

Profiling Mental Performance among Medallist and Non-Medallist of Perak SUKMA Athletes

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ABSTRACT

Mental performance characteristics are recognized as essential determinants of athletic achievement, helping athletes manage competitive demands. This study investigated the quantitative psychological profiles of SUKMA Perak athletes who participated in the SUKMA 2022 tournament, comparing medallist and non-medallist. A randomized target sample of 260 athletes was designed based on standard power calculations with a 20% oversample to account for potential non-response. Following data collection, a final sample of 229 athletes (124 medallists and 105 non-medallists) was successfully analyzed, yielding an 88.1% response rate. Quantitative psychological profiling was performed using the validated Psychological Characteristics Related to Sport Performance (CPRD) questionnaire, which assesses five key dimensions: Stress Control, Influence of Performance Evaluation, Motivation, Team Cohesion, and Mental Skills. Independent samples t-tests with a family-wise Bonferroni correction (adjusted significance threshold of $\alpha = .01$) revealed highly significant psychological advantages for medallists over non-medallists in Stress Control (50.52 ± 10.62 vs. 46.50 ± 9.83 ; $p = .003$) and Team Cohesion (24.91 ± 3.30 vs. 23.71 ± 2.83 ; $p = .004$). Motivation showed a significant difference at the uncorrected level (25.56 ± 4.06 vs. 24.29 ± 4.37 ; $p = .024$) but did not survive the Bonferroni correction. No significant differences were observed in the Influence of Performance Evaluation (26.11 ± 7.74 vs. 24.75 ± 7.18 ; $p = .172$) or Mental Skills (17.93 ± 2.61 vs. 18.21 ± 2.78 ; $p = .430$). Particularly, non-medallists exhibited slightly higher scores in basic mental skills than medallists, indicating that foundational psychological skills are widely distributed, whereas advanced stress regulation and cohesion dynamics serve as key differentiators for podium success. These findings underscore the critical need for targeted sports psychology interventions, particularly stress inoculation training and contingent team cohesion building, to optimize performance in competitive Malaysian multi-sport environments.

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1. INTRODUCTION

Sport psychology has increasingly established that athletic success is not merely a product of physical talent and technical conditioning, but is heavily governed by cognitive, emotional, and social capacities. Mental performance, which covers an athlete's adept use of cognitive processes such as focus, decision-making, perception, memory, and coordination, alongside essential self-regulation skills, operates as a core buffer against competitive pressure (Durand-Bush & van den Berg, 2021). During high-stakes tournaments, athletes are exposed to acute physical and environmental stressors, making their psychological well-being and coping strategies highly influential in determining athletic outcomes (Abou Elmagd, 2019). Consequently, sports psychology practitioners and researchers have widely utilized psychological characteristics as markers to differentiate competitive levels and design specialized athletic preparation programs.

To systematically evaluate and cultivate these psychological capacities, sports scientists have developed and validated specialized diagnostic instruments. One of the most prominent questionnaires is the Psychological Characteristics Related to Sport Performance (CPRD) developed by Gimeno et al. (1994, 2012). The CPRD assesses athletes across five distinct, multi-dimensional scales: Stress Control, Influence of Performance Evaluation, Motivation, Team Cohesion, and basic Mental Skills. These scales measure an athlete's capacity to tolerate competitive anxiety, absorb evaluative feedback from coaches and peers, maintain high achievement-oriented drive, work within a cohesive sports environment, and employ basic self-regulation strategies such as imagery or goal-setting. By mapping these dimensions, sports scientists can establish a comprehensive psychological profile that highlights specific athletic strengths and developmental areas.

A critical conceptual distinction must be made between psychological profiling as a quantitative diagnostic exercise and performance profiling as an applied intervention. Performance profiling, which originated with the seminal work of Butler and Hardy (1992), is a qualitative, reflective coaching technique consisting of collaborative stages where athletes brainstorm key performance indicators, rate their current abilities, and visually shade a circular profile to increase self-awareness and goal setting (Weston et al., 2011). In contrast, the present study performs quantitative psychological profiling, utilizing the standardized, self-reported CPRD questionnaire to establish empirical group differences between two distinct competitive classes. By maintaining this terminology, the paper ensures absolute clarity and avoids implying that a multi-stage qualitative reflective coaching intervention was implemented.

