

Examining Mental Toughness and Collegiate Performance in Individual Sports: A Descriptive-Correlational Study

Criser A. Constancio¹, John Lloyd L. Mallanao², Jay Carlo S. Bagayas^{3*}

^{1,2,3} College of Education, Mindanao State University - General Santos, Philippines

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*Corresponding author:
Jay Carlo S. Bagayas

email:
jaycarlo.bagayas@msugensan.edu.ph

Abstract: Mental toughness is widely recognized as a crucial psychological factor in competitive sports, yet its variation across athlete demographics and its link to performance remain inconclusive, particularly among collegiate athletes in Southeast Asia. This study examined differences in mental toughness and sports performance across demographic profiles and explored their relationship among individual-sport athletes. A descriptive-correlational design was employed involving 64 College of Education student-athletes (34 men, 30 women) competing in taekwondo, swimming, athletics, darts, and chess at the 2024 University Intramurals of Mindanao State University-General Santos City, Philippines. Participants were selected through simple random sampling. Mental toughness was assessed using an adopted, expert-validated questionnaire measuring rebound ability, pressure handling, concentration, confidence, and motivation. Sports performance was based on institutional rank scores, anthropometric measures were not collected, as the study focused on psychological and competitive-performance variables. Data were analyzed using descriptive statistics, independent samples t-test, one-way ANOVA with Scheffé post-hoc test, and Spearman's rank-order correlation at $\alpha = .05$. Overall mental toughness was average ($M = 3.34$), with motivation rated high ($M = 4.00$), while sports performance was poor ($M = 2.98$). Mental toughness did not significantly differ across sex, sport, year level, or playing experience. Sports performance differed only by sport type ($p = .005$), with swimming lower than taekwondo and athletics. No significant relationship was found between mental toughness and sports performance ($p = -.004$, $p = .978$). These findings suggest that performance is influenced more by sport-specific and contextual factors than mental toughness alone, highlighting the need for targeted psychological skills training and sport-specific conditioning.

Keywords : *mental toughness, sports performance, individual sports, collegiate student-athletes*



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Introduction

Individual sports such as taekwondo, swimming, athletics, darts, and chess place the burden of competitive success squarely on the individual performer, who must regulate stress, sustain concentration, and recover from setbacks without the immediate support of teammates. Within this self-reliant context, mental toughness has emerged as one of the most consistently cited psychological resources associated with high performance. Mental toughness is commonly conceptualized as a constellation of values, attitudes, and cognitions that enable performers to cope better than their opponents with the demands of competition, training, and adversity, and to remain determined, focused, confident, and in control under pressure (Clough, Earle, & Sewell, 2002; Gucciardi, Gordon, & Dimmock, 2008). Operationally, it is often examined through dimensions such as rebound ability, the ability to handle pressure, concentration, confidence, and motivation, all of which are theorized to underpin optimal performance.

A growing body of evidence links mental toughness to favorable performance and adaptive functioning across sporting contexts. A recent systematic review and meta-analysis reported a moderate, positive overall association between mental toughness and athletic performance ($r = .36$), although the magnitude varied considerably with age, sport category, and the way performance was measured (Hsieh et al., 2024). A separate meta-analysis similarly found a small but significant positive relationship that was moderated by age, sex, and sport (Crum, 2022). Mental toughness has also been shown to operate through related mechanisms such as resilience in endurance performance (Gameiro et al., 2023) and behavioral perseverance under demanding conditions (Gucciardi, Peeling, & Ducker, 2016), and to support the emotion-regulation and concentration processes that protect performance under stress (Horvath, Kovacs, Toth, & Toth, 2022; Laborde, Lautenbach, Allen, Herbert, & Achtzehn, 2014). Motivation, in particular, has been identified as a key driver of adherence and perceived performance among athletes (Almagro, Sáenz-López, Fierro-Suero, & Conde, 2020; Afrouzeh, Konukman, Lotfinejad, & Afrouzeh, 2020).

