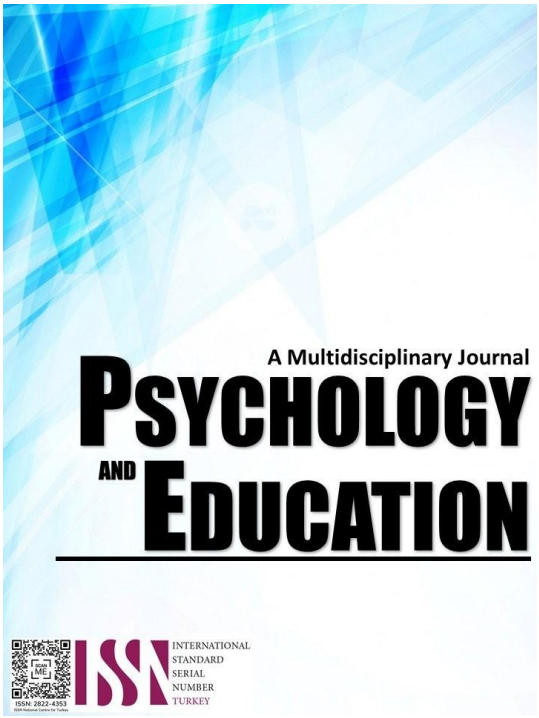
SPORTS MENTAL TOUGHNESS AND PAIN ANXIETY AMONG INJURED FILIPINO STUDENT-ATHLETES



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Research Article

Sports Mental Toughness and Pain Anxiety Among Injured Filipino Student-Athletes

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Abstract

Mental toughness and pain anxiety are critical psychological factors in student-athletes' psychological health and ability to cope with the physical and emotional challenges of recovery. While mental toughness is often regarded as a protective attribute that enhances resilience, emerging evidence suggests it may also interact with pain-related anxiety in many complex ways, potentially hindering recovery when accompanied by pressure to return to play. This study investigated the relationship between mental toughness and pain anxiety using a sequential explanatory mixed-method design. Through the said method, the study first conducted a quantitative phase (Phase 1) with 124 Filipino collegiate student-athletes (18–25 years) who had sustained significant injuries. Participants completed the Sports Mental Toughness Questionnaire and the Pain Anxiety Symptoms Scale-20. Regression analysis revealed a significant model, $F(1, 122) = 12.50$, $p < .001$, with SMT accounting for 9.3% of the variance in PA ($R^2 = 0.093$). SMT was a significant positive predictor of PA ($B = 0.934$, $\beta = 0.305$, $p < .001$), contrary to the hypothesized negative association. In Phase 2, nine participants were purposively sampled and participated in semi-structured interviews, which were analyzed using Braun and Clarke's thematic analysis. Integration was achieved by using qualitative insights to explain the quantitative trend. Four themes emerged: (1) mental toughness as a double-edged factor, (2) psychoemotional challenges during recovery, (3) post-injury adjustments and coping, and (4) adverse environmental influences. These themes clarified how high SMT could coexist with elevated PA due to internalized pressure and expectations to recover quickly. The findings highlight the paradoxical role of SMT, suggesting that while it supports resilience, it may also intensify pain and anxiety. Interventions should aim to strike a balance between mental toughness and adaptive emotional processing.

Keywords: *sports injury, mental toughness, pain anxiety, student-athletes*

Introduction

Student-athletes engage in rigorous physical training and competitive sports activities, often balancing physical, technical, and psychological demands. Among the psychological factors, mental toughness has emerged as a crucial attribute that enables athletes to sustain their performance and cope with pressure. Defined as a dynamic psychological resource, mental toughness encompasses attributes like confidence, motivation, and resilience, enabling individuals to navigate challenges effectively (Gucciardi et al., 2017; Beattie et al., 2020). This trait is essential not only for achieving success but also for overcoming setbacks, such as injuries.

Sports injuries are prevalent in competitive sports, with studies estimating that over 50% of collegiate athletes sustain significant injuries during their careers (Ahlquist et al., 2020). These injuries profoundly impact physical capabilities and have psychological repercussions, particularly in the form of pain anxiety. Pain anxiety—characterized by excessive fear or worry about experiencing pain—can hinder recovery, delay an athlete's return to sport, and exacerbate psychological distress (Ford et al., 2017; Potter, 2016). Despite its critical role in rehabilitation outcomes, few studies have examined how mental toughness interacts with pain anxiety, particularly in culturally specific contexts like that of Filipino student-athletes.

Some challenges athletes encounter include physical and emotional challenges, such as poor performances, plateaus, and injuries, especially women athletes (Dixon et al., 2023; Mosewich et al., 2013). Studies have revealed that athletes who play with an injury report higher mental toughness than those who play without one. These injuries can harm athletes' physical health, mental well-being (Madrigal et al., 2016, as cited in Naderi et al., 2024), athletic performance, professional and social life, and finances (Édouard & Ford, 2020).

According to Cowee and Simon (2019), an athlete is considered to have suffered a severe injury if they are unable to compete for more than 21 days and experience limitations in performing daily activities and exercising. Additionally, a significant sports injury often requires rehabilitation and can threaten an athlete's performance, career, and success in a specific sport (NIAMS Health Information on Sports Injuries, 2023). In this study, a significant injury is defined as a physical condition experienced by an athlete, including but not limited to bone fractures, dislocations, sprains, tendinitis, or other musculoskeletal injuries that result in at least 21 days lost from sports activity (Kay et al., 2017).

