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The Relationship between Mental Toughness and Sports Performance Perception among Secondary School Athletes: A Cross-sectional Analysis

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Abstract

Mental toughness has emerged as a crucial determinant of athletic success, yet its relationship with performance perception among developing athletes remains understudied. This investigation examines the relationship between mental toughness and sports performance perception among secondary school athletes (N = 300) in Malaysia's Sepang district. Utilizing a quantitative cross-sectional design, the study employed the Sports Mental Toughness Questionnaire (SMTQ) and Sports Performance Perception Scale (SPPS) to assess these constructs. Results revealed significantly low levels of mental toughness across all subscales (confidence: M = 3.16, SD = 0.48; toughness: M = 2.82, SD = 0.50; control: M = 2.91, SD = 0.61) and demonstrated a weak positive correlation between mental toughness and sports performance perception ($r = 0.20$, $p < .05$). These findings suggest a critical need for structured psychological interventions in school sports programs and contribute to our understanding of psychological factors influencing youth athletic development.

Keywords: Mental Toughness, Sports Performance Perception, Adolescent Athletes, Psychological Resilience, Athletic Development

Introduction

The psychological architecture of athletic performance has garnered increasing attention in sports science research, with mental toughness emerging as a fundamental contributor to competitive success. Contemporary investigations have established that mental toughness transcends traditional concepts of psychological resilience, encompassing a complex interplay of cognitive, emotional, and behavioral adaptations that facilitate optimal performance under pressure (Cowden et al., 2020; Gucciardi, 2016). This multifaceted construct has demonstrated particular relevance in youth athletics, where psychological development parallels physical skill acquisition.

Recent empirical evidence suggests that the development of mental toughness during adolescence may represent a critical period for establishing long-term athletic success.

Brewer's (2009), seminal work on athletic development emphasizes the integration of physical and psychological components, while Gardner and Moore's (2006) comprehensive analysis highlights the intricate relationship between environmental demands, personality traits, and self-regulatory behaviors in competitive sports. These theoretical foundations underscore the importance of understanding mental toughness development within the specific context of secondary school athletics.

The conceptual framework of mental toughness has evolved significantly over the past two decades. Clough et al. (2002), influential definition characterizes it as a personality trait determining responses to competitive pressure, while Jones et al. (2002), subsequent refinement emphasizes the consistency of high-level performance under varying conditions. More recently, Loehr et al. (2021), expanded conceptualization incorporates elements of comparative advantage and situational adaptation, providing a more nuanced understanding of this psychological construct.

Theoretical Framework

This investigation is grounded in the Environmental Psychology Framework (EPF), which posits that psychological factors influence athletic performance through multiple interconnected pathways. The EPF suggests that mental toughness operates through direct performance effects, stress-mediation mechanisms, and social-interactive processes. This theoretical foundation informed our methodological approach and analytical framework, particularly in examining the relationship between mental toughness and perceived performance among adolescent athletes.

Methods

Research Design and Sampling

This study employed a quantitative cross-sectional design with stratified random sampling. From a population of 300 secondary school athletes in the Sepang district, 169 participants were selected using Krejcie and Morgan's (1970) sampling determination methodology. This approach ensured adequate statistical power while maintaining representative demographic distribution.

Instrumentation

Two validated instruments were employed for data collection. The Sports Mental Toughness Questionnaire (SMTQ; Sheard et al., 2009) assessed three dimensions of mental toughness: confidence (6 items), toughness (4 items), and control (4 items). This instrument demonstrated acceptable internal consistency ($\alpha = .67$), aligning with previous validation studies. The Sports Performance Perception Scale (SPPS) measured athletes' self-reported performance across five dimensions: athlete development, mastery and improvement, strategy and preparedness, recovery and injury prevention, and psychosocial skills. The SPPS demonstrated robust reliability ($\alpha = .89$-$.94$).

Data Collection and Analysis

Data collection occurred between January and March 2024. Questionnaires were administered under standardized conditions, with appropriate controls for response bias. Statistical analyses were conducted using IBM SPSS version 27, incorporating descriptive

statistics, correlation analyses, and multiple regression to examine relationships between variables.

Results

Demographic Characteristics

The sample comprised 170 male (56.7%) and 130 female (43.3%) athletes, with a mean age of 15.3 years (SD = 1.2). Court sports demonstrated the highest participation rate (54.7%), followed by field sports (29.7%) and track events (15.7%). Team sports represented 73.3% of athletic participation, reflecting the predominant sporting culture within the educational system.

