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# Mental Toughness and Anxiety in Varsity Collegiate Athletes and Non-Athletes

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## Abstract:

This study investigates whether varsity collegiate athletes are indeed more “mentally tough” than their non-athlete counterparts and whether there is a correlation between mental toughness in sports and an individual’s general ability to cope with anxiety and stressful life events. Specifically, this study investigates differences in mental toughness, anxiety (trait, performance, and test anxiety), anxiety sensitivity, and anxiety control beliefs in college students who participate in competitive sports (e.g., varsity sports) and in college students who do not—including students who participate in performance-based, and in some instances competitive activities, such as drama, music, dance, and those requiring public speech. By investigating the relationships between these constructs, this research seeks to shed light on potential risk and resilience factors in the development and maintenance of pathological or maladaptive anxiety. Several hundred students at a small, Division III undergraduate institution in the Midwest were recruited via email to complete a battery of questionnaires previously shown to be reliable and valid measures of the constructs of interest. Analysis of the data suggests that athletes are more mentally tough than their non-athlete counterparts and that mental toughness is positively correlated with anxiety control beliefs and negatively correlated with anxiety sensitivity, trait anxiety, performance anxiety, and test anxiety. This study should contribute to a better understanding of competitive anxiety and the construct of mental toughness as these relate to sports, and perhaps to a better understanding more generally of anxiety, performance anxiety, and the distinction between effective and ineffective coping.

## Introduction:

- Mental toughness is a commonly used yet poorly understood term in applied sports psychology (Crust, 2008).
- Competitive athletics is a realm in which challenges, appraisals, emotions, and coping are especially relevant.
- Mental strength is developed by acquiring mental skills such as concentrating, control of attitude, managing pressure, thinking right and talking to oneself in constructive ways, energy control, staying motivated, and visualizing success or achievement (Loehr, 1982).
- The dominant view of mental toughness is based on qualitative research by Jones, Hanton, & Connaughton (2007), who studied elite and super-elite athletes (such as Olympic or world champions).
- Jones et al. (2007) proposed 30 attributes that are essential to mental toughness, which include, having an inner arrogance that makes one believe one can achieve anything one sets his or her mind to; remaining in control and not controlled by emotions and circumstances; adapting to and coping with any change, distraction, or, threat under pressure; and using failure to drive oneself to further success.
- Mental toughness skills, which give an athlete the necessary psychological edge to perform optimally under pressure, are potentially transferable to realms outside of competitive sports (Loehr, 1982). Sheard (2010) maintains that the development and maintenance of mental toughness is important for effective performance in both sport and life in general.
- In general, scores on measures such as the Mental Toughness Questionnaire-48 (MTQ48) and the Sports Mental Toughness Questionnaire (SMTQ) correlate significantly with scores on other concepts theoretically related to mental toughness, such as positive self-image, life satisfaction, self-efficacy, lack of trait anxiety, and physical endurance (Clough, Earle, & Sewell, 2002; Crust & Clough, 2005), as well as hardiness (Golby & Sheard, 2010; Gucciardi & Gordon, 2009), optimism (Nicholls, Polman, Levy, & Blackhouse, 2009), resilience (Clough et al., 2002; Gucciardi & Gordon, 2009), coping style (Kaiseler, Polman, & Nicholls, 2009), and the Big-5 personality traits (Horsburgh, Schermer, Veselks, & Vernon, 2009).

## Method:

**Participants:** Participants consisted of 236 undergraduate students; 64 (27.1%) were currently members of a collegiate varsity sports team, 12 (5.1%) had previously played on a collegiate varsity sports team, 160 (67.8%) were non-athletes, and 82 (33.7%) were collegiate performers (dance, theater, music, or activities requiring public speech). Of the 236 participants, 166 (70.3%) identified as female and 67 (29.7%) identified as male. Of the 236 participants, 2 identified as American Indian or Alaskan Native (0.8%), 5 identified as Black or African American (2.1%), 1 identified as Hawaiian Native or Pacific Islander (0.4%), 11 identified as Hispanic or Latino (4.7%), 211 identified as White or Caucasian (89.4%), 3 identified as Middle Eastern (1.3%), 14 identified as Asian (5.9%), and 7 identified as other (3.0%). Ages ranged from 18 to 23 with a mean age of 19.27 (SD = 1.19).

