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Mental Toughness Scale for Pakistani University Students: A Validation Study

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The current mental toughness is multidimensional construct that help the individual to show persistent strength and preservation during the high competitive situations. The university life is the most vulnerable and pressured time for the university students. The aim of the current study was to determine the psychometric properties of the Mental Toughness Scale (MTS) in university students. A total of 306 participants (151 men and 155 women) with the age range of 18-25 (M = 20.66; SD = 1.36) were administered the Mental Toughness Scale, the Resilience Scale and the Student Problem Checklist. The results of the Exploratory and Confirmatory factor analysis yielded a three factor solution Sense of Personal Competence, Problem Solving Skills and Social Competence. Further, the MTS was found high internal consistency, reliability, construct and discriminant validity. The results pave the way for application of the Mental Toughness of University students of Pakistan and are discussed in light of cultural implications.

Keywords. Mental toughness, university students, mental health problems

The emergence of positive psychology has led researchers to identify different attitudes and characteristics of an individual that help to enhance ones' potentials to successfully meet the challenges of life. Mental toughness (MT) is one of the multidimensional psychological constructs that has been studied only with reference to sports psychology and considered as one of the contributing factors to enhance one's performance in sports (Crust, 2008; Gucciardi, Gordon, & Dimmock, 2008; Jones, Hanton, & Connaughton, 2002). MT is one of the factors that gained very recent attention from the researchers other than sports (Marchant et al., 2009; Stamp et al., 2015).

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Since MT is gaining attention yet many researchers are still struggling to define the very nature of the mental toughness. There has been little general consensus on the distinct components of this construct, for example, it is still not clear weather MT is a trait or can be learned, general or context specific construct (Crust, 2008). Few systematic attempts that have been devoted to identifying the origin of MT have concluded that there is a strong genetic component in MT yet can be improved through skills and practice (e.g. Golby & Sheard, 2006; Horsburgh, Schermer, Veselka, & Vernon, 2009; Sheard & Golby, 2006). Many definitions have been provided to explain mental toughness including as one's ability to handle adverse situations and failures (Goldberg, 1998). Jones et al (2002) has concluded that mental toughness is most over-used, but least understood construct, lacks operational definition, considered as an entity that is confused, and overlapping with other positive psychological attributes and characteristics.

Most of the researchers focused on identifying the attributes and characteristics that constitute MT rather than define operationally the construct itself. Clough, Earle, and Sewell (2002) proposed a "4C's" model that describes the MT comprising four components; firstly, control that denotes the individual's tendency to feel, act and influence. Secondly, commitment that denotes to a deep sense of involvement with the task. Thirdly, challenge which refers to a person's ability to find and accept opportunities. Lastly, confidence denotes to a sense of self-belief and a sense of competence. On the other hand, Jones, Hanton, and Connaughton (2007) have identified the attributes of MT comprising self-awareness, control over thoughts, focused on goals and a strong sense of self-belief. Crust (2007) further explained that MT also includes effective coping and ability to bounce back from adverse situations, persistence, and resilience. Individual with mental toughness has also been characterized by high self-reliance, self-belief, able to cope better with adverse life experiences, and with a great sense of responsibility (Gucciardi et al., 2008)

The most recent and comprehensive theoretical explanation of MT has been provided by an extensive work of Gucciardi, Gordon, and Dimmock (2009a) based on the personal construct psychology. According to Gucciardi's explanation, MT is defined as a dynamic attribute primarily based on person's subjective interpretation of events. Moreover, MT is a combination of number of attributes of a person that influence person's interpretation of negative and positive events in his life. These key characteristics and attributes include perseverance, hope, hardiness, resilience, and optimisms (Johnson, Rosen, Chang, Djurdjevic, & Taing, 2012).

