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The Relationship between Anxiety, Mindfulness, and Mental Toughness among Collegiate Athletes

by

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Submitted to the Graduate Faculty as partial fulfillment of the requirements for the

Master of Arts Degree in Clinical Psychology

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An Abstract of

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One of the most prominent mental health concerns that negatively impacts collegiate athletes is anxiety. High levels of anxiety in athletes are associated with negative psychosocial well-being and performance outcomes in sports. Previous research supports that mindfulness and mental toughness (MT) separately contribute to decreased generalized anxiety and performance anxiety. However, research has not determined if MT can moderate the relationship between generalized anxiety and performance anxiety in student-athletes. This study examined MT as a moderator between mindfulness and generalized anxiety, and mindfulness and performance anxiety in a sample of student-athletes participating in the National Collegiate Athletic Association (NCAA) to determine how anxiety and these psychological characteristics interact. Further, we explored whether generalized anxiety and performance anxiety are associated with greater mindfulness and MT capacities. Self-report data were collected via the Qualtrics platform, and student-athletes completed the following measures of anxiety, mindfulness, and MT: 1) Comprehensive Inventory of Mindfulness Experiences (CHIME), 2) Mindfulness Inventory for Sport (MIS), 3) Mental Toughness Questionnaire 10-Item (MTQ-10), 4) Sports Mental Toughness Questionnaire (SMTQ), 5) Generalized Anxiety

Disorder 7-Item (GAD-7), and 6) Sport Anxiety Scale-2 (SAS-2). The findings supported the existing literature that mindfulness and MT are separately associated with reductions in both generalized anxiety and performance anxiety. The study also provided evidence that collegiate athletes with greater MT may have greater mindfulness capacities and vice versa. Moreover, MT may be a strong predictor of changes in both generalized anxiety and performance anxiety. In sum, these findings can be used to better understand protective factors for generalized anxiety and performance anxiety and increase the efficacy of programs aimed at reducing anxious symptoms among collegiate athletes.

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List of Abbreviations

CHIME.....Comprehensive Inventory of Mindfulness Experiences

GAD-7.....Generalized Anxiety Disorder 7-Item

MIS .....Mindfulness Inventory for Sport
MT.....Mental toughness
MTQ-10 .....Mental Toughness Questionnaire 10-Item

NCAA .....National Collegiate Athletic Association

SAS-2.....Sport Anxiety Scale-2
SMTQ .....Sports Mental Toughness Questionnaire

Chapter One

Literature Review

According to the NCAA, there are roughly 500,000 college athletes competing in 24 different sports across three divisions (National Collegiate Athletic Association, 2022a). While this number may seem large at first glance, intercollegiate student-athletes embody only about 4% of the full-time college student population in the United States (National Center for Education Statistics, 2022). This small yet selective population is often perceived to be entitled and overindulged by the public (Saffici & Pellegrino, 2012) and while student-athletes do reap the benefits of many institutional resources, they also face more demanding stressors than their non-athlete peers (Martens et al., 2006). Along with the typical collegiate experience of completing rigorous coursework, individuating from parents, and exploring one's identity (Lavelle & O'Ryan, 2001), student-athletes are responsible for balancing two very important jobs: being a student and being an athlete. Being a student requires attending classes, completing assignments and tests, and becoming involved in extracurricular activities, while being an athlete requires spending a substantial amount of time attending practices and training sessions, team meetings, travel, and competitions (Lopes Dos Santos et al., 2020). Further, data from the NCAA (2015) indicates that student-athletes spend over 40 hours per week on sport-related activities, resulting in greater than 80 total hours per week devoted to academic and athletic duties combined.

The physical demands associated with intercollegiate athletics, and the emotional fatigue that occurs from overtraining and elite competition, can become detrimental to student-athletes' overall well-being (Putukian, 2016). The broad range of stressors and

adversities unique to this population, and the stress associated with college life in general, may increase their risk of experiencing both physical and mental issues (Li et al., 2017). Research has indicated that the additional demands placed on student-athletes put them at a much greater risk for developing and/or exacerbating a variety of health problems such as depression, eating disorders, burnout, and anxiety (Putukian, 2016), which in turn, can lead to decreases in sport performance if left unaddressed (Lopes Dos Santos et al., 2020). More recently, there has been an increased emphasis placed on the mental health of collegiate athletes (Petrie et al., 2014; Li et al., 2019), igniting the movement of athletics departments to hire mental health professionals and establish well-being programs for their student-athletes (Moreland et al., 2018). In addition, researchers have been exploring protective factors associated with negative mental health and sport performance outcomes, such as mindfulness and mental toughness. These protective factors, also considered to be trainable psychological skills, have been found to contribute to mental well-being and improve sport performance in college student-athletes (Bird et al., 2021; Gerber et al., 2018; Gucciardi et al., 2017; Josefsson et al., 2017; Li et al., 2019).

Student-Athlete Mental Health

Collegiate athletes who view the demands of stressors from academics and sports as a positive challenge (i.e., an individual's self-confidence or belief in oneself to accomplish the task outweighs any anxiety or emotional worry that is felt) may potentially increase their learning capacity and competency on and off the field (Brown, 2014). However, when these demands are perceived as exceeding the student-athlete's

capacity, this stress can ultimately become detrimental to their mental and physical well-being (Ivarsson et al., 2017; Li et al., 2017).

In more recent years, there has been a movement to further examine and understand the prevalence of mental health-related issues within the collegiate athlete population. A National College Health Assessment administered both in 2008 and 2012 reported that about 31% of male and 48% of female NCAA student-athletes experienced symptoms of depression and anxiety each year the survey was issued (Moreland et al., 2018). Although it is not uncommon for college students to experience the symptoms mentioned above, the numbers are quite high for a population making up only 4% of the full-time college student population. In fact, consistent with depression, anxiety rates among student-athletes appear to be higher than what is reported by non-athlete college students (Auerbach et al., 2018).

Further, another survey administered by the NCAA in 2015 found that 30% of student-athletes felt extremely overwhelmed, and nearly 25% felt mentally exhausted. Following this report, psychosocial health problems were identified as the number one health and safety concern for student-athletes (NCAA, 2015). In addition, research has revealed that 19% of student-athletes have been diagnosed with a mental health condition (American College Health Association, 2016). This should come as no surprise, as recent research has revealed student-athletes are at risk for developing clinical or subclinical eating disorders (Clifford & Blyth, 2018), substance abuse issues (Mastroleo et al., 2019), sleep disturbances (Kroshus et al., 2019), and various other mental health-related problems (Moreland et al., 2018).

Student-Athlete Anxiety and Performance

One of the most prominent mental health concerns that negatively impacts collegiate athletes is anxiety. In general, anxiety is made up of cognitive (e.g., worrying thoughts and apprehensions) and somatic (e.g., degree of physical activation) components (Ford et al., 2017). Anxiety is considerably high among student-athletes, with nearly one-third of this population experiencing moderate to severe anxiety symptoms (Drew & Matthews, 2019). Research has suggested that student-athletes' anxiety stems from the pressure to succeed which can often be exacerbated by implicit (i.e., coaches, teammates, fans, family, etc.) and intrinsic (i.e., motivation, nutrition, etc.) factors (Breslin et al., 2018). As the anxiety and pressure build, it may manifest as performance anxiety, and ultimately, negatively impact their athletic performance (Clark et al., 2019).

Psychological well-being (i.e., anxiety), as well as performance anxiety, influences athletic performance. In a sport context, and in this case collegiate athletics, anxiety is often regarded as a response to a situation where an athlete's skills are being evaluated and is considered an unpleasant response associated with the stress of participating in sport (Ford et al., 2017). The anxiety experienced in a sport-based context gave rise to the construct of performance anxiety. Cheng and colleagues (2009) defined performance anxiety as "an unpleasant psychological state in reaction to perceived stress concerning the performance of a task under pressure". To date, much research has been devoted to understanding how anxiety impacts athletic performance. Several theoretical models (i.e., Drive Theory, Reversal Theory, Multi-dimensional Anxiety Theory, etc.) have been developed to explain sport-related anxiety and its relationship with performance (Ford et al., 2017). Despite inconsistent empirical results, researchers can agree upon the facts that 1) sport-related anxiety influences performance, 2) such effects

on performance can be either negative or positive depending on the individual and situation, and 3) the direction of such effects on performance are typically a result of the individual's cognitive, behavioral, and physiological responses to the potentially stressful sporting situation (Ford et al., 2017).

Several studies have implemented and applied these theoretical models. One study found that in both competition and training, athletes with lower levels of anxiety performed better than athletes with higher levels of anxiety (Castro-Sánchez et al., 2018). It is important to note that competitive anxiety is influenced by various individual factors. Research has highlighted that ego-orientation goals are positively associated with performance anxiety, while mastery or task orientation is negatively related to performance anxiety (Amit, 2016). Similarly, studies have found that higher performance anxiety is associated with ego-oriented motivation settings, while lower performance anxiety is associated with mastery (task)-oriented climates (Smith et al., 2006). In addition, Geukes and colleagues (2017) revealed that under high-stress situations, athletes with fears of negative evaluation demonstrated an increase in competition anxiety and an overall decrease in their athletic performance.

