



## The Relationship Between Mental Toughness and the Competition Performance of Pencak Silat Athletes

Yuda Pratama<sup>1A-E\*</sup>, Tri Aji<sup>2B-D</sup>

<sup>1,2</sup> Universitas Negeri Semarang

[muhammadyudhatama04@students.unnes.ac.id](mailto:muhammadyudhatama04@students.unnes.ac.id)\*

### ABSTRACT

Mental toughness is recognized as one of the most important psychological factors influencing athletes' ability to perform optimally under competitive pressure. In combat sports such as pencak silat, athletes are required not only to possess superior physical and technical abilities but also to demonstrate psychological resilience, confidence, commitment, and emotional control during competition. This study aimed to: (1) describe the level of mental toughness among PPLOP Central Java pencak silat athletes based on coaches' assessments; (2) describe athletes' competition performance based on self-assessment; and (3) examine the relationship between mental toughness and competition performance. This study employed a quantitative correlational survey design. The participants consisted of 13 pencak silat athletes from the Central Java Student Sports Education and Training Center (PPLOP Jawa Tengah), selected using total sampling. Data were collected through two questionnaires: a 25-item Mental Toughness Questionnaire completed by coaches and a 48-item Competition Performance Questionnaire completed by athletes. Data analysis included validity testing using Pearson Product Moment, reliability testing using Cronbach's Alpha, normality testing using the Shapiro-Wilk test, descriptive statistics, and Spearman Rank correlation analysis. The results revealed that the majority of athletes were categorized as having moderate mental toughness (38.5%), with a mean score of 89.46 (SD = 2.33). Meanwhile, most athletes perceived their competition performance as high (46.2%), with a mean score of 155.00 (SD = 19.00). Spearman Rank analysis indicated no significant relationship between coach-rated mental toughness and athlete-rated competition performance ( $r_s = -0.014$ ;  $p = 0.964$ ). The absence of a significant relationship may be attributed to differences in assessment perspectives, the small sample size, and the homogeneity of mental toughness scores. These findings highlight the importance of improving psychological assessment methods and implementing more structured mental development programs in athlete training systems.

### ARTICLE HISTORY

Received: 2026/05/18

Accepted: 2026/05/25

Published: 2026/05/31

### KEYWORDS

Mental Toughness;  
Competitive Performance;  
Pencak Silat;  
Sport Psychology;  
Athlete Development.

### AUTHORS' CONTRIBUTION

A. Conception and design of the study;  
B. Acquisition of data;  
C. Analysis and interpretation of data;  
D. Manuscript preparation;  
E. Obtaining funding

**Cites this Article** : Pratama, Y.; Aji, T. (2026). The Relationship Between Mental Toughness and the Competition Performance of Pencak Silat Athletes. **Competitor: Jurnal Pendidikan Kepeleatihan Olahraga**. 18 ( 2 ), p.4156-4170

## INTRODUCTION

Pencak silat is an indigenous Indonesian martial art that has evolved from a traditional cultural practice into a highly competitive international sport. Since its



inclusion in major multi-sport events such as the Southeast Asian Games and its continued expansion through the activities of the International Pencak Silat Federation, the sport has experienced substantial growth in terms of athlete participation, coaching systems, and scientific training approaches. As competitive standards continue to increase, athlete success is no longer determined solely by physical conditioning, technical proficiency, and tactical mastery. Contemporary sport science increasingly recognizes psychological factors as critical determinants of athletic performance, particularly in combat sports where athletes are exposed to intense physical confrontation and psychological pressure simultaneously.

Among various psychological constructs, mental toughness has emerged as one of the most influential predictors of athletic achievement. Mental toughness refers to a psychological capacity that enables individuals to remain focused, confident, resilient, and committed while facing adversity, pressure, uncertainty, and competitive challenges. According to Peter Clough and colleagues, mental toughness encompasses dimensions such as challenge, commitment, control, and confidence that facilitate optimal functioning under demanding circumstances. Athletes possessing high levels of mental toughness are generally better equipped to regulate emotions, maintain concentration, recover from setbacks, and sustain performance consistency throughout competition.

The importance of mental toughness becomes particularly evident in combat sports, including pencak silat. Unlike many team sports, combat athletes must make rapid decisions, execute complex motor skills under pressure, and manage the psychological burden associated with direct confrontation against opponents. Competitive situations frequently involve fear of failure, performance anxiety, fatigue, scoring uncertainty, and tactical unpredictability. These conditions create psychological demands that often distinguish successful athletes from less successful competitors. Consequently, understanding the role of mental toughness in determining competitive performance has become increasingly important for athlete development programs.