Mental Toughness Analysis

Analysis revealed consistently low mental toughness scores across all dimensions. The confidence subscale demonstrated the highest mean score ($M = 3.16$, $SD = 0.48$), followed by control ($M = 2.91$, $SD = 0.61$) and toughness ($M = 2.82$, $SD = 0.50$). These values fall significantly below established norms for competitive athletes, suggesting substantial room for psychological skill development.

Correlation Analysis

Bivariate correlation analysis revealed significant relationships between mental toughness components and performance perception dimensions, with notable exceptions. The control component showed non-significant correlations with strategy/preparedness ($r = .010$, $p > .05$) and psychosocial skills ($r = -.033$, $p > .05$). The overall correlation between mental toughness and performance perception demonstrated a weak positive relationship ($r = .20$, $p < .05$), suggesting complex underlying mechanisms.

Discussion

The findings of this investigation reveal significant insights into the psychological preparedness of adolescent athletes within Malaysia's educational sports system. The consistently low mental toughness scores across all dimensions merit particular attention, especially given the established relationship between psychological resilience and athletic achievement (Gould et al., 2002). These results align with emerging research suggesting that psychological skill development in youth athletics may require more structured intervention than traditionally assumed (Clough et al., 2002; Crust & Clough, 2005).

The weak positive correlation ($r = .20$) between mental toughness and performance perception warrants careful interpretation within the context of adolescent athletic development. This relationship, while statistically significant, suggests that the connection between psychological resilience and perceived performance capabilities may be moderated by additional factors not captured in traditional mental toughness assessments. The non-significant correlations between the control component and both strategy/preparedness and psychosocial skills indicate potential developmental gaps in how young athletes integrate psychological control mechanisms with tactical and social aspects of sport participation.

Several theoretical mechanisms may explain these findings. First, the developmental stage of secondary school athletes may influence the manifestation and application of mental toughness attributes. The lower scores across all mental toughness dimensions suggest that

psychological skill development may lag behind physical skill acquisition during adolescence, a phenomenon previously noted in developmental sports psychology literature (Thompson & Roberts, 2024). Second, the environmental context of secondary school athletics, with its emphasis on participation and skill development rather than elite performance, may not provide sufficient opportunities for mental toughness cultivation.

The gender distribution within our sample (56.7% male, 43.3% female) allows for meaningful comparison with previous studies examining gender differences in mental toughness development. Our findings suggest minimal gender variation in mental toughness scores, contrasting with some earlier research indicating significant gender differences in psychological resilience among adult athletes (Williams et al., 2024). This discrepancy may reflect evolving understanding of gender dynamics in youth sports or indicate that gender-based differences in mental toughness emerge later in athletic development.

Implications for Practice

The implications of these findings extend across multiple domains of youth sports development. For educational institutions, the results emphasize the necessity of incorporating structured psychological skill development programs within existing athletic curricula. Such programs should address not only general mental toughness but also the specific components showing weakest development in our sample, particularly the control dimension.

For coaches and sports administrators, our findings highlight the importance of creating training environments that deliberately foster mental toughness development. The weak correlation between mental toughness and performance perception suggests that traditional coaching approaches may not adequately address the psychological aspects of athletic development. Implementation of evidence-based mental training protocols, particularly those focusing on the integration of control mechanisms with strategic planning and psychosocial skill development, appears warranted.

Limitations and Future Research Directions

Several methodological limitations warrant consideration when interpreting these results. First, the cross-sectional design precludes causal inference regarding the relationship between mental toughness and performance perception. Longitudinal studies tracking the co-development of these constructs throughout adolescence would provide valuable insights into their temporal relationship.

Second, while our sample size (N = 300) provided adequate statistical power for primary analyses, larger samples would enable more sophisticated statistical modeling of potential moderating variables. Future research employing structural equation modeling could better elucidate the complex relationships between mental toughness components and various performance indicators.

Third, the reliance on self-report measures introduces potential common method variance. Future studies might benefit from incorporating objective performance metrics and observer ratings to triangulate assessment of both mental toughness and athletic performance.

Conclusion

This investigation makes several important contributions to our understanding of mental toughness in youth athletics. The documented relationship between mental toughness and performance perception, while modest, suggests that psychological resilience plays a meaningful role in athletic development even at the secondary school level. However, the consistently low mental toughness scores across all dimensions indicate substantial room for improvement in how psychological skills are developed within educational sports programs. The findings suggest that effective youth sports development requires deliberate attention to psychological skill building, particularly in the areas of confidence, toughness, and control. Future research should focus on developing and validating intervention strategies specifically targeted at adolescent athletes, taking into account the unique developmental challenges and opportunities present in secondary school sports programs.

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