



RELATIONSHIP BETWEEN MENTAL TOUGHNESS AND TRAIT ANXIETY IN SPORTS

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ABSTRACT

The attribute of mental toughness terminologically could be explained as an interactive combination of stable humane characteristics which inspires him or her to strive persistently for excellence. Though the concept of mental toughness is used widely, but comprehensive understanding of the construct based on empirical evidence is scanty. This research investigated the corroborative relationship between mental toughness and trait anxiety to determine whether mentally tough athletes generally experience more or less anxiety. We recruited 57 men (M age = 25.4 years, $SD = 4.66$) and 45 women (M age = 23.5 years, $SD = 5.73$), who are regular participants in a variety of sports. All of them were subjected to assessment of mental toughness using MTQ48, level of trait anxiety (which was assessed using the trait scale of State-Trait Anxiety Inventory (STAI-T)). Series of Pearson correlations between trait anxiety, overall mental toughness, and the six subscales of mental toughness showed significant ($p > 0.05$) correlations. No significant differences were evident in overall mental toughness and mental toughness dimensions between men and women, whereas trait anxiety was observed as significantly different between male and female players. Our findings however suggest the relevance and importance of trait anxiety in the assessment and development of mental toughness among athletes.

KEY WORDS: Mental Toughness, Trait Anxiety, MTQ48.



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INTRODUCTION

Though mental toughness is often synonymously used in lieu of popular term hardy personality¹, cognitive appraisal of the underlying construct could be acknowledged as identical to internalised regulation or resilience² or emotional integrity.³ Thus the term "mental toughness" being a popular concept in the domain of competitive sport, conceptualization of this construct resulted in lack of consistency.^{4,5} A good deal of research literature in this area has outlined mental toughness as a multidimensional and hierarchical construct; with several conceptual models have been proposed.⁶⁻¹² Recent research in this field carried out by the leading researchers had argued that mental toughness may be best conceptualized as a one-dimensional rather than a multidimensional concept.¹³ A good deal of research aimed at identifying the attributes and characteristics of an ideal mentally tough performer have relied on qualitative research paradigms to examine mental toughness.¹⁴ In an attempt to provide some conceptual clarity and a standard definition to the concept, Jones¹⁵ revealed 12 attributes associated with the mentally tough performer that related to, self-belief, desire and motivation, performance and lifestyle distractions, pressure and anxiety associated with competition, and physical and emotional pain. This definition characterizes mental toughness as a quality that allows athletes to cope better than her/his opponent with the demands of competition, which specifically relates to the notions of resiliency and competitive desire. Based on thorough interview sessions with athletes, coaches and sport psychologists a theory-driven model of mental toughness was prepared⁷, which revealed close association of the construct of mental toughness with the previous popular concept of hardiness¹. Hardiness represents a trait-like characteristic that influences the way people perceive situations and react on stressful circumstances. Previous research has shown hardy individuals appear to be futuristic in their decisions, and they tend to seek out challenges, take risks, and approach, rather than averting potential anxiety-producing situations.¹⁶ Other researchers⁷ clearly defined mentally tough individuals as "Individuals [who] tend to be sociable and outgoing as they are able to remain calm and relaxed, they are competitive in many situations and have lower anxiety levels than others". Researchers also were found to categorize athletes as mentally tough, as they reported to have lower levels of perceived stress and higher self-control when encountering a stressor during competition.¹⁷ Thus it seems feasible to argue that mental toughness is reflected in an athlete's ability to deal with anxiety associated with high pressure competitive situations.¹⁵ Although mental toughness is believed to be an extremely important part of successful performance in athletics, there are several other relevant traits, one of which for instance, anxiety has consistently been studied in the field of sport psychology. Two meta-analytical reviews however were suggestive of a probable negative relationship between anxiety and sporting performance.^{18,19} The 'Individual Zones of Optimal Functioning (IZOF)' model also suggested that there is an optimal level of anxiety which is supposed to be different in each individual athlete,