The Pusat Pendidikan dan Latihan Olahraga Pelajar Jawa Tengah serves as one of Indonesia's prominent athlete development institutions, producing young athletes capable of competing at regional and national levels. Within this training environment, coaches are responsible not only for developing technical and tactical competencies but also for fostering psychological readiness and mental resilience. However, despite the recognized importance of psychological preparation, empirical evidence regarding the relationship between mental toughness and competitive performance among PLOPP pencak silat athletes remains limited.

Over the past decade, mental toughness has received considerable attention in sport psychology research. Numerous studies have demonstrated that athletes with stronger mental toughness tend to achieve superior competitive outcomes compared to their counterparts. A systematic review conducted by Guskowska and Wojcik (2021) reported that sixteen of eighteen reviewed studies identified a positive association between mental toughness and athletic performance. These findings indicate that

mental toughness contributes substantially to performance consistency, competitive success, and psychological adaptation during stressful sporting situations.

Further evidence has been provided through quantitative synthesis studies. A meta-analysis by Cowden et al. (2023), encompassing sixteen independent investigations, revealed a moderate-to-large positive relationship between mental toughness and sport performance, with an overall effect size of  $r = 0.36$ . This finding suggests that mental toughness is not merely a complementary psychological attribute but a meaningful predictor of athletic achievement across different sports contexts.

Within combat sports, the role of mental toughness appears even more pronounced. Research involving martial arts athletes, including taekwondo, karate, judo, wrestling, and mixed martial arts, consistently demonstrates that mentally tough athletes exhibit greater emotional regulation, self-confidence, competitive persistence, and stress tolerance. Mojtahedi et al. (2023) found that mental toughness significantly moderated competitive anxiety among combat sport athletes. Athletes with higher mental toughness were better able to manage anxiety symptoms and maintain performance effectiveness during competition.

Additional studies have highlighted the multidimensional benefits of mental toughness. Gucciardi et al. (2017) reported that mentally tough athletes demonstrate enhanced motivation, greater commitment to training, and improved coping strategies under pressure. Likewise, Cowden (2018) identified positive associations between mental toughness, psychological well-being, self-regulation, and competitive achievement. Research conducted in youth athlete populations has also indicated that mental toughness contributes to long-term athlete development by facilitating resilience, confidence, and adaptability throughout the training process.

Within Indonesian sports contexts, studies examining mental toughness have primarily focused on football, badminton, volleyball, and general athlete populations. Findings generally indicate that athletes with higher mental toughness scores exhibit better competitive readiness, stronger achievement motivation, and greater confidence. Nevertheless, investigations specifically addressing pencak silat athletes remain relatively scarce, particularly within elite youth development institutions such as PLOP.

Although previous studies have consistently demonstrated the importance of mental toughness for athletic success, several important gaps remain unresolved. First, existing literature predominantly examines mental toughness and performance using self-report assessments administered exclusively to athletes. Such an approach may introduce subjective bias because athletes often evaluate their own psychological readiness and performance through personal perceptions that may not fully reflect objective observations.

Second, research focusing specifically on pencak silat athletes remains limited compared with studies conducted in other combat sports. While psychological characteristics of taekwondo, karate, judo, and wrestling athletes have been extensively explored, empirical investigations involving Indonesian pencak silat athletes are still

insufficient. Considering the unique cultural, technical, and tactical characteristics of pencak silat, findings from other combat sports may not be directly generalizable.

Third, few studies have adopted a dual-rater perspective that combines external evaluations from coaches with internal evaluations from athletes. Coaches interact with athletes daily and possess valuable insights regarding behavioral indicators of mental toughness, including perseverance, confidence, emotional control, and competitive resilience. Integrating coach assessments with athlete self-evaluations may therefore provide a more comprehensive understanding of psychological readiness and performance outcomes. Fourth, limited evidence exists concerning mental toughness among adolescent athletes undergoing systematic talent development programs in regional training centers. Understanding psychological characteristics during this developmental stage is essential because mental skills established during adolescence often influence future elite performance trajectories.

Based on the aforementioned issues, this study aims to: (1) describe the level of mental toughness among PPLOP Central Java pencak silat athletes based on coach assessments; (2) describe athletes' competitive performance based on self-assessment; and (3) examine the relationship between mental toughness and competitive performance among PPLOP Central Java pencak silat athletes.

The novelty of this study lies in its implementation of a dual-rater assessment approach that combines coach-rated mental toughness and athlete-rated competitive performance. Unlike previous studies that predominantly rely on single-source self-report measures, this research integrates external and internal perspectives to obtain a more comprehensive evaluation of psychological readiness and performance. Furthermore, this study contributes empirical evidence regarding mental toughness within the context of Indonesian pencak silat athletes, particularly those participating in a structured elite youth development program. The findings are expected to enrich the sport psychology literature while providing practical implications for coaches, sport psychologists, and athlete development institutions seeking to optimize competitive performance through psychological training interventions.