Despite this general pattern, findings on how mental toughness varies across athlete demographics remain inconsistent. In an influential study of more than 600 performers, Nicholls, Polman, Levy, and Backhouse (2009) reported that mental toughness differed by gender, age, experience, and sport type, with men, older athletes, and more experienced competitors generally scoring higher. Subsequent work has been mixed: some studies found higher mental toughness or more effective psychological preparation among men (Meggs & Chen, 2018), others found that imagery and mental toughness were more strongly tied to performance among women (Yarayan et al., 2024), and still others found that achievement level and accumulated experience, rather than sex per se, accounted for differences in mental toughness (Mack, 2020). Sport type and competitive level have

likewise been shown to shape mental toughness profiles (Boobani, Grants, Boge, Litwiniuk, & Benjamin, 2022; Wibowo, Sulaiman, & Akbar, 2024). These divergent results suggest that demographic moderators of mental toughness are context dependent and warrant continued, population-specific examination.

Two further gaps motivate the present study. First, much of the evidence derives from elite or Western samples and from single-sport or team-sport designs, leaving collegiate athletes who compete across several individual sports especially in Southeast Asian university settings comparatively understudied (Arcangel, 2022). Recent international evidence on collegiate and university athletes further underscores the need for up-to-date, population-specific examination of mental toughness (Akbar et al., 2024; Halim et al., 2025; Workman et al., 2025). Second, although mental toughness is widely assumed to translate into superior results, the strength of the mental toughness-performance link is heterogeneous and sometimes weak, and few studies have tested it against an objective, rank-based index of competitive outcome rather than self-rated performance (Cowden, Crust, Jackman, & Duckett, 2019; Guszowska & Wójcik, 2021; Hsieh et al., 2024). The present study addresses this gap by operationalizing competitive outcome through an objective, institutionally documented rank-based index (the MSU-GenSan rank-based scoring system) rather than self-rated performance, which represents the study's key methodological innovation. Examining mental toughness, demographic differences, and an institutionally documented performance measure together within a single sample of individual-sport athletes therefore addresses a meaningful evidentiary gap.

Clarifying these relationships carries practical significance for several stakeholders. Findings can inform coaches and physical-education teachers in designing psychological-skills interventions, help sport psychologists tailor mental-training programs to specific dimensions such as concentration and confidence, and guide sport administrators in allocating support to underperforming events (Soundara Pandian, Balaji Kumar, Kannan, Gurusamy, & Biju, 2023; Wilson et al., 2019). For student-athletes themselves, a clearer understanding of which psychological attributes are, and are not–associated with competitive outcomes can foster more realistic and effective preparation.

Against this background, the present study examined the mental toughness and sports performance of individual-sport athletes in a Philippine university and sought to answer three questions: (1) Is there a significant difference in mental toughness across the athletes' demographic profile (sex, individual sports event, year level, and years of playing experience)? (2) Is there a significant difference in sports performance across the same demographic profile? and (3) Is there a significant relationship between mental toughness and sports performance?

Method

Study Design and Participants

This study employed a quantitative, descriptive-correlational research design, which is appropriate for describing the levels of variables as they naturally occur and for examining associations among them without manipulation. The participants were 64 student-athletes from the College of Education of Mindanao State University - General Santos City who competed in individual sports—taekwondo, swimming, athletics, darts, and chess—during the 2024 University Intramurals. Respondents were selected through simple random sampling: the required sample size was determined using the Raosoft sample-size calculator, and individual respondents were drawn at random from the roster of qualified athletes using a randomization tool (Wheel of Names). The sample comprised 34 men (53.1%) and 30 women (46.9%) distributed across year levels and varying lengths of playing experience; anthropometric measures (age, height, weight, and body mass index) were not collected, as the study focused on psychological and competitive-performance variables. Athletes' physical characteristics therefore fell outside the analytic scope of this psychological and rank-based performance study; this omission is acknowledged as a limitation and flagged for future research. The study was conducted in accordance with the ethical principles for research involving human participants set out in the Declaration of Helsinki, and written informed consent was obtained from every participant prior to data collection.

Ethical approval statement

The study received approval from the Institutional Ethics Review Committee (IERC) of Mindanao State University - General Santos City (Approval No. 304-2024-MSUGSC-IERC). Participation was voluntary, responses were treated with strict confidentiality, and participants were informed of their right to withdraw at any time without penalty.

