individuals in terms of their basketball skill acquisition even though they all had the same curriculum. Several non-mutually-exclusive factors could reasonably explain the subgroup with low outcomes despite identical curriculum exposure. These factors may include differences in prior basketball or other sport experiences, variations in instructional fidelity during small-group practice, and measurement error from using a single-occasion motor test. We'll be considering these possibilities more in discussion Section 4.4. Figure 2 illustrates this categorical distribution visually for all three variables.

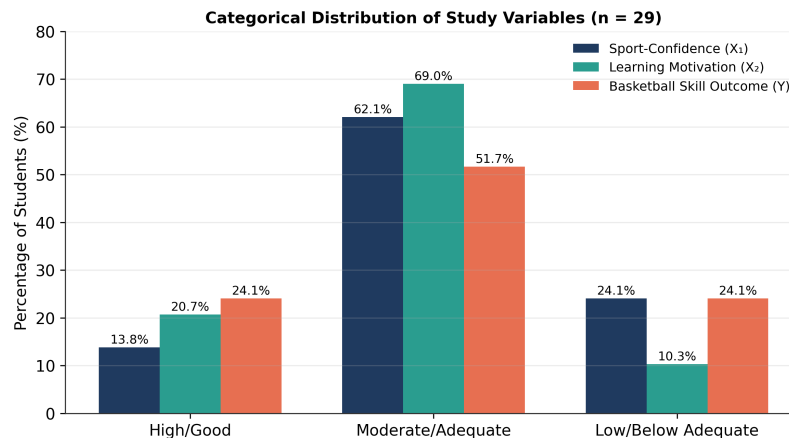


Figure 2. Categorical distribution of sport-confidence, learning motivation, and basketball skill-learning outcomes (n = 29).

Preliminary Assumption Testing

The results of the Kolmogorov, Smirnov tests showed that all the three variables followed normal distribution which led to fulfilment of distributional assumption for parametric correlation analysis (see Table 2). At testing for linearity with the help of simple regression, it was found that there were no significant differences from linearity in either of the predictor, criterion pairs (see Table 3), which verified that Pearson correlation was indeed a suitable method for testing the hypotheses.

Table 2. Kolmogorov–Smirnov Normality Test Results (n = 29)

Variable	D (K–S statistic)	Sig. (p)	Distribution
Sport-confidence (X ₁)	0.133	.634	Normally distributed
Learning motivation (X ₂)	0.182	.259	Normally distributed
Basketball skill outcome (Y)	0.138	.595	Normally distributed

Table 3. Linearity Test Results for Predictor–Criterion Relationships (n = 29)

Relationship	r	F	Sig. (p)	Interpretation
X ₁ → Y	.239	1.633	.212	Linear
X ₂ → Y	-.224	1.422	.243	Linear

Bivariate Associations

Pearson correlation analysis showed that there was a positive relationship between sport-confidence and basketball skill-learning outcomes, but this was not statistically significant, $r(27) = .239$, $t = 1.278$, $p = .212$. It was less than the critical value of $r = .367$ that is required for significance at $df = 27$. Learning motivation exhibited a small negative, also non-significant, relationship with basketball skill-learning outcomes, $r(27) = .224$, $t = 1.193$, $p = .243$. Neither bivariate hypotheses, therefore, were supported at the conventional $\alpha = .05$ threshold.

Multiple Correlation

The correlation between the two predictors was moderate, yet statistically significant: $r(X_1, X_2) = .496$, $p = .006$. When both predictors were taken together in a multiple correlation analysis sport-confidence and learning motivation were shown to be significantly related to basketball skill-learning outcomes: $R = .461$, $R^2 = .212$, $F(2, 26) = 3.502$, $p = .045$, the critical F-value was 3.369. In other words, the two variables combined explained 21.2%

of the changes in basketball skill-learning outcomes, a level of explanation that was significant statistically even though the two predictors separately were not even close to significance. Figure 3 shows the simple linear graphs of each predictor against the resulting variable, while Table 4 contains the summary of the correlational and multiple-correlational findings.