In conclusion, mental toughness has been widely recognized as a critical psychological factor influencing athletic performance, particularly in combat sports characterized by high levels of pressure, uncertainty, and physical confrontation. Although previous studies have consistently demonstrated positive relationships between mental toughness and sport performance, evidence concerning pencak silat athletes remains limited, especially within structured athlete development programs. Furthermore, the predominance of self-report methodologies has restricted a comprehensive understanding of psychological readiness from multiple perspectives. Therefore, the present study addresses these limitations by investigating the relationship between coach-assessed mental toughness and athlete-assessed competitive performance among PPLOP Central Java pencak silat athletes. The findings are expected to contribute both theoretically and practically to the advancement of psychological athlete development in Indonesian combat sports.

## METHODS

This study employed a quantitative approach using a correlational survey design to examine the relationship between mental toughness and competitive performance among pencak silat athletes. Correlational research is widely used in sport psychology to investigate the magnitude and direction of relationships between psychological and performance-related variables without manipulating experimental conditions (Sugiyono, 2024). This design was considered appropriate because the present study aimed to determine whether athletes with higher levels of mental toughness tend to demonstrate better competitive performance. Previous sport psychology studies have similarly utilized correlational approaches to explore the association between mental toughness, resilience, motivation, and athletic achievement (Cowden et al., 2023; Gucciardi et al., 2017). The independent variable (X) in this study was mental toughness, while the dependent variable (Y) was competitive performance. Unlike many previous studies that relied solely on athlete self-reports, this research adopted a dual-rater approach. Mental toughness was assessed by coaches, whereas competitive performance was evaluated through athletes' self-assessments. Such an approach has been recommended in recent psychological measurement studies to reduce common method bias and provide a more comprehensive evaluation of athlete characteristics (Nicholls et al., 2019; Mojtahedi et al., 2023).

The population consisted of all pencak silat athletes in the fighting category registered at the Central Java Student Sports Education and Training Center (PLOP Jawa Tengah). Given the limited number of athletes available, total sampling was employed, resulting in a sample of 13 athletes (N = 13). Each athlete was paired with one coach who served as an evaluator of mental toughness, producing 13 coach-athlete data pairs for analysis. Total sampling is considered appropriate when the population size is relatively small and all members can be included in the study, thereby minimizing sampling error and increasing data representativeness (Etikan & Bala, 2017).

Data were collected using two structured questionnaires. The first instrument was a Mental Toughness Questionnaire consisting of 25 items completed by coaches. The questionnaire was developed based on the 4C model of mental toughness, encompassing the dimensions of control, commitment, challenge, and confidence. The 4C framework remains one of the most widely accepted conceptual models in sport psychology and has demonstrated strong psychometric properties across various athletic populations (Clough & Strycharczyk, 2012; Mojtahedi et al., 2023; Lin et al., 2017). The second instrument was a Competitive Performance Questionnaire consisting of 48 items completed by athletes. This instrument measured perceived performance across four domains: technical execution, tactical decision-making, physical readiness, and psychological effectiveness during competition. These dimensions have been recognized as major determinants of athletic performance in combat sports and elite athlete development programs (Gould & Maynard, 2009; Cowden, 2018).

Both instruments utilized a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Data collection was conducted directly at the PLOP Central Java

training complex using a cross-sectional procedure. To minimize response bias, coaches and athletes completed their respective questionnaires independently in separate rooms. Cross-sectional assessment is commonly applied in psychological and sport performance studies because it enables efficient measurement of variables at a specific point in time while maintaining ecological validity (Thomas et al., 2022).

Data analysis was performed in several stages. First, item validity was examined using Pearson Product-Moment correlation, with items considered valid when the correlation coefficient was equal to or greater than 0.30 (Hair et al., 2019). Second, instrument reliability was evaluated using Cronbach's Alpha coefficient, where values above 0.70 indicated acceptable internal consistency (Taber, 2018). Third, data normality was tested using the Shapiro-Wilk test because the sample size was below 50 participants (Mishra et al., 2019). Fourth, descriptive statistical analyses were conducted, including mean, median, mode, standard deviation, frequency distribution, percentage distribution, and categorical classification. Finally, hypothesis testing was performed using Spearman Rank Correlation when normality assumptions were violated. Statistical significance was determined at an alpha level of 0.05. All analyses were conducted using IBM SPSS Statistics software, which is widely employed in contemporary sport science and psychological research (Field, 2022).