Since the very nature of mental toughness is not very clear, therefore, very little attention has been given to provide a psychometrically sound measurement scale for MT, especially, in general population. Most of the studies have been used qualitative approach to measure MT in sports psychology (Sheard, Golby, & Van Wersch, 2009). One of the most widely used measures is the Mental Toughness Questionnaire 48 (MTQ48; Clough et al., 2002). However, the MTQ 48 has found to have a limited applicability because of the lack of theoretical conceptualization and sound psychometric properties (Sheard et al., 2009). Another measure to assess MT is developed Sports Mental Toughness Questionnaire (SMTQ; Sheard et al., 2009) based on the themes and quotes to develop item pool resulted into three factors namely Confidence, Constancy, and Control. An attempt (Crust & Swann, 2011) was made to measure the correlation between MTQ48 and SMTQ on a sample on 110 male athletes. Quite interestingly, the correlation between both MTQ48 and SMTQ was found to be moderate showing that subscales of both measures even with same labels may not measure the same psychological constructs. To conclude, we can say that both of the scales found to be psychometrically sound yet they differ conceptually, only applicable to sport's psychology and on Western samples. Therefore, it is important to note that these scales that are constructed on different conceptual framework, administered on different set of samples and lacks generalizability on general population.

The construct of Mental Toughness has found to be associated with many other psychological variables for example better sleep quality (Brand et al., 2014), high association with hope, optimism, and resilience (Guillén & Laborde, 2014). Individuals who show higher mental toughness tend to be sociable, able to handle life stressors, and experience less anxiety (Clough et al., 2002). The term mental toughness is used interchangeably with grit in the literature. Both are addressing the same framework of showing perseverance, resilience, and psychological strength to stay determined and face adversity (Duckworth, Peterson, Mathews, & Kelly, 2007). Moreover, MT was found to be associated with academic performance (Crust et al., 2014), school attendance, peer relationship, problem solving skills (Bull, Shambrook, James, & Brooks, 2005), and high psychological well-being in college students (Stamp et al., 2015). Keeping in mind the higher positive outcomes of MT in general population, it is pertinent to study this phenomenon in university students.

In recent years, university students and their mental health has gained a great deal of interest from the researchers (Macaskill, 2013).

University years is a transition from adolescence to adulthood characterized by changing emotional, academic, and social demands that requires a great deal of adjustment and learning of new skills (Nelson, Quinn, Marrington, & Clarke, 2013). Changing roles, demands, and expectation put university students at greater risk of mental health problems including anxiety, depression, suicidal ideation, and so on (Wynaden, Wichmann, & Murray, 2013). These problems if persist may lead towards serious consequences in academic, personal, and social domains of university students (Kugu, Akyuz, Dogan, Ersan, & Izgic, 2006). Since university years are considered stressful and need constant adaptability, yet some individual tend to adjust well in the expanding world of opportunities, might be because they possess some positive attributes that prevent and buffer against these stressors. Many studies have demonstrated that positive attributes like high self-esteem; confidence; ability to solve problems; communication skills; physical fitness and health; tolerance; social support from family and friends; parenting; physical and economic security; and satisfaction at work makes a good shield for a person's mental health functioning (Gucciardi, Gordon, & Dimmock, 2009b). It was also found that individuals who have a high mental toughness knowingly set enormously long-standing goals and never step back from them despite negative feedback (Duckworth, Peterson, Mathews, & Kelly, 2007).

To summarize, MT is one of the most appealing and functional concept of psychology, yet it has been given little attention on non athlete population. MT has only been studied with reference to sports psychology, while ignoring the general population and contextual differences. Therefore, a conceptual, empirical, and psychometric evidence is required to understand not only the nature, but also the determinants and consequences of MT in varied samples outside sports psychology context. In the current research, the concept of mental toughness is based on the theoretical framework of Gucciardi and Hanton, (2016) and defined as an individual's capacity to perform consistently despite life adversities. Keeping in view the importance and application of MT, the current study is aimed to explore the phenomenology of MT in university students and to develop a psychometrically sound measure to assess MT for university sample in Pakistan.

