The influence of social support, anxiety, and self-confidence on peak performance among badminton athletes: the mediating role of mental toughness

La influencia del apoyo social, la ansiedad y la autoconfianza en el rendimiento máximo de los atletas de bádminton: el papel mediador de la fortaleza mental

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Abstract

Introduction: This study explores the effects of social support, anxiety, and self-confidence on peak performance among youth badminton athletes, emphasizing the mediating role of mental toughness. While prior research highlights these psychological factors, limited evidence addresses how mental toughness translates them into optimal outcomes.
Objective: The study aims to analyze the direct and indirect influences of social support, anxiety, and self-confidence on peak performance, with mental toughness as a mediating variable.
Methodology: A quantitative explanatory design was applied with 214 athletes selected via simple random sampling from 418 active players in badminton clubs across Yogyakarta, Indonesia. Instruments used included the PASS-Q (social support), SAS-2Id (anxiety), Sports Confidence Questionnaire, a performance scale adapted from Potgieter & Kidd (2011), and MTIid (mental toughness). Data were analyzed using PLS-SEM with SmartPLS 4.0.
Results: Social support significantly enhanced peak performance ($t = 2.948$; $p = 0.003$) and mental toughness ($t = 4.034$; $p = 0.000$). Anxiety negatively affected both peak performance ($t = 3.757$; $p = 0.000$) and mental toughness ($t = 3.874$; $p = 0.000$). Self-confidence positively influenced peak performance ($t = 10.481$; $p = 0.000$) and mental toughness ($t = 9.784$; $p = 0.000$). Mental toughness itself improved peak performance ($t = 4.284$; $p = 0.000$) and mediated the effects of social support ($t = 3.176$; $p = 0.002$), anxiety ($t = 2.811$; $p = 0.005$), and self-confidence ($t = 3.723$; $p = 0.000$).
Conclusions: Social support, anxiety, and self-confidence significantly influence peak performance both directly and indirectly through mental toughness. Coaches should enhance athletes' mental toughness, build supportive environments, strengthen confidence, and manage anxiety to optimize competitive success.

Keywords

Social support, anxiety, self-confidence, mental toughness, peak performance.

Resumen

Introducción: Este estudio explora los efectos del apoyo social, la ansiedad y la autoconfianza en el rendimiento máximo de los jóvenes atletas de bádminton, destacando el papel mediador de la fortaleza mental. Aunque investigaciones previas han resaltado estos factores psicológicos, existe evidencia limitada sobre cómo la fortaleza mental traduce dichos recursos en resultados óptimos.
Objetivo: El objetivo del estudio es analizar las influencias directas e indirectas del apoyo social, la ansiedad y la autoconfianza en el rendimiento máximo, con la fortaleza mental como variable mediadora.
Metodología: Se aplicó un diseño cuantitativo explicativo con 214 atletas seleccionados mediante muestreo aleatorio simple de una población de 418 jugadores activos en clubes de bádminton de Yogyakarta, Indonesia. Se utilizaron instrumentos validados: PASS-Q (apoyo social), SAS-2Id (ansiedad), Cuestionario de Confianza Deportiva, una escala de rendimiento adaptada de Potgieter & Kidd (2011) y MTIid (fortaleza mental). Los datos fueron analizados mediante PLS-SEM utilizando SmartPLS 4.0.
Resultados: El apoyo social mejoró significativamente tanto el rendimiento máximo ($t = 2.948$; $p = 0.003$) como la fortaleza mental ($t = 4.034$; $p = 0.000$). La ansiedad afectó negativamente el rendimiento máximo ($t = 3.757$; $p = 0.000$) y la fortaleza mental ($t = 3.874$; $p = 0.000$). La autoconfianza influyó positivamente en el rendimiento máximo ($t = 10.481$; $p = 0.000$) y en la fortaleza mental ($t = 9.784$; $p = 0.000$). La fortaleza mental, a su vez, mejoró el rendimiento máximo ($t = 4.284$; $p = 0.000$) y medió de forma significativa los efectos del apoyo social ($t = 3.176$; $p = 0.002$), la ansiedad ($t = 2.811$; $p = 0.005$) y la autoconfianza ($t = 3.723$; $p = 0.000$).
Conclusiones: El apoyo social, la ansiedad y la autoconfianza influyen de manera significativa en el rendimiento máximo, tanto de forma directa como indirecta, a través de la fortaleza mental. Se recomienda que los entrenadores fortalezcan la resiliencia mental de los atletas, fomenten entornos de apoyo, refuercen la confianza y gestionen la ansiedad para optimizar el éxito competitivo.

Palabras clave

Apoyo social, ansiedad, autoconfianza, fortaleza mental, rendimiento máximo.

Introduction

In the increasingly competitive and rapidly evolving landscape of modern sport, achieving and sustaining peak performance has become a central concern for athletes, coaches, and sport psychologists. The concept of peak performance extends beyond physical conditioning—it represents an optimal integration of physical, technical, tactical, and psychological components that collectively enable athletes to realize their highest potential (Schneider, 2024). Contemporary sport psychology thus emphasizes that mental resilience and emotional intelligence are pivotal mechanisms underpinning both physical and psychological well-being (Wandik et al., 2024). hese mental dimensions are critical in determining whether athletes can maintain consistency under pressure, regulate emotions during competition, and recover from adversity—core attributes that differentiate elite performers from their peers (Lochbaum, Sherburn, et al., 2022).

Despite notable progress in physical and technical preparation, psychological readiness remains the decisive differentiator between competent and exceptional performance. A growing body of research highlights the interactive influence of social support, competitive anxiety, self-confidence, and mental toughness in shaping athletes' ability to reach and sustain peak performance (Atkinson & Martin, 2020; Joshi & Kalode, 2019). Yet, much of this literature remains fragmented—each construct is often examined in isolation, lacking a unified model that explains their dynamic interrelationships, particularly in individual sports where psychological resilience directly affects match outcomes.

The Indonesian Badminton Context

Badminton occupies a unique socio-cultural position in Indonesia as both a national sport and a symbol of international achievement. The sport's institutionalized development pathways and extensive grassroots participation have positioned it as a cornerstone of Indonesia's athletic identity (Fakhrurrozi, Rustiadi, & Nasuka, 2020; Maksum & Indahwati, 2023). Despite the structured development programs, sustaining elite-level performance among adolescent athletes transitioning into high-performance phases remains challenging. Field observations during the 2024 Daerah Istimewa Yogyakarta (DIY) Regional Badminton Championship revealed recurrent psychological patterns among youth athletes. Interviews with eight club coaches identified key behavioral indicators—hesitation in decision-making, execution errors, and loss of focus under pressure—attributable to elevated competitive anxiety, unstable self-confidence, limited perceived social support, and low mental toughness. These anecdotal observations align with empirical evidence suggesting that peak performance deficits often emerge from the complex interplay of psychological vulnerabilities and environmental constraints (Potgieter & Kidd, 2011).