## RESULTS AND DISCUSSION

### Result

#### Instrument Validity and Reliability Testing

Prior to hypothesis testing, validity and reliability analyses were conducted to ensure the quality of the research instruments. The validity test results indicated that 15 out of 25 items of the Mental Toughness Questionnaire met the validity criteria, whereas 10 items were excluded. Meanwhile, 27 out of 48 items of the Competitive Performance Questionnaire were declared valid, while 21 items failed to meet the required criteria. Reliability testing using Cronbach's Alpha revealed a coefficient of 0.889 for the competitive performance instrument, indicating high reliability. In contrast, the mental toughness instrument produced an alpha coefficient of 0.093, suggesting low internal consistency. The results are presented in Table 1.

**Table 1.**  
 Summary of Instrument Validity and Reliability Testing

Variable	Total Items	Valid Items	Invalid Items	Cronbach's Alpha
Mental Toughness (Coach Assessment)	25	15	10	0.093
Competitive Performance (Athlete Self-Assessment)	48	27	21	0.889

The low reliability coefficient observed in the mental toughness instrument may be attributed to the small sample size and the relatively homogeneous responses provided by coaches. Such conditions often reduce score variability and negatively affect reliability estimates.

## Normality Test

The normality assumption was examined using the Shapiro–Wilk test because the sample size was fewer than 50 participants. The results showed that the mental toughness variable was normally distributed ( $W = 0.962$ ;  $p = 0.788$ ), whereas the competitive performance variable was not normally distributed ( $W = 0.864$ ;  $p = 0.044$ ). Consequently, non-parametric statistical analysis using Spearman Rank Correlation was employed for hypothesis testing.

**Table 2.**  
Shapiro–Wilk Normality Test Results

Variable	W	p-value	Interpretation
Mental Toughness	0.962	0.788	Normal
Competitive Performance	0.864	0.044	Not Normal

## Descriptive Statistics of Mental Toughness

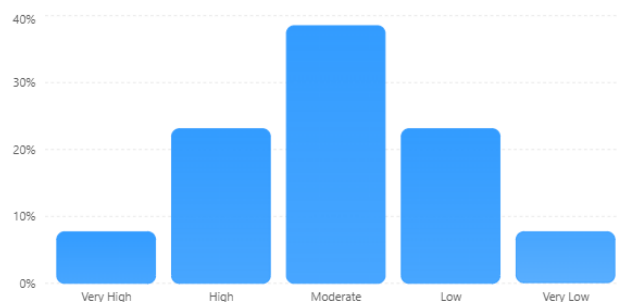
Based on coaches' assessments, athletes demonstrated an average mental toughness score of 89.46 ( $SD = 2.33$ ), with scores ranging from 85 to 93. The median and mode were both 90, indicating a relatively concentrated distribution around the central tendency. The categorization results showed that most athletes (38.5%) were classified within the moderate category, followed by high and low categories (23.1% each). Only one athlete was categorized as very high and one athlete as very low.

**Table 3.**  
Mental Toughness Category Distribution

Category	Score Range	n	%
Very High	> 92.95	1	7.7
High	90.63–92.95	3	23.1
Moderate	88.30–90.62	5	38.5
Low	85.97–88.29	3	23.1
Very Low	< 85.96	1	7.7
<b>Total</b>		<b>13</b>	<b>100</b>

## Mental Toughness Categories

Distribution of PPLOP Central Java pencak silat athletes based on coach assessments.



**Figure 1.**

Distribution of PPLOP Central Java pencak silat athletes based on coach assessments

The findings indicate that the majority of athletes possessed moderate levels of mental toughness, suggesting that psychological development programs remain necessary to further enhance athletes' resilience, confidence, and emotional control during competition.

### Descriptive Statistics of Competitive Performance

Athletes' self-assessments of competitive performance yielded a mean score of 155.00 (SD = 19.00), with scores ranging from 119 to 176. The median score was 161.00, while the mode was 165. The categorization results revealed that nearly half of the athletes (46.2%) perceived their performance as high, whereas no athlete rated their performance in the very high category.

**Table 4.**

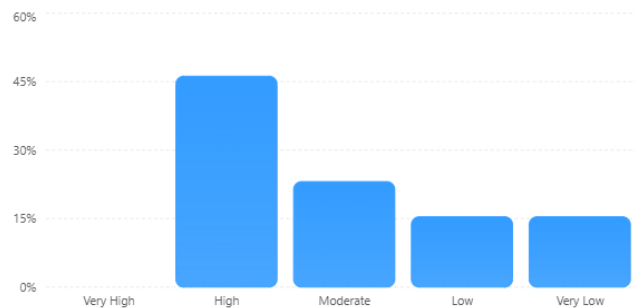
Competitive Performance Category Distribution

Category	Score Range	n	%
Very High	>183.50	0	0.0
High	164.50-183.50	6	46.2
Moderate	145.50-164.49	3	23.1
Low	126.50-145.49	2	15.4
Very Low	<126.49	2	15.4
<b>Total</b>		<b>13</b>	<b>100</b>

### Competitive Performance Distribution

Competitive Performance Categories

Athletes' self-perceived competitive performance levels.