As such, it is well-known that participating in competitive sports has the potential for athletes to experience high levels of stress and anxiety. If left unaddressed, these high levels of generalized and sport-related anxiety can have spiraling effects on not only athletic performance but also mental well-being. Research has found that performance anxiety can 1) have a negative impact on performance during practice and competitions, 2) lead to increased risk of injury occurrence and recurrence, and 3) delay and obstruct injury rehabilitation and the return to sport process (Ford et al., 2017). However, several

psychosocial interventions are beneficial in managing anxiety in athletes. The two training interventions that have recently gained popularity in the field of sport psychology include mindfulness and mental toughness, both of which, separately, have proven to be protective factors against generalized and performance anxiety (Mehrsafar et al., 2019; Röthlin et al., 2016; Gucciardi & Jones, 2012; Kalinin et al., 2019).

Protective Factor 1: Mindfulness

Mindfulness has been described as "the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" (Kabat-Zinn, 2003). Bishop and colleagues (2004) conceptualized the construct as consisting of two components, the self-regulation of attention on one's "immediate experience" of present-moment events, along with an orientation toward this experience "that is characterized by curiosity, openness, and acceptance". In addition, mindfulness can be conceptualized as a dispositional trait, also referred to as dispositional mindfulness, and is considered one of the personality traits (Medvedev et al., 2017) that can be enhanced by athletes through regular practice (Nien et al., 2020; Röthlin et al., 2020).

Mindfulness has rapidly transitioned from an ancient Buddhist practice to a widely used intervention in sport (Gross, 2020). For more than 30 years, researchers have been exploring the application of mindfulness within athlete populations (Nien et al., 2020). One driving factor behind its popularity may be that, consistently across literature, mindfulness has been shown to reduce stress and anxiety and contribute to improved performance among athletes. Research has revealed that mindfulness practice reduces symptoms of anxiety and increases overall well-being in athletes (Gustafsson et al; 2015;

Medvedev et al., 2017; Röthlin et al., 2020). Several studies have also demonstrated that better dispositional mindfulness leads to lower perceived stress (Gustafsson et al., 2015; Lee, 2020) and competitive anxiety in athlete populations (Mehrsafar et al., 2019; Röthlin et al., 2016). In addition, better dispositional mindfulness in sport has been found to be related to positive outcomes such as mental toughness (Jones & Parker, 2018; Walker, 2016).

Further, a breadth of literature suggests that mindfulness can be enhanced through regular training. Sport-based mindfulness trainings commonly focus on the ability to regulate present-moment attention during performance, cultivate awareness of the body, emotions, and thoughts, and finally, retain acceptance of such experiences without judgment (Zhang et al., 2017). Evers et al. (2020) observed that mindfulness and mental health improved significantly among collegiate athletes following a 4-week mindfulness-based intervention (MBI) with collegiate athletes. The application of additional mindfulness programs for student-athletes has also been associated with decreased perceived stress and anxiety and increased athletic coping skills (Glass et al., 2019; Vidic et al., 2017). All in all, literature has pointed toward mindfulness as a protective factor for anxiety and overall mental well-being among elite and collegiate athletes, both as a trait and as a regular practice.

Protective Factor 2: Mental Toughness

Mental toughness (MT) is one of the most important psychological constructs underlying sport performance. Clough et al. (2002) conceptualized MT from both the athlete and established psychological theory, as a trait-like construct that shares similarities with hardiness. Hardiness is characterized by three main components: *control*

of various life situations; *commitment,* being when one tends to involve themselves in the action they're doing; and *challenge*, the extent to which individuals see challenges as opportunities (Kobassa, 1979). Based on their research, Clough et al. (2002) added a fourth factor to this model: *confidence*. Consistent with existing literature on mental toughness, this addition suggests that self-confidence and the belief in one's ability is the most important characteristic of MT in a sporting context (Gucciardi et al., 2009; Jones et al., 2007). As such, we can define MT as "a personal capacity to produce consistently high levels of subjective (e.g., personal goals) or objective performance (e.g., race time) despite everyday challenges and stressors as well as significant adversities" (Gucciardi et al., 2014).

Several qualitative studies have suggested that more mentally tough athletes cope more effectively than less mentally tough athletes (Jones et al., 2007). The reasoning behind this may be that athletes with higher levels of MT are less inclined to interpret ambiguous information or high-pressure competitive situations as threatening and to respond with dysfunctional thoughts and maladaptive behavior (Hossein et al., 2016). A recent narrative review suggested that MT could facilitate improved mental health in sport by enabling athletes to overcome stressors and adversities and therefore promote increased well-being (Gucciardi et al., 2017). Related research has also shown that MT in athletes is positively associated with objective performance and positive symptoms of mental health but is inversely related with negative symptoms of mental health such as anxiety (Gucciardi et al., 2017).

Several studies have indicated that athletes who report higher MT are more likely to experience lower anxiety, as they are better able to regulate negative and potentially

debilitating emotions such as generalized and performance-related anxiety (Jones et al., 2007). Gucciardi and Jones (2012) showed small to moderate negative correlations between MT and stress, anxiety, and depression in a sample of cricketers. In addition, Kalinin and colleagues (2019) found that within their sample of elite handball players, the more mentally tough the athletes were, the less anxious they felt. Although athletes with MT also experience anxiety, stress, and pressure during competition (Jones et al., 2007), they typically approach them as a challenge, thus allowing them to cope better than those with lower levels of MT (Gordon et al., 2017; Nicholls et al., 2009). Although MT is a fairly new construct, the literature confirms an association between MT, anxiety, and performance, in that MT may act as a protective factor for generalized and performance anxiety in athletes.

Statement of the Problem and Proposed Study

Over the past two decades, the psychological aspects of athlete health and performance have gained increased attention (Gucciardi et al., 2017). Collegiate athletes are faced with a significant number of challenges while navigating the balancing act of maintaining peak performance in academics and sport (Lopes Dos Santos et al., 2020). The broad range of stressors and adversities unique to this population, and the normal stress associated with college life in general, may increase a student-athlete's risk of experiencing both physical (e.g., injury) and mental issues (e.g., anxiety, depression, etc.) (Li et al., 2017; Lopes Dos Santos et al., 2020). One of the more prominent concerns that student-athletes face is anxiety, with nearly one-third experiencing moderate to severe anxiety symptoms (Drew & Matthews, 2019).

With growing awareness regarding the critical importance of supporting athletes' mental health (Vella et al., 2021), it is important to develop evidence-based strategies for cultivating well-being and reducing anxiety. While experiencing anxiety can be beneficial in certain situations, there is considerable evidence that increased anxiety is associated with negative psychosocial well-being and performance outcomes in sport (Mellalieu et al., 2009; Tamminen et al., 2021). To date, much research has been devoted to understanding how anxiety can affect sport performance, both in practice and in competitive settings. Previous literature supports that increased mindfulness (Mehrsafar et al., 2019; Röthlin et al., 2016) and MT (Gucciardi & Jones, 2012; Kalinin et al., 2019) separately contribute to decreased generalized anxiety and performance anxiety in athletes. However, while some literature ties generalized anxiety and performance anxiety with mindfulness and MT, these variables have not been explored concurrently within a collegiate athlete population. Additionally, research has not determined whether MT serves as a moderator of the relationship between mindfulness and generalized anxiety, and the relationship between mindfulness and performance anxiety in student-athletes.

The proposed study will investigate the relationship between mindfulness, generalized anxiety, performance anxiety, and MT within collegiate athletes to explore whether generalized anxiety and performance anxiety can be reduced through greater mindfulness and MT capacities. This study will also examine MT as a moderator between mindfulness and generalized and performance anxiety in student-athletes to determine how anxiety and these psychological characteristics interact.

Hypotheses

Based on the above literature review, the present study will examine the direction and magnitude of relationships between the constructs of mindfulness, generalized anxiety, performance anxiety, and mental toughness in a population of collegiate student-athletes to test the following hypotheses:

1. It is hypothesized that mindfulness will correlate significantly and negatively with generalized anxiety.
2. It is hypothesized that mindfulness will correlate significantly and negatively with performance anxiety.
3. It is hypothesized that MT will correlate significantly and negatively with generalized anxiety.
4. It is hypothesized that MT will correlate significantly and negatively with performance anxiety.
5. It is hypothesized that the associations between mindfulness and generalized anxiety will be moderated by MT.
6. It is hypothesized that the associations between mindfulness and performance anxiety will be moderated by MT.

Chapter Two

Method

Recruitment

Prior to participant recruitment, an a priori power analysis was conducted using G*Power version 3.1.9.7 (Faul et al., 2007) to determine the minimum sample size required to test the study hypotheses. Results indicated that the minimum required sample size to achieve 80% power for detecting a small to medium effect (.30), at a significance criterion of $\alpha = .05$, was $N = 89$ to perform moderation analyses using PROCESS macro (Hayes, 2013) for SPSS. Thus, accounting for missing or invalid data, a minimum sample size of 100 student-athletes were needed for this study.