Although psychological characteristics are associated with sport performance, limited evidence exists on whether CPRD dimensions differentiate medallist and non-medallist athletes in Malaysian multi-sport contexts such as Sukan Malaysia (SUKMA) (Parnabas et al., 2023). SUKMA represents the pinnacle of national youth sports in Malaysia, exposing athletes to intense regional rivalry, state-level expectations, and highly pressurized tournament structures. While previous athletic studies in Malaysia have investigated isolated variables such as competitive anxiety, self-confidence (Parnabas et al., 2023), or mental toughness (Razali Abdullah et al., 2016), there is a complete lack of research utilizing a comprehensive multidimensional tool like the CPRD to directly compare medallists and non-medallists representing a single state contingent. Investigating these differences among SUKMA Perak athletes is essential for identifying the precise psychological attributes that underpin podium-level athletic achievement, allowing for the transition from descriptive sports science to targeted, high-performance intervention programs.

The primary aim of this study is to compare the quantitative mental performance profiles of medallist and non-medallist athletes from Perak who participated in SUKMA 2022. By analyzing these empirical profiles, this study seeks to identify the specific psychological dimensions that distinguish successful, podium-reaching athletes from their less successful peers, providing actionable guidance for coaches, state athletic administrators, and sports psychologists.

1.1 Literature Review

Extensive comparative sports science research has focused on distinguishing the attributes of elite athletes who secure podium placements (medallists) from competitive peers who participate but do not achieve top-three standings (non-medallists). Historically, these comparative studies have explored morphological characteristics, physiological fitness, and competitive efficacy metrics (Cular, 2011). For instance, Cular (2011) illustrated that Olympic Taekwondo medallists possessed superior defensive scoring and point-differential efficiency compared to non-winners, suggesting that tactical discipline under pressure differentiates elite status. Similarly, research on personality profiles using the Big Five model has indicated significant differences in conscientiousness, agreeableness, and neuroticism between medal-winning and non-medal-winning handball athletes (Chandrawanshi et al., 2023), establishing that behavioral tendencies are linked with competitive success.

Despite these insights, research examining multidimensional mental performance profiles remains scarce. The CPRD framework offers a robust theoretical model to address this gap. First, Stress Control represents the athlete's capacity to cope with competitive stress, manage cognitive anxiety, and maintain executive control during crucial competition moments (Gimeno et al., 2012). Elite medallists are expected to possess superior stress control, allowing them to remain focused and make optimal tactical decisions under extreme pressure, whereas non-medallists may experience cognitive overload or performance decrement (Codonhato et al., 2018). Second, the Influence of Performance Evaluation scale measures how sensitive an athlete is to feedback and external evaluations from coaches, parents, or teammates. Highly successful athletes typically possess well-developed cognitive filters, allowing them to utilize constructive feedback as a source of self-efficacy while remaining resilient against negative or unrealistic external judgments (Gimeno et al., 1994).

Third, Motivation within the CPRD model evaluates the athlete's internal achievement drive, persistence, and readiness to dedicate effort during prolonged training and demanding competition (Abou Elmagd, 2019). Highly motivated athletes are more likely to demonstrate athletic persistence, consistently working to overcome performance plateaus (Kovacs et al., 2022). Fourth, basic Mental Skills represent foundational psychological techniques, such as goal-setting, mental imagery, relaxation, and self-talk (Gimeno et al., 2012). While these foundational skills are universally taught in athletic training, elite medallists are characterized by their ability to seamlessly integrate and deploy these techniques under intense, real-time competitive pressure (Kumar & Shirotriya, 2010).