Research Instruments

Two instruments were used. Mental toughness was measured with an adopted mental toughness questionnaire (the "S3 Task 5 Mental Toughness" instrument of Leith Academy), a 24-item, five-point Likert-type scale organized into five dimensions: rebound ability, ability to handle pressure, concentration, confidence, and motivation. Prior to administration, the adopted instrument underwent content validation by three subject-matter experts, who rated its clarity, relevance, and appropriateness; it obtained an overall mean rating of 4.51, interpreted as "Very Highly Valid". This level of expert agreement is consistent with the established psychometric properties of standardized mental toughness measures, which typically report acceptable internal consistency (Cronbach's $\alpha = .70-.80$) across their confidence, constancy, and control subscales (Sheard, Golby, & van Wersch, 2009). Sports performance was indexed using the Mindanao State University - General Santos rank-based minor scoring system applied during the 2024 Intramurals, which converts each athlete's

official competition rank into an equivalent performance score, yielding a five-level classification ranging from very poor to very good. Sports performance was initially determined using the official MSU-GenSan rank-based scoring system. The institutional equivalent points were subsequently classified into five ordered performance categories: Very Poor, Poor, Average, Good, and Very Good. For statistical analysis, these categories were coded as 1 = Very Poor, 2 = Poor, 3 = Average, 4 = Good, and 5 = Very Good. Accordingly, the analyzed variable represented an ordinal performance-category score rather than the original institutional equivalent points.

Table 1. MSU-GenSan Sports Performance Scoring Matrix and Interpretation

Rank	Equivalent Points	Interpretation
Champion	20	Very good
1st Runner Up	15	Very good
2nd Runner Up	12	Good
3rd Runner Up	10	Good
4th Runner Up	7	Average
5th Runner Up	6	Average
6th Runner Up	5	Poor
7th Runner Up	4	Poor
8th Runner Up	3	Very poor
9th Runner Up	2	Very poor
10th Runner Up	1	Very poor

Note: The equivalent points were used to determine each athlete's performance category. For subsequent statistical analysis, the categories were coded ordinally from 1 (Very Poor) to 5 (Very Good).

Data Analysis

The Data were encoded and analyzed using the Statistical Package for the Social Sciences (SPSS). Frequency and percentage distributions described the demographic profile, while the weighted mean and standard deviation described the levels of mental toughness and sports performance. The Shapiro-Wilk test was used to assess the normality of the distributions. To test differences across the demographic profile, an independent samples t-test compared groups by sex and a one-way analysis of variance (ANOVA) compared groups by individual sports event, year level, and years of playing experience; the Scheffé post-hoc test was applied to locate significant pairwise differences. Because sports performance violated the assumption of normality, the relationship between mental toughness and sports performance was examined using Spearman's rank-order correlation. All inferential tests used a significance level of $\alpha = .05$.

Results

This section presents the levels of mental toughness and sports performance among the individual-sport athletes, the differences in these variables across the demographic profile, and the relationship between them, followed by an integrated discussion.

Table 2 presents the demographic profile of the 64 respondents. In terms of sport type, athletics had the largest

representation (35.9%), followed by swimming (20.3%), while taekwondo and darts each accounted for 14.1%, and chess comprised 15.6% of the sample. Regarding sex, the distribution was relatively balanced, with a slight majority of male athletes (53.1%) compared to females (46.9%). In terms of year level, most respondents were in their fourth year (45.3%), while second-year students represented the smallest group (12.5%). For years of experience, the largest proportion of athletes had 0-1 year of experience (40.6%), followed by those with 2-3 years (34.4%); only a small percentage had 4-5 years (10.9%) or more than 5 years (14.1%). Overall, the participants were predominantly upper-year students with relatively limited competitive experience.

Table 2. Demographic Profile of the Respondents (N = 64)

Variable	Frequency (f)	Percentage (%)
Individual Sports Event		
Taekwondo	9	14.1
Swimming	13	20.3
Athletics	23	35.9
Darts	9	14.1
Chess	10	15.6
Sex		
Male	34	53.1
Female	30	46.9
Year Level		
1st Year	11	17.2
2nd Year	8	12.5
3rd Year	16	25.0
4th Year	29	45.3
Years of Experience		
0-1 year	26	40.6
2-3 years	22	34.4
4-5 years	7	10.9
5 and above	9	14.1

Across the five dimensions, the athletes' overall mental toughness was average ($M = 3.34$, $SD = 0.35$). Motivation was the only dimension rated high ($M = 4.00$, $SD = 0.56$), indicating strong goal orientation and drive, whereas rebound ability ($M = 3.22$), ability to handle pressure ($M = 3.37$), confidence ($M = 3.18$), and concentration ($M = 2.94$) were all average. Table 3 summarizes these descriptive results.