The psychological ramifications of sports injuries are notable, garnering attention for their impacts on pain, anxiety, and mental toughness. The psychological repercussions of sports injuries extend beyond physical rehabilitation, profoundly affecting athletes' mental toughness. Athletes encounter anxiety linked to sports injuries, including the fear of reinjury, the worry about being unable to resume the sport at peak performance, and the dread of enduring lifelong debilitating pain and symptoms (Kvist & Silbernagel, 2022).

Among these effects of acquiring a sports injury is the tendency for athletes to also experience anxiety related to pain.

Pain anxiety, a phenomenon characterized by an excessive worry about experiencing pain, emerges as a notable concern for both student and professional athletes following significant injuries (Ford et al., 2017). In a study by Fisher and colleagues (2018), pain anxiety is defined within the athletic sphere as the apprehension and negative cognitive responses associated with the anticipation of pain due to injury. This factor can profoundly affect recovery and performance. This apprehension can deter full engagement in recovery, influencing the injury's overall outcome. Hence, the recognition of pain anxiety's early signs and symptoms becomes critical in the context of sports injuries, aiding in the prevention of long-term psychological distress. Current investigations into the relationship between anxiety and sports injuries highlight this condition's complexity, further expounding the diverging effects of anxiety on the rehabilitation and return-to-sport phases across different sports modalities (Ríos Garit et al., 2021). In line with Potter's (2016), our study will also define pain anxiety as the manifestation of fearful and anxious responses toward pain.

Recognizing the significance of mental toughness and pain anxiety explains the capacity of athletes to endure and manage both psychological and physical stressors. This can be supported by Lazarus and Folkman's seminal work on Cognitive Appraisal Theory (Tomaka et al., 1997), which posits that an individual's perception, evaluation, and subsequent response to stressors are pivotal to understanding their emotional and behavioral outcomes. In support of this, according to Lazarus and Folkman's Transactional Theory of Stress, individuals engage in primary and secondary appraisals when faced with stressful situations—the former determining the significance of a potential stressor and the latter assessing one's ability to cope with such stressors (Lazarus & Folkman, 1984). This ongoing evaluative process enables an individual to identify a threat and decide whether to confront or avoid it. Furthermore, Lazarus and Folkman (1984) emphasized that the Cognitive Appraisal Theory also highlights the importance of cognitive evaluations in regulating emotional and physiological responses to stressors. These intertwined theories collectively form a comprehensive framework for understanding how individuals perceive and manage stressors.

Student-athletes, often revered for their physical and mental prowess, face a myriad of stressors and challenges spanning academic, biological, psychological, and social domains (Brown et al., 2021; Kumar & Mohammad, 2019; Putukian, 2016; Wolanin et al., 2016). Injuries are prominent biological stressors, with rigorous training and high-risk activities increasing their vulnerability (Kay et al., 2017). Ahlquist and colleagues (2020) estimated that over half of college athletes will suffer at least one sports-related injury during their collegiate careers. Athletes with higher training volumes tend to experience more injuries and miss more time due to these injuries. Moreover, recent studies underscore the prevalence of mental health concerns and psychosocial stressors among student-athletes (NCAA, 2013, 2019). Despite dedicating over 40 hours per week to sport-related activities, student-athletes face unique stressors that contribute to physical injuries, depression, anxiety, stress, and relational challenges (Brown et al., 2021).

Previous studies highlight that mental toughness reduces general anxiety and improves coping strategies, suggesting its potential as a protective factor (Kristjánsdóttir et al., 2018; Mojtahedi et al., 2023). However, few have explored its direct relationship with pain anxiety, especially in athletes recovering from significant injuries. This study addresses this gap by examining this relationship in the understudied demographic of Filipino student-athletes, who face unique cultural, academic, and athletic challenges (Jannah et al., 2018; Benjamin & Wang, 2021). Guided by the Cognitive Appraisal Theory, which posits that perceptions of stressors influence emotional and behavioral responses (Lazarus & Folkman, 1984), this study employs a comprehensive analysis that integrates both quantitative and qualitative approaches.

Research Questions

The general objective of the study was to examine how sports mental toughness relates to pain anxiety among Filipino collegiate student-athletes who have experienced major injuries in their respective sports, with the broader aim of informing psychological interventions that might enhance resilience and recovery. Specifically, the study addressed the following research questions:

1. Does sports mental toughness significantly predict pain anxiety among Filipino collegiate student-athletes who have experienced a major injury?
2. How do injured student-athletes experience and interpret mental toughness in relation to their pain anxiety during recovery?
3. How do athletes experience and interpret mental toughness in sports, and how does this influence their experience and development of pain-related anxiety?

Methodology

Research Design

This study used a sequential explanatory mixed-method design to determine whether mental toughness can predict pain anxiety among student-athletes. A sequential explanatory design is a two-phase approach in which quantitative data are collected and analyzed first, followed by qualitative data to explain further and contextualize the initial results (Creswell & Creswell, 2018; Ivankova et al., 2006). This design is particularly appropriate for research that seeks not only to test predictive associations but also to gain deeper insights into the quantitative results. This research design is fit for our study since we aimed to understand the predictive relationship between mental toughness and pain anxiety, and explored further the factors that played into this relationship. The first phase involved collecting cross-sectional data within a specific period to compare mental toughness and pain anxiety levels. Additionally, each variable was

studied within the same set of participants. The quantitative data collection followed Johnson's (2001) predictive, cross-sectional study design. The second phase involved qualitative data collection through semi-structured interviews with a subset of participants from the first phase. The phenomenological design explored the participants' personal experiences and perceptions, focusing on how they managed pain, anxiety, and mental toughness during recovery.