Recruitment consisted of a variety of strategies implemented across the course of six months. Participant recruitment was first conducted at the University of Toledo by posting flyers on the University of Toledo campus, particularly around the athletic facilities, as well as distributing electronic flyers and survey links directly to student-athletes via email and SMS text message. Approximately one month later, we expanded our subject pool to encompass institutions participating in the Mid-American Conference (MAC) to solicit further recruitment through the same methods listed above. Additionally, we individually contacted athletic directors via email from each institution in the MAC to aid in study distribution. After three months had passed with little increase in our sample, we expanded our subject pool once again to encompass institutions participating in the National Collegiate Athletic Association (NCAA). To reach our desired audience, we distributed the study survey link and electronic flyer via LinkedIn to publicly available student-athlete profiles and through public and private online forums.

Participants

Participants eligible for our study were at least 18 years old and currently participating in at least one varsity sport in the National Collegiate Athletics Association (NCAA). Of the 116 participants who provided informed consent to participate in the survey, 10 were excluded because they provided consent to participate but did not begin the survey, 37 were excluded because they provided incomplete responses, and 7 were excluded due to their alumni standing as they were not current collegiate athletes. As such, the final sample consisted of 62 student-athletes currently competing at any institution in the United States comprised in the NCAA. Participants were aged between 18 and 24 years (M_{age} = 20.19, *SD* = 4.24). At the time of the survey, the mean number of years spent participating in their respective sports was 12.07 (*SD* = 11.86). In addition, approximately 65% of participants reported previously seeking support from a licensed mental health professional, ~30% reported currently receiving support from a licensed mental health professional, and ~5% preferred not to answer. Further demographic characteristics of our sample are listed below in Table 1. There was no missing data in the final sample.

Table 1

Demographic Characteristics of the Final Sample (N=62)

	N	%
Sex		
Male	10	16.1
Female	52	83.9
Gender		
Man	10	16.1

	N	%
Woman	52	83.9
Race/Ethnicity		
White	53	85.5
Black or African American	4	6.5
Asian	3	4.8
Hispanic or Latinx	1	1.6
Native Hawaiian or Other Pacific Islander	1	1.6
Year in College		
Freshman	12	19.4
Sophomore	17	27.4
Junior	15	24.2
Senior	10	16.1
Fifth/Sixth Year	4	6.4
Graduate Student	4	6.4
Sport		
Men's Baseball	1	1.6
Men's Cross Country	1	1.6
Men's Football	4	6.5
Men's Golf	2	3.2
Men's Ice Hockey	1	1.6
Men's Tennis	4	6.5
Men's Track and Field	3	4.8
Men's Wrestling	2	3.2
Women's Basketball	9	14.5
Women's Cross Country	3	4.8
Women's Field Hockey	4	6.5
Women's Golf	3	4.8
Women's Gymnastics	3	4.8
Women's Lacrosse	1	1.6

	N	%
Women's Rowing	1	1.6
Women's Soccer	2	3.2
Women's Softball	4	6.5
Women's Swimming and Diving	6	9.7
Women's Tennis	4	6.5
Women's Track and Field	2	3.2
Women's Water Polo	2	3.2

Procedure

Online survey self-report data was collected using the Qualtrics platform. Prior to completing the survey, participants were informed of the aims of the study, their rights in participating, and provided informed consent prior to voluntary participation. Next, participants answered demographic questions (e.g., age, academic year, major, sex, gender, ethnicity), and items related to their sport participation. Participants then completed six self-report measures: 1) Comprehensive Inventory of Mindfulness Experiences (CHIME), 2) Mindfulness Inventory for Sport (MIS), 3) Mental Toughness Questionnaire 10-Item (MTQ-10), 4) Sports Mental Toughness Questionnaire (SMTQ), 5) Generalized Anxiety Disorder 7-Item (GAD-7), and 6) Sport Anxiety Scale (SAS-2) (see Table 2 below for internal consistency of these measures). Completion of the Qualtrics survey took approximately 15 minutes. The study was approved by the University of Toledo's Institutional Review Board (Study #301635).

Measures

Comprehensive Inventory of Mindfulness Experiences (CHIME; Bergomi et al., 2013). The CHIME is a 37-item measure assessing an individual's degree of

mindfulness within daily tasks. The measure is made up of eight subscales of mindfulness: 1) awareness of internal experiences, 2) awareness of external experiences, 3) acting with awareness, 4) accepting and nonjudgmental attitude, 5) nonreactive decentering, 6) openness to experiences, 7) awareness of thoughts' relativity, and 8) insightful understanding. Sample items include, "When I talk to other people, I notice what feelings I am experiencing" and "I am hard on myself when I make a mistake." Items are scored on a 6-point Likert scale, ranging from 1 (Fully applies) to 6 (Does not apply at all), with higher scores indicating greater mindfulness experiences. The CHIME has been validated to aid in measuring mindfulness in both a community sample and a sample of MBSR course participants (Bergomi et al., 2019). Construct validity has also been supported by strong correlations of total CHIME scores with total scores on the Five Facet Mindfulness Questionnaire (FFMQ) which assess similar concepts (r = .85). Both internal consistency (α = .70-.90) and test-retest reliability (α = .70-.90) have proven to be satisfactory (Medvedev et al., 2018). More recently, several minor modifications to the English CHIME were made to fit the Rasch model ($\chi 2$ (45) = 31.99, p = 0.93), which resulted in unidimensionality, invariance across personal factors, and a high reliability (PSI = 0.92) (Wilkinson et al., 2023).

Mindfulness Inventory for Sport (MIS; Thienot et al., 2014). The MIS is a 15-item instrument intended to measure three components of athletic mindfulness: 1) present moment awareness, 2) non-judgementality, and 3) the ability to refocus. Sample items include, "I am able to notice the intensity of nervousness in my body" (Awareness), "When I become aware that I am really upset because I am losing, I criticize myself for reacting this way" (Non-judgmental; reverse-scoring), and "When I become aware that I

am not focusing on my own performance, I am able to quickly refocus my attention on things that help me to perform well" (Refocusing). The items are rated on a 6-point Likert scale, ranging from 1 (Not at all like me) to 6 (Very much like me). The MIS was initially validated with undergraduate students and elite athletes (Thienot et al., 2014). Substantial correlations between the MIS subscales and five other measures (mindful trait in daily life, $\alpha = .87$; flow disposition, $\alpha = .74$; worry and concentration disruption, $\alpha = .89$; perfectionism, $\alpha = .76$; and rumination, $\alpha = .78$) were found in terms of evidence for the external aspect of construct validity (Thienot et al., 2014). Psychometric properties of the MIS have demonstrated good internal consistency ($\alpha = .86$) and test-retest reliability ($\alpha = .89$) (Baykose & Celik, 2021).

Mental Toughness Questionnaire 10-Item (MTQ-10; Papageorgiou et al., 2018). The MTQ-10 is an abridged 10-item version of the MTQ-48 (Clough et al., 2002) that comprises the highest line-adding items from Challenge, Commitment, Control, and Confidence from the MTQ-48. Within the MTQ-10, items are presented as statements (e.g., "I generally cope well with any problems that occur" and "Even when under considerable pressure, I usually remain calm"). Respondents indicate their level of agreement on a 5-point Likert scale, ranging from 1 (Strongly disagree) to 5 (Strongly agree). The summation of items produces an overall score, with higher scores indicating greater levels of mental toughness. The MTQ-10 has demonstrated good psychometric integrity (Dagnall et al., 2019; Papageorgiou et al., 2018). Tests of concurrent validity reveal that MTQ-10 is a strong predictor of well-being (life satisfaction) ($\beta = 0.688$, $p < 0.001$.) (Dagnall et al., 2019). Papageorgiou et al. (2018) reported adequate composite

reliability and internal consistency (α = 0.75), as well as acceptable test-retest reliability (α = 0.74).

Sports Mental Toughness Questionnaire (SMTQ; Sheard et al., 2009). The SMTQ is a 14-item instrument used to ascertain athletes' mental toughness levels. It is composed of three subscales: 1) Confidence (athletes' belief in their own abilities to achieve goals, 6 items), 2) Constancy (determination, individual responsibility, ability to concentrate, 4 items), and 3) Control (one is personally influential and can bring about desired outcomes with reference to controlling emotions, 4 items) (Sheard, 2009). Out of the 14 items on the SMTQ, there are 6 items in the Confidence subscale, 4 items in the Constancy subscale, and 4 items in the Control subscale. The items are rated on a 4-point Likert scale, ranging from 1 (Not at all true) to 4 (Very true). Sample items include, "I interpret threats as positive opportunities" (Confidence), "I get distracted easily and lose my concentration" (Constancy), and "I am overcome by self-doubt" (Control). The total SMTQ score is obtained by summing the three subscale scores, with higher scores indicating a higher degree of sports mental toughness. The SMTQ possesses satisfactory psychometric properties with adequate reliability, divergent validity, and discriminative power (Sheard et al., 2009). Sheard et al. (2009) reported acceptable internal consistency for the three subscales (Confidence, α = .80; Constancy, α = .74; Control, α = .71).