**Procedure:** The study was approved as ethical by both the Psychology Department’s Internal Review Board (IRB) and the college’s campus-wide IRB. Participants were recruited via email. A general recruitment email was sent to all students of Kenyon College and a special recruitment email was sent to all varsity athletes. The recruitment emails contained a link to an informed consent form which participants were required to read and sign prior to their participation. After providing informed consent (if they wished to do so), students were automatically linked to the survey on the Survey Monkey website. After completing the survey, participants were automatically linked to a debriefing form that described the goals of the study; listed local psychological services in the event that the survey tapped anxiety disorders or problems with performance anxiety; and provided the email addresses of officials to contact if the participant had significant concerns regarding the study’s ethics. After the survey closed, data were downloaded and analyzed. The researchers specifically examined significant correlations, significant differences between athletes and non-athletes, and the reliability of the measures included in the survey.

## Method (Continued):

- The Survey** (Measures 2-5 and 8 have acceptable reliability and validity, and measure 7 is adapted from two reliable and valid measures):
1. **Demographic Questionnaire:** A 9-item demographics questionnaire by the researchers to gather information regarding age, gender, race and ethnicity, parental education attainment level, and parental income level. Furthermore, questions were asked regarding participants’ current (college) and prior (high school) participation in varsity sports as well as various forms of performance (e.g., drama, theater, debate).
  2. **Trait Anxiety:** The 21-item trait anxiety subscale of the State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA; Ree, French, MacLeod, & Locks, 2008) was used to measure trait anxiety.
  3. **Mental Toughness:** The Sports Mental Toughness Questionnaire (SMTQ; Sheard, 2010) was used to measure overall mental toughness.
  4. **Anxiety Sensitivity:** The 18-item Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007) was used to assess participants’ anxiety about anxiety-related bodily sensations.
  5. **Emotional Control:** The Anxiety Control Questionnaire (ACQ; Rapee, Craske, Brown, & Barlow, 1996) is a 30-item questionnaire that assesses individuals’ perceived control over their anxiety. A 15-item revised version of the ACQ was used (Brown, White, Forsyth, & Barlow, 2004).
  6. **Physical Fitness:** A physical fitness self-report questionnaire was created by the researchers for this study. It consists of 5 items designed to evaluate the frequency of exercise, the intensity of workouts, and perceived fitness of participants. Questions were adapted from the Canadian Physical Activity, Fitness, and Lifestyle Appraisal (CPAFLA; Tremblay, Shepard, McKenzie, & Gledhill, 2001).
  7. **Performance Anxiety:** The 20-item Performance Anxiety Questionnaire (PAQ; Cox & Kenardy, 1993) was used to assess the cognitive and somatic symptoms of performance anxiety.
  8. **Test Anxiety.** A 20-item refined version of the Revised Test Anxiety Scale (RTA; Benson & El-Zahhar, 1994) was used to measure test anxiety. This version of the RTA consists of four factors, two cognitive factors (worry and test irrelevant thoughts) and two somatic factors (tension and bodily symptoms).

## Results:

Table 1  
*Pearson Correlations, Means, Standard Deviations, and Cronbach's Alphas of Survey Measures*

	STICSA	PAQ	RTA	RACQ	ASI-3	SMTQ
<b>STICSA</b>	1					
<b>PAQ</b>	0.66	1				
<b>RTA</b>	0.62	0.64	1			
<b>RACQ</b>	-0.44	-0.51	-0.53	1		
<b>ASI-3</b>	0.55	0.55	0.42	-0.48	1	
<b>SMTQ</b>	-0.54	-0.57	-0.50	0.76	-0.40	1
<i>M</i>	37.94	50.81	37.26	46.13	14.86	37.72
<i>SD</i>	10.54	12.02	10.49	11.99	11.81	6.16
<i>α</i>	0.91	0.89	0.92	0.88	0.90	0.81

Note: STICSA = State-Trait Inventory for Cognitive and Somatic Anxiety, PAQ = Performance Anxiety Questionnaire, RTA = Revised Test Anxiety Scale, RACQ = Revised Anxiety Control Questionnaire, ASI-3 = Anxiety Sensitivity Index-3, and SMTQ = Sports Mental Toughness Questionnaire.