Respondents

The target population for this study consists of Filipino student-athletes who have experienced a significant injury. Participants were Filipinos aged 18 to 25, residing in the Philippines, enrolled in a university, and collegiate student-athletes who had experienced a significant injury. They had a basic understanding of English, which enabled them to understand and respond to the questionnaires accurately. Excluded are those diagnosed with anxiety disorders. We utilized purposive sampling, a non-probability sampling technique, to select participants for Phases 1 and 2 of the study. This technique, as outlined by Campbell et al. (2020), aligns the sample more closely with the study's aims and objectives, thereby enhancing the study's accuracy and the reliability of its data and findings.

Using OpenEpi by Sullivan et al. (2019), a free and open-source software for epidemiologic statistics, it was determined with a 95% confidence level that the minimum sample size required for our population in Phase 1 is 384 participants. However, only a total of 124 Filipino student-athletes passed the inclusion criteria for Phase 1. For Phase 2, Guest and colleagues (2006) recommended conducting 12 interviews to achieve data saturation in a qualitative study using purposive sampling. We initially interviewed 12 student-athletes, selected from the participants in Phase 1 who agreed to participate in the study. However, the number was reduced to nine respondents due to invalid responses.

Individuals with anxiety disorder diagnoses were excluded from the study. Although these individuals could provide informed consent, their participation was limited due to the potential psychological risks associated with the study's sensitive topics and the possibility of confounding the variable, pain anxiety. While participants were offered a post-questionnaire debriefing, the study design prioritized minimizing psychological distress and ensuring that the potential benefits of the study outweighed any potential risks to participants' mental well-being.

Instrument

Sport Mental Toughness Questionnaire (SMTQ). The SMTQ is a 14-item questionnaire used to measure an athlete's mental toughness levels, developed by Sheard and colleagues (2009). Based on the previous qualitative studies of mental toughness, themes and quotes from the raw data were used to create the SMTQ items. The questionnaire initially included 53 items. Following a pilot test to evaluate the applicability of each item and a Principal Axis Factoring (PAF) analysis, the questionnaire was streamlined to a final set of 14 items. Moreover, PAF identified three subscales of mental toughness: confidence with six items (e.g., "I can regain my composure if I have momentarily lost it"), constancy with four items (e.g., "I give up in difficult situations"), and control with four items (e.g., "I worry about performing poorly"). A four-point Likert scale was used, ranging from "not at all true" (1) to "very true" (4). The SMTQ overall mental toughness score ranges between 14 and 56, with higher scores indicating higher degrees of mental toughness (Brace et al., 2020). The Cronbach's alpha was determined for each subscale using a sample of 1,142 athletes from various sports, ages 16 to 63 (Sheard et al., 2009). An acceptable internal consistency was determined for each subscale: control ($\alpha = 0.71$), constancy ($\alpha = 0.74$), and confidence ($\alpha = 0.80$). Moreover, Miçooğulları (2017) concluded that the overall internal consistency of the SMTQ scale was considered high, with a coefficient alpha value of 0.82. Confirmatory Factor Analysis (CFA) was employed to assess the validity of the SMTQ (Sheard et al., 2009). The results of the CFA showed good overall model fit and incremental fit for the three-factor model (control, consistency, and confidence). The convergent validity of the scale, as compared to the Mental Toughness Questionnaire-48 (MTQ48), revealed that the overall mental toughness scores were significantly and positively related ($r = 0.75$) (Crust & Swann, 2011).

Pain Anxiety Symptoms Scale 20 (PASS-20). The scale was initially developed to quantify pain-related anxiety and fear associated with chronic pain among individuals. It contains 40 items, with its four subscales and total scale demonstrating internal consistency, ranging from an alpha of 0.74 to 0.94. Furthermore, significant test-retest reliability was established over approximately two weeks, with correlations ranging from $r = 0.74$ to $r = 0.84$, in 250 patients. The adapted scale, PASS-20, was developed to accommodate the time and effort demands on the subjects. Correlations between the original PASS subscales and the shortened counterparts are very high, averaging $r = 0.95$. Moreover, correlations between the shortened version of the subscales and their non-matching counterparts are low, averaging $r = 0.57$, thereby affirming good convergent and divergent validity of PASS-20. By reducing the PASS subscales from ten to five items, PASS-20 maintains its satisfactory internal consistency, evidenced by a mean alpha = 0.81. Additionally, the correlations observed in PASS's original and shortened versions provide significant support for predictive and construct validity (McCracken & Dhingra, 2002). The items in the PASS-20 are categorized into four subscales: Cognitive (e.g., "I cannot think straight when in pain"), Escape/avoidance (e.g., "I go immediately to bed when I feel severe pain"), Fear (e.g., "I think that if my pain gets too severe, It will not decrease"), and Physiological anxiety (e.g., "Pain makes me nauseous"). All items are rated on a 6-point Likert scale, ranging from 0 (never) to 5 (always), with total scores ranging from 0 to 100. Higher scores on the PASS-20 represent heightened levels of pain-related anxiety (Abrams et al., 2007).