**Figure 1.**

Athletes' self-perceived competitive performance levels

These findings suggest that most athletes perceived their competitive performance positively, although substantial variability remained among participants, as indicated by the relatively large standard deviation.

### Hypothesis Testing

The relationship between mental toughness and competitive performance was examined using Spearman Rank Correlation. The analysis produced a correlation coefficient of  $r_s = -0.014$  with a significance value of  $p = 0.964$ . Since the p-value exceeded the significance level of 0.05, the null hypothesis ( $H_0$ ) was accepted and the alternative hypothesis ( $H_1$ ) was rejected.

**Table 5.**

Spearman Rank Correlation Results

Variables	Spearman's $r_s$	p-value	Strength	Interpretation
Mental Toughness – Competitive Performance	-0.014	0.964	Very Weak	Not Significant

The findings indicate that there was no statistically significant relationship between coach-rated mental toughness and athlete-rated competitive performance among PPLOP Central Java pencak silat athletes. The correlation coefficient was close to zero, suggesting virtually no association between the two variables in the present sample.

Overall, the results demonstrate that although athletes generally displayed moderate mental toughness and relatively high self-perceived competitive performance, mental toughness as assessed by coaches was not significantly associated with athletes' perceptions of their own competitive performance. This finding highlights the potential influence of assessment perspectives, sample size limitations, restricted score variability, and measurement reliability issues in understanding psychological-performance relationships within elite youth combat sport settings.

## Discussion

The present study aimed to examine the relationship between mental toughness and competitive performance among pencak silat athletes at the Central Java Student Sports Education and Training Center (PPLOP Jawa Tengah). The findings revealed that most athletes were categorized as having moderate levels of mental toughness based on coach assessments, while nearly half of the athletes perceived their competitive performance as high. However, the Spearman Rank correlation analysis indicated no significant relationship between mental toughness and competitive performance ( $r_s = -0.014$ ;  $p = 0.964$ ). These findings provide important theoretical and practical implications regarding the assessment of psychological characteristics in combat sports, particularly within youth athlete development programs.

The descriptive results demonstrated that the majority of athletes possessed moderate mental toughness. This finding is consistent with previous studies on adolescent combat sport athletes, which reported that developing athletes generally exhibit moderate psychological resilience due to ongoing cognitive, emotional, and social maturation processes (Gucciardi et al., 2017; Cowden, 2018; Nicholls et al., 2019). Mental toughness is considered a dynamic psychological construct that develops through prolonged exposure to competitive experiences, challenging training environments, and effective coaching support (Gucciardi et al., 2022). Athletes participating in structured development systems such as PPLOP are continuously exposed to performance demands that contribute to the gradual formation of confidence, commitment, emotional control, and resilience.

The predominance of moderate mental toughness levels may also reflect the developmental characteristics of adolescent athletes. According to Lin et al. (2017), psychological attributes such as confidence and emotional regulation continue to mature during late adolescence, making it common for young athletes to demonstrate fluctuating levels of mental toughness. Similar findings have been reported among martial arts athletes in Indonesia, where moderate psychological readiness remains

prevalent despite systematic training programs (Saputra & Akbaruddin, 2023). Therefore, the current findings suggest that PLOP athletes possess an adequate psychological foundation but still require structured mental skills training to achieve higher levels of competitive resilience.

The competitive performance results revealed that 46.2% of athletes perceived their performance as high. This finding indicates that athletes generally held positive perceptions regarding their technical, tactical, physical, and psychological readiness during competition. Self-perceived performance has been recognized as an important determinant of athlete confidence and motivation (Mojtahedi et al., 2023). Athletes who perceive themselves as performing effectively tend to display greater self-efficacy, stronger achievement motivation, and more adaptive coping strategies during competition (Moradi et al., 2021). In combat sports, positive performance perceptions may enhance decision-making quality, persistence under pressure, and willingness to take tactical risks (Slimani et al., 2018).