Generalized Anxiety Disorder 7-Item (GAD-7; Spitzer et al., 2006). The GAD-7 is a 7-item instrument that is used to measure or assess the severity of generalized anxiety disorder (GAD). Participants are asked to rate the severity of their symptoms over the past two weeks on a 4-point Likert scale, ranging from 0 (Not at all) to 3 (Nearly every day). Sample items include, "Feeling nervous, anxious, or on edge" and "Trouble

relaxing". Scores range from 0 to 21, with scores of 8 or higher indicating more severe GAD symptoms and possible clinical anxiety conditions (Spitzer et al., 2006). Research suggests that the GAD-7 is a valid screening tool for generalized anxiety disorder in a primary care setting and for assessing its severity in clinical practice and research (Spitzer et al., 2006). Evidence supports high internal consistency ($\alpha = 0.89$) and validity of the GAD-7 in the general population (Löwe et al., 2008).

Sport Anxiety Scale-2 (SAS-2; Smith et al., 2006). The SAS-2 is a 15-item instrument that assesses the competitive trait anxiety, or sport-performance anxiety, experienced by athletes before or during competition. The measure includes the three subscales of 1) Somatic Anxiety, 2) Worry, and 3) Concentration Disruption, each consisting of 5 items. The items are rated on a 4-point Likert scale, ranging from 1 (Not at all) to 4 (Very much). Sample items include, "My body feels tense" (Somatic Anxiety), "I worry that I will not play my best" (Worry), and "It is hard to concentrate on the game" (Concentration Disruption). A composite performance-anxiety score is obtained by summing the three subscale scores, with higher scores indicating greater sport-performance anxiety. Smith et al. (2006) reported internal consistency (Cronbach's alpha) coefficients exceeding .80 for all subscales and .91 for the total score. In their college sample, reliability estimates for the three subscales were excellent (Worry, $\alpha = .91$; Concentration Disruption, $\alpha = .84$; Somatic Anxiety, $\alpha = .89$) (Smith et al., 2006). Test-retest reliability indicates acceptable measurement stability (Total, $\alpha = .87$; Worry, $\alpha = .90$; Concentration Disruption, $\alpha = .85$; Somatic Anxiety, $\alpha = .76$) (Smith et al., 2006).

Table 2

Internal Consistency of Study Measures

Measure	# of items	Cronbach's α
CHIME	37	.85
MIS	15	.67
MTQ-10	10	.83
SMTQ	14	.79
GAD-7	7	.89
SAS-2	15	.93

Note. CHIME = Comprehensive Inventory of Mindfulness Experiences, MIS = Mindfulness in Sport, MTQ-10 = Mental Toughness Questionnaire 10-Item, SMTQ = Sports Mental Toughness Questionnaire, GAD-7 = Generalized Anxiety Disorder 7-Item, SAS-2= Sport Anxiety Scale-2.

Chapter Three

Results

Preliminary analyses were conducted to screen for outliers and missing values. Prior to testing the proposed hypotheses and investigating the research questions, descriptive statistics were run to examine the demographic information collected (see Table 2 above). To test our first four hypotheses, we ran bivariate correlations (see Table 3 below). We used Cohen's (1988) conventions to interpret effect size, where a correlation coefficient of .10 represents a weak or small association, a correlation coefficient of .30 is considered a moderate correlation, and a correlation coefficient of .50 or larger represents a strong or large correlation. Our fifth and sixth hypotheses were examined using PROCESS macro (Hayes, 2013) for SPSS. Finally, we ran additional exploratory analyses to investigate our data beyond our initial hypotheses.

Table 3

Correlations

	CHIME	**MIS**	**MTQ-10**	**SMTQ**	**GAD-7**	**SAS-2**
CHIME	-	.456**	.750**	.488**	-.598**	-.408**
MIS	.456**	-	.441**	.470**	-.418**	-.481**
MTQ-10	.750**	.441**	-	.717**	-.683**	-.516**
SMTQ	.488**	.470**	.717**	-	-.539**	-.641**
GAD-7	-.598**	-.418**	-.683**	-.539**	-	.567**
SAS-2	-.408**	-.481**	-.516**	-.641**	.567**	-
Mean	127.11	62.24	32.03	39.32	17.66	34.90
Std. Deviation	16.99	8.46	6.71	5.65	5.94	10.67

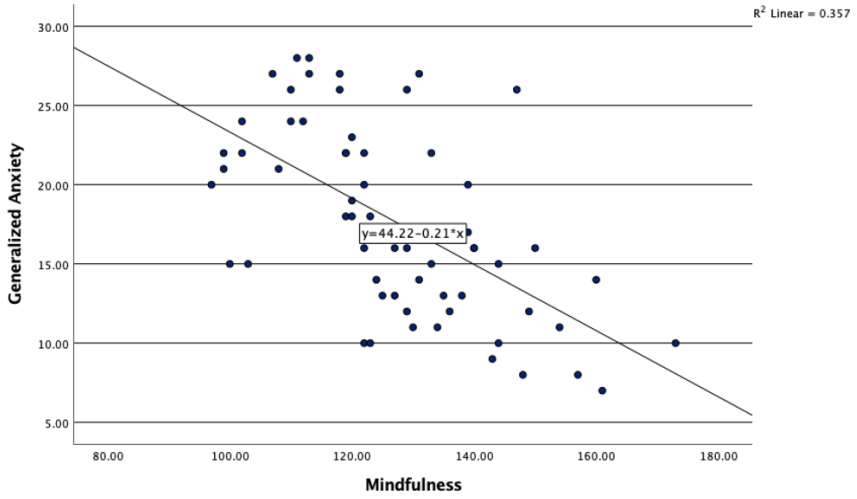
Note. ** = Correlation is significant at the 0.01 level (2-tailed). CHIME = Comprehensive Inventory of Mindfulness Experiences, MIS = Mindfulness in Sport, MTQ-10 = Mental Toughness Questionnaire 10-Item, SMTQ = Sports Mental Toughness Questionnaire, GAD-7 = Generalized Anxiety Disorder 7-Item, SAS-2= Sport Anxiety Scale-2.

Hypothesis 1

To assess for the direction and strength of the relationship present between mindfulness and generalized anxiety, bivariate correlations were conducted for the *CHIME* and *GAD-7* total scores. Based on these results, our hypothesis was supported. There was a strong negative correlation between mindfulness and generalized anxiety (r (60) = -.598, $p < .001$) (see Figure 1).

Figure 1

Correlation Between Mindfulness and Generalized Anxiety

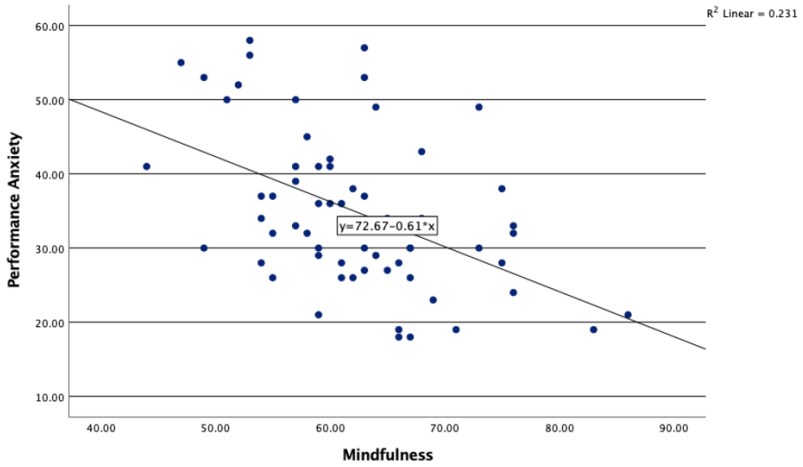


Hypothesis 2

Assessing for the direction and strength of the relationship present between mindfulness and performance anxiety, bivariate correlations were conducted for the *MIS* and *SAS-2* total scores. These results supported our hypothesis, in that we found a moderate negative correlation between mindfulness and performance anxiety (r (60) = -.481, $p < .001$) (see Figure 2).