Interview Protocol. Guided by the central question, "How do athletes experience and interpret mental toughness in sports, and how does this influence their experience and development of pain-related anxiety?" the interview protocol was developed to build directly

on the results of the quantitative phase. Specifically, the positive relationship found between sports mental toughness and pain anxiety (contrary to the hypothesized inverse association) informed the construction of follow-up questions that probed how participants experienced this paradox in their recovery. The interview questions were organized from general to specific inquiries, starting with athletes' overall experiences of injury and gradually moving toward more targeted questions on the interplay of mental toughness and pain anxiety. Content validity of the interview protocol was established through expert reviews by faculty members from the Department of Psychology with expertise in qualitative research and sports psychology. To enhance the trustworthiness of the qualitative phase, credibility was supported through member checking with participants and peer debriefing among the research team. Dependability was addressed by maintaining an audit trail of coding decisions, and confirmability was enhanced by team-based coding to reduce bias.

Procedure

Pre-data collection procedures involved gathering and curating appropriate measures for our independent variable, mental toughness, and dependent variables, pain, anxiety, and psychological well-being, among Filipino collegiate student-athletes aged 18-25 years old. The Sport Mental Toughness Questionnaire (SMTQ) and Pain Anxiety Symptoms Scale 20 (PASS-20) were used for this purpose. The curated questionnaire, integrating both measures, was administered online via Google Forms and offline in person. Subsequently, the collected data underwent coding, scoring, and statistical analysis using Jamovi (version 2.5.3) as part of the post-data gathering activities in Phase I.

In Phase II, interview questions were prepared, and participants from Phase I were selected using purposive sampling to ensure a diverse range of perspectives. Prior to the interviews, informed consent was reiterated to emphasize the importance of ethical considerations. The interviews were conducted either online via Google Meet or in-person at a rented coworking space, depending on the participant's convenience. To ensure privacy and safety, the interview setting was arranged so that only the participant and the study team were present. Following the data collection process, the information gathered from the interviews was thematically analyzed and interpreted. Throughout the study, confidentiality was strictly maintained, ensuring no identifying information was released. All data were securely deleted in accordance with ethical guidelines after the study.

Data Analysis

Our study involved collecting quantitative data from participants, necessitating the use of statistical techniques for proper analysis and computation. The data analysis was conducted using Jamovi Desktop (version 2.5.3). A significance level of $p < .05$, corresponding to a 95% confidence level, was applied throughout the analysis.

To explore the relationship between mental toughness and pain anxiety, we employed Pearson correlation to assess their association. Following this, linear regression analysis was conducted to predict the value of the dependent variable based on the independent variable. This approach allowed us to examine whether an inverse relationship exists between mental toughness and pain anxiety.

The qualitative data was manually analyzed using Braun and Clarke's (2006) thematic analysis to identify themes that will provide further insights into the results obtained from the quantitative data. Google Docs (2024), a web-based document editor, was utilized to transcribe and organize the information gathered from the interviews.

Ethical Considerations

This study adhered to established ethical guidelines for research involving human participants. Prior to data collection, the research protocol was reviewed and approved by the Research Ethics Office (REO) of Manila Central University (MCU) and the MCU Ethics Review Board (MCUERB) under protocol number 2024-065. All participants were provided with an informed consent form that explained the study's purpose, procedures, potential risks, and benefits. They were reminded that participation was voluntary and could be withdrawn at any time without penalty. Confidentiality was ensured by anonymizing data, using participant codes instead of names, and storing all digital files on password-protected devices accessible only to the research team. Audio recordings and transcripts were securely stored and scheduled for deletion after completion of the study. To minimize potential psychological risks, debriefing was conducted after the completion of questionnaires and interviews, and referral information for counseling services was provided if needed. These measures ensured that participants' rights, dignity, and well-being were safeguarded throughout the research process.

Results and Discussion

Phase 1

Table 1 presents the correlation between the scores of participants who took the SMTQ and the PASS-20. With $r(124) = 0.305$, $p < 0.001$, the correlation between Sports Mental Toughness (SMT) ($M = 39.93$, $SD = 5.25$) and Pain Anxiety (PA) ($M = 54.81$, $SD = 16.1$) reveals a weak positive correlation. The Pearson correlation results support our hypothesis that there is a significant relationship between sports mental toughness and pain anxiety among Filipino student-athletes who have experienced a significant injury. However, it contradicts our expectation of an inverse relationship. Preliminary analyses were conducted to ensure that no violations of the assumptions of normality, linearity, and homoscedasticity occurred. Both SMTQ and PASS-20 utilize global scores, calculated by summing the scores from their respective 14 and 20 questions, with total scores ranging from 14 to 56 for SMTQ and 0 to 100 for

PASS-20.

Table 1. *Descriptive Statistics and Correlations of Sports Mental Toughness and Pain Anxiety*

Variable	*n*	*M*	*SD*	*1*	*2*	*p*
1. Sports Mental Toughness	124	39.93	5.25	-		
2. Pain Anxiety	124	54.81	16.1	0.305*	-	<0.001*

Table 2 presents the unstandardized coefficient, standard error, standardized coefficient Beta, the t-value, and the p-value of the constant and SMT. A significant regression was found, $F(1, 122) = 12.497$, $p < 0.001$, with $R^2 = 0.093$, where the effect of SMT explains 9.3% of the variance in PA. The unstandardized beta value for SMT indicates that for each one-unit increase in SMT, PA increases by 0.934 units, with a standard error of 0.264. The analysis also revealed that SMT is a significant positive predictor of PA ($\beta = 0.305$, $p < .001$). The standardized beta suggests that a one standard deviation increase in SMT is associated with a 0.305 standard deviation increase in PA. The t-value and p-value further confirm the statistical significance of these results. These findings further support the hypothesis that SMT predicts PA, but conflict with the hypothesized negative relationship between SMT and PA.