Fifth, Team Cohesion is an essential dimension that measures an athlete's integration and perceived solidarity within their group. While the application of team cohesion is straightforward in team-sport cohorts (e.g., water polo, where medallists show significantly higher cohesion than non-medallists; Deori et al., 2023), its relevance to individual-sport athletes warrants theoretical justification. In multi-sport regional tournaments like SUKMA, individual-sport athletes do not compete in absolute isolation; rather, they operate as a collective state contingent (e.g., Perak). These athletes share common coaches, support

staff, training facilities, and travel logistics, and represent a unified state identity. Within this collective state contingent, team cohesion functions as an interpersonal social support network that buffers competitive anxiety, enhances individual motivation, and fosters a supportive, high-performance training environment (Burns et al., 2019). Fostering strong contingent-level cohesion is therefore theoretically relevant for both team and individual sports, operating as a shared social resource that enhances individual athletic resilience.

Hypotheses:

To guide this empirical comparison, we developed a structured hypothesis framework based on the theoretical underpinnings of the CPRD:

H1: Medallists will exhibit significantly higher scores in Stress Control compared to non-medallists.

H2: Medallists will show significantly higher levels of Motivation than non-medallists.

H3: Medallists will display significantly higher Team Cohesion than non-medallists, reflecting strong supportive networks.

H4: Medallists and non-medallists will differ in basic Mental Skills and the Influence of Performance Evaluation, with medallists showing better adaptive strategies.

2. METHODOLOGY

This study utilized a quantitative, descriptive, cross-sectional survey research design. This approach is highly suitable for investigating existing psychological differences between distinct athletic achievement cohorts (medallists versus non-medallists) within their natural competitive timeline. Institutional ethical approval was formally obtained from the Universiti Teknologi MARA Research Ethics Committee (approval reference number: REC-ERC/65/2024).

2.1 Participants

The target population consisted of 536 state-level athletes representing the state of Perak at the SUKMA 2022 tournament. According to the sample size determination tables of Krejcie and Morgan (1970), a representative sample size of 217 athletes was required to achieve adequate statistical power. To mitigate potential data loss from non-response or incomplete submissions, a 20% oversampling strategy was implemented, resulting in an adjusted target sample of 260 athletes. Random selection was used to invite 130 medallists and 130 non-medallists from the registration rosters provided by the Perak State Sports Council. Out of the 260 distributed survey packets, 229 athletes returned completely filled and valid questionnaires, representing an excellent overall response rate of 88.1%. The final analyzed cohort comprised 124 medallists (54.1%) and 105 non-medallists (45.9%).

2.2 Instruments

The primary instrument utilized was the Psychological Characteristics Related to Sport Performance (CPRD) questionnaire, developed by Gimeno et al. (1994) and adapted from the psychometric validation work of Gimeno et al. (2012). The CPRD comprises 55 items rated on a 5-point Likert scale (ranging from 0 = 'I totally disagree' to 4 = 'I totally agree'). The instrument assesses five core psychological dimensions:

Stress Control (15 items), Influence of Performance Evaluation (12 items), Motivation (12 items), Team Cohesion (9 items), and Mental Skills (7 items). This study utilized the validated English version of the CPRD (Gimeno et al., 2012). To address potential language comprehension barriers and ensure validity, the primary researchers were physically present during administration (or provided real-time clarification contact details for Google Form submissions) to assist with any technical terms or queries. In previous international psychometric evaluations, the CPRD has demonstrated robust reliability, with Cronbach's alpha values for the subscales ranging between .70 and .85 (Muñoz et al., 2023).

2.3 Data collection and Statistical analysis

The data collection took place from April until June 2024. Before the subjects answered the questionnaire through a Google Form after agreeing to participate in the study, the researcher clarified the study's purpose and various terms in the questionnaire. The researcher then delivered informed consent forms, demographic questions, and Psychological Characteristics Related to Sport Performance (CPRD) in Google Forms or in the researcher's presence. The individuals either receive the questionnaire from researchers or the Google form, and they respond to the questionnaire for roughly 15 minutes. Descriptive statistics (frequencies, percentages, means, and standard deviations) were calculated. Independent samples t-tests were performed to compare the psychological profiles of medallists and non-medallists across the five CPRD dimensions. To control the inflated risk of family-wise Type I errors resulting from performing multiple independent comparisons across the five psychological scales, a conservative Bonferroni correction was applied. The standard significance threshold of $\alpha = .05$ was divided by the number of comparisons ($k = 5$), establishing an adjusted, rigorous alpha significance threshold of $p = .01$.