Thematic Review of Core Constructs

Social Support and Motivation

Social support from coaches, peers, and family serves as a vital psychological resource that fosters athletes' motivation, resilience, and perceived competence (Freeman & Rees, 2009). Drawing from Self-Determination Theory (SDT) (R. M. Ryan & Deci, 2024), social support satisfies athletes' fundamental psychological needs—autonomy, competence, and relatedness—thereby enhancing intrinsic motivation and self-regulated engagement in training and competition.

Anxiety and Attentional Control

Conversely, competitive anxiety exerts a deleterious influence on attention, decision-making, and psychomotor performance. Based on Attentional Control Theory (ACT) (Eysenck, Derakshan, Santos, & Calvo, 2007), high anxiety consumes cognitive resources, disrupts goal-directed processing, and heightens susceptibility to errors during critical performance moments (Boltobaev, Kostikova, Azizov, & Azizov, 2022; Palazzolo, 2020).

Self-Confidence and Emotional Regulation

Self-confidence functions as a robust psychological buffer that mitigates anxiety and enhances cognitive control. It promotes adaptive coping, emotional stability, and persistence under pressure (Jang et al., 2018; R S Vealey, Chase, & Cooley, 2017). However, its effects on performance are often contingent upon

the athlete's capacity for emotional regulation and resilience, suggesting an indirect pathway mediated by mental toughness.

Mental Toughness as a Mediating Mechanism

Mental toughness encapsulates an athlete's ability to maintain focus, commitment, and composure in adversity (Gucciardi, Hanton, Gordon, Mallett, & Temby, 2015; Wu et al., 2021). The construct is theoretically positioned as a *mediating bridge* between social and emotional factors and peak performance outcomes. Recent evidence indicates that mental toughness mitigates the negative effects of anxiety and enhances the positive influence of social support and confidence on performance (Hsieh et al., 2024).

Theoretical Framework and Conceptual Integration

To conceptually anchor these relationships, this study integrates Self-Determination Theory (SDT) (R. Ryan & Deci, 2000) and Attentional Control Theory (ACT) (Eysenck & Derakshan, 2011). From the SDT perspective, social support enhances self-determined motivation through the satisfaction of basic needs, facilitating engagement and persistence. ACT, on the other hand, explains how anxiety disrupts attentional control, thereby diminishing performance efficiency. Within this integrated framework, mental toughness operates as an adaptive mechanism that regulates attentional and emotional resources, enabling athletes to maintain peak functioning despite stress.

Research Gap and Rationale

While the literature has established the independent effects of social support, anxiety, and self-confidence on performance, few studies have synthesized these variables into a unified structural framework grounded in SDT and ACT. Moreover, most prior research is situated in Western, team-sport, or elite adult contexts, leaving a methodological and contextual gap regarding individual-sport athletes in Southeast Asia, particularly in badminton. The mediating role of mental toughness also remains underexplored through structural equation modeling (SEM) approaches that can capture both direct and indirect pathways. Addressing these gaps is vital for developing culturally relevant, evidence-based psychological interventions for Indonesian athletes.

Research Objectives

This study aims to:

1. Examine the direct effects of social support, anxiety, and self-confidence on peak performance.
2. Assess the direct influences of these psychological constructs on mental toughness.
3. Determine the direct impact of mental toughness on peak performance.
4. Evaluate the mediating role of mental toughness in linking social support, anxiety, and self-confidence with peak performance.

Through this theoretically grounded and contextually specific investigation, the present study advances an integrated psychological model of peak performance among Indonesian badminton athletes. Its findings are expected to inform targeted psychological skills training, coaching practices, and policy-level athlete development strategies that bridge the gap between physical excellence and mental resilience, ultimately fostering sustained peak performance in high-stakes competitive environments.

Literature Review

Social Support and Athletic Performance

Social support constitutes a multidimensional construct encompassing emotional, instrumental, and informational support that athletes receive from significant others, including coaches, teammates, family members, and peers (Freeman & Rees, 2009; Rees & Hardy, 2000). Emotional support refers to empathy and encouragement during stressful competition; instrumental support entails tangible assistance or resource provision; while informational support includes guidance and feedback relevant to performance improvement.

Empirically, social support has been associated with reduced anxiety, increased motivation, and improved performance outcomes (Freeman & Rees, 2009)According to Self-Determination Theory (SDT)

(R. Ryan & Deci, 2000), social support fulfills the three basic psychological needs—autonomy, competence, and relatedness—thereby enhancing self-determined motivation. When athletes perceive high-quality social support, they are more likely to develop confidence, maintain focus, and exhibit greater persistence under pressure (Rees et al., 2020).

In the Indonesian sport context, social support from coaches and peers has been shown to significantly enhance athletes' psychological resources—such as optimism and self-efficacy—especially during training and competitive phases (Sari & Thamrin, 2021). Hence, in this study social support is expected to positively influence both mental toughness and peak performance, functioning as a motivational resource that reinforces adaptive responses to competitive challenges.

Competitive Anxiety and Performance

Competitive anxiety has long been recognized as a decisive psychological factor influencing sport performance (Martens, Vealey, & Burton, 1990). It is typically categorized into cognitive anxiety (worry, negative expectations) and somatic anxiety (physiological arousal such as tension or increased heart rate). According to Attentional Control Theory (ACT) (Eysenck et al., 2007), anxiety disrupts goal-directed attention by consuming limited working memory resources, resulting in impaired decision-making and execution accuracy.

Excessive cognitive anxiety can narrow attentional focus and reduce flexibility, while somatic anxiety interferes with motor coordination (Cheng, Hardy, & Markland, 2009). Nonetheless, a moderate level of anxiety may facilitate optimal arousal and motivation, following the inverted-U hypothesis (Teigen, 1994).

Recent empirical evidence confirms that competitive anxiety negatively predicts athletes' self-confidence and performance consistency (Boltobaev et al., 2022; Kristjánsdóttir, Erlingsdóttir, Sveinsson, & Saavedra, 2018). In Southeast Asian athletes, high competition density and cultural emphasis on outcome success may intensify anxiety responses (Nandu, Noordin, Suppiah, & Azmi, 2022). Therefore, this study posits that anxiety negatively affects mental toughness and peak performance, while its adverse impact may be mitigated by athletes' resilience resources.

Self-Confidence and Motivation in Sport

Self-confidence, defined by Robin S Vealey (1986) as "the belief or degree of certainty individuals possess about their ability to succeed in sport", represents a key determinant of performance behaviour. It shares conceptual overlap with self-efficacy theory (Bandura, 1997), which emphasises perceived capability to execute specific tasks successfully. High self-confidence fosters approach motivation, attentional control, and persistence despite failure (Hays, 2007; Robin S Vealey, 1986). In contrast, athletes with low confidence are more susceptible to performance anxiety and attentional lapses (R. Vealey, Chase, & Cooley, 2017). Empirical work across racquet sports shows that self-confidence predicts emotional stability and task engagement (Lochbaum, Sisneros, Cooper, & Terry, 2023; Rintaugu, Lusaga, Francis, & Kipchumba, 2023). Within the framework of SDT (Ryan & Deci, 2024), confidence reinforces competence satisfaction, thereby strengthening intrinsic motivation and psychological well-being. Consequently, this study hypothesises that self-confidence positively influences both mental toughness and peak performance.