Despite these positive descriptive findings, the primary result of this study demonstrated no statistically significant relationship between mental toughness and competitive performance. This outcome appears inconsistent with a substantial body of literature that identifies mental toughness as a significant predictor of athletic success. For example, the meta-analysis conducted by Cowden et al. (2023) reported a moderate positive correlation ( $r = 0.36$ ) between mental toughness and sport performance across multiple athletic populations. Similarly, Guszowska and Wojcik (2021) found that sixteen of eighteen reviewed studies reported positive associations between mental toughness and performance outcomes. Studies involving taekwondo, karate, wrestling, and mixed martial arts athletes have likewise demonstrated that mentally tougher athletes generally achieve superior competitive results (Mojtahedi et al., 2023; Vaughan et al., 2019).

Several methodological and contextual factors may explain the discrepancy between the present findings and previous research. First, the most influential explanation concerns the difference in raters used to assess the variables. Mental toughness was evaluated by coaches, whereas competitive performance was assessed by athletes themselves. Research in sport psychology has shown that external evaluations and self-perceptions often capture different dimensions of athlete functioning (Gumusdag & Aydin, 2022). Coaches typically assess observable behaviors such as discipline, persistence, emotional control, and commitment during training. Conversely, athletes evaluate their internal experiences, including confidence, motivation, tactical awareness, and satisfaction with performance outcomes. Consequently, discrepancies between coach-rated and athlete-rated measures may weaken observed correlations.

This phenomenon is consistent with multi-source assessment theories suggesting that psychological constructs are interpreted differently depending on the evaluator's perspective (Roberts et al., 2020). In combat sports, coaches may prioritize behavioral indicators of toughness, whereas athletes may emphasize subjective experiences during

competition. Such perceptual differences can reduce agreement between ratings and obscure potential relationships between variables (Appleby et al., 2022).

Second, the limited sample size substantially influenced the statistical power of the study. With only thirteen athlete-coach pairs, the probability of detecting meaningful relationships was reduced. Statistical power is strongly dependent on sample size, particularly in correlational research (Lakens, 2022). Small samples increase the likelihood of Type II errors, where genuine relationships remain undetected despite existing within the population. Meta-analytic studies that report significant relationships between mental toughness and performance often include hundreds or thousands of participants across multiple investigations (Cowden et al., 2023). Therefore, the absence of significance in the current study should be interpreted cautiously.

Third, the restricted range observed in mental toughness scores may have attenuated the correlation coefficient. The mental toughness scores displayed a narrow distribution, ranging only from 85 to 93, with a standard deviation of 2.33. Restricted variability is a well-known statistical issue that reduces the ability to detect relationships between variables (Field, 2022). When participants receive highly similar scores, the resulting correlation coefficients tend to be underestimated. Similar concerns have been reported in athlete development studies where homogeneous elite samples exhibit limited score dispersion despite meaningful psychological differences (Gucciardi et al., 2022).

Another important explanation relates to the reliability of the mental toughness instrument. The Cronbach's Alpha coefficient of 0.093 indicates extremely low internal consistency. Measurement theory emphasizes that unreliable instruments reduce construct validity and weaken observed relationships between variables (Taber, 2018). According to Soundara Pandian et al. (2023), low reliability increases measurement error, which in turn diminishes the accuracy of correlation estimates. Consequently, the insignificant relationship observed in the present study may partly reflect psychometric limitations rather than the absence of a true relationship between mental toughness and performance.

Beyond methodological factors, the findings may also suggest that competitive performance in pencak silat is influenced by multiple determinants beyond mental toughness alone. Contemporary athlete performance models emphasize the interaction of physical conditioning, technical proficiency, tactical intelligence, psychological readiness, recovery quality, coaching effectiveness, and environmental support (Stambulova & Wylleman, 2019; Henriksen et al., 2020). In combat sports specifically, factors such as reaction speed, tactical adaptability, opponent quality, weight management, and physiological readiness can substantially affect performance outcomes (Franchini et al., 2019; Slimani et al., 2018).

Furthermore, self-rated performance may not always correspond directly to objective competitive achievements. Athletes often evaluate their performance based on subjective criteria, including effort, satisfaction, confidence, or perceived improvement rather than actual competition results (Nicholls et al., 2019). Therefore, the

relationship between coach-rated mental toughness and athlete-rated performance may have been weakened by differences in measurement orientation.

Despite the lack of statistical significance, the findings offer valuable implications for athlete development programs. First, psychological development should remain an integral component of training because extensive evidence continues to support the importance of mental toughness in sport performance (Cowden et al., 2023; Gucciardi et al., 2022). Second, coaches should implement systematic mental skills training programs focusing on confidence enhancement, emotional regulation, resilience, stress management, attentional control, and competitive coping strategies. Third, athlete evaluations should incorporate multiple assessment sources, including coaches, athletes, sport psychologists, and objective competition indicators, to obtain a more comprehensive understanding of psychological readiness and performance.