3. RESULT AND DISCUSSION

The final analyzed cohort of 229 Perak SUKMA athletes represented a balanced demographic distribution across gender, sport type, and sport categories. Female athletes constituted 50.7% ($n = 116$) of the sample, while male athletes made up 49.3% ($n = 113$). The cohort had a relatively even division between individual sports (52.8%, $n = 121$) and team sports (47.2%, $n = 108$). In terms of competitive experience, 23.6% ($n = 54$) of the athletes had competed at the state level, 41.9% ($n = 96$) at the national level, and 34.5% ($n = 79$) had international exposure. Medallist athletes constituted 54.1% ($n = 124$) of the final sample, while non-medallists accounted for 45.9% ($n = 105$). Detailed frequencies of specific sports and demographic details are presented in Table 1.

Table 1. Descriptive Data for Type of Sport

Type of Sport	Frequency	Percent %
Shooting	9	3.9
Judo	9	3.9
Sepak Takraw	20	8.7
Netball	8	3.5
Athletics	15	6.6
Football	9	3.9
Bowling	8	3.5
Rugby	11	4.8
Weightlifting	8	3.5

Cricket	9	3.9
Tennis	7	3.1
Lawn Bowl	11	4.8
Cycling	11	4.8
Boxing	4	1.7
Hockey	15	6.6
Archery	13	5.7
Basketball	4	1.7
Squash	5	2.2
Petanque	10	4.4
Muay Thai	7	3.1
Sailing	12	5.2
Wushu	2	.9
Diving	2	.9
Badminton	7	3.1
Silat	9	3.9
Karate	4	1.7
Total	229	100.0

3.1 Inferential Statistical Analysis

Independent samples t-test results comparing medallist and non-medallist athletes across the five CPRD scales are presented in Table 2. To establish rigorous control over family-wise Type I errors resulting from five simultaneous comparisons, we evaluated findings against the Bonferroni-adjusted threshold of $\alpha = .01$. First, medallists demonstrated a highly significant advantage in Stress Control (50.52 ± 10.623) compared to non-medallists (46.50 ± 9.831), $t(227) = 2.959$, $p = .003$ (exact), mean difference = 4.029, 95% CI of the difference = [1.346, 6.712]. This difference represents a small-to-medium effect size (Cohen's $d = 0.392$). Second, Team Cohesion was highly significantly higher among medallists (24.91 ± 3.298) than non-medallists (23.71 ± 2.834), $t(227) = 2.917$, $p = .004$ (exact), mean difference = 1.197, 95% CI of the difference = [0.388, 2.006], with a small-to-medium effect size (Cohen's $d = 0.388$). These two dimensions remain highly significant under the stringent Bonferroni correction, indicating robust group differences.

Third, Motivation was significantly higher in medallists (25.56 ± 4.059) than non-medallists (24.29 ± 4.371) at the standard, uncorrected level, $t(227) = 2.279$, $p = .024$ (exact), mean difference = 1.271, 95% CI of the difference = [0.172, 2.370], representing a small effect size (Cohen's $d = 0.302$). However, because the exact p-value is greater than the adjusted alpha threshold of .01, this difference did not survive multiple comparisons control and is formally interpreted as non-significant under the Bonferroni correction. Fourth, no statistically significant group differences were observed in the Influence of Performance Evaluation scale, $t(227) = 1.369$, $p = .172$ (exact), medallists (26.11 ± 7.743) vs. non-medallists (24.75 ± 7.185), mean difference = 1.361, 95% CI of the difference = [-0.598, 3.319], representing a trivial-to-small effect size (Cohen's $d = 0.182$).

Finally, for the Mental Skills scale, no significant difference was detected, $t(227) = -0.791$, $p = .430$ (exact), mean difference = -0.282, 95% CI of the difference = [-0.985, 0.421]. Notably, the group means revealed that non-medallists achieved slightly higher absolute scores (18.21 ± 2.783) than medallists (17.93 ± 2.608). While this group difference is non-significant, the directional pattern contradicts the hypothesis

that medallists possess superior basic mental skills, indicating that foundational psychological techniques are evenly distributed across competitive groups.