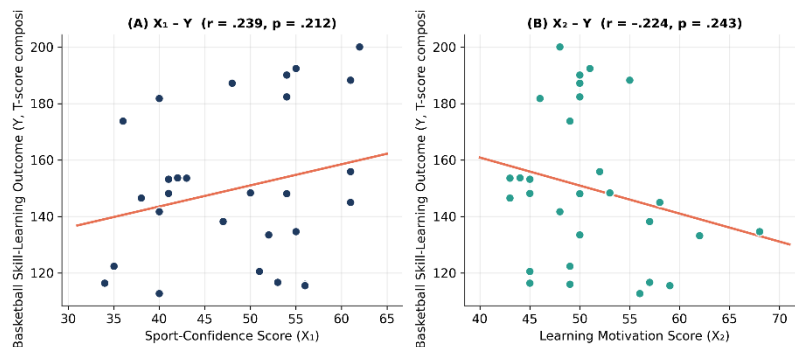


Figure 3. Scatter plots of (A) sport-confidence and (B) learning motivation against basketball skill-learning outcome, with linear trend lines ($n = 29$).

When looking at the pattern in Tables 1 and 4 the two psychological predictors themselves were quite strongly correlated with each other, neither one was significantly linearly related to the composite motor-performance criterion, and only the model that combined both predictors in a multiple-correlation analysis was significant. This overall descriptive pattern, not either single coefficient, is the main empirical result that we discuss in the Discussion section.

Table 4. Pearson and Multiple Correlation Results for Sport-Confidence, Learning Motivation, and Basketball Skill-Learning Outcomes ($n = 29$)

Association	r / R	r^2 / R^2	t / F	Critical value	p	Decision
$X_1 \rightarrow Y$ (sport-confidence)	.239	.057	$t = 1.278$	$t_{.05,27} = 2.052$.212	Not significant
$X_2 \rightarrow Y$ (learning motivation)	-.224	.050	$t = -1.193$	$t_{.05,27} = 2.052$.243	Not significant
$X_1, X_2 \rightarrow Y$ (joint)	.461	.212	$F(2,26) = 3.502$	$F_{.05}(2,26) = 3.369$.045	Significant
$X_1 \leftrightarrow X_2$ (inter-predictor)	.496	—	—	$r_{.05,27} = .367$.006	Significant

Overview of the Pattern of Findings

The main discovery from this study is that the bivariate results and the multivariate results showed different things: individually, neither sport-confidence nor learning motivation, had even a slight relationship with basketball skill-learning outcomes, however, the two variables together explained a statistically significant portion of outcome variance. This pattern contradicts the simple additive explanation where each psychological resource independently and gradually supports performance and instead, it indicates that a complementary or interactive psychological profile, in which confidence and motivation work together rather than separately, is more representative. Now, instead of repeating the numerical results presented above, this section explains why this pattern is reasonable, links it with the wider empirical literature on confidence and motivation in sport and PE contexts, and explores its educational implications.

Why Confidence Alone Did Not Predict Performance

The fact that the bivariate correlation between sport-confidence and skill outcomes was not significant should not be interpreted as a sign that the confidence, performance link is not real; the association was in a positive direction and consistent with the theory, and the size of the effect ($r = .239$) was close to, but did not meet, the significance level of this particular sample. Different factors may explain why we got this pattern. First, with a sample of this size, the statistical power to detect correlations that are in the small-to-moderate range is limited,

so there is a considerable chance that a true underlying relationship of the magnitude in question would not be statistically significant, this is a shortcoming that is well known in the sport-confidence literature which often uses small convenience samples (López-Rodríguez et al., 2025). Second, and more importantly, the confidence, performance relationship found in studies of top-level and competitive scenarios is most likely to be very strong when performance is measured during moments of psychological pressure, for example, a player taking a shot while the audience is making noise or in the middle of a competitive match (Yang et al., 2024), as opposed to the relatively low pressure, individually administered testing conditions used in the AAHPERD battery. Weinberg and Gould (2018) also maintain that it is in the presence of evaluative threat or competitive uncertainty (which are the kind of situations where confidence influences performance the most), that confidence leads to the clearest performance effects; a physical education skills test does not simulate such conditions very well. Third, the TSCI as used in this study assesses trait confidence, that is a fairly stable personality characteristic, whereas the actual level of motor skill displayed on a particular testing day may also be influenced by the level of state confidence, which varies according to the immediate situational factors; the use of a trait-level predictor together with a single-occasion performance criterion leading to a dissociation of the measures is recognized as a source of lower correlations in sport-confidence research (Vealey, 1986).