Method

Stage 1: Item Generation

Institutional Review Board (IRB) approved the current study for ethical considerations. Forty participants (20 men and 20 women)

from post-graduate level with the age range 18 to 25 years (M = 19.71, SD = 1.19) were selected from a private and a Public sector university of Lahore. Each participant was personally contacted by the researchers and all ethical issues were taken into account and each participant was briefly explained the aims and objectives of the research and assured about the privacy, confidentiality, and anonymity. Semi-structured interview were carried out individually lasting average 20 minutes were recorded in verbatim. The interview schedule was open-ended in nature and the participants were asked to identify and describe the key characteristics and components of mental toughness in university students. Mental toughness was operationally defined as "individual's reaction that enables him to call upon inner abilities, skills and strengths to deal with demands of an aversive situation".

Since the current research was exploratory in nature therefore, no prior assumptions, themes or broader categories were assumed. Based on these phenomenological interviews, all the verbatim were closely examined by the researchers. An attempt was made to retain original linguistic connotation and expression of university students. Each item was kept simple, clear, and double negatives were avoided. After excluding repetitions and vague items, a list of 40 items was finalized and named as Mental Toughness Scale (MTS).

Stage 2: Pilot Study

The aim of the pilot study was to determine the user-friendliness, comprehension of items, and instructions of MTS. Thirty participants (15 men and 15 women) from post-graduate level with the age range 18-25 years were selected. Mental Toughness Scale was converted into a self-report measure with Likert scale (0-3). All participants reported MTS as user-friendly with no difficulty in item comprehension.

Stage 3: Establishing Psychometric Properties

Participants. A total of 306 participants (151 men and 155 women) from post-graduate level were recruited from 3 universities of Lahore, Pakistan. Stratified random sampling technique was used and strata were made on the basis of gender and age. The age ranges of the participants from 18-25 (M = 20.66, SD = 1.36).

Measures. ***Demographic Form.*** A demographic form was devised comprising demographic information of the participants such as age, gender, class, and family system.

Mental Toughness Scale (MTS). A 40 item scale comprised the key components of the mental toughness in university students identified in Stage 1 was used. MTS requires respondents' response on each item of MTS to the extent to which it applies to them. Response options include 0 (*not at all*), 1(*slightly*), 2 (*to some extent*), 3(*very much so*). Higher score on MTS reflects high mental toughness in the university students.

Student Problem Checklist (SPCL; Saleem & Mahmood, 2011). The discriminant validity of MTS was established through SPCL which consists of 45 items with Likert scale (0-3); 0 (*not at all*), 1 (*very less*), 2 (*to some extent),* and 3 (*very much*). SPCL measures four different kind of mental health problems namely Being Dysfunctional, Loss of Confidence, Lack of Self-regulation, and Anxiety Proneness. SPCL was found to have acceptable psychometric properties. High score on SPCL reflects greater mental health problems in university students.

The Resilience Scale (RS; Khadim, 2015). Construct validity of MTS was established with Resilience Scale. The Resilience Scale (RS) comprised 47 items with scoring options 0-4; 0 (*never*), 1(*sometimes*), 2 (*often*), and 3 (*always*). Moreover, it measures four dimensions of the resilient and nonresilient individual, namely Lack of Emotion Regulation, Self-Confidence, Robustness, and Problem-Solving. The first factor represents lack of resilience. The Resilience Scale is validated on university students and found to have high reliability, validity, and other psychometric properties.

Procedure. Four universities were sent a request for permission to collect data from university students along with the brief research proposal highlighting the aims, objectives, and inclusion criteria for the selection of participants. Three universities were granted permission for data collection. Stratified sampling technique was used based on gender and educational level for recruitment of participants. A list of enrolled participant was collected from the registrar office of each university and every 10^{th} participant was selected and were approached with the help of university authorities. All the participants were given the consent form comprising assurance of confidentiality, anonymity and privacy. After obtaining informed consent, participants were tested in small group setting averaging 10. A debriefing session was carried out for any queries and feedback.