Table 3. Level of Mental Toughness

Mental Toughness Component	Mean	SD	Interpretation
Rebound Ability	3.22	.57	Average
Ability to Handle Pressure	3.37	.48	Average
Concentration	2.94	.65	Average
Confidence	3.18	.47	Average
Motivation	4.00	.56	High
Overall	3.34	.35	Average

The athletes' overall sports performance was poor ($M = 2.98$, $SD = 1.35$), reflecting a generally below-midpoint and highly variable level of competitive outcomes. Most athletes were distributed across the average and good categories, while a smaller number reached very good performance. Swimming had the highest number of very poor performers, whereas athletics showed a wider spread across performance levels, including the highest counts in the good and very good categories. Overall, the results suggest generally low to moderate performance levels, with variations across different sports (see Table 4).

Table 4. Level of Sports Performance

Sports Performance	T	S	A	D	C	Total
Very Poor	2	8	2	0	0	12
Poor	0	2	5	5	0	12
Average	0	0	5	4	6	15
Good	4	2	6	0	3	15
Very Good	3	1	5	0	1	10
Total	9	13	23	9	10	64
Overall Mean (M)					2.98	
Overall Standard Deviation (SD)					1.35	

Table 5 indicates that there are no statistically significant differences in mental toughness across all examined demographic variables. Specifically, sex ($t(62) = -1.025$, $p = .309$), type of individual sports event ($F(4, 59) = 0.987$, $p = .422$), year level ($F(3, 60) = 0.110$, $p = .954$), and years of playing experience ($F(3, 60) = 1.916$, $p = .137$) all yielded p-values greater than the .05 significance level. This suggests that mental toughness is relatively consistent among participants regardless of their demographic characteristics. In other words, factors such as gender, academic progression, sports category, and experience do not appear to meaningfully influence the level of mental toughness among the respondents, implying that it may be a more stable psychological trait within this group.

Table 5. Differences in Mental Toughness Across the Demographic Profile

Demographic Variable	Test	t / F	p	Decision
Sex	t-test	-1.025	.309	Not Significant
Individual Sports Event	ANOVA	0.987	.422	Not Significant
Year Level	ANOVA	0.110	.954	Not Significant
Years of Playing Experience	ANOVA	1.916	.137	Not Significant

Table 6 reveals that sports performance does not significantly differ based on most demographic variables, including sex ($t(62) = -0.694$, $p = .490$), year level ($F(3, 60) = 0.657$, $p = .582$), and years of playing experience ($F(3, 60) = 0.403$, $p = .751$), as all p -values exceed the .05 threshold. However, a statistically significant difference was found across individual sports events ($F(4, 59) = 4.204$, $p = .005$), indicating that the type of sport influences performance outcomes. Further analysis using the Scheffé post-hoc test showed that swimmers performed significantly lower than athletes in taekwondo ($p = .028$) and athletics ($p = .045$). This finding suggests that performance levels vary depending on the specific sport, possibly due to differences in physical demands, competitive structures, or training approaches inherent in each discipline.

Table 6. Differences in Sports Performance Across the Demographic Profile

Demographic Variable	Test	t / F	p	Decision
Sex	t-test	-0.694	.490	Not Significant
Individual Sports Event	ANOVA	4.204	.005	Significant
Year Level	ANOVA	0.657	.582	Not Significant
Years of Playing Experience	ANOVA	0.403	.751	Not Significant

Table 7 shows that there is no significant relationship between mental toughness and sports performance, as indicated by a very low correlation coefficient ($\rho = -0.004$) and a p -value of .978, which is far above the .05 level of significance. The negative value of the coefficient suggests a negligible inverse relationship; however, its magnitude is so close to zero that it essentially indicates no meaningful association between the two variables. This means that variations in mental toughness do not correspond to changes in sports performance among the participants. Consequently, mental toughness, in this sample, does not appear to be a predictor of performance outcomes, suggesting that other factors beyond psychological resilience may play a more substantial role in influencing athletic performance.