Table 2

*Significant Orthogonal Contrasts to Test A Priori Predictions Regarding Athletes and Performers*

Variable	Collegiate Athlete/Performer Status			Significant Contrasts
	Athlete	Non-athlete/ Performer	Non-Athlete/ Non-Performer	
<b>Mental Toughness (SMTQ)</b>	40.84 (5.64)	37.31 (5.29)	35.49 (6.15)	1, 2
<b>Performance Anxiety (PAQ)</b>	47.85 (12.50)	50.88 (12.17)	53.18 (11.08)	1
<b>Test Anxiety (RTA)</b>	34.83 (10.61)	37.62 (10.06)	39.11 (10.40)	1
<b>Anxiety Control Beliefs (RACQ)</b>	48.42 (12.35)	46.16 (10.67)	44.25 (12.36)	None
<b>Anxiety Sensitivity (ASI-3)</b>	12.45 (10.65)	15.87 (12.95)	16.13 (11.70)	None
<b>Trait Anxiety (STICSA)</b>	35.93 (10.67)	38.97 (9.83)	38.78 (10.81)	None

Note. Contrast column refers to which of the two orthogonal contrasts were significant ( $p < 0.05$ ). Contrast 1 examines whether there are significant differences between performers (including athletes) and non-performers. Contrast 2 examines whether there are significant differences between athletes and non-athletes controlling for performance. Standard deviations are in parentheses.

## Results (Continued):

- There were significant differences in mental toughness (One-way ANOVA,  $F = 16.48$ ,  $p = 0.001$ ), test anxiety (One-way ANOVA,  $F = 3.32$ ,  $p = 0.038$ ), and performance anxiety (One-way ANOVA,  $F = 3.96$ ,  $p = 0.020$ ) between athletes, non-athlete non-performers, and non-athlete performers.
- Gender differences were observed, with females participants reporting greater performance anxiety (Independent Samples T-test,  $t = -3.09$ ,  $p = 0.002$ ) and lower mental toughness (Independent Samples T-test,  $t = 2.66$ ,  $p = 0.008$ ) and anxiety control beliefs (Independent Samples T-test,  $t = 3.24$ ,  $p = 0.001$ ) than male participants.
- Previous or current collegiate varsity athletes reported greater mental toughness (Independent Samples T-test,  $t = 5.32$ ,  $p = 0.001$ ) and lower performance anxiety (Independent Samples T-test,  $t = -2.53$ ,  $p = 0.012$ ), test anxiety (Independent Samples T-test,  $t = -2.47$ ,  $p = 0.014$ ), and anxiety sensitivity (Independent Samples T-test,  $t = -2.00$ ,  $p = 0.047$ ) than non-athletes.
- Orthogonal contrast tests demonstrated that collegiate varsity athletes are more mentally tough than non-athletes, including those who participate in performance-based, and in some cases competitive activities.

## Discussion:

- As predicted, greater mental toughness was associated with less reported trait anxiety, performance anxiety, test anxiety, and anxiety sensitivity.
- Greater mental toughness was associated with greater anxiety control beliefs, that is, a greater belief in one’s ability to control his or her anxiety.
- The strong correlation between test anxiety and performance anxiety suggests that individuals respond similarly to different types of evaluative situations.
- The results of the orthogonal contrast tests suggest that competitive sports fosters greater mental toughness and that involvement in performance-based activities (e.g., sports, theater, dance, speech) reduces anxiety in evaluative situations, such as performing in front of an audience or taking a test.
- The strong correlation between anxiety sensitivity and mental toughness suggests that those who are more mentally tough are less sensitive to the bodily sensations related to anxiety.
- There was not a significant difference in trait anxiety between collegiate athletes and non-athletes. This finding suggests that both athletes and non-athletes have an equal predisposition to feeling anxious. However, perhaps due to specific learned skills and training (e.g., mental toughness), they report less anxiety in evaluative situations.
- All this suggests that being a performer reduces anxiety in evaluative situations, and that participation in competitive athletics, specifically, is correlated with greater mental toughness, providing a possible explanation for athletes’ reduced anxiety in evaluative situations.

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