The result, however, corresponds well with basketball-related research which shows that self-confidence in one's ability is often, though the association is sometimes quite weak even indirectly, linked to better shooting results (Santua, 2020). It also accords with the general finding based on a recent meta-analytic review that, although self-confidence is a dependable correlate of sport performance across disciplines, it does not exhibit a very large effect size (López-Rodríguez et al., 2025). When combined, the current non-significant but positively directed finding is interpreted as a reflection of an actual but small and not easily detectable in this study confidence, performance relationship, rather than being an indication that confidence has nothing to do with basketball skill learning in PE environments.

Why Motivation Alone Showed a Negative, Non-Significant Association

Although very minimal and statistically insignificant, the negative side of the motivational-outcome correlation is indeed worth the discussion as it contradicts the common belief that higher motivation necessarily leads to better performance. The simplest explanation is given by Self-Determination Theory. The SMS-II total score employed in this study sums up intrinsic motivation, three types of extrinsic regulation, and amotivation into a single composite score. Therefore, two students obtaining the same total score could have very different motivational profiles the first one may be driven by pure enjoyment and a desire for mastery, while the second one may be motivated by fear of punishment or wanting to avoid social disapproval. Much of the SDT-based research in the PE field supports the idea that it is the quality (autonomous vs. controlled) of motivation rather than the quantity that best predicts adaptive engagement and skill development (Hsu et al., 2023; Ryan & Deci, 2017). A single composite score then would potentially conceal a true positive relationship between autonomous motivation and performance if the sample also includes students whose high scores are due to controlled or introjected regulation. This reading corresponds to the basketball-specific results indicating that a balance, well-regulated motivation instead of maximal motivation just by itself is what links to resilience and a lower risk of burnout among players (Kostopoulos et al., 2024), and SEM-based intervention research that demonstrates motivational improvements only lead to skill and confidence results when the underlying psychological needs (autonomy, competence, relatedness) are truly fulfilled, not simply when self-reported motivation is high (Bessa et al., 2021; Franco et al., 2021; Liu et al., 2023).

The other reason is a surprise of timing between a motivational measurement that captures the state of a person emotionally close to the criterion is a motor learning one that has been gathered over time. Acquisition of technical skills like basketball shooting, passing, and dribbling is attained through multiple times practice over a long period, while a SMS-II motivational state measurement is a snapshot of student's motivation close to the testing moment; thus, a student's motivational state at a particular instant might not be a true representation of the total effort that has been put into skill acquisition during the semester. This temporal mismatch has been identified as a limitation of cross-sectional motivation, performance designs in general (Zhang, Soh, et al., 2025) and indicates that in the future research longitudinal or practice-log-based motivational measures could be more successful in revealing a real motivation, skill relationship.

Why Confidence and Motivation Jointly Predicted Skill Outcomes

In fact, the single most theoretically and methodologically significant result is the presence of a substantial overall multiple correlation in the face of the absence of significant Pearson correlations for all individual pairs of variables. In this study sport-confidence and learning motivation were mutually correlated to a quite high degree and significantly ($r = .496$). As a result, when the standard Coke-Cola multiple-correlation model is used to isolate the effect of a single predictor after partialing out the other predictor, it turns out that there are unique contributions of each predictor that are actually quite substantial but were masked by the high bivariate-

correlation between the two predictors of the criterion. This suggests that not only sport-confidence and learning motivation as two constructs, but also two predictors in the regression of criterion are subject to the suppression effect and this means that the partialled outness of X_s can be seen as mutually suppressive to each other. This all matches up very nicely to the theoretical standpoint wherein confidence and motivation are one of the key constructs that mutually reinforce each other rather than being independent parts of the whole. Specifically, Bandura's self-efficacy framework suggests that the level of self-confidence determines the degree of effort and perseverance that a learner is willing to put in. In other words, confidence can be considered as one of the components of motivated behavior rather than something completely distinct or parallel to it. Similarly, from the perspective of the sub-theory of SDT known as Cognitive Evaluation Theory, perceived competence very similar to sport-confidence is considered to be the only condition upon which the maintenance of intrinsic motivation depends (Ryan & Deci, 2017). So, a student who is not confident with their ability in basketball will very likely lose their motivation for the practice that relies on their autonomy even if that motivation is the one scored on the questionnaire. Following this line of thought, the fact that the two variables taken together predict a criterion is very much in line with the nature of these two constructs being psychological inputs which, on one hand, are not fully distinct and, on the other hand, are partially indicative of a single motivation-confidence underlying personality while the combined characteristic of X_1 and X_2 is much more informative when it comes to the prediction of skill outcomes than each construct measured separately.