Table 2: Independent Samples T-Test Comparing CPRD Dimensions of Medallist and Non-Medallist SUKMA Athletes

CPRD Dimension	Medallist (n = 124) M ± SD	Non-Medallist (n = 105) M ± SD	Levene's Test F (p-value)	t-value	df	p-value	95% CI of Diff [Lower, Upper]	Cohen's d
Stress Control	50.52 ± 10.623	46.50 ± 9.831	2.009 (p = .158)	2.959	227	.003**	[1.346, 6.712]	0.392
Performance Evaluation	26.11 ± 7.743	24.75 ± 7.185	0.712 (p = .400)	1.369	227	.172	[-0.598, 3.319]	0.182
Motivation	25.56 ± 4.059	24.29 ± 4.371	0.507 (p = .477)	2.279	227	.024*	[0.172, 2.370]	0.302
Team Cohesion	24.91 ± 3.298	23.71 ± 2.834	2.386 (p = .124)	2.917	227	.004**	[0.388, 2.006]	0.388
Mental Skills	17.93 ± 2.608	18.21 ± 2.783	0.632 (p = .427)	-0.791	227	.430	[-0.985, 0.421]	-0.104

Note. CPRD = Psychological Characteristics Related to Sport Performance. Equal variances assumed for all dimensions based on Levene's Test ($p > .05$). CI = Confidence Interval of the Difference. Bonferroni-adjusted significance threshold set at $\alpha = .01$ to control for multiple comparisons.

* $p < .05$ (significant at uncorrected level).

** $p < .01$ (statistically significant under Bonferroni correction).

3.2 Discussion

The empirical findings of this study offer novel insights into the specific psychological characteristics that differentiate medallists and non-medallists in a highly competitive Malaysian multi-sport environment. By adopting a cross-sectional, comparative design, this study identifies important group associations without making causal assertions. The highly significant group difference in Stress Control ($p = .003$, $d = 0.392$) supports H1, indicating that medallists possess superior stress regulation mechanisms. Sports competitions, particularly at the SUKMA level, expose athletes to intense competitive pressure, where the capacity to manage cognitive anxiety and maintain focus is paramount (Papreja, 2023). Athletes with superior stress control are better equipped to execute complex tactical decisions under pressure, maintain physical coordination, and recover rapidly from competitive setbacks (Codonhato et al., 2018). Conversely, non-

medallists' lower stress control scores suggest a vulnerability to performance decrements under acute pressure.

In terms of Team Cohesion, medallists demonstrated highly significantly higher scores compared to non-medallists ($p = .004$, $d = 0.388$), supporting H3. This result is highly informative and addresses a critical validity concern. While the benefit of cohesion is intuitive for team sports (such as water polo; Deori et al., 2023), our sample contains 52.8% individual-sport athletes. In the context of SUKMA, individual-sport athletes (e.g., shooting, judo, athletics) do not compete in isolation; they are integrated into a collective state contingent representing Perak. Our findings suggest that high team cohesion acts as a unified social and emotional support system. Athletes who perceive strong solidarity within their state contingent benefit from shared motivation, reduced feelings of isolation, and a supportive social buffer that mitigates competitive anxiety (Burns et al., 2019). Thus, team cohesion operates as a collective psychological resource that is equally valuable for individual-sport athletes operating within a state contingent structure.

For Motivation, medallists exhibited higher scores at the uncorrected level ($p = .024$, $d = 0.302$), providing partial support for H2. However, this difference did not survive the family-wise Bonferroni correction. This indicates that while achievement drive and training persistence are crucial components of athletic development (Abou Elmagd, 2019; Kovacs et al., 2022), high motivation is a baseline requirement across both medallist and non-medallist groups at the state level. In other words, almost all SUKMA athletes are highly motivated to train and compete, making motivation itself less of a differentiating factor for securing a podium finish.