and learning to identify one's own IZOF may assist the players to achieve that level, and enhanced performance thereby.²⁰ Apart from anxiety, the other relevant psychological factor associated with heightened performance is self-confidence^{21, 22}, which determines the extent to which players expect to control the obvious stressors. These factors interact in between them and the extent of subjective experience of transient anxiety, which may have debilitating impact on performance, is entirely determined by the dispositional or trait anxiety (TA) of the player.²³ Individuals identified as high on trait anxiety, perceive and interpret relatively non-threatening situations as critical and apprehensive^{2,25}, while low trait-anxious players tend to perceive those situations as challenging.²⁴⁻²⁷ Although the significance of dispositional or trait anxiety (TA) as determinant of mental toughness is well-known²⁵⁻²⁷, testing of construct validity of mental toughness questionnaire, has only been attempted in one study employing MTQ48, which tested the significance of TA in validating mental toughness.²⁸ With such a background, this present study purports to examine the relationship between trait anxiety and mental toughness.

METHODOLOGY

2.1. Participants

The sample consisted of 57 men (M age = 25.4 years, *SD* = 4.66) and 45 women (M age = 23.5 years, *SD* = 5.73) who regularly (at least twice per week) attended various sports which included football, futsal, basketball, and netball. Study participants completed the questionnaire under the supervision of researchers. Participants received detailed information about the purpose of the study and about the voluntary basis of their participation. All participants were assured of the confidentiality of their responses. The study was approved by a University's Research Ethics Committee and participants provided informed consent prior to participating. (Reference number for ethics: FWA Reg. N: 00007718; IRB Reg. No: 00004494)

2.1.1 Inclusion criteria of participants

- 1) Relatively highly skilled players (at least two years of regular engagement in sports activities);
- 2) Right foot dominant soccer players (regular penalty-shooters, both in training and in match situations);
- 3) Participants from other sports (having right handedness - consistency for human brain hemispheric differences was maintained) (diagnosed by Edinburgh inventory);
- 4) Normal or corrected-to-normal visual acuity in both eyes were required to participate in this study;
- 5) Control group participants were non-athletes, who never participated in any competitive sport events, even at the amateur level.

2.1.2. Exclusion criteria of participants

- 1) Participants experienced or suffered from traumatic head injury requiring medical diagnostic assessment were excluded (to avoid the possible occurrence of EEG deficits;

- 2) Participants with neurological, psychiatric, or other medical problems were also excluded from the study.

2.2. Instruments

2.2.1. Mental toughness

The present study used the 48-item Mental Toughness Questionnaire (MTQ48; Clough et al., 2002). The MTQ48 assessed total mental toughness (MT) and six subcomponents: challenge, commitment, interpersonal confidence, confidence in own abilities, emotional control, and life control. The items on the MTQ48 rated on a 5-point Likert-type scale anchored at 1= strongly disagree to 5=strongly agree. The MTQ48 has an overall test-retest coefficient of 0.9. In this study, overall Cronbach's alpha for the MTQ48 was 0.77. Several studies showed that the reliability of the overall toughness indices and the test-retest correlations of the MTQ48 subscales were high.^{7, 29-31} In these studies moderate to high correlations existed between the MTQ48 overall index and other psychological constructs such as optimism, self-image, life satisfaction and self-efficacy. However, some MTQ48 subscales had unsatisfactory internal consistency in some of the aforementioned investigations.^{30,31} Moreover, the factorial structure of the MTQ48 could not be confirmed via confirmatory factor analysis (CFA) in a recent investigation.³²