Statistically, the pattern corresponds to the net or classical suppression phenomenon: when two correlated predictors, each possessing a component of variance that is irrelevant to, or even negatively correlated with, the criterion but only after the other predictor is held constant, their combined multiple correlation can be greater than the highest of their simple correlations. In fact, some of the variance sport-confidence taps into could be related to a general positivity disposition, which, in itself, is not indicative of motor competence, while a part of the SMS-II composite variance could reflect controlled or extrinsically motivated engagement, which, as is the case, can work against skilled performance (this is discussed in Section 4.3). When both variables are used as predictors together, the part of each variable that is really related to motor learning, practicing confidently and motivatedly, statistically disappears from the part that is not, resulting in a stronger combined effect. Psychologically, this explanation takes us in a different direction than the one a statistical reader would. So it is not either-or, it is two different but quite compatible descriptions of the same underlying phenomenon one expressed in the language of shared method variance, the other, in the language of motivational and self-efficacy theory.

This perspective gains support from interventions research into the Sport Education Model, which repeatedly points out that confidence and motivational/behavioral improvements tend to happen together in the same students after pedagogical integration interventions and not as separate effects (Bessa et al., 2021; Sukiri et al., 2024; Zhang, Xiao, et al., 2024). It is also in line with the basketball-specific findings that psychological need satisfaction, motivation, and commitment are an interlocking system rather than an additive set of independent predictors of basketball engagement and performance (Kostopoulos et al., 2024). In the end, the combined (rather than individual) predictive pattern observed here resembles a finding from an Indonesian locally conducted study, that psychological factors including confidence simultaneously and significantly contributed to students' success in motor-learning tasks when considered as a composite psychological profile rather than as isolated variables (Hasan & Priana, 2025).

Comparison With the Broader Confidence–Motivation–Performance Literature

Situating the current pattern in the context of a larger number of recent studies not only reveals how it aligns with existing evidence but also how it departs from them. In the case of confidence alone, the bivariate positive but non-significant result obtained here is reminiscent of a study on domestic extracurricular basketball players, which found a positive and quite strong association between confidence and free-throw shooting success (Setianovan et al., 2022), a competitive, evaluative task that is generally more in line with pressure situations where confidence effects are strongest (Yang et al., 2024) than the individually administered AAHPERD battery used in this study. A qualitative review of confidence studies in Indonesian basketball players ended up with the conclusion that it is low confidence, not high confidence, that is the more diagnostic condition: a lack of confidence is reliably the precursor to anxiety-induced motor disruption, while confidence above the moderate level threshold yields diminishing returns for technical execution (Mukhtarsyaf et al., 2022), a trajectory that is in line with the present sample, in which a mere 13.8% of students had high confidence and the entire group was concentrated in the moderate range, which may limit the variability needed for a strong linear correlation to appear.

At the level of motivation, the minor negative bivariate correlation is still a part of a larger pattern. There are other studies on the relationship between anxiety, motivation, and outcome in motor-skill domains within Indonesian PE that have also witnessed inconsistent or counter-intuitive association directions especially when

motivation is considered as an undifferentiated composite measure (Hasan & Priana, 2025; Lesmana & Raharja, 2025). This, in fact, supports the understanding provided in Section 4.3 that composite motivational scoring, rather than a lack of any true relationship, is a likely culprit of these counter-intuitive findings. Research from abroad, guided by SDT, through a different perspective, comes to the same conclusion: studies on the novelty-satisfaction and psychological-need-satisfaction conducted in PE after pandemic-disrupted instruction showed that motivational benefits depended on the specific psychological supplies being met, not arising spontaneously from any elevated motivational engagement (Hsu et al., 2023). Similarly, systematic reviews of SEM implementation point out that characteristics of participants and interventions, rather than motivation level only, determine whether motivational engagement actually leads to skill or knowledge gain that can be measured (Zhang, Soh, et al., 2025). Moreover, a wider systematic review of hybrid pedagogical models incorporating SEM principles reached a comparable conclusion, i.e., that psychological engagement variables are indicators of PE learning outcomes only if the structural and pedagogical are also met (Zhang, Geok Soh, et al., 2024).