Figure 2

Correlation Between Mindfulness and Performance Anxiety

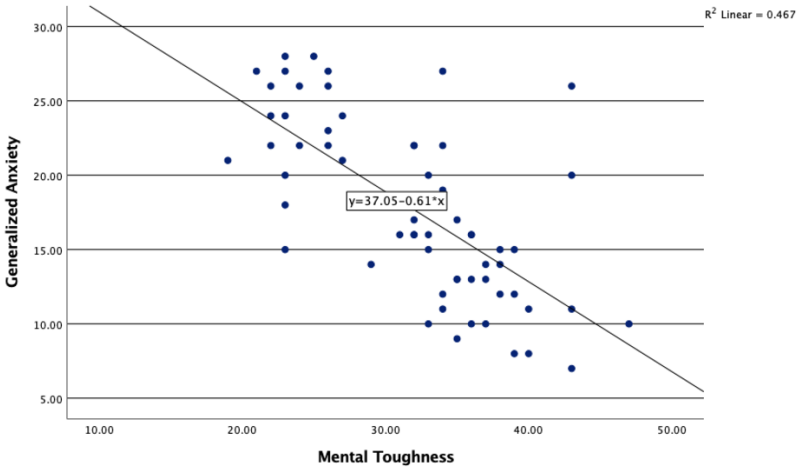


Hypothesis 3

To assess for the direction and strength of the relationship present between MT and generalized anxiety, bivariate correlations were conducted for the *MTQ-10* and *GAD-7* total scores. Based on these results, our hypothesis was supported. There was a strong negative correlation between MT and generalized anxiety (r (60) = -.683, $p < .001$) (see Figure 3).

Figure 3

Correlation Between MT and Generalized Anxiety

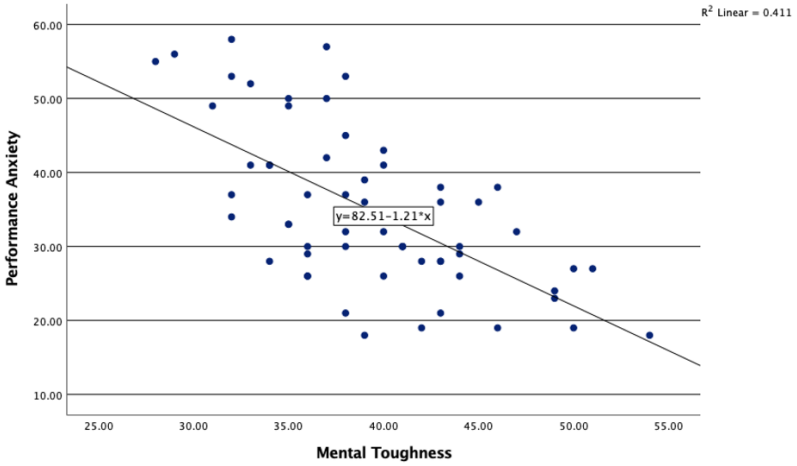


Hypothesis 4

In order to assess for the direction and strength of the relationship between MT and performance anxiety, bivariate correlations were conducted for the *SMTQ* and *SAS-2* total scores. These results supported our hypothesis, in that we found a strong negative correlation between MT and performance anxiety (r (60) = -.641, p < .001) (see Figure 4).

Figure 4

Correlation Between MT and Performance Anxiety



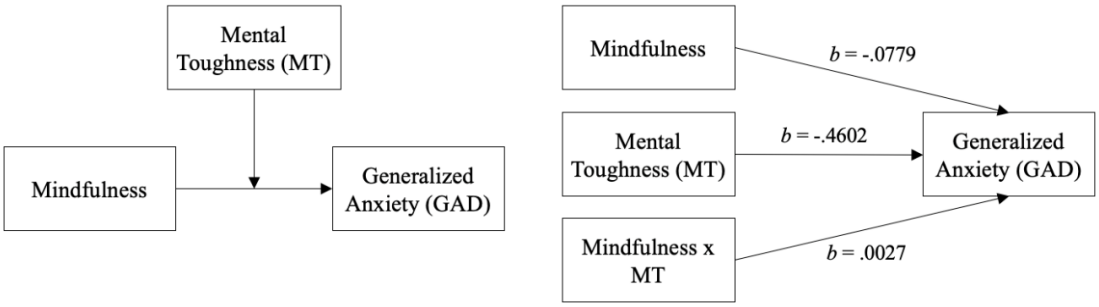
Hypothesis 5

To examine whether MT (*MTQ-10*) moderated the relationship between mindfulness (*CHIME*) and generalized anxiety (*GAD-7*), moderation analyses were conducted using PROCESS macro (Hayes, 2013) for SPSS. Our overall model using MT and mindfulness to predict generalized anxiety was significant, R^2 = .486, F (3, 58) = 18.31, p <.0001. However, the interaction between MT and mindfulness was not statistically significant (R^2-change =.0028, F (1, 58) = .3217, p = .5728), and only MT was a significant predictor of generalized anxiety, b = -.4602, t (58) = -3.566, p = .0007 (see Figure 5).

Further, we conducted a bootstrapping procedure, generating 1000 resamples from our relatively modest-sized sample to assess whether the observed effect would attain statistical significance within a larger, synthetically generated sample size. However, the results of the bootstrapped analysis indicated that the moderation effect did not attain statistical significance (*b* = .0027, BootLLCI = -.0085, BootULCI = .0137). As such, these results do not support our initial hypothesis.

Figure 5

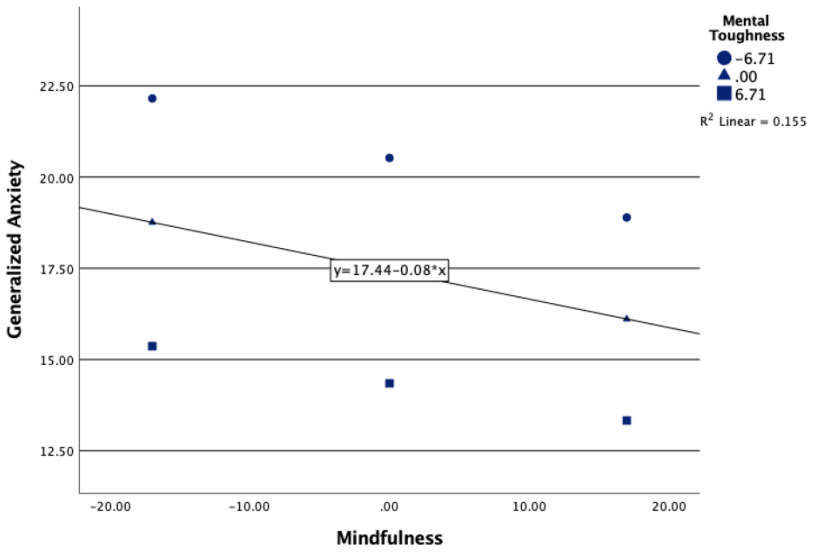
Moderation Model for Hypothesis 5



Note. *b* = regression coefficient.

Figure 6

Mindfulness and Generalized Anxiety by MT



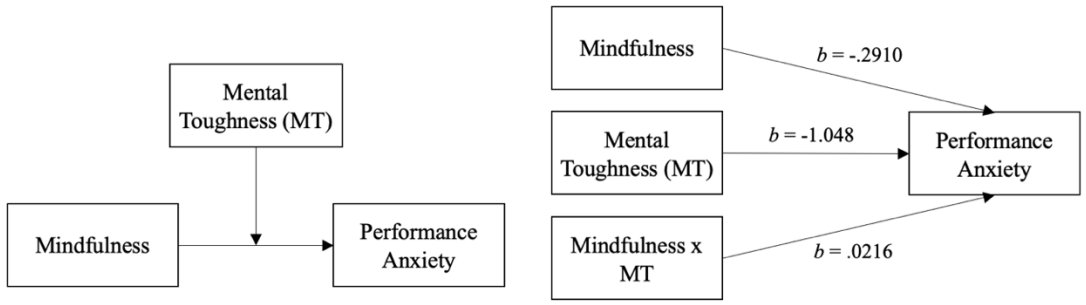
Hypothesis 6

To examine whether MT (S*MTQ*) moderates the relationship between mindfulness (*MIS*) and performance anxiety (*SAS-2*), moderation analyses were conducted using PROCESS macro (Hayes, 2013) for SPSS. Our overall model using MT and mindfulness to predict performance anxiety was significant, $R^2 = .462$, F (3, 58) = 16.60, $p < .0001$. However, the interaction between MT and mindfulness was not statistically significant (R^2-change = .0099, F (1, 58) = 1.071, $p = .3050$), and only MT was a significant predictor of performance anxiety, $b = -1.048$, t (58) = - 4.989, $p <$ .0001.

Once again, we conducted a bootstrapping procedure, generating 1000 resamples from our relatively modest-sized sample to assess whether the observed effect would attain statistical significance within a larger, synthetically generated sample size. Our results indicated that the moderation effect did not attain statistical significance (b = .0216, BootLLCI = -.0129, BootULCI = .0610). Therefore, both our non-bootstrapped and bootstrapped sample do not support our initial hypothesis.