Mental Toughness as a Mediating Construct

Mental toughness (MT) has emerged as one of the most influential constructs explaining individual differences in stress tolerance and performance persistence. Conceptually, Clough, Earle, & Sewell (2002) proposed the 4Cs model—control, commitment, challenge, and confidence—as the core dimensions of MT. Athletes high in MT remain focused, motivated, and emotionally stable in adverse situations (Gucciardi et al., 2015). In the Indonesian context, Akbar et al., (2024) extended this conceptualization by exploring MT among student-athletes, thereby reinforcing its cross-cultural applicability.

From a theoretical perspective, MT acts as a mediating mechanism that translates social and motivational inputs (e.g., social support, confidence) into sustained performance outcomes. Within SDT, MT may facilitate the internalization of motivation by promoting autonomous goal pursuit, while under

ACT, MT buffers anxiety by enhancing attentional control. Empirical findings corroborate MT's mediating role between psychological variables and performance across diverse sports (Mahoney, Gucciardi, Ntoumanis, & Mallet, 2014; Nicholls et al., 2015).

Moreover, mental toughness exhibits variability across populations, with athletes displaying higher resilience and psychological endurance compared to non-athletes, and differences observed by gender and educational background (Putra, Sutoro, et al., 2024). These findings support the notion that mental toughness is not uniformly distributed, highlighting the need to consider individual and contextual factors in performance enhancement strategies.

In badminton, where individual accountability is high and feedback is immediate, MT enables athletes to maintain composure and adapt strategically under competitive stress (Cowden, 2017; Lestari et al., 2025). Recent systematic review findings also corroborate this relationship, demonstrating that higher mental toughness consistently predicts better performance outcomes across diverse sports (Aditya et al., 2024). Accordingly, this study conceptualizes MT as a mediator linking social support, anxiety, and self-confidence to peak performance.

Conceptual Integration and Hypothesis Development

Synthesizing the preceding theoretical and empirical evidence, the present study integrates Self-Determination Theory and Attentional Control Theory to explain how motivational resources (social support, self-confidence) and emotional constraints (anxiety) jointly influence peak performance, both directly and indirectly through mental toughness.

Hypotheses:

- H1: Social support positively affects peak performance.
- H2: Anxiety negatively affects peak performance.
- H3: Self-confidence positively affects peak performance.
- H4: Social support positively affects mental toughness.
- H5: Anxiety negatively affects mental toughness.
- H6: Self-confidence positively affects mental toughness.
- H7: Mental toughness positively affects peak performance.
- H8: Mental toughness mediates the effects of social support, anxiety, and self-confidence on peak performance.

Method

Participants

The population of this study consisted of 418 registered badminton athletes affiliated with officially recognized clubs under the Yogyakarta Regional Badminton Association. The minimum required sample size was determined based on the guidelines for SEM, which recommend at least 5–10 participants per indicator variable. Given that the study employed 21 observed indicators, the minimum required sample size was 210 respondents.

A simple random sampling technique was applied to select participants from the population list provided by the regional badminton association. The randomization process was executed using a random number generator in Microsoft Excel to ensure equal selection probability. This procedure was intended to preserve representativeness across gender and club affiliation.

The final sample comprised 214 athletes (132 male, 82 female) aged 12–20 years (M = 16.42, SD = 2.07), with an average training experience of 4.8 ± 1.6 years. Participants were recruited from 16 clubs representing urban and suburban training centers across the region.

Inclusion criteria consisted of (a) active membership in a badminton club for at least one year, and (b) participation in official tournaments within the last 12 months.

Exclusion criteria included (a) athletes currently undergoing injury rehabilitation, (b) those engaged in concurrent psychological intervention programs, and (c) incomplete or inconsistent questionnaire responses.

All participants and their parents or guardians (for athletes under 18) provided written informed consent. The study protocol was approved by the Institutional Review Board of Universitas Negeri Yogyakarta (Approval No. UNY-ET/2025/03/042), adhering to the ethical principles of the Declaration of Helsinki (World Medical Association, 2013).

Research Design

This study employed a quantitative explanatory–causal design to investigate the direct and indirect relationships among social support, anxiety, self-confidence, mental toughness, and peak performance among youth badminton athletes. The choice of this design aligns with the study's objective to identify not merely descriptive tendencies but also causal mechanisms linking psychological constructs through a mediation framework. The use of Partial Least Squares Structural Equation Modeling (PLS-SEM) was deemed appropriate for this research because it accommodates complex models with multiple mediators, does not assume multivariate normality, and performs well with moderate sample sizes (Hair et al., 2021).

The research was conducted between January and June 2025 across 16 active badminton clubs in the Special Region of Yogyakarta (DIY), Indonesia. This region was strategically chosen for its heterogeneity in coaching systems, training cultures, and athlete development environments, providing a representative sample of Indonesia's competitive badminton context.

Instrument and Measures

The research instrument consisted of a structured, closed-ended questionnaire that integrated validated scales for each psychological construct. All items were measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Instrument Adaptation and Validation

The English-language instruments were translated and culturally adapted to Indonesian using Brislin (1970) forward–backward translation procedure. The translated items were reviewed by a panel of three experts—two sport psychology faculty members and one national-level badminton coach—to ensure semantic, conceptual, and contextual equivalence. A pilot study involving 30 athletes was conducted to evaluate item clarity, reliability, and comprehension. Necessary revisions were made based on feedback from this pilot process.

Construct Validity and Reliability

Each instrument's construct validity and reliability were confirmed through confirmatory factor analysis (CFA) using established fit indices. Thresholds followed Hu & Bentler (1999), including RMSEA ≤ 0.08, SRMR ≤ 0.08, and CFI/TLI ≥ 0.90. Internal consistency was assessed using Cronbach's α and composite reliability (CR), with acceptable thresholds ≥ 0.70, and convergent validity through average variance extracted (AVE ≥ 0.50).

Table 1. Summarizes the blueprint of the instruments used and the corresponding psychometric properties based on both prior validation and the present study's CFA results.

Table 1. Instrument Blueprint and Psychometric Properties

Variable	Dimension / Indicator	No. of Items	Validity Indices	Reliability Indices
Social Support	Emotional Esteem Informational Tangible Support	8	RMSEA = 0.05 SRMR = 0.06 CFI = 0.94	Cronbach's α = 0.68–0.84 (Grasel Barbosa et al., 2024; Şenel & Sakallı, 2024)
Anxiety	Somatic Anxiety Worry Concentration Disruption	15	RMSEA = 0.077 CFI = 0.923 TLI = 0.910	AVE ≥ 0.50 (Putra et al., 2021)
Self-Confidence	Persistence Doubt Calmness Physical Superiority	5	KMO = 0.867 χ^2/df = 2.723	Cronbach's α = 0.799–0.873 (Jang et al., 2018)

Peak Performance	Focus Confidence Stress Control Self-Belief	5	RMSEA = 0.041 GFI = 0.99 AGFI = 0.98	CR = 0.70–0.88α = 0.65–0.85 (Potgieter & Kidd, 2011)
Mental Toughness	Attention Emotion Regulation Success Mindset Context Awareness. Resilience Optimism	7	CFI = 0.967 TLI = 0.954 RMSEA = 0.069 SRMR = 0.034	CR = 0.862α = 0.862 (Putra, Kurdi, et al., 2024)

All instruments demonstrated adequate psychometric soundness and theoretical coherence with prior literature.