At the joint confidence, motivation contribution level, current findings align most closely with the ones collected through basketball-specific studies wherein motivation, psychological need satisfaction, and commitment do not act as separate, additive factors but are operating together as a system to predict basketball engagement and resilience (Kostopoulos et al., 2024). Relatedly, different intervention studies demonstrate that SEM-based teaching not only raises the level of empowerment/self-confidence of the students but also boosts their behavioral motivation simultaneously within the same group of students, instead of one leading to the other independently (Bessa et al., 2021; Franco et al., 2021; Sukiri et al., 2024). This also correlates with the findings implying that sport-education interventions which are focused on basketball are helping in improving technical content knowledge and performance together with, and not at the expense of, psychological engagement (Liu et al., 2023). Last but not least, the joint-predictor combination discovered here is in agreement with a home-grown finding that psychological factors, including confidence are responsible individually and on the whole to play a key role in motor-learning success when considered as a composite profile rather than as isolated variables (Hasan & Priana, 2025). It is also generally in line with the broader insight that motor-skill proficiency and academic/learning outcomes are systematically related across children, indicating that the psychological ecosystem that supports motor learning in PE is unlikely to be reduced to any one construct (Wang & Wang, 2024). On the whole, such a comparative reading shows that the major achievement of the present study, proving a significant joint effect against a background of non-significant individual effects, is not a single statistical anomaly of a small sample, but a pattern with both theoretical and empirical support, clearly present in Indonesian and international sport psychology and PE pedagogy literature.

Educational and Pedagogical Implications

These discoveries have an obvious consequence for PE teaching: programs that focus only on confidence and motivation might be less effective than those that try to develop both at the same time. Different ways of working such as Sport Education Model, cooperative and small-sided games, and mastery-oriented feedback have all been proven to help students improve their competence and motivation level at the same time in one teaching unit (Liu et al., 2023; Sukiri et al., 2024). For PE teachers who are teaching adolescent students of mixed skills like the sample here, where basketball skill performances ranged from significantly below to significantly above the group mean despite common curricular exposure this means that differentiated feedback focusing on incremental mastery experiences (small, attainable technical successes) may be more effective than mere words of encouragement since such feedback simultaneously increases perceived competence (confidence) and autonomous engagement (motivation quality), in line with the joint-predictor pattern found here. Creating classroom environments where students are not publicly and comparably evaluated a major source of both lowering confidence and autonomous motivation in adolescent PE settings can also be expected to sustain the joint psychological profile which the present study's results indicate as being educationally significant (Ryan & Deci, 2017; Weinberg & Gould, 2018).

Limitations

There are few limitations that set some boundaries for the conclusions. The most important one is that the effective sample ($n = 29$, a single intact class was used rather than two classes of 72 planned originally) limits statistical power for bivariate hypothesis testing and it is hardly possible to generalize findings beyond the school where sampling took place; the study can therefore be seen primarily as exploratory that generate new hypotheses, rather than a definitive confirmatory test. Secondly, psychological variables in both cases were assessed with self-report, so it can be assumed that some participants answered in a socially desirable way. Third, the cross-sectional, correlational design not allowing any causal inference; the data at hand is insufficient to establish the direction of influence between psychological state and motor performance. Fourth, several uncontrolled factors prior basketball playing experience, level of physical fitness at the testing day, practice outside of class, and other psychological factors such as sport anxiety are very likely to account for the substantial unexplained variance (78.8%) in skill results. Lastly, the composite SMS-II score use here is incapable of telling

autonomous motivational regulation from controlled one, which according to the above interpretation might be the key to the observed negative bivariate association.

Conclusions

The research investigated both individual characteristics as well as the combined effects of sport-confidence and learning motivation on basketball skill-learning outcomes of Grade 10 Indonesian PE students. Independently, neither psychological variable was a predictor of skill outcomes; however, together they statistically significantly accounted for 21.2% of out-come variance, showing that confidence and motivation as complement psychological resources rather than as independent ones in motor-skill acquisition. Conceptually, this empirical pattern re-frames self-efficacy and self-determination theories by revealing, via a real life school PE setting, that psychological constructs' power for motor learning may only be unmasked by the joint modeling of constructs with shared variance rather than in isolation --- a methodological issue with consequences beyond the present sample. On the other hand, the results indicate that PE teachers who want to see students' basketball skills go from strength to strength should give lessons that simultaneously increase confidence and motivation, e.g. through carefully planned mastery experiences, providing autonomy-supportive feedback, and lessening comparative evaluation, rather than treating these as separate pedagogical targets. Considering the small and single-site sample that was used here, further researches including bigger, multi-school samples, longitudinal or repeat-measures designs, and disaggregated (autonomous versus controlled) motivational measures are required to determine the extent, generalizability, and directionality of the combined confidence-motivation-skill relationship identified in this study.

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