2.2.2. Trait anxiety

One of the most popular and frequently used self-report inventories for measure of anxiety is the State-Trait Anxiety Inventory (STAI). Trait anxiety was assessed with trait scale, Form Y (Spielberger's STAI-T).³³ The trait scale consisted of 20 statements that required individuals to rate how they generally felt on a 4-point Likert-type scale, ranging from 1 to 4 (from "almost never" to "almost always") with a total score range of 20 to 80. The STAI-T included items with the highest stability over time and the best convergence with previous measures of trait anxiety.³⁴ Low scores indicated a mild form of anxiety whereas median scores indicated a moderate form of anxiety and high scores indicated a severe form of anxiety. Concurrent validity with other anxiety questionnaires ranged from 0.73±0.85.³³ Alpha coefficient in the present study was adequate, with a value of 0.83 for trait anxiety scale. The STAI-T was selected for this study because it differentiates between anxiety as a psychological state and personality trait. It has designed to measure a stable propensity to experience anxiety, and tendencies to perceive stressful situations as threatening.³⁵

2.3. Procedures

Participants completed a pre-form containing a participant information sheet, an informed consent form, a demographic questionnaire, the MTQ48 and the STAI-T questionnaire. Participants were informed that, honesty in responses was essential, participation was voluntary, and the responses would remain confidential. Although instructions for completing each questionnaire were contained within the questionnaire package, completion of the questionnaires was supervised while the players completed the questionnaire to ensure all queries were completed. Participants completed the questionnaires in various locations that were quiet and safe locations.

2.4. Data analysis

Using the Statistical Program for Social Science (SPSS) 21.0, data were examined for missing variables and outliers. Means, standard deviations, and internal consistency were calculated prior to statistical analysis. Pearson Product Moment Correlations were calculated between trait anxiety, overall mental toughness and the six subscales of the MTQ48 questionnaire. Correlations were also conducted to assess any relationship between mental toughness, trait anxiety and age. Finally, independent t-tests were performed to determine any possible gender differences, and differences relating to performance levels of the participants in mental toughness and trait anxiety.

RESULTS AND DISCUSSION

A summary of the demographic variables as well as the means and standard deviations for each of the six subscales of the MTQ48 and STAI-T are presented in Table 1. Tests of univariate normality revealed no departure from standard skewness (<2) or kurtosis (<2). Pearson correlations between mental toughness and trait anxiety can be viewed in Table 2. Overall mental toughness was found to be significantly and negatively related to trait anxiety ($r = -0.54, p < .01$). Of the mental toughness subscales, confidence interpersonal ($r = -0.43, p < .01$), commitment ($r = -0.42, p < .01$), challenge ($r = -0.41, p < .01$), confidence abilities ($r = -0.38, p < .01$), control life ($r = -0.35, p < .01$) and control emotion ($r = -0.27, p < .05$) correlated significantly with trait anxiety. Age was found to be unrelated to mental toughness ($r = 0.02, p > .05$) and trait anxiety ($r = 0.04, p > .05$). Independent t-tests found no significant difference ($p > .05$) in overall mental toughness and the mental toughness subscales between men and women. Women showed significantly higher self-rating of trait anxiety ($t = 2.04, p < .05, d = 0.55$).

Table 1
Descriptive data and gender differences for mental toughness and trait anxiety

Parameters Evaluated	Statistics				t	p
	Men(n=57)		Women(n=45)			
	M	SD	M	SD		
Mental toughness	162.20	14.91	159.10	12.38	.84	.40
Challenge	29.00	3.77	28.43	3.26	.59	.55
Commitment	36.00	4.37	35.96	3.78	.03	.97
Emotional control	22.28	3.07	22.40	2.90	.14	.88
Life control	23.20	3.05	22.80	2.90	.49	.62
Confidence in ability	30.68	3.41	29.83	2.71	1.02	.31
Interpersonal confidence	21.04	3.40	19.66	2.02	1.85	.07
Trait anxiety	38.32	8.59	43.23	9.11	2.04	.04

Table 2
Pearson product moment correlations between mental toughness and trait anxiety

Parameters Evaluated	Statistics							
	Mental toughness	Challenge	Commitment	Emotional control	Life control	Ability confidence	Interpersonal confidence	Trait anxiety
Mental toughness		.59**	.77**	.76**	.76**	.70**	.61**	-.54**
Challenge			.18	.28*	.32*	.31*	.40**	-.41**
Commitment				.59**	.49**	.50**	.38**	-.42**
Emotional control					.51**	.39**	.43**	-.27*
Life control						.60**	.29*	-.35**
Ability confidence							.13	-.38**
Interpersonal confidence								-.43**
Trait anxiety								

* $p < .05$. ** $p < .01$.