Figure 7

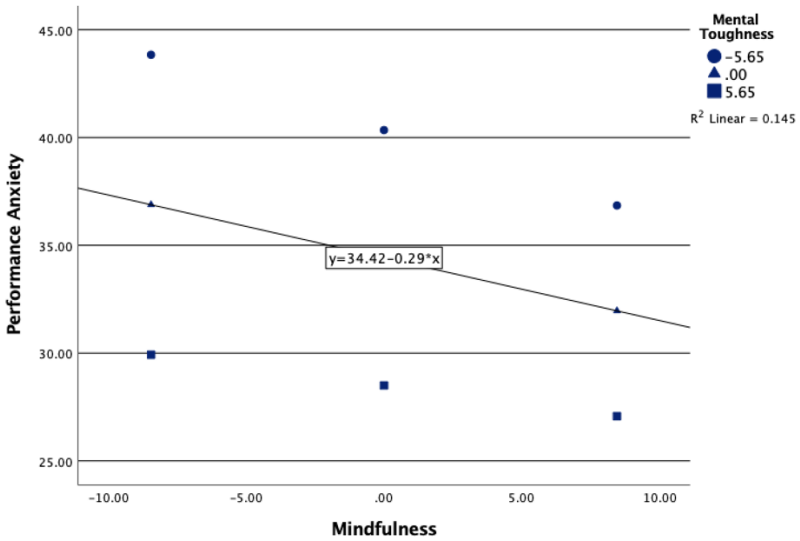
Moderation Model for Hypothesis 6



Note. b = regression coefficient.

Figure 8

Mindfulness and Performance Anxiety by MT



Additional Exploratory Analyses

Cocor (Diedenhofen & Musch, 2015) was used to conduct statistical comparisons between correlations. We examined the difference in the magnitudes of the bivariate correlations between the measures of mindfulness and MT with the measures of general anxiety and performance anxiety to determine whether a significant difference in the magnitude of these correlations was present; however, results indicated that there were no significant differences in magnitudes for any of the correlations between the mindfulness and MT measures with the general or performance anxiety measures.

In addition to our initial hypotheses testing, bivariate correlations were conducted to examine: 1) the association between mindfulness (*CHIME*) and MT (*MTQ-10*) in general, 2) the association between mindfulness (*MIS*) and MT (*SMTQ*) in the context of sport, and 3) the association between generalized anxiety (*GAD-7*) and performance anxiety (*SAS-2*). We found a strong positive correlation between mindfulness and MT in general (r (60) = .750, p < .001) and a moderate positive correlation between mindfulness

and MT in the context of sport, (r (60) = .470, p < .001). We also found a significant difference in the magnitude between these two correlations (z = 2.637, p = 0.008; 95% CI: 0.1188, 0.8070), such that the magnitude of the correlation between mindfulness and MT in general was significantly greater than the magnitude of the correlations between mindfulness and MT in the context of sport. This may suggest that the relationship between mindfulness and MT is not consistent across all situations, and that factors specific to sports, such as performance pressures, may influence the strength of this relationship differently than factors in everyday life. Further, a moderate positive correlation between generalized anxiety and performance anxiety, (r (60) = .567, p < .001) was present.

Chapter Four

Summary and Discussion

Purpose of Study

The purpose of this study was to examine the relationship between mindfulness, generalized anxiety, performance anxiety, and mental toughness (MT) within a collegiate athlete population. Previous research has determined that mindfulness (Mehrsafar et al., 2019; Röthlin et al., 2016) and MT (Gucciardi & Jones, 2012; Kalinin et al., 2019) separately contribute to decreased generalized anxiety and performance anxiety in athletes. However, previous research has not examined the effects of mindfulness and MT on collegiate athletes' generalized anxiety and performance anxiety concurrently. Additionally, research has not determined whether MT may act as a moderator of the relationship between mindfulness and generalized anxiety, nor has it determined whether MT may moderate the relationship between mindfulness and performance anxiety in collegiate athletes. Thus, the gaps in the literature led to current study which provided information on the relationship between mindfulness, MT, generalized anxiety, and performance anxiety. Our results support the existing literature that mindfulness and MT separately contribute to reductions in both generalized anxiety and performance anxiety. It also appears that collegiate athletes with greater MT may have greater mindfulness capacities and vice versa. While MT did not significantly moderate the relationship between mindfulness and generalized anxiety and mindfulness and performance anxiety, MT may be a strong predictor of changes in both generalized anxiety and performance anxiety. The specific findings, implications, limitations, and future directions of the study will be further discussed.

Aims and Implications

The current study had multiple aims. The first hypothesis was that mindfulness would be negatively associated with generalized anxiety in our sample of collegiate athletes. This was hypothesized because several studies have found that better dispositional mindfulness leads to lower perceived stress (Gustafsson et al., 2015; Lee, 2020) and that mindfulness practice reduces symptoms of anxiety in athletes (Gustafsson et al; 2015; Medvedev et al., 2017; Röthlin et al., 2020). In accordance with our first hypothesis, it was observed that mindfulness was negatively and moderately correlated with symptoms of generalized anxiety. This finding supported previous research, and further contributed to the replicability of mindfulness as a construct that is associated with symptoms of generalized anxiety in collegiate athletes. This is important because fostering mindfulness could potentially serve as a valuable strategy for reducing generalized anxiety symptoms within this specific population, thus promoting their emotional well-being.

The second hypothesis was that mindfulness would be negatively associated with performance anxiety in collegiate athletes. Research has demonstrated that higher trait mindfulness is associated with reduced performance anxiety, higher self-efficacy and sport confidence, and subjectively better ability to perform (Mehrsafar et al., 2019; Röthlin et al., 2016) in athlete populations. Assessing for our second hypothesis, we found that mindfulness was negatively and moderately correlated with performance anxiety. This finding not only supported previous research, but it also indicates that mindfulness may serve as a valuable coping strategy for collegiate athletes in high-stress

performance situations, which in turn, may lead to improved performance outcomes due to their lower levels of performance anxiety.

Our third hypothesis was that MT would be negatively associated with generalized anxiety in collegiate athletes. Accounting for our third hypothesis, it was observed that MT was negatively and strongly correlated with symptoms of generalized anxiety. This finding supported previous related research has shown that MT in athletes is positively associated with positive symptoms of mental health and is inversely related with negative symptoms of mental health such as anxiety (Gucciardi et al., 2017). Our finding supported this work and contributed to the replicability of MT as a construct that is strongly associated with lower levels of generalized anxiety symptoms. This suggests that collegiate athletes with higher levels of MT may be better equipped to manage anxiety and stress, potentially leading to positive mental health outcomes.

For our fourth hypothesis, we hypothesized that MT would be negatively associated with performance anxiety in collegiate athletes. It was observed that mindfulness was negatively and strongly correlated with symptoms of performance anxiety. This finding supports previous work that that athletes who report higher MT are more likely to experience lower performance-related anxiety (Jones et al., 2007). Not only does this contribute to the replicability of MT as a construct that is strongly associated with lower levels of performance anxiety symptoms, but it further suggests that cultivating MT can potentially lead to improved performance in collegiate athletes.

Regarding our fifth hypothesis, it was hypothesized that the relationship between mindfulness and generalized anxiety will be moderated by MT. While research has not yet explored this specific relationship between the constructs within a collegiate athlete

population, we sought to determine whether MT may act as a moderating variable. While our overall model was significant, the interaction between MT and mindfulness was not. As such, MT did not moderate the relationship between mindfulness and generalized anxiety, suggesting that MT did not change or alter how mindfulness was related to generalized anxiety in the context of the study. We also found that MT significantly predicted generalized anxiety, which indicates that MT may be a reliable predictor of the levels of generalized anxiety observed in collegiate athletes. This is important because it can provide a more comprehensive approach to athlete support and inform mental skills training or counseling to build resilience and reduce generalized anxiety symptoms.

The sixth and final hypothesis was that relationship between mindfulness and performance anxiety will be moderated by MT. Research has also yet to explore these constructs within this relationship, so we sought to determine whether MT may act as a moderating variable. We found that our overall model was significant, however, the interaction between MT and mindfulness was not. Thus, MT did not moderate the relationship between mindfulness and performance anxiety, suggesting that MT did not change or alter how mindfulness was related to performance anxiety in our study. Additionally, we found that only MT was a significant predictor of performance anxiety, which highlights the importance of developing MT to manage anxiety and optimize performance in high-pressure situations.

Furthermore, our exploratory analyses yielded encouraging findings. It was observed that mindfulness was positively and strongly correlated with MT in general and moderately in the context of sport, suggesting collegiate athletes with greater mindfulness may also exhibit higher levels of MT and vice versa. A significant difference in the

magnitude between these two correlations was also found, which is noteworthy in that sports factors may influence the strength between mindfulness and MT differently than factors in everyday life. Finally, it was observed that generalized anxiety was positively and moderately correlated with performance anxiety. This is important because it indicates that collegiate athletes with greater generalized anxiety symptoms may also exhibit greater performance anxiety and vice versa.

Limitations and Future Directions

Future research should aim to address various limitations present in the current study. First, most of our sample was made up of white collegiate athletes (85.5%) and female collegiate athletes (83.9%). In 2022, 44% of collegiate athletes participating in the NCAA were female, 56% were male, and 62% of this group were white (NCAA, 2022b). Since our sample is not representative of the broader population of collegiate athletes, our findings may not be generalizable which can make it challenging to draw broader conclusions that are relevant to all NCAA collegiate athletes. To mitigate this limitation, future research should carefully consider sampling methods and strive for greater diversity in their samples, specifically placing more emphasis on recruiting more males and non-white collegiate athletes.