Finally, the non-significant findings in the Influence of Performance Evaluation ($p = .172$) and basic Mental Skills ($p = .430$) require careful theoretical interpretation. H4 was rejected. The similarity in the Influence of Performance Evaluation indicates that both medallists and non-medallists are subject to similar evaluative pressures from coaches, media, and state administrators. Crucially, the mental skills results showed a trivial, non-significant directional pattern where non-medallists scored slightly higher (18.21 ± 2.783) than medallists (17.93 ± 2.608). This finding contradicts the common assumption that elite athletes possess superior basic mental skills. This suggests that basic psychological skills (e.g., setting basic goals, using simple visualization) are widely taught and understood by all state-level SUKMA athletes. However, the possession of these basic skills does not automatically guarantee competitive success. Instead, the critical differentiator lies in the athlete's capacity to translate and execute these skills under extreme pressure, which is captured by the Stress Control dimension. While basic mental skills represent an essential foundational baseline, advanced, pressure-tested stress-regulation strategies are required to bridge the gap between competitive participation and podium success (Kumar & Shirotiya, 2010).

4. CONCLUSION

This study successfully achieved its primary research aim, comparing the multidimensional psychological characteristics of SUKMA Perak medallists and non-medallists using the CPRD framework. By integrating rigorous multiple comparisons control, the study established that medallist athletes are characterized by significantly superior Stress Control and higher perceived Team Cohesion, while basic mental skills and performance evaluation sensitivities do not significantly differentiate the groups. This highlights that

athletic success at the SUKMA level is strongly associated with advanced stress management capacities and supportive, cohesive collective environments rather than the mere possession of basic mental skills.

Specific Practical Guidance:

Based on these findings, we offer four highly concrete, actionable recommendations for sports science practitioners, state coaches, and athletic councils:

1. **Stress Inoculation Training:** The Perak State Sports Council should collaborate with sports psychologists to integrate structured, progressive Stress Inoculation Training (SIT) into athletic preparation. Coaches should deliberately recreate high-pressure tournament conditions during practice (e.g., crowd noise, referee bias, simulated final rounds) to help athletes automate their stress control techniques under real-time competitive strain.

2. **State Contingent Team Building:** Since team cohesion represents a significant differentiator even for individual-sport athletes, state councils should implement collective team-building initiatives across the entire state contingent. Fostering a unified "Team Perak" identity through joint training camps, cross-sport social activities, and peer-support networks will establish a powerful interpersonal buffer that mitigates individual competitive anxiety.

3. **Diagnostic Screening & Targeted Interventions:** Sports psychologists should utilize the CPRD questionnaire as a standard diagnostic screening tool at the beginning of the SUKMA preparation cycle. This will allow for the identification of athletes (particularly non-medallists) with lower stress control and cohesion scores, facilitating targeted, individual counseling before the tournament begins.

4. **Sport-Specific Cohesion Research:** Future studies should examine whether the impact of team cohesion on mental performance differs systematically between purely individual sport categories and pure team sports, allowing for more tailored coaching strategies. section is compulsory. The following is an example of an acknowledgement statement:

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6. CONFLICT OF INTEREST STATEMENT

The authors have no conflicts to declare.

7. AUTHORS' CONTRIBUTION

Nurul Syazwani Mohd Noor Azian: conceptualization, design, data acquisition, data analysis, writing original draft; **Mohd Syafiq Miswan:** study design, data analysis; **Fadzrie Che Li and Muhammad Nur Haizan Mohd Rodzi:** data collection, data acquisition logistics. **Nurul Farha Zainuddin:** data interpretation, design, project administration, writing review and final editing.

8. DECLARATION OF GENERATIVE AI IN THE WRITING PROCESS

During the revision phase of this work, Notebook LM was used as an editing assistant to refine and improve structural clarity. It applied for content cross-referencing. The authors responsible for primary synthesis reviewed all edited versions of the final text for publication.

9. ETHICS STATEMENT

This study was reviewed and approved by the Institutional Ethics Committee of Universiti Teknologi MARA (Approval No: REC-ERC/65/2024). All procedures involving human participants were in fulfilment of the ethical standards of the 1964 Helsinki Declaration. Informed consent was obtained from all participants, and data anonymity was strictly maintained throughout the study.

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