Table 7. Relationship Between Mental Toughness and Sports Performance

Variables Correlated	ρ	p	Strength of Relationship	Decision
Mental Toughness and Sports Performance	-0.004	.978	Very Low	Not Significant

Discussion

The findings present a coherent but theoretically challenging picture: the athletes were strongly motivated yet only moderately tough overall, performed poorly as a group, showed no demographic differences in mental toughness, and exhibited essentially no association between mental toughness and competitive outcome. The uniformly average mental toughness across sex, sport, year level, and experience diverges from the classic demographic gradients reported by Nicholls, Polman, Levy, and Backhouse (2009) and from studies emphasizing sex- or experience-based differences (Mack, 2020; Meggs & Chen, 2018), yet it is consistent with the growing recognition that such differences are inconsistent and context dependent (Yarayan et al., 2024) and may be attenuated in relatively homogeneous, sub-elite collegiate samples with limited playing experience. The prominence of motivation relative to the other dimensions aligns with self-determination-based evidence that intrinsic motivation is a salient and resilient psychological resource among athletes (Afrouzeh, Konukman, Lotfinejad, & Afroozeh, 2020; Almagro, Sáenz-López, Fierro-Suero, & Conde, 2020), while the comparatively lower concentration and confidence scores echo work identifying attentional control and emotion regulation as the dimensions most vulnerable to competitive stress (Horvath, Kovacs, Toth, & Toth, 2022; Laborde, Lautenbach, Allen, Herbert, & Achtzehn, 2014).

That sports performance differed only by sport type—with swimming significantly below taekwondo and athletics—supports the view that competitive outcomes are heavily conditioned by sport-specific demands, training quality, and resources rather than by demographic membership (Rees et al., 2016). Most strikingly, the negligible mental toughness–performance correlation contrasts with meta-analytic estimates of a moderate positive association (Crum, 2022; Hsieh et al., 2024) and with studies linking toughness to resilience and perseverance (Gameiro et al., 2023; Gucciardi, Peeling, & Ducker, 2016); however, those same syntheses emphasize substantial heterogeneity and weaker effects when performance is operationalized objectively and when samples are non-elite, conditions that both characterize the present study (Cowden, Crust, Jackman, & Duckett, 2019; Guskowska & Wójcik, 2021).

The results imply that, in this population, a rank-based competitive outcome is driven more by technical skill, physical conditioning, coaching, and the structural characteristics of each sport than by self-reported mental toughness, and that mental toughness—though valuable for adherence and well-being—should not be assumed to translate automatically into superior placement. Practically, these findings argue for sport-specific psychological-skills training that strengthens concentration and confidence, for targeted developmental support in underperforming events such as swimming, and for foundational mentoring of less-experienced athletes (Arcangel, 2022; Soundara Pandian, Balaji Kumar, Kannan, Gurusamy, & Biju, 2023; Wilson et al., 2019; Bagayas & Carrillo, 2026).

Several limitations qualify these findings. First, mental toughness was assessed with the S3 Task 5 questionnaire, a general, non-sport-specific instrument whose dimensions may not be psychometrically equivalent across disciplines with markedly different task demands. Future studies should therefore adopt sport-calibrated or validated measures such as the Sports Mental Toughness Questionnaire (SMTQ) or the Mental Toughness Index (MTI), ideally with formal tests of invariance across sports. Second, anthropometric characteristics (age, height, weight, and body mass index) were not collected because the study focused on psychological and rank-based competitive-performance variables; their absence precludes adjustment for physical maturation and body composition and should be addressed in future work. Finally, these results are consistent with recent international evidence in collegiate populations, in which mental toughness tends to be low to moderate and largely independent of competition level or sport type (Akbar et al., 2024; Halim et al., 2025; Workman et al., 2025).

Conclusions

Among individual-sport collegiate athletes, mental toughness was average overall—distinguished only by a high level of motivation—while competitive performance was poor. Mental toughness did not vary significantly with sex, sport, year level, or playing experience, and sports performance varied only by sport type, with swimmers performing significantly below athletes in taekwondo and athletics. Crucially, mental toughness was not significantly related to sports performance, indicating that, in this context, psychological toughness alone does not predict competitive outcomes. These results suggest that performance is better explained by sport-specific, technical, and contextual factors.

It is therefore recommended that institutions implement structured, sport-specific psychological-skills programs emphasizing concentration and confidence, provide focused support to underperforming events and to athletes with limited experience, and integrate mental-skills training with technical and physical conditioning. Future research should employ larger and multi-institutional samples, longitudinal designs, and additional explanatory variables (e.g., training load, coaching quality, and anxiety) to clarify the conditions under which mental toughness contributes to competitive success.

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Author Contribution

Author contributions: Conceptualization and methodology: CAC; Investigation: JLM; Writing—original draft preparation: JCB.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Data Availability

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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