Data analysis

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0. Prior to analysis, data screening was performed to assess missing values, outliers, and distributional characteristics. Skewness and kurtosis tests indicated mild non-normality in several variables, supporting the use of PLS-SEM due to its robustness against violations of multivariate normality assumptions.

Measurement Model Evaluation

The measurement model was evaluated through four criteria:

(a) Indicator reliability (factor loading ≥ 0.70),

(b) Internal consistency (CR ≥ 0.70),

(c) Convergent validity (AVE ≥ 0.50), and

(d) Discriminant validity, verified using both Fornell–Larcker and HTMT ratio (< 0.85) criteria.

Structural Model and Mediation Testing

After establishing the adequacy of the measurement model, the structural model was assessed to determine the significance and strength of hypothesized relationships. Path coefficients were estimated using bootstrapping with 5,000 resamples and bias-corrected 95% confidence intervals, following the guidelines of (Hair et al., 2021).

Mediation analysis was conducted to test the indirect effect of mental toughness on the relationship between social support, anxiety, self-confidence, and peak performance. A mediation effect was confirmed when the indirect path was significant and the confidence interval excluded zero.

Common Method Bias (CMB) and Ethical Controls

Procedural remedies were implemented to minimize CMB, including anonymity, counterbalancing item order, and assuring confidentiality. Statistical verification using Harman's single-factor test indicated that the first factor accounted for 27.8% of the total variance, suggesting that CMB was not a significant threat.

All data were collected anonymously, stored securely, and analyzed only for academic purposes.

Results

Measurement Model Evaluation

Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM)—an advanced multivariate technique suitable for examining complex theoretical models involving both direct and indirect relationships among latent constructs. This approach was selected due to its robustness in handling non-normally distributed data, small-to-moderate sample sizes, and the presence of mediating variables, such as mental toughness in the present study (Sarstedt, Ringle, & Hair, 2021). All analyses were performed using SmartPLS version 4, which enabled a systematic evaluation of both the measurement and structural models.

Outer Loading Analysis

Figure 1. Results in the PLS Algorithm

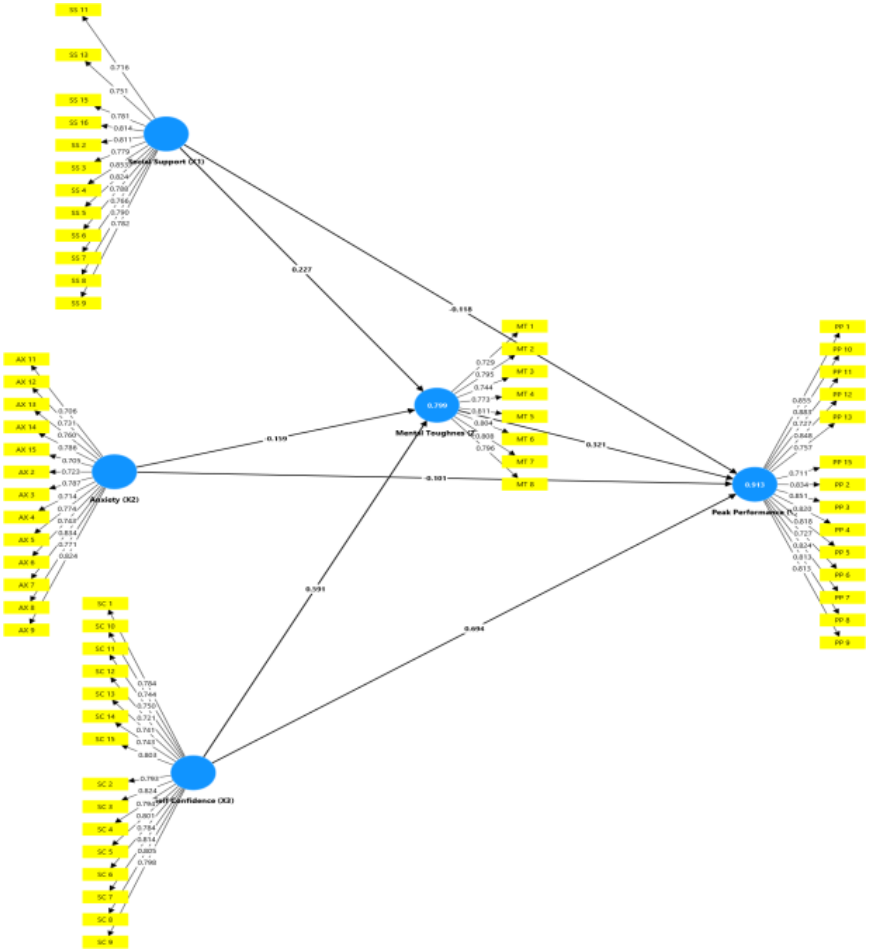


Table 2. Outer Loading

Code	Social Support (X1)	Code	Anxiety (X2)	Code	Self Confidence (X3)	Code	Mental toughness (Z)	Code	Peak performance (Y)
SS 11	0.716	AX 11	0.706	SC 1	0.784	MT 1	0.729	PP 1	0.855
SS 13	0.751	AX 12	0.731	SC 10	0.744	MT 2	0.795	PP 10	0.883
SS 15	0.781	AX 13	0.760	SC 11	0.750	MT 3	0.744	PP 11	0.727
SS 16	0.814	AX 14	0.786	SC 12	0.721	MT 4	0.773	PP 12	0.848
SS 2	0.811	AX 15	0.705	SC 13	0.741	MT 5	0.811	PP 13	0.757
SS 3	0.779	AX 2	0.723	SC 14	0.743	MT 6	0.804	PP 15	0.711
SS 4	0.853	AX 3	0.787	SC 15	0.803	MT 7	0.808	PP 2	0.834
SS 5	0.824	AX 4	0.714	SC 2	0.793	MT 8	0.796	PP 3	0.851
SS 6	0.788	AX 5	0.774	SC 3	0.824			PP 4	0.820
SS 7	0.766	AX 6	0.743	SC 4	0.794			PP 5	0.818
SS 8	0.790	AX 7	0.834	SC 5	0.801			PP 6	0.727
SS 9	0.782	AX 8	0.771	SC 6	0.784			PP 7	0.824
		AX 9	0.824	SC 7	0.814			PP 8	0.813
				SC 8	0.805			PP 9	0.813
				SC 9	0.798				

The initial measurement model was examined through outer loadings to assess indicator validity. As presented in Table 2, several items in the first iteration demonstrated factor loadings below the minimum threshold of 0.70, specifically items 1, 10, 12, and 14 of Social Support (X_1), item 10 of Anxiety (X_2), item 16 of Self-Confidence (X_3), and item 14 of Peak Performance (Y). These items were subsequently removed.

After refinement, Outer Loading 2 indicated improved results, with all items exceeding the 0.70 threshold except item 1 of Anxiety (X_2). The third iteration, Outer Loading 3, confirmed that all remaining indicators across the five constructs achieved factor loadings above 0.70, indicating that all retained items validly represent their respective latent constructs.