Future research should employ larger samples, utilize psychometrically robust mental toughness instruments, and incorporate objective competition outcomes such as win-loss records, match statistics, or national ranking points. Longitudinal designs may also provide deeper insights into how mental toughness develops over time and influences competitive success throughout the athlete development pathway.

Overall, the present study contributes to the growing body of literature on sport psychology in Indonesian combat sports by highlighting the complexity of the relationship between mental toughness and competitive performance. While no significant association was observed, the findings underscore the importance of measurement methodology, sample characteristics, and multidimensional performance determinants in understanding psychological influences on athletic achievement.

## CONCLUSION

Based on the findings of this study, it can be concluded that the mental toughness level of PLOP Central Java pencak silat athletes, as assessed by coaches, was predominantly classified in the moderate category (38.5%), with a mean score of 89.46 and a standard deviation of 2.33. This finding indicates that although athletes possess adequate psychological resilience, confidence, commitment, and emotional control, there remains considerable room for improvement to achieve higher levels of mental toughness required for elite competition. Meanwhile, athletes' self-assessments of competitive performance were predominantly categorized as high (46.2%), with a mean score of 155.00 and a standard deviation of 19.00, suggesting that most athletes perceived themselves as performing effectively in technical, tactical, physical, and psychological aspects during competition.

The hypothesis testing results revealed no significant relationship between coach-rated mental toughness and athlete-rated competitive performance ( $r_s = -0.014$ ;  $p = 0.964 > 0.05$ ). These findings suggest that, within the present sample, mental toughness as evaluated by coaches was not associated with athletes' perceptions of their own competitive performance. This result may be influenced by differences in assessment

perspectives, limited sample size, restricted score variability, and the low reliability of the mental toughness instrument.

Therefore, coaches and PLOP administrators are encouraged to implement more structured psychological development programs aimed at enhancing athletes' mental toughness. Future studies should involve larger samples, employ psychometrically robust instruments, incorporate objective competition performance indicators, and utilize consistent rating sources to minimize rater discrepancy and improve the accuracy of psychological-performance assessments in combat sports.

## ACKNOWLEDGMENTS

The authors would like to express their sincere gratitude to all individuals and institutions who contributed to the completion of this research entitled "The Relationship Between Mental Toughness and Competitive Performance of PLOP Central Java Pencak Silat Athletes." Special appreciation is extended to the management of the Central Java Student Sports Education and Training Center (PLOP Jawa Tengah) for granting permission and providing the facilities necessary for conducting this study.

The authors also wish to thank the pencak silat coaches and athletes who willingly participated in the research process. Their cooperation, openness, and commitment in completing the questionnaires provided valuable data that significantly contributed to the success of this study. Without their participation, the implementation of this research would not have been possible.

Furthermore, the authors acknowledge colleagues, academics, and sport science practitioners who provided constructive suggestions, academic insights, and methodological input throughout the research process. Their contributions helped improve the quality and rigor of the study.

Finally, the authors express their deepest appreciation to their families and all parties who offered moral support, encouragement, and motivation during the preparation of this manuscript. It is hoped that the findings of this study will contribute to the development of sport psychology, particularly in enhancing mental toughness and optimizing competitive performance among pencak silat athletes and other combat sport practitioners in Indonesia.

## REFERENCES

- Clough, P., & Strycharczyk, D. (2012). Developing mental toughness: Improving performance, wellbeing and positive behaviour in others. Kogan Page. <https://www.koganpage.com/product/developing-mental-toughness-9780749463786>
- Cowden, R. G. (2018). Mental toughness and success in sport: A review and prospect. *The Open Sports Sciences Journal*, 11(1), 1-14. <https://doi.org/10.2174/1875399X01811010001>