Secondly, our study sample exhibited a limited statistical power due to its relatively modest size, with a total of 62 participants. The NCAA revealed there were 522,165 total collegiate athletes competing in their respective sports in 2022 (NCAA, 2022b). Once again, our participant sample is not representative of the total population of NCAA collegiate athletes, and our sample size may decrease our ability to detect true effects or differences within the population. To address this limitation, researchers should

aim for larger and more representative sample sizes of collegiate athletes from the NCAA to enhance the robustness and reliability of their results.

The third limitation of our study is that we relied only on self-report data from collegiate athletes. Although self-report data offers the advantage of gathering extensive information, it has the potential to produce biased responses given that individuals are reporting their subjective experiences. Additionally, individuals may tend to overreport or underreport on their experiences on self-report measures. Future studies are encouraged to implement more objective measures, such as physiological measures or lab observational tasks, to limit bias and obtain a more multi-faceted view of generalized anxiety and performance anxiety among collegiate athletes.

The fourth limitation within our study is that we employed a cross-sectional research design. While this was useful in measuring current mindfulness, MT, and symptoms of anxiety within our sample of collegiate athletes, it does not allow for the examination of changes or developments in these variables over an extended period. As a result, our study design may miss critical insights into how these variables evolve or interact over time. To address this limitation, future studies should consider incorporating longitudinal designs to gain a more comprehensive understanding of mindfulness, MT, generalized anxiety, and performance anxiety, and how they relate to one another, change over time, and affect individual trajectories.

Finally, the fifth limitation of our study arises from the potential influence of confounding variables, including individual factors and risk factors, which might have affected the associations between our variables. While we implemented measures to manage the potential influence of confounding variables, we cannot entirely exclude the

possibility of their impact. It is recommended that future research consider incorporating more robust methods for both exploring and mitigating the impact of confounding variables to address this limitation.

Conclusion

The current study provided information on the interactions between mindfulness, MT, generalized anxiety, and performance anxiety within a collegiate athlete population. This is important because little mental-health-related research has been conducted with this specific population. The findings of our study supported previous research that greater mindfulness and greater MT capacities are associated with reduced symptoms of generalized anxiety and performance anxiety in collegiate athletes. Further, it provided evidence that while MT did not change or alter how mindfulness was related to generalized anxiety and performance, it highlighted the importance of MT as a key factor that can predict both generalized anxiety and performance anxiety. The significant difference in correlation magnitudes indicates that the relationship between mindfulness and MT may be more robust than initially thought. This observation has implications for collegiate athletes in that those with higher levels of MT may not necessarily require the supplementary advantage of mindfulness capabilities to alleviate their symptoms of generalized anxiety and performance anxiety. As approximately one-third of collegiate athletes experience moderate to severe anxiety symptoms (Drew & Matthews, 2019), and these symptoms can often lead to declines in performance and mental well-being (Clark et al., 2019), it is crucial to develop strategies and skills that collegiate athletes can strengthen to effectively mitigate anxious symptoms.

This information opens avenues for future research, institutions, and clinicians to adopt a more comprehensive approach to athlete support and develop further effective interventions and strategies for collegiate athletes. More specifically, future work can use this information to develop mindfulness and MT interventions that target both mechanisms to prevent and treat generalized anxiety, as well as performance anxiety within collegiate athletes. Previously developed efficacious mindfulness programs that support the wellbeing of collegiate athletes and the reduction of stress and anxiety have utilized empirical research for their development. For example, a recent systematic review and meta-analysis of randomized controlled trial found a significant improvement in the performance indicators of student-athletes after receiving a mindfulness-based intervention MBI (Wang et al., 2023). Additionally, multiple studies have found increased psychological well-being and performance within athletes as a result of the implementation of mindfulness-based stress reduction (MBSR) interventions (Jones et al., 2020). While various MBIs have been developed and implemented within a collegiate athlete population, there is a lack of research and evidence-based MT interventions at this time. As supported by prior research and our own findings, the role of MT in predicting both generalized and performance-related anxiety underscores its potential utility for guiding future research. We encourage future work to focus on creating evidence-based MT intervention programs to help reduce anxious symptoms in collegiate athletes. Overall, our work underscores the importance of holistic student-athlete development, acknowledging that their mental well-being is just as crucial as their physical well-being.

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Appendix A

Measures

Measure 1

Comprehensive Inventory of Mindfulness Experience (CHIME)

Please indicate how often, in the past two weeks, you have had each of the following experiences.

		Never or Almost Never	Rarely	Not Often	Fairly Often	Often	Always or Almost Always
1.	When my mood changes, I notice it right away.						
2.	During both ups and downs of life, I am kind to myself.						
3.	In everyday life, I notice when my negative attitudes towards a situation make things worse.						
4.	It is clear to me that my evaluations of situations and people can easily change.						
5.	When I am sitting or lying down, I notice the sensations in my body						
6.	I am able to smile when I notice myself seeing things as more complicated than they actually are.						
7.	I am hard on myself when I make a mistake.						
8.	When I have distressing thoughts or images, I am able to feel calm soon afterward.						
9.	I notice details in nature, such as colors, shapes, and textures.						
10.	I break or spill things because I am not paying attention, or I am thinking of something else.						

		Never or Almost Never	Rarely	Not Often	Fairly Often	Often	Always or Almost Always
11.	I see my mistakes and difficulties without judging myself.						
12.	It is easy for me to stay focused on what I am doing.						
13.	When I have distressing thoughts or images, I am able to notice them without having to react.						
14.	When I talk to other people, I notice what feelings I am experiencing.						
15.	When I have been needlessly hard on myself, I can see it with some humor.						
16.	In difficult or triggering situations, I can pause for a moment without reacting immediately.						
17.	In everyday life, I get distracted by many memories, images, or daydreams.						
18.	When I ride in a car, bus, or train, I am aware of the surroundings, such as the landscape.						
19.	I try to stay busy to avoid specific thoughts or feelings from coming to mind.						
20.	When caught in thought and emotions, I am able to "step back" and quickly notice the thought or image without being taken over by it.						
21.	I pay attention to sensations, such as the wind in my hair or sunshine on my face.						
22.	I try to distract myself when I feel unpleasant emotions.						
23.	In everyday life, I realize my thoughts are not always facts.						

		Never or Almost Never	Rarely	Not Often	Fairly Often	Often	Always or Almost Always
24.	I am able to smile to myself when I notice I have made a big deal out of a small problem.						
25.	I am able to notice my thoughts and feelings without getting tangled up in them.						
26.	When I read, I have to reread paragraphs because I was thinking of something else.						
27.	I notice sounds in my environment, such as birds chirping or cars passing.						
28.	I notice my thoughts and feelings and can also "step back" and observe them from a distance.						
29.	I clearly notice changes in my body, such as quicker or slower breathing.						
30.	I do not like it when I am angry or fearful and try to get rid of these feelings.						
31.	In everyday life, I am aware that my view on things is not always based on facts.						
32.	Even when I make a big mistake, I treat myself with kindness and understanding						
33.	When I am in pain, I try to avoid the sensations as much as possible.						
34.	I am aware of how I am feeling at any given time.						
35.	I am aware that even my strongly held opinions may change over time.						
36.	I resent my own mistakes and weaknesses.						

		Never or Almost Never	Rarely	Not Often	Fairly Often	Often	Always or Almost Always
37.	I am able to notice when I needlessly make life more difficult for myself.						

Measure 2

Mindfulness Inventory for Sport (MIS)

The statements below describe a number of things that athletes may experience just before or during their sport performance. Please circle the number that best indicates how much each statement is generally reflective of your recent experience. There are no right or wrong answers.

Awareness

		Not at all					Very much
1.	I am aware of the thoughts that are passing through my mind.	1	2	3	4	5	6
2.	I am able to notice the intensity of nervousness in my body.	1	2	3	4	5	6
3.	I am able to notice the sensations of excitement in my body.	1	2	3	4	5	6
4.	I am able to notice the location of physical discomfort when I experience it.	1	2	3	4	5	6
5.	I pay attention to the type of emotions I am feeling.	1	2	3	4	5	6

Non-judgmental (reverse-scoring)

		Not at all					Very much
1.	When I become aware that I am thinking about a past performance, I criticize myself for not being focused on my current performance.	1	2	3	4	5	6
2.	When I become aware that I am angry at myself for making a mistake, I criticize myself for having this reaction.	1	2	3	4	5	6
3.	When I become aware that I am not focusing on my own performance, I blame myself for being distracted.	1	2	3	4	5	6
4.	When I become aware that I am thinking of the final result, I blame myself for not being focused on relevant cues for my performance.	1	2	3	4	5	6
5.	When I become aware that I am really upset because I am losing,	1	2	3	4	5	6

	I criticize myself for reacting this way.						