Discriminant Validity

The discriminant validity test using the Fornell-Larcker criterion further supports the construct validity. The square root of the Average Variance Extracted (AVE) for each construct exceeded the correlation values with other constructs in the same row or column, as shown in Table 3, indicating that each latent variable is distinct and measures a unique concept within the structural model.

Table 3. Fornell-Larcker Discriminant Validity Criterion

Construct	(X2)	(Z)	(Y)	(X3)	(X1)
Anxiety (X2)	0.760	-0.621	-0.652	-0.590	-0.497
Mental toughness (Z)	-0.621	0.783	0.798	0.776	0.704
Peak performance (Y)	-0.652	0.798	0.807	0.737	0.776
Self Confidence (X3)	-0.590	0.776	0.737	0.780	0.742
Social Support (X1)	-0.497	0.704	0.776	0.742	0.789

Discriminant validity was assessed using the Fornell–Larcker criterion, as shown in Table 3. The square root of the Average Variance Extracted (AVE) for each construct exceeded the correlations with all other constructs, confirming discriminant validity. Specifically, the diagonal AVE square root values were: Anxiety (0.760), Mental Toughness (0.783), Peak Performance (0.807), Self-Confidence (0.780), and Social Support (0.789). Each of these values surpassed the corresponding inter-construct correlations, indicating that each variable measures a unique conceptual domain within the model.

In addition, all constructs achieved AVE values above 0.50 (not tabulated), demonstrating convergent validity and confirming that the latent variables collectively explain a substantial portion of variance in their indicators.

Reliability Assessment

The reliability test, used to assess the internal consistency of the indicators, employed both Cronbach's Alpha and composite reliability. According to the standard criteria, a construct is considered reliable if its values exceed 0.70. The results of the reliability test are presented in Table 4.

Table 4. Reliability Test Results

Construct	Cronbach's Alpha	Composite Reliability (rho_A)	Composite Reliability (rho_C)
Anxiety (X2)	0.939	0.942	0.946
Mental toughness (Z)	0.910	0.912	0.927
Peak performance (Y)	0.958	0.960	0.963
Self Confidence (X3)	0.954	0.955	0.959
Social Support (X1)	0.945	0.945	0.952

Reliability was evaluated using Cronbach's Alpha, Composite Reliability (ρ_a), and Composite Reliability (ρ_c), as summarized in Table 4. All coefficients exceeded the recommended 0.70 threshold, confirming internal consistency reliability.

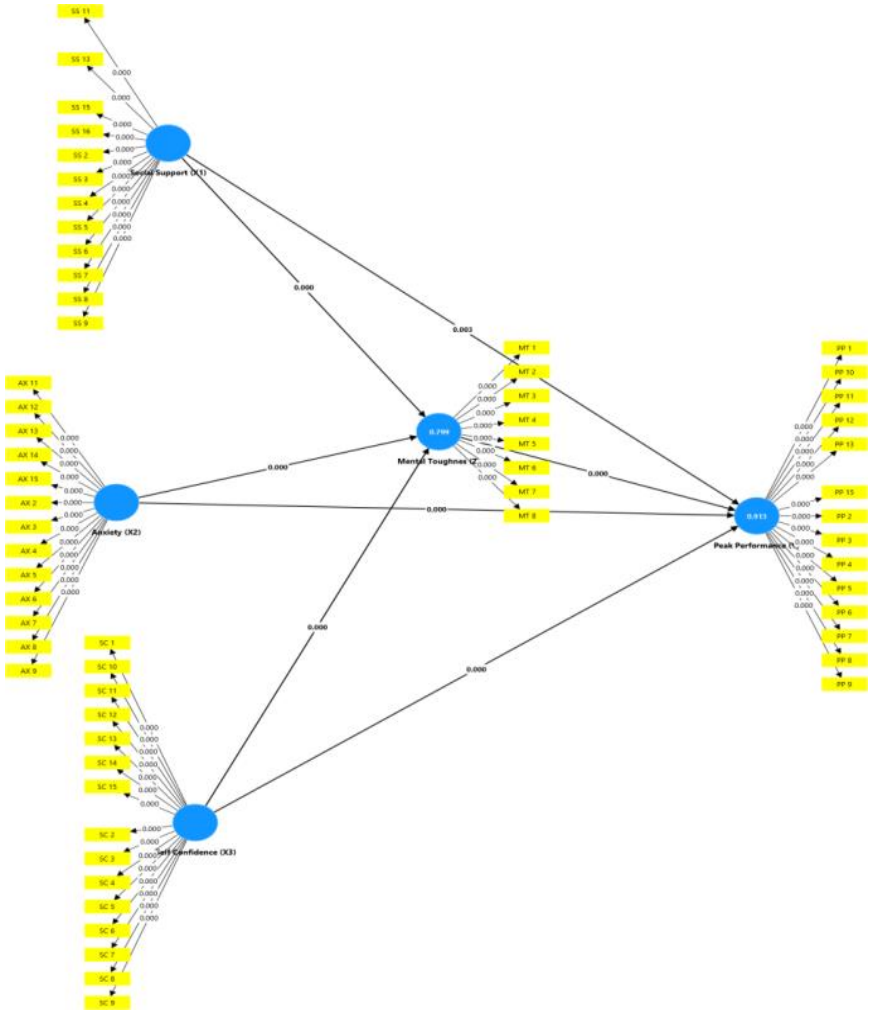
The Anxiety construct (X_2) demonstrated excellent reliability ($\alpha = 0.939$; $\rho_a = 0.942$; $\rho\_c = 0.946$), followed by Mental Toughness (Z) ($\alpha = 0.910$; $\rho_a = 0.912$; $\rho\_c = 0.927$). Likewise, Peak Performance (Y) exhibited high reliability ($\alpha = 0.958$; $\rho_a = 0.960$; $\rho\_c = 0.963$), as did Self-Confidence (X_3) ($\alpha = 0.954$; $\rho_a = 0.955$; $\rho\_c = 0.959$) and Social Support (X_1) ($\alpha = 0.945$; $\rho_a = 0.945$; $\rho\_c = 0.952$).

Collectively, these results confirm that all constructs meet the reliability criteria for PLS-SEM, ensuring that indicators measure their intended latent variables consistently and precisely.

Structural Model Evaluation

After establishing the validity and reliability of the measurement model, the structural model was evaluated to examine the hypothesized relationships among constructs.

Figure 2. Results in the Bootstrapping



Coefficient of Determination (R^2)

The R-Square (R^2) value is used to assess the explanatory power of independent variables in predicting the dependent variable. According to common interpretive standards, an R-Square value of 0.67 indicates a strong model, 0.33 indicates a moderate model, and 0.19 reflects a weak model. The R-Square results for this study are presented in Table 5.

Table 5. R-Square Results

Variable	R-square	R-square adjusted
Mental Toughnes (Z)	0.799	0.797
Peak performance (Y)	0.913	0.912

The R-Square (R^2) statistic was used to assess the model's explanatory power. As reported in Table 5, the Mental Toughness variable (Z) had an R^2 of 0.799 (adjusted R^2 = 0.797), indicating that 79.9% of the variance in mental toughness is explained by Social Support, Anxiety, and Self-Confidence. The remaining 20.1% is attributed to unmeasured factors.