Table 2. *Regression Analysis for Sports Mental Toughness Predicting Pain Anxiety*

Variable	*B*	*SE B*	*β*	*t*	*p*	*F*	*R2*
(Constant)	17.532	10.636	-	1.648	0.102	12.497	0.093
Sports Mental Toughness	0.934	0.264	0.305	3.535	.000*		

Note. Constant = 17.532, F (1, 122) = , p < 0.001, R2 = 0.093*

These results indicate that rather than an inverse relationship, SMT and PA demonstrate a direct positive association, suggesting alternative interpretations that may be further explored in the qualitative phase. Assumption checks for normality, linearity, and homoscedasticity were conducted and met. No comparisons were made between groups in this phase of the study.

Phase 2

Guided by the quantitative results, nine participants were interviewed to explore their lived experiences and answer the central question: How do athletes experience and interpret mental toughness in sports, and how does this influence their experience and development of pain-related anxiety? Thematic analysis identified four key themes: (1) Mental Toughness, (2) Psychoemotional Challenges, (3) Post-Injury Adjustments, and (4) Adverse Environmental Factors.

These themes reflect the lived experiences of Filipino student-athletes who have experienced a significant injury. The participants' responses highlighted a direct relationship between mental toughness and pain anxiety.

(1) Mental Toughness. This theme examines the factors that contributed to the participants' mental toughness both during and after their injuries. Four sub-themes emerged: (1) resiliency and drive, (2) mental strategies for recovery, (3) physical strengthening and conditioning, and (4) social and emotional support. The theme encapsulates the comprehensive approach student athletes take to conquer injury, powered by inner strength and a sense of purpose. It encompasses their mental and physical strategies for recovery, such as reframing setbacks, staying focused, and rebuilding strength, along with the key emotional and motivational support provided by coaches, professionals, family, and peers. This has been highlighted in these statements:

"Siguro po yung number 1 po diyan yung passion sa laro eh. Kasi, mahirap naman iwan yung football eh, sa totoo lang. Kasi simula bata, eto na po yung nilalaro ko. Parang napamahal din po ako sa laro. Tapos, meron pa pong kasing gustong maachieve sa buhay ko na yung 'di ko pa naachieve eh. Parang may mga goals ako na gusto pang ano eh, siempre same din naman sa ibang tao. Meron po tayong mga ano, gustong abutin sa buhay natin, individually. "Maybe the number one reason is the passion for the game. Because honestly, it's hard to leave football. Ever since I was a kid, this is what I've been playing. I've grown to love the game. There are also still things I want to achieve in life that I haven't reached yet. I have goals that I still want to accomplish, just like everyone else. We all have things we want to reach in life, individually.") – P8

"Like, ipipilit mo yung sarili mo kahit masakit. Kasi sa lakaran ng laro sa sports, in terms of taekwondo, hindi kasi pwede yung kahit isang sipa lang kung ano man yung sakit na mararamdaman mo, magsistop ka." ("You force yourself even when it hurts. Because in the field of sports, in terms of taekwondo, you can't just simply stop after receiving a single kick or whenever you feel pain.") – P7

"Meron pong mga coach na yung parang minomotivate po lalong-lalo na yung family ko po na nandiyan number 1 supporter ko po sila eh. Lagi po nila akong minomotivate na kakayanin ko lahat yung mga ano, talagang family ko po talaga yung laging nandiyan sa likod ko para isupport ako sa lahat ng bagay" (There are coaches who motivate us, especially my family who are my number 1 supporter. They always motivate me that I can do anything. Truly, my family always has my back and supports me in everything.) – P9

(2) Psychoemotional Challenges. This theme examines the psychological and emotional challenges that student-athletes face after sustaining a significant injury. This includes two sub-themes: (1) psychological challenges post-injury and (2) emotional challenges post-injury. This theme focuses on anxiety about pain, reinjury, and uncertainty regarding their athletic future. It also encompasses overwhelming feelings of exclusion, diminished confidence, and doubts about their ability to recover and regain peak performance. This is evident in the following statements:

"Iniisip ko na baka 'pag naulit siya, mas maging malala siya and mas maka-affect siya sa pagiging student-athlete ko na hindi na talaga ako totally makalaro talaga sa mga games." ("I keep thinking that if it happens again, it could get worse and affect me more as a student-athlete, to the point that I might not be able to play in the games anymore.") – P5

"There are days na injured ako, tapos sila nagtratraining, ayoko lumabas ng dorm kasi kapag nakikita ko sila, parang gusto ko maglaro or parang nadodown ako kasi parang dapat 'andun ako." ("There are days when I'm injured, and they're training, and I don't want to leave the dorm because when I see them, I feel like I want to play, or I feel down because it feels like I should be there with them.") – P6

(3) Post-Injury Adjustments. This theme highlights the significant cognitive and behavioral adjustments athletes undergo as part of their recovery process. This includes two sub-themes: (1) recognizing physical limitations post-injury and (2) avoiding reinjury through careful activity and self-monitoring. These adjustments include recognizing physical limitations and making conscious changes in activity to prevent reinjury. These cognitive and behavioral changes were deeply connected to athletes' mental toughness and pain anxiety. Those who exhibited strong mental resilience adapted by focusing on what they could still do rather than dwelling on what was lost. Meanwhile, increased body awareness allowed them to better gauge their physical state and make informed decisions about their participation in sports. The adjustment process following an injury requires a balance of cognitive acceptance and behavioral modifications. While athletes face the challenge of recognizing their physical limitations, they also take active steps to prevent reinjury through careful activity and self-monitoring, becoming more mindful of their movements to ensure that every action is calculated and cautious. The following statements demonstrate this:

"Ina-accept ko na lang yung mga situations, injuries na nangyayari sa akin. Hindi kinakaya ng katawan ko." ("I just accept the situations and injuries that happen to me. My body can't handle it anymore.") – P1

"After the verge ng injury ko, siyempre kailangan maingat sa lahat ng galaw." ("After my injury, of course, I had to be careful with all my movements.") – P7

(4) Adverse Environmental Factors. This theme encompasses the external factors that affect the well-being and performance of the participants. It includes three sub-themes: (1) balancing academics and sports, (2) social pressure, and (3) the lack of psychological intervention. The pressure of balancing academics and sports increases stress, making recovery more difficult. Social expectations discourage them from acknowledging pain or seeking help, while also amplifying their fear of reinjury and the need to return to peak performance quickly. Without psychological intervention, they lack essential coping mechanisms and support, prolonging their anxiety and hindering both physical and mental recovery. These were mentioned in the following statements:

"Since academic-wise and balancing both is pretty hard, mental toughness comes in where you have to push both, not slacking on one." – P8

"Ayoko naman makita ng mga bata na 'Ah, si ****, ano pala siya, lumpo habang nag-training?" ("I don't want the younger athletes to see me and think, 'Oh, so **** is crippled while training?'") – P7

"Never ako nabigyan ng option din na makapagreceive ng mental health consultation." ("I was never given an option to receive a mental health consultation.") – P6

Table 3. *Key Themes from Participant Interviews*

Themes	*Sub-themes*	*Participant Quotes*
Mental Toughness	(1) R*esiliency and drive*, (2) M*ental strategies for recovery*, (3) *Physical strengthening and conditioning*, and (4) *Social and emotional support*.	*"Siguro po yung number 1 po diyan yung passion sa laro eh. Kasi, mahirap naman iwan yung football eh, sa totoo lang. Kasi simula bata, eto na po yung nilalaro ko. Parang napamahal din po ako sa laro. Tapos, meron pa pong kasing gustong maachieve sa buhay ko na yung 'di ko pa naachieve eh. Parang may mga goals ako na gusto pang ano eh, siempre same din naman sa ibang tao. Meron po tayong mga ano, gustong abutin sa buhay natin, individually. "* ("Maybe the number one reason is the passion for the game. Because honestly, it's hard to leave football. Ever since I was a kid, this is what I've been playing. I've grown to love the game. There are also still things I want to achieve in life that I haven't reached yet. I have goals that I still want to accomplish just like everyone else. We all have things we want to reach in life, individually") – **P8**
Psychoemotional Challenges	(1) *Psychological challenges post-injury* and (2) *Emotional challenges post-injury*.	*"Iniisip ko na baka 'pag naulit siya, mas maging malala siya and mas maka-affect siya sa pagiging student-athlete ko na hindi na talaga ako totally makalaro talaga sa mga games."* ("I keep thinking that if it happens again, it could get worse and affect me more as a student-athlete, to the point that I might not be able to play in the games anymore.") – **P5** *"There are days na injured ako, tapos sila nagtratraining, ayoko lumabas ng dorm kasi kapag nakikita ko sila, parang gusto ko maglaro*

		or parang nadodown ako kasi parang dapat 'andun ako." ("There are days when I'm injured, and they're training, and I don't want to leave the dorm because when I see them, I feel like I want to play, or I feel down because it feels like I should be there with them.") – **P6**
Post-Injury Adjustments	(1) *Recognizing physical limitations post-injury* and (2) *Avoiding reinjury through careful activity and self-monitoring*	*"Ina-accept ko na lang yung mga situations, injuries na nangyayari sa akin. Hindi kinakaya ng katawan ko."* ("I just accept the situations and injuries that happen to me. My body can't handle it anymore.") – **P1** *"After the verge ng injury ko, siyempre kailangan maingat sa lahat ng galaw."* ("After my injury, of course, I had to be careful with all my movements.") – **P7**
Adverse Environmental Factors	(1) B*alancing academics and sports*, (2) *Social pressure*, and (3) *The lack of psychological intervention*	"Since academic-wise and balancing both is pretty hard, mental toughness comes in where you have to push both, not slacking on one." – ***P8*** *"Ayoko naman makita ng mga bata na 'Ah, si ****, ano pala siya, lumpo habang nag- training?"* ("I don't want the younger athletes to see me and think, 'Oh, so **** is crippled while training?'") – **P7** *"Never ako nabigyan ng option din na makapagreceive ng mental health consultation."* ("I was never given an option to receive a mental health consultation.") – **P6**

Figure 1 illustrates the complex relationship between pain, anxiety, and mental toughness in sports through the analogy of a weightlifting athlete. The athlete's muscles, grip, and stance symbolize mental toughness, developed through years of training and discipline. Just as stronger muscles support heavier lifts, greater mental toughness helps athletes endure setbacks, pain, and anxiety. However, the weight itself, represented by the barbell and plates, symbolizes pain and anxiety, which remains a challenge even for mentally tough athletes. Similarly, weightlifters who perceive themselves as stronger—meaning they have higher mental toughness—are more likely to push their limits by lifting heavier weights, acknowledging the risks, leading to increased pain and anxiety as it exceeds their usual load. Much like the athletes in our study, they reframe pain as a necessary part of improving performance or enduring it for the sake of performance. In this model, heavier weights represent greater psychological challenges, reinforcing the idea that pain can be a valuable indicator of an effective workout and overall growth.