- Etikan, I., & Bala, K. (2017). Sampling and sampling methods. *Biometrics & Biostatistics International Journal*, 5(6), 00149. <https://doi.org/10.15406/bbij.2017.05.00149>
- Field, A. (2022). *Discovering statistics using IBM SPSS statistics* (6th ed.). Sage Publications. <https://us.sagepub.com>
- Gumusdag, H., & Aydin, I. (2022). Coach-athlete perceptions and psychological characteristics in competitive sport. *International Journal of Human Movement and Sports Sciences*, 10(3), 421–429. <https://doi.org/10.13189/saj.2022.100315>
- Gucciardi, D. F., Hanton, S., Gordon, S., Mallett, C. J., & Temby, P. (2017). The concept of mental toughness: Tests of dimensionality, nomological network, and traitness. *Journal of Personality*, 85(1), 26–44. <https://doi.org/10.1111/jopy.12217>
- Gucciardi, D. F., Jackson, B., Hodge, K., Anthony, D. R., & Brooke, L. E. (2022). Implicit theories of mental toughness: Relations with cognitive, motivational, and behavioral correlates. *Sport, Exercise, and Performance Psychology*, 11(2), 165–181. <https://doi.org/10.1037/spy0000280>
- Guszkowska, M., & Wojcik, A. (2021). Mental toughness and sports performance: A systematic review. *Journal of Education, Health and Sport*, 11(8), 73–89. <https://apcz.umk.pl/JEHS>
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage Learning. <https://www.cengage.com>
- Henriksen, K., Stambulova, N., & Roessler, K. K. (2020). Holistic ecological approaches to sport talent development environments. *International Journal of Sport and Exercise Psychology*, 18(3), 315–330. <https://doi.org/10.1080/1612197X.2018.1558882>
- Hsieh, Y. C., Lu, F. J. H., Gill, D. L., Hsu, Y. W., Wong, T. L., & Kuan, G. (2024). Effects of mental toughness on athletic performance: A systematic review and meta-analysis. *International Journal of Sport and Exercise Psychology*, 22(6), 1317–1338. <https://doi.org/10.1080/1612197X.2023.2204312>
- Lakens, D. (2022). Sample size justification. *Collabra: Psychology*, 8(1), 33267. <https://doi.org/10.1525/collabra.33267>
- Lin, Y., Mutz, J., Clough, P. J., & Papageorgiou, K. A. (2017). Mental toughness and individual differences in learning, educational and work performance, psychological well-being, and personality: A systematic review. *Frontiers in Psychology*, 8, 1345. <https://doi.org/10.3389/fpsyg.2017.01345>
- Mishra, P., Pandey, C. M., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Annals of Cardiac Anaesthesia*, 22(1), 67–72. [https://doi.org/10.4103/aca.ACA\\_157\\_18](https://doi.org/10.4103/aca.ACA_157_18)
- Mojtahedi, D., Dagnall, N., Denovan, A., Clough, P., Dewhurst, S., Hillier, M., Papageorgiou, K., & Perry, J. (2023). Competition anxiety in combat sports and the importance of mental toughness. *Behavioral Sciences*, 13(9), 713. <https://doi.org/10.3390/bs13090713>
- Moradi, J., Bahrami, A., & Dana, A. (2021). Motivation, self-confidence, and performance among elite athletes. *Journal of Human Sport and Exercise*, 16(2), 345–356. <https://doi.org/10.14198/jhse.2021.162.10>

- Nicholls, A. R., Madigan, D. J., Backhouse, S. H., & Levy, A. R. (2019). Mental toughness in sport: Achievement level, gender, age, experience, and sport type differences. *Personality and Individual Differences*, 139, 204–209. <https://doi.org/10.1016/j.paid.2018.11.019>
- Roberts, R., Callow, N., Hardy, L., Woodman, T., & Thomas, L. (2020). Interactive effects of different mental toughness components on performance. *International Review of Sport and Exercise Psychology*, 13(1), 1–25. <https://doi.org/10.1080/1750984X.2018.1539384>
- Saputra, A., & Akbaruddin, A. (2023). Profil ketangguhan mental atlet pencak silat PPLP Jawa Barat. *Jurnal Keolahragaan*, 11(2), 145–154. <https://journal.uny.ac.id/index.php/jolahraga>
- Slimani, M., Miarka, B., Bragazzi, N. L., Hue, O., & Chamari, K. (2018). The relationship between mental toughness and competitive performance in combat sports athletes. *Frontiers in Psychology*, 9, 2545. <https://doi.org/10.3389/fpsyg.2018.02545>
- Soundara Pandian, R., Abdullah, N., & Rahman, A. (2023). Reliability and validity considerations in psychological measurement among athletes. *International Journal of Evaluation and Research in Education*, 12(4), 1987–1995. <https://doi.org/10.11591/ijere.v12i4.24518>
- Stambulova, N., & Wylleman, P. (2019). Psychology of athletes' dual careers: A state-of-the-art critical review. *Psychology of Sport and Exercise*, 42, 74–88. <https://doi.org/10.1016/j.psychsport.2018.11.013>
- Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, 48(6), 1273–1296. <https://doi.org/10.1007/s11165-016-9602-2>
- Thomas, J. R., Nelson, J. K., & Silverman, S. J. (2022). *Research methods in physical activity* (8th ed.). Human Kinetics. <https://us.humankinetics.com>
- Vaughan, R., Carter, G. L., Cockroft, D., & Maggiorini, M. (2019). Hardiness, mental toughness and competitive performance in combat sport athletes. *Journal of Sports Sciences*, 37(23), 2692–2699. <https://doi.org/10.1080/02640414.2019.1660872>