Meanwhile, the Peak Performance variable (Y) recorded an R^2 of 0.913 (adjusted R^2 = 0.912), demonstrating that 91.3% of the variance in peak performance is explained by the combined effects of Social

Support, Anxiety, Self-Confidence, and Mental Toughness. According to Hair et al., (2021), these values indicate a model with strong predictive accuracy and explanatory power.

Goodness of Fit (GoF)

The Goodness of Fit (GoF) test in Partial Least Squares Structural Equation Modeling (PLS-SEM) is used to evaluate the overall fit of the research model and to determine how well the model represents the empirical data being analyzed.

Table 6. Goodness of Fit Results

	Saturated model	Estimated model
SRMR	0.067	0.067

Model fit was assessed using the Standardized Root Mean Square Residual (SRMR) criterion. The SRMR values for both the saturated and estimated models were 0.067 (Table 6), below the 0.08 benchmark for an acceptable fit (Hu & Bentler, 1999). This indicates that the proposed model adequately represents the empirical data and is appropriate for hypothesis testing.

Path Coefficients and Mediation Analysis

The path coefficients provide information about the strength and direction of the relationships between independent and dependent variables. They not only indicate the magnitude of influence but also reveal whether the hypothesized relationships are positive or negative. The results of the path analysis are detailed in Table 7.

Table 7. Path Coefficient Results

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
X1 -> Y	0.118	0.117	0.040	2.948	0.003
X1 -> Z	0.227	0.224	0.056	4.034	0.000
X2 -> Y	-0.101	-0.101	0.027	3.757	0.000
X2 -> Z	-0.159	-0.162	0.041	3.874	0.000
X3 -> Y	0.694	0.694	0.066	10.481	0.000
X3 -> Z	0.591	0.592	0.060	9.784	0.000
Z -> Y	0.321	0.320	0.075	4.284	0.000
X1 -> Z -> Y	0.073	0.071	0.023	3.176	0.002
X2 -> Z -> Y	-0.051	-0.052	0.018	2.811	0.005
X3 -> Z -> Y	0.190	0.190	0.051	3.723	0.000

Note: Social Support (X1), Anxiety (X2), Self-Confidence (X3), Mental Toughness (Z), Peak Performance (Y)

The standardized path coefficients, their standard deviations, t-statistics, and p-values are presented in Table 7. The analysis revealed both direct and indirect effects that were statistically significant ($p < 0.05$).

The Effect of Social Support on Peak Performance (H1)

Social support exhibited a positive and significant effect on peak performance ($\beta = 0.118$, $t = 2.948$, $p = 0.003$). This finding supports the notion that athletes who receive consistent encouragement, emotional empathy, and instrumental assistance from coaches, peers, and family are more likely to perform optimally. The effect size, though moderate, underscores the indirect but stabilizing influence of supportive environments on competitive focus and motivation. This result aligns with previous evidence by Bianco & Eklund (2001) and Freeman & Rees (2009), which highlighted that perceived support enhances psychological readiness and performance sustainability.

The Effect of Social Support on Mental Toughness (H2)

The influence of social support on mental toughness was positive and significant ($\beta = 0.227$, $t = 4.034$, $p < 0.001$). This indicates that athletes who perceive a strong network of interpersonal support tend to develop greater perseverance, confidence, and emotional control. In line with (Clough et al., 2002) and Gucciardi et al., (2015), these findings suggest that supportive environments function as developmental scaffolds for psychological resilience, enhancing athletes' capacity to recover from setbacks and maintain composure during competitive stress.

The Effect of Anxiety on Peak Performance (H3)

Anxiety had a negative and significant effect on peak performance ($\beta = -0.101$, $t = 3.757$, $p < 0.001$). High levels of competitive anxiety were associated with cognitive interference, attentional disruption, and physiological overarousal, which impaired athletes' technical execution and tactical decision-making. This finding aligns with more recent empirical evidence indicating that elevated anxiety undermines performance by disrupting attentional focus and increasing somatic tension (Lochbaum, Stoner, et al., 2022; Niering, Monsberger, Seifert, & Muehlbauer, 2023), reinforcing the notion that anxiety remains a detrimental determinant of athletic outcomes when it exceeds optimal arousal thresholds.

The Effect of Anxiety on Mental Toughness (H4)

Anxiety negatively predicted mental toughness ($\beta = -0.159$, $t = 3.874$, $p < 0.001$). This suggests that athletes who frequently experience worry, tension, and performance-related apprehension tend to exhibit lower emotional control and reduced resilience. Recent empirical evidence supports this relationship: for example, increased anxiety is associated with diminished mental toughness and attentional regulation in competitive contexts (Mojtahedi et al., 2023).

The Effect of Self-Confidence on Peak Performance (H5)

Self-confidence emerged as the strongest direct predictor of peak performance ($\beta = 0.694$, $t = 10.481$, $p < 0.001$). Athletes with high self-belief demonstrated greater consistency, task focus, and emotional stability under pressure. This supports Robin S Vealey (1986) sport confidence model and empirical findings by Moritz, Feltz, Fahrbach, & Mack (2000), confirming that confidence functions as a central mechanism driving successful performance outcomes.

The Effect of Self-Confidence on Mental Toughness (H6)

The positive relationship between self-confidence and mental toughness ($\beta = 0.591$, $t = 9.784$, $p < 0.001$) indicates that confident athletes are more capable of sustaining motivation and emotional regulation when facing adversity. The result reinforces the conceptual overlap between these constructs proposed by Clough et al., (2002), where confidence represents both a component and precursor of mental toughness.

The Effect of Mental Toughness on Peak Performance (H7)

Mental toughness significantly predicted peak performance ($\beta = 0.321$, $t = 4.284$, $p < 0.001$). Athletes high in mental toughness are characterized by sustained concentration, emotional control, and persistence in demanding conditions. This finding validates prior studies by Mahoney et al., (2014) and Gucciardi et al., (2015), confirming mental toughness as a crucial psychological determinant of consistent high-level performance.

Mediation Effects

The mediation analysis revealed that mental toughness plays a significant mediating role in the relationships between the independent psychological variables and peak performance:

H8a: The indirect path from social support to peak performance via mental toughness was positive and significant ($\beta = 0.073$, $p = 0.002$). This implies that the performance benefits of social support are partially transmitted through the enhancement of resilience and perseverance.

H8b: The indirect effect of anxiety on peak performance through mental toughness was negative and significant ($\beta = -0.051$, $p = 0.005$). This suggests that anxiety diminishes performance not only directly but also by weakening mental resilience.

H8c: The indirect relationship between self-confidence and peak performance via mental toughness was positive and substantial ($\beta = 0.190$, $p < 0.001$), confirming that self-belief strengthens resilience, which subsequently boosts competitive output.

Collectively, these findings confirm that mental toughness functions as an empirical mediator, transforming external (social) and internal (emotional-cognitive) inputs into sustained performance outcomes. The mediational pattern supports the integrative model of psychological performance regulation, where both environmental resources and personal belief systems converge through resilience mechanisms to yield peak performance.