External conditions also influence performance, much like real-life stressors affecting an athlete's ability to manage pain and anxiety. Factors such as an unstable platform, sweaty hands, or a noisy crowd mirror challenges like balancing academics, dealing with social pressures, or a lack of psychological rehabilitation resources. Moreover, past injuries often force athletes to adjust their stance, use support gear, or modify their techniques, underscoring the need for both mental and physical adaptations following an injury. These adjustments can either help them cope or heighten their awareness of pain, shaping their overall experience of pain anxiety in sports.

Figure 1. *Model of Lived Experiences of Filipino Student-athletes who have Sustained a Major Injury in relation to their Mental Toughness and Pain Anxiety*

A study aimed to gain a deeper understanding of the experiences of Filipino athletes who have experienced a significant injury regarding the constructs of Sports Mental Toughness (SMT) and Pain Anxiety (PA). Initially, we hypothesized an inverse relationship between the two variables. However, quantitative results revealed that SMT was a significant positive predictor of PA, such that higher mental toughness coincided with greater pain anxiety upon returning to sports. This unexpected finding challenges the traditional view of SMT as a purely protective factor. According to Guszkowska and Wójcik (2021), while mental toughness helps in managing stress and

anxiety, it does not eliminate the psychological and emotional consequences of physical injuries. This suggests a need for a deeper understanding of the underlying psychological factors that influence athletes' responses to injury.

The unexpected outcome of the quantitative phase of the study can be understood through several psychological theories that provide insight into the complexity of athlete behavior under stress. One relevant framework is the Stress-Injury Model (Williams & Andersen, 1998), which posits that psychological stress increases the risk of injury and impedes recovery. Athletes with high mental toughness may push themselves excessively to meet performance standards, interpreting pain as a threat but an integral part of their athletic identity. This internal pressure may elevate anxiety, particularly when injury interrupts their ability to perform. Their drive to maintain athletic competence can paradoxically lead to increased psychological distress in the face of physical limitations.

Additionally, Achievement Goal Theory (Nicholls, 1984) can help explain this relationship. Athletes who are highly task- or ego-oriented may experience heightened anxiety when injury disrupts their ability to achieve performance goals. High mental toughness, in this context, is closely linked to competitiveness and persistence. However, when facing injury, this same drive may also impede their ability to perform at their peak potential and may heighten their fear of reinjury, further intensifying pain anxiety.

Moreover, Self-Determination Theory (Deci & Ryan, 1985) emphasizes the importance of autonomy, competence, and relatedness in sustaining motivation and well-being. When athletes with high mental toughness perceive their injury as limiting their autonomy or competence, it may lead to emotional discomfort and heightened anxiety around pain and recovery. Their intrinsic motivation to return to sport quickly can clash with the physical need for rest, creating internal tension that feeds into pain anxiety.

Taken together, these theories underscore the multifaceted nature of mental toughness. While it is often considered a protective factor, in some contexts—especially when recovery is uncertain—it may amplify psychological strain. The positive correlation found in this study suggests that mental toughness does not universally buffer athletes from pain-related distress. However, it may instead contribute to heightened awareness and concern over the implications of injury, reinforcing the need for a more nuanced understanding of mental resilience in sports.

To further contextualize and interpret the unexpected results of the quantitative phase, a qualitative study was conducted using in-depth interviews with student-athletes who had experienced major injuries. The goal of the qualitative phase was to gain a richer, more nuanced understanding of the student-athletes' lived experiences and internal processes during injury and the post-injury phase. From this analysis, four central themes emerged: mental toughness, psychoemotional challenges, adverse environmental factors, and post-injury adjustments.

The first theme, mental toughness, encapsulated the athletes' strong willpower, discipline, and internal drive to overcome adversity and to push through pain despite injury. Participants consistently described how their mental toughness kept them committed to their sport, helped them mask vulnerability, and led them to create physical and mental strategies to cope with the physical and emotional pain they experienced. Rather than perceiving pain and injuries as setbacks, they come to see them as natural and expected aspects of rigorous training and competition. Through repeated engagement in physically demanding and high-risk situations, student-athletes can reinforce this mindset, integrating pain as an inherent part of their athletic journey (Everhart et. al., 2021; Flanigan et al., 2021). In this case, pain was not viewed as a warning sign but rather as something to endure in order to maintain their athletic identity and meet external expectations. This persistence, however, reinforced their tendency to tolerate pain, which in turn, exacerbated their fear of reinjury, which can lead to increased pain sensitivity and anxiety. Interestingly, this trait, typically regarded as protective, also appeared to fuel heightened anxiety. Because these athletes set such high standards for themselves and were determined to return to peak performance quickly, they became increasingly sensitive to any sign of physical discomfort or delay in healing. In effect, their mental toughness amplified their fear of prolonged injury and reinjury, which provides a meaningful explanation for the surprising positive association between SMT and PA observed in the quantitative results.