Despite widespread agreement on the importance of anxiety in the mental toughness concept, research in this area remains largely unexplored. This paper seeks to examine the relationship between mental toughness and trait anxiety to determine whether mentally tough athletes generally experience more or less anxiety. Results showed significantly negative correlation between total scores on the MTQ48 and STAI-T. This finding mirrors the way in which mental toughness has been defined. More specifically, Clough et al. (2002) state that mentally tough individuals are "calm and relaxed...and have lower anxiety levels than others".⁷ Based on this finding, and emerging evidence showing mental toughness can be developed^{6,8}, imply that trait anxiety might be reduced. Moreover, low to moderate correlations were found between the dimensions of mental toughness and trait anxiety. The largest correlations were found between the MT dimension of interpersonal confidence, and trait anxiety ($r = -0.43$). This finding confirmed to the definition of trait anxiety that is associated with a maladaptive tendency to interpret ambiguous information in a threatening way. Thus, individuals with high trait anxiety are expected to have less ability to cope with the resultant anxiety associated with high pressure competitive situations.

Previous research has shown highly trait-anxious subjects perceived more situations as threatening and faced more frequently intense and sustained anxiety states compared to subjects with low trait anxiety.^{33,36} Theoretically, this kind of dysfunctional thoughts and maladaptive behaviour tendencies seem to be conflicting with the attributes of control, challenge, commitment and confidence, which thought characterize a mentally tough individual as widely accepted in sport psychology. Mentally tough individuals are characterized by a tendency to view their personal environment as controllable, to perceive themselves as capable and influential, to stay committed even under adverse circumstances and to consider problems as natural challenges.⁷ This notion may explain why they usually have less anxiety levels. No significant differences were found between men and women with regards to overall mental toughness and its dimensions. Our finding is consistent with earlier studies that reported mental toughness did not discriminate between gender.^{7,37} However, this is in contrast to two other studies that found male athletes scored significantly higher than female athletes on mental toughness, confidence, and control based on the use of the MTQ48.^{14,38} Therefore, future work is

needed to elaborate on the gender differences in mental toughness to verify a more affirmative finding.

Recognition of such differences is essential for coaches and practitioners who implement techniques to foster psychological skills that are consonant with mental toughness in athletes of either gender. The importance of gender as an important variable in the investigation of trait anxiety has been previously reported.³⁹ Females in the current study showed higher level than males in trait anxiety. The results obtained provide support for previous research that women display higher levels of trait anxiety than men and are more vulnerable to develop anxiety.^{40,41} As there was no significant difference in mental toughness scores, it is entirely possible that the observed gender differences are mediated by potential influence of other psychological moderating factors not specifically measured in the current study. There are several limitations to the current study. We only used self-report measures to examine relationships between trait anxiety and mental toughness and there is some evidence that self-reports are distorted by social desirability, and that the degree of distortion is greater at older ages. Secondly, the analyses were restricted to university students with a small sample size. It is therefore important to replicate the study to a wider group, different samples, and with longitudinal data to further ascertain the relationship between mental toughness and trait anxiety. Despite

these limitations, our findings have important implications for the study of mental toughness and also

interesting in light of prior work that suggests mental toughness as a psychological attribute to deal with anxiety.

CONCLUSION

The current study has provided empirical verification that there is a relationship between self-report of mental toughness and trait anxiety. This finding suggests participants with high or low levels of mental toughness characteristically experience more or less trait anxiety. In more anxious individuals, intervention/training could be designed through the development of mental toughness. More research is required to understand how mentally tough athletes (in comparison to less tough athletes) maintain low levels of trait anxiety as well as any gender differences in various competitive sport and mental toughness.

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