Summary of Structural Findings

In summary, the structural model demonstrates robust predictive power and empirical coherence. Self-Confidence was identified as the most potent determinant of Peak Performance, followed by Mental Toughness and Social Support, while Anxiety exerted a significant negative effect. The mediating function of Mental Toughness validates its theoretical positioning as both a psychological outcome and a regulatory mechanism that facilitates optimal athletic functioning. These findings form the empirical foundation for the theoretical and practical discussions presented in the subsequent section.

Discussion

Overview of Findings

The present study provides compelling empirical evidence underscoring the intricate psychological mechanisms underlying peak performance among badminton athletes. Results reveal that social support, anxiety, and self-confidence exert significant and interrelated effects on athletes' mental toughness, which in turn mediates their overall performance quality. Specifically, social support from coaches, peers, and family demonstrated a positive and robust effect on athletes' engagement and motivation during training and competition. In contrast, competitive anxiety showed a detrimental impact, while self-confidence emerged as the strongest positive predictor of peak performance. The mediating role of mental toughness was validated, confirming its status as a central psychological construct that integrates cognitive, emotional, and behavioral adaptations under pressure.

Interpretation in Relation to Previous Studies

The pivotal role of social support found in this study is consistent with the empirical patterns reported by Zhang, Hasibagen, & Zhang (2022), who demonstrated that proximal and consistent support systems significantly enhance athletes' self-efficacy and motivation to cope with competitive challenges. Drawing upon Self-Determination Theory (SDT) (R. Ryan & Deci, 2000), the present findings affirm that social support fulfills athletes' basic psychological needs—competence, autonomy, and relatedness—thereby facilitating intrinsic motivation and sustaining optimal performance states. Emotional encouragement and instructional feedback from coaches not only buffer psychological strain but also cultivate a sense of belonging, which is fundamental to athletes' sustained engagement.

Similarly, consistent with the meta-synthesis by Shi et al., (2025), this study verifies that social support indirectly enhances performance through the mediation of self-efficacy and mental toughness. Emotional reassurance, performance feedback, and tactical guidance constitute essential forms of psychosocial input that mitigate the onset of competitive burnout (Shang & Yang, 2021). These findings collectively support the notion that athletes' psychological endurance is socially constructed, rather than merely inherent, emphasizing the necessity of structured support systems within athletic programs.

Conversely, the study substantiates competitive anxiety as a detrimental variable in athletic contexts. In accordance with Attentional Control Theory (Eysenck et al., 2007), elevated anxiety disrupts attentional focus, leading athletes to prioritize threat-related cues rather than task-relevant information. This impairment in attentional regulation contributes to diminished motor precision and cognitive flexibility, particularly in fast-paced sports such as badminton where perceptual-motor integration is critical. The negative correlation between anxiety and performance observed in this study ($\beta = -0.159$) mirrors findings from Niering et al., (2023), who reported a consistent negative linear relationship between cognitive anxiety and performance, accompanied by an inverted-U effect for somatic anxiety.

These results also converge with the evidence from Khaleghi, Sheykhzadeh, Derakhshan, & Eyni (2025) and Sofyan & Nurjaya (2024), indicating that heightened anxiety erodes psychological resilience, thereby weakening athletes' ability to recover from performance setbacks. The present study expands this understanding by identifying mental toughness as a mediating buffer—a mechanism through which anxiety's adverse effects on performance are substantially attenuated.

Parallel to these findings, self-confidence emerged as the most powerful predictor of peak performance, with a standardized path coefficient of 0.694. This outcome aligns with the extensive literature emphasizing confidence as a determinant of sport success (Horcajo, Santos, & Higuero, 2022; Lochbaum et al.,

2023). High self-confidence enhances attentional control, emotional regulation, and positive expectancy toward performance outcomes. These psychological attributes collectively foster adaptive coping mechanisms that sustain performance under duress.

Moreover, self-confidence was found to serve as a precursor to mental toughness. Athletes with high confidence display greater perseverance, cognitive flexibility, and self-regulatory capacity (Bochaver, Reznichenko, & Bondarev, 2023). The evidence corroborates Robin S Vealey (1986) Sport Confidence Model, suggesting that perceived competence—shaped by both mastery experiences and social reinforcement—facilitates resilient responses in high-pressure environments. Complementary findings by Dewi & Jannah (2023) demonstrate that interventions such as mental skills training, goal setting, and self-talk effectively enhance confidence and resilience, which this study further substantiates within the context of Indonesian badminton.

Mediating Role of Mental Toughness

The findings establish mental toughness as a pivotal mediating construct linking social support, self-confidence, and anxiety to peak performance. This reinforces the conceptualization proposed by Clough et al., (2002), who defined mental toughness as a multidimensional construct encompassing control, commitment, challenge, and confidence. The present study's path model confirmed that mental toughness significantly predicts peak performance ($\beta = 0.321$), highlighting its integrative function in sustaining concentration, emotional balance, and goal-oriented persistence during competition.

Benjamin & John (2021) estimated that mental toughness mitigates approximately 82% of anxiety's negative impact on performance—a pattern replicated in the current data. This buffering capacity positions mental toughness as a psychological shield that sustains performance consistency under stress. Athletes who exhibit high mental toughness are capable of cognitive reframing, transforming adversity into motivation, and maintaining attentional control even in unstable emotional states.

In the broader context, this study corroborates Wu et al., (2021) and Beauchamp, Kamis, & Stull (2021), who argue that mental toughness is not merely a stable trait but a developable skill set responsive to environmental and social reinforcement. The mediation observed here underscores the dynamic interdependence between personal agency (self-confidence), contextual support (social support), and internal regulation (mental toughness).

Theoretical Implications

From a theoretical standpoint, this study makes three substantial contributions.

First, it extends Self-Determination Theory (Ryan & Deci, 2000) by demonstrating that social support not only satisfies basic psychological needs but also indirectly enhances mental toughness, a construct not originally integrated into SDT frameworks. The evidence suggests that mental toughness functions as an outcome of internalized motivation—athletes who experience autonomy-supportive environments exhibit higher psychological endurance and adaptive coping.

Second, through the lens of Attentional Control Theory, the study confirms that competitive anxiety disrupts cognitive efficiency, leading to diminished task performance. However, athletes with stronger mental toughness maintain attentional control by allocating cognitive resources toward task-relevant cues, thereby offsetting anxiety's deleterious effects.

Third, the findings refine the Resilience Framework in Sport Psychology (Galli & Vealey, 2008), positioning mental toughness as the operational manifestation of resilience. Whereas resilience emphasizes recovery from adversity, mental toughness emphasizes sustained functionality during adversity. This distinction enriches conceptual understanding and suggests that resilience and toughness operate on a temporal continuum—from recovery (resilience) to proactive endurance (toughness).

Practical Implications

The practical applications of these findings are multifaceted. For coaches, the results underscore the necessity of creating autonomy-supportive climates that provide constructive feedback and emotional reinforcement. Structured mentorship programs and consistent performance dialogue can foster the psychological security necessary for athletes to develop confidence and resilience.