Refocusing

		Not at all					Very much
1.	When I become aware that some of my muscles are sore, I quickly refocus on what I have to do.	1	2	3	4	5	6
2.	When I become aware that I am thinking about how tired I am, I quickly bring my attention back to what I should focus on.	1	2	3	4	5	6
3.	When I become aware that I am really excited because I am winning, I stay focused on what I have to do.	1	2	3	4	5	6
4.	When I become aware that I am tense, I am able to quickly bring my attention back to what I should focus on.	1	2	3	4	5	6
5.	When I become aware that I am not focusing on my own performance, I am able to quickly refocus my attention on things that help me to perform well.	1	2	3	4	5	6

Measure 3

Mental Toughness Questionnaire 10-Item (MTQ-10)

How would you respond to each of these 10 items using the Likert scaling method? Do you 1) strongly disagree, 2) disagree, 3) neither agree nor disagree, 4) agree, or 5) strongly agree with each specific prompt?

	Items (1-15)	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1.	Even when under considerable pressure, I usually remain calm.	1	2	3	4	5
2.	I tend to worry about things well before they actually happen.	1	2	3	4	5
3.	I usually find it hard to summon enthusiasm for the tasks I have to do.	1	2	3	4	5
4.	I generally cope well with any problems that occur.	1	2	3	4	5
5.	I generally feel that I am a worthwhile person.	1	2	3	4	5
6.	“I just don't know where to begin" is a feeling I usually have when presented with several things to do at once.	1	2	3	4	5
7.	When I make mistakes, I usually let it worry me for days after.	1	2	3	4	5
8.	I generally feel in control.	1	2	3	4	5
9.	I am generally able to react quickly when something unexpected happens.	1	2	3	4	5
10.	I generally look on the bright side of life.	1	2	3	4	5

Measure 4

Sports Mental Toughness Questionnaire (SMTQ)

Please indicate your agreement/disagreement with each statement below in relation to your involvement with participation in sports.

		Not at all True			Very True
1.	I can regain my composure if I have momentarily lost it.	1	2	3	4
2.	I worry about performing poorly.	1	2	3	4
3.	I am committed to completing the tasks I have to do.	1	2	3	4
4.	I am overcome by self-doubt.	1	2	3	4
5.	I have an unshakeable confidence in my ability.	1	2	3	4
6.	I have what it takes to perform well while under pressure.	1	2	3	4
7.	I get angry and frustrated when things do not go my way.	1	2	3	4
8.	I give up in difficult situations.	1	2	3	4
9.	I get anxious by events I did not expect or cannot control.	1	2	3	4
10.	I get distracted easily and lose my concentration.	1	2	3	4
11.	I have qualities that set me apart from other competitors.	1	2	3	4
12.	I take responsibility for setting myself challenging targets.	1	2	3	4
13.	I interpret potential threats as positive opportunities.	1	2	3	4
14.	Under pressure, I am able to make decisions with confidence and commitment.	1	2	3	4

Measure 5

Generalized Anxiety Disorder 7-Item (GAD-7)

Over the last 2 weeks, how often have you been bothered by the following problems?

	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious, or on edge.	0	1	2	3
2. Not being able to stop or control worrying.	0	1	2	3
3. Worrying too much about different things.	0	1	2	3
4. Trouble relaxing.	0	1	2	3
5. Being so restless that it is hard to sit still.	0	1	2	3
6. Becoming easily annoyed or irritated.	0	1	2	3
7. Feeling afraid, as if something awful might happen.	0	1	2	3

If you checked any problems, how difficult have they made it for you to do your work, take care of things at home, or get along with other people?

___Not difficult at all ___Somewhat difficult ___Very difficult ___Extremely difficult

Measure 6

Sport Anxiety Scale-2 (SAS-2)

Many athletes get tense or nervous before or during games, meets or matches. This happens even to pro athletes. Please read each question. Then, circle the number that says how you USUALLY feel before or while you compete in sports. There are no right or wrong answers. Please be as truthful as you can.

Before or while I compete in sports:	Not at all	A little bit	Pretty much	Very much
1. It is hard to concentrate on the game.	1	2	3	4
2. My body feels tense.	1	2	3	4
3. I worry that I won't play well.	1	2	3	4
4. It is hard for me to focus on what I am supposed to do.	1	2	3	4
5. I worry that I will let others down.	1	2	3	4
6. I feel tense in my stomach.	1	2	3	4
7. I lose focus on the game.	1	2	3	4
8. I worry that I will not play my best.	1	2	3	4
9. I worry that I will play badly.	1	2	3	4
10. My muscles feel shaky.	1	2	3	4
11. I worry that I will mess up during the game.	1	2	3	4
12. My stomach feels upset.	1	2	3	4
13. I cannot think clearly during the game.	1	2	3	4
14. My muscles feel tight because I am nervous.	1	2	3	4
15. I have a hard time focusing on what my coach tells me to do.	1	2	3	4

Measure 7

Demographic Questions

INSTRUCTIONS: Complete the following demographic information. Please note that all personal information will be kept completely confidential and none of the responses you provide will be connected to your name, email address, or other identifying information.

1. Age	_____
2. Academic Year	Freshman; Sophomore; Junior; Senior; Fifth Year
3. Major	_____
4. Sex	Male; Female; Intersex
5. Gender	Man; Woman; Trans Man/Masculine; Trans Woman/Feminine; Other Gender Identity
6. Ethnicity	White; Black or African American; Hispanic or Latinx; American Indian or Alaska Native; Asian, Native Hawaiian or Other Pacific Islander; Middle Eastern, Multiracial
7. Sport	Men's – Baseball, Basketball, Cross Country, Football, Golf, Ice Hockey, Soccer, Swimming and Diving, Tennis, Track and Field, Wrestling; Women's – Basketball, Cross Country, Field Hockey, Golf, Gymnastics, Lacrosse, Rowing, Soccer, Softball, Swimming and Diving, Tennis, Track and Field, Volleyball, Water Polo
8. Years Playing Current Sport	_____
9. Have you previously sought support from a licensed mental health professional?	Yes; No; Prefer not to say
10. Are you currently receiving support from a licensed mental health professional?	Yes; No; Prefer not to say

Appendix B

Informed Consent

Principal Investigator: Wesley A. Bullock, Ph.D., Department of Psychology (419-530-2719)

Graduate Student Investigator: Teona Velehorschi, B.A., Department of Psychology (491-530-2721)

Purpose: You are invited to participate in the research project entitled "Student-Athlete Anxiety, Mindfulness, and Mental Toughness." This study is being conducted at the University of Toledo under the direction of Dr. Wesley Bullock. The purpose of this study is to better understand the relationship between mindfulness, anxiety, and mental toughness within a student-athlete population.

Description of Procedures: This research study will take place online through Qualtrics, a secure online data collection platform. During the single research session, you will be asked to complete several questionnaires about anxiety, mindfulness, and mental toughness pertaining to your daily life and sport participation. Completing the surveys is expected to take approximately 15 minutes.

Potential Risks: There are minimal risks to participation in this study. You do not have to answer any question that you do not want to. You can also stop your participation at any time or take a break. Although you will not be asked to provide any identifying information, there remains the potential risk of breach of confidentiality.

Potential Benefits: The only direct benefit to you by participating is that you may learn about survey research and how anxiety, mindfulness, and mental toughness are measured. The field of psychology may benefit from this research by learning more about student-athlete mindfulness, anxiety, and mental toughness, and others may benefit by learning about the results of this research.

Confidentiality: All information and data collected for this research study are confidential. No personally identifying information will be collected. To help preserve confidentiality, your research data will be assigned a study ID number. Your data will be stored under this number in an encrypted and password-protected online database. Only approved and trained research staff on this study have access to study data. Also, any data from the study will be reported only in aggregate group form, combined with other participants' data. Data will be retained for 7 years after its last use, after which the data will be destroyed. The information that is collected from your participation in this research may be used in future research studies without your consent.

Voluntary Participation: Your refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. Your refusal to participate will not affect

your relationship with any institution affiliated with the National Collegiate Athletic Association (NCAA). Declining to participate will not affect any of your classes, status as an athlete, or your relationship with coaches or others in the athletic department. You have the right to discontinue participation at any time.

Contact Information: If you have any questions at any time before, during or after your participation, you should contact the primary investigator, Dr. Bullock, by email at wesley.bullock@utoledo.edu or phone 419-530-2719, or graduate student investigator, Teona Velehorschi, by email at teona.velehorschi@rockets.utoledo.edu or phone 419-530-2721.

If you have questions beyond those answered by the research team or your rights as a research subject or research-related injuries, the Chairperson of the SBE Institutional Review Board may be contacted through the Human Research Protection Program on the main campus at 419-530-6167.

Study Number: 301635-UT
Exemption Granted: 01/19/2023

CONSENT AGREEMENT

Please read carefully. You are making a decision whether or not to participate in this research study. If you choose to participate, please click on the box below to indicate that you are providing consent for participation in this study. You may take as much time as necessary to think it over.

○ **By clicking this box, I am confirming that I understand the study described above, am at least 18 years of age, and choose to participate.**