The second theme, psychoemotional challenges, captured the profound psychological and emotional distress that accompanied the physical pain of injury. Athletes reported experiencing psychological challenges such as fear of reinjury, fear of ending their athletic career, anxiety about pain and recovery, performance anxiety, and decreased self-esteem. As such, previous injuries produce enduring psychological impacts (Kvist & Silbernagel, 2022). Pain was not just a physical experience but one loaded with emotional weight. This emotional toll was particularly pronounced among those who viewed their self-worth through the lens of their athletic performance. The uncertainty of recovery timelines, including increased anxiety, lower self-esteem, and a feeling of isolation, led to increased psychological vulnerability. This distress leads to experiencing a range of emotions such as anxiety, frustration, disappointment, depression, and isolation (Brady-Lee, 2023). These emotional challenges created a fertile ground for pain anxiety to grow, especially among those who were otherwise perceived as "mentally tough."

The third theme, post-injury adjustments, referred to the coping mechanisms and behavioral shifts athletes adopted to navigate their recovery process. These adjustments ranged from modifying training routines and adapting movement strategies to gradually developing new perspectives on their limitations and strengths. While some athletes experienced empowerment and growth through these adjustments, gaining greater self-awareness and emotional maturity (Kvist & Silbernagel, 2022), others faced repeated setbacks that triggered cycles of discouragement and self-doubt, often influencing fear-avoidant behavior (Gatchel et al., 2016, as cited in Hart et al., 2024). This theme revealed that rehabilitation is not only a physical process but also a psychological journey that requires

flexibility, support, and acceptance. Importantly, these post-injury adaptations highlight that resilience is not a linear process and that recovery often involves regaining emotional and psychological equilibrium, in addition to physical readiness (Ohji et al., 2021).

The fourth theme, adverse environmental factors, highlighted the impact of external pressures and contextual stressors on shaping the athletes' injury experiences. This supports our quantitative finding of a weak correlation between sports mental toughness and pain anxiety, implying that external factors significantly influence how student-athletes cope with pain. Many participants shared that the expectations from coaches, teammates, school administrators, and even family members added another layer of stress during their recovery. This aligns with Breslin's (2022) findings that athletes have traditionally been expected to appear strong. Participants also reported that balancing academic responsibilities with athletic commitments was a persistent struggle, especially during periods of injury recovery. This aligns with the findings of Stambulova and colleagues (2020), who suggest that student-athletes' dual demands can lead to stress, burnout, and poor mental health. Some felt pressure to return to play prematurely to maintain their place on the team, while others struggled with the lack of access to quality rehabilitation facilities and psychological interventions. The environment surrounding the student-athlete played a crucial role in either reinforcing or undermining their ability to cope.

The convergence of our qualitative and quantitative results explains this paradox. The regression model indicated that SMT accounted for 9.3% of the variance in PA; however, the statistical findings were unable to explain the lived experiences of the athletes. The qualitative themes contextualized these results by illustrating how resilience, otherwise viewed as an adaptive construct, becomes maladaptive in high-stress settings. For example, the mental toughness theme, as a double-edged variable, showed that the same perseverance that motivated athletes to rehabilitate quickly also made them overly sensitive to pain and fearful of reinjury, explaining the positive relationship meaningfully. In the same vein, psychoemotional difficulties (e.g., anxiety, fear of losing a career, and lowered self-esteem) demonstrated how internal suffering increased pain anxiety even when mental toughness was high. Post-injury adaptations demonstrated that healing is not a straightforward process and frequently entailed relapses that amplified fear-avoidant behaviors. In contrast, negative environmental factors underscored the social and institutional pressures that reinforced fear. Both of these themes demystified the quantitative correlation between SMT and PA, not just as a statistical aberration, but also as an indicator of the lived complexity of rehabilitation.

Conclusions

The present study tested the correlation of Sports Mental Toughness (SMT) and Pain Anxiety (PA) in Filipino student-athletes with a significant injury. Contrary to the a priori expectation of an inverse relationship, the quantitative phase found a significant positive correlation, where higher SMT correlates with higher PA. Qualitative results framed this paradox by demonstrating how resilience and determination on the part of athletes to work through pain were frequently followed by increased fear of reinjury, psychoemotional distress, and external pressure. As a whole, these results illustrate the double-edged and multifaceted nature of SMT's contribution to rehabilitation from injury. While it promotes resilience, it can also intensify psychological strain if not tempered by suitable coping tools and an enabling atmosphere.

The research is theoretically significant in undermining the assumption of SMT as an across-the-board protective factor, revealing its outcomes to be context-dependent instead. The research has practical implications, with the lessons learned highlighting the need for comprehensive recovery programs that combine physical therapy with psychological counseling. Coaches, sports psychologists, and organizations are encouraged to provide mental health services, minimize pressure to perform, and create environments where athletes feel comfortable coming forward without fear of stigma. Interventions must emphasize adaptive coping strategies, emotional regulation, and realistic expectations to prevent SMT from becoming maladaptive.

Several limitations need to be addressed in future studies. The small sample and cross-sectional design limit generalizability and cause-and-effect inference, necessitating large, diverse, and longitudinal studies. A prospective investigation of other factors, such as personality, pre-existing injury history, quality of rehabilitation, sport category (team or individual), and contextual factors (e.g., quality of sleep, socioeconomic status, academic stress, and coach attitudes), is suggested. The use of multiple data sources, such as objective ones, and the investigation of athletes' post-injury coping and experience with anxiety disorders will give further insights. These gaps will be addressed in order to improve understanding of SMT and PA and to inform the development of evidence-based interventions that can enhance both resilience and psychological well-being among injured athletes.

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