For sport psychologists and mental trainers, this study highlights the efficacy of integrating cognitive-behavioral techniques, emotional regulation training, and social reinforcement mechanisms into mental toughness development programs. Interventions such as imagery rehearsal, positive self-talk, mindfulness routines, and goal-setting frameworks should be institutionalized within athlete training cycles.

For sport policy and administration, particularly within the Indonesian context, the evidence advocates for the institutionalization of sport psychology services in elite and developmental training centers. Embedding psychological support within performance programs ensures sustained mental well-being and competitive excellence. Furthermore, collaboration among coaches, psychologists, and medical staff should be mandated to establish holistic athlete development models that balance physical and psychological readiness.

Limitations and Future Research Directions

Despite its robust empirical validation, this study acknowledges certain limitations. The cross-sectional design restricts causal inference; longitudinal studies are required to trace the temporal evolution of psychological constructs across competition cycles. Moreover, the reliance on self-reported measures may introduce social desirability bias; future research should integrate behavioral and physiological indicators such as cortisol levels or heart rate variability to capture real-time stress responses. Additionally, while the present model explains a substantial proportion of variance in performance, other potential mediators—such as coping style, goal orientation, or coach–athlete communication quality—warrant inclusion in future models.

Cross-cultural comparisons across Southeast Asian sport systems could also enhance the generalizability of these findings, particularly given the sociocultural variability in coaching philosophy and athlete collectivism. Qualitative follow-up studies are encouraged to explore athletes' subjective experiences of mental toughness cultivation and the nuanced influence of familial and community support networks.

Conclusions

This study provides a comprehensive account of the psychological architecture underpinning peak performance in competitive badminton. Moving beyond statistical verification, the findings offer theoretical and practical insights into how social support, self-confidence, and anxiety interact through the mediating mechanism of mental toughness to shape athletes' ability to perform optimally under pressure.

Theoretical Synthesis

The evidence confirms that social support functions as a foundational enabler of both peak performance and mental toughness. Consistent with *Self-Determination Theory* (R. Ryan & Deci, 2000), the study demonstrates that when athletes perceive autonomy-supportive environments—characterized by empathy, feedback, and validation from coaches, peers, and family—their intrinsic motivation and psychological resilience are strengthened. However, this study extends SDT by showing that these supportive dynamics do not merely satisfy basic psychological needs; they are internalized as mental toughness, enabling sustained emotional regulation, focus, and recovery from failure.

In contrast, competitive anxiety exerts a negative psychological force that disrupts attentional control, self-regulation, and performance stability. This aligns with *Attentional Control Theory* (Eysenck et al., 2007), which posits that heightened anxiety diverts cognitive resources from task-relevant to threat-related processing. The current model refines this framework by demonstrating that mental toughness mediates this disruption—acting as a cognitive-emotional buffer that converts potentially detrimental anxiety into adaptive energy through mechanisms of reappraisal, focus realignment, and emotional composure.

Equally crucial, self-confidence emerges as a critical precursor that both strengthens mental toughness and enhances direct performance outcomes. This supports *Bandura's Self-Efficacy Theory* (Bandura, 1997), yet contributes new evidence by embedding self-confidence within a structural model alongside anxiety and social support. The implication is that confidence is not merely a byproduct of prior success but a dynamic psychological construct that reinforces resilience, optimism, and persistence under pressure.

Collectively, these interconnections highlight mental toughness as a central integrating construct that consolidates the motivational, affective, and cognitive dimensions of athlete performance. The study thus contributes a more holistic conceptualization—positioning mental toughness not as an isolated personality trait but as a *learned, socially reinforced, and dynamically modulated process*.

Practical and Applied Implications

The practical implications of these findings are particularly salient for coaching practice and sport psychology interventions.

1. For Coaches: The data underscore the importance of cultivating a psychologically safe and autonomy-supportive training climate. Coaches should integrate mental skills training into daily routines—through positive reinforcement, reflective dialogue, and structured goal-setting—to nurture confidence and resilience.
2. For Sport Psychologists: Interventions should prioritize anxiety management and confidence-building techniques, including cognitive-behavioral approaches, mindfulness-based training, and stress inoculation exercises. These strategies can optimize attentional control and promote adaptive coping responses during high-stakes matches.
3. For Policy and Program Design: Within Indonesia's competitive badminton ecosystem, the study highlights the urgency of institutionalizing psychological service units within athlete development programs. Such units could systematically deliver resilience and confidence training, providing measurable psychological preparation alongside technical and physical conditioning.

By embedding these psychological dimensions within national training systems, Indonesia can move toward a holistic athlete development paradigm—one that values mental readiness as a determinant of long-term success.

Limitations and Future Directions

Despite its significant contributions, this research acknowledges several limitations that invite future refinement. The cross-sectional design restricts causal interpretation of variable relationships. Subsequent research should adopt longitudinal or experimental designs to observe how mental toughness evolves over time and under varied training interventions. Additionally, the reliance on self-report questionnaires introduces potential biases related to self-perception and social desirability; thus, incorporating behavioral, physiological, or observational measures (e.g., heart-rate variability, gaze-tracking, or performance analytics) would enhance construct validity.

Culturally, the study's sample is situated within the Indonesian badminton context—a sport that values discipline and collectivism. While this strengthens ecological validity, cross-cultural replication is needed to examine how these dynamics manifest in more individualistic or team-oriented environments. Furthermore, conceptual overlap between constructs such as mental toughness, resilience, and grit warrants deeper theoretical exploration to delineate their unique and shared contributions to performance psychology.

Future studies are encouraged to test intervention-based models that deliberately cultivate mental toughness through structured psychological training, as well as to explore gender, age, and competitive-level differences that may moderate these pathways.

Conceptual Integration

Synthesizing across findings, the proposed model articulates a relational-psychological ecosystem of performance. Social support provides the motivational foundation; self-confidence energizes and stabilizes self-belief; anxiety represents a regulatory challenge; and mental toughness integrates these dimensions into a coherent adaptive response. In this framework, peak performance emerges not from isolated variables but from the *synergy of social, cognitive, and emotional regulation processes*.

By bridging motivational and stress-regulation theories, this study contributes a unified psychological model that reconceptualizes mental toughness as both a mediator and moderator—a flexible psychological mechanism that translates social and emotional inputs into behavioral excellence.

Closing Reflection

In conclusion, this research enriches the theoretical and empirical discourse on performance psychology by demonstrating that elite performance is socially constructed, cognitively regulated, and emotionally sustained. It challenges traditional views of mental toughness as an immutable trait, emphasizing instead its developmental and relational nature. For athletes, coaches, and institutions, the findings advocate for a sustained commitment to psychological conditioning—ensuring that technical mastery is consistently supported by emotional resilience and mental clarity.

Ultimately, this integrative approach offers a transformative vision for athlete development: one where peak performance is not merely the absence of anxiety, but the presence of adaptive strength, confidence, and focused composure cultivated through social connection and psychological empowerment.

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Conflict of interest

The author declares that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. This includes the absence of financial relationships, institutional affiliations, or personal interests that could have influenced the objectivity or integrity of the study findings.

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