Results

The data was analyzed for validation via Exploratory Factor Analysis (EFA) and later for factors structure of Mental Toughness Scale, Confirmatory Factor Analysis (CFA) was done.

Exploratory Factor Analysis (EFA)

Initially, exploratory factor analysis with Varimax rotation was carried out on 40 items of the Mental Toughness Scale. Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was .83 and Bartlett's Test of Sphericity was found significant ($p < .001$). These values suggest that 40 items represented a homogenous group. The Scree Plot that indicated a three factor solution as a best fit model with least dubious items and clear factor structure. The criterion to retain items was .40 loading and 35 items retained. Five items had factor loadings less than .40 on all factors; thus, were dropped. The 3-factor solution accounted for 35% of the total variance in the data.

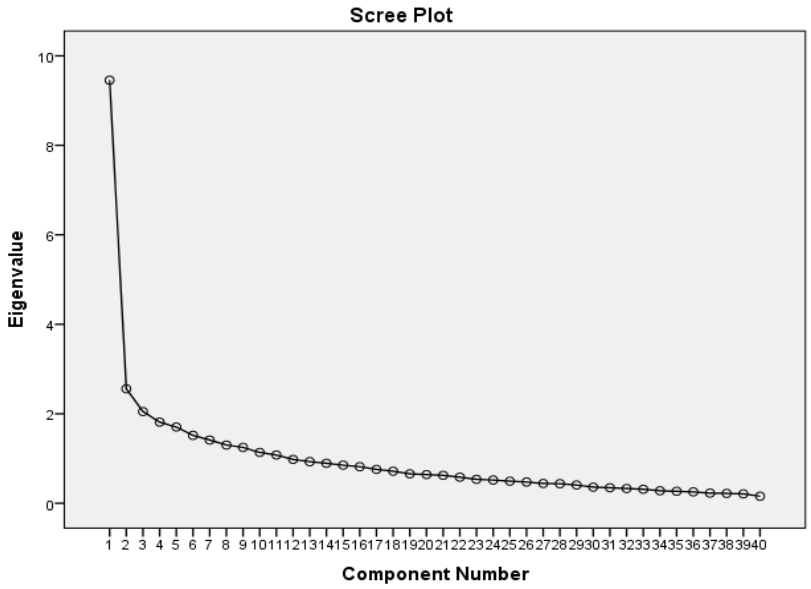

Figure 1. Scree plot of Mental Toughness Scale.

Table 1

Factor Structure of Item of Mental Toughness Scale (MT) With Varimax Rotation (N=154)

Items No	F1	F2	F3	Items No	F1	F2	F3
8	**.59**	.11	.24	6	-.05	**.71**	-.02
9	**.59**	.26	-.11	7	.35	**.53**	.17
10	**.58**	.39	-.07	20	.19	**.40**	.28
11	**.60**	.19	.22	22	.08	**.57**	.19
12	.41	**.36**	.26	23	.27	**.42**	.22

Continued…

Items No	F1	F2	F3	Items No	F1	F2	F3
13	**.51**	.38	.17	19	-.01	.39	**.53**
15	**.66**	.12	.02	27	.07	.30	**.42**
16	**.55**	-.02	.25	28	.02	.07	**.65**
18	**.56**	.35	.19	29	.11	.03	**.67**
21	**.40**	.37	.12	30	.16	.23	**.53**
24	**.49**	.33	.02	31	.16	.05	**.53**
25	**.52**	.09	.19	33	.09	.01	**.66**
26	**.52**	.26	.24	34	.28	.15	**.45**
32	**.43**	.34	.15	37	.04	.24	**.59**
35	**.45**	.37	.28	40	.20	.05	**.49**
39	**.44**	-.41	-.11	4	.33	.29	.36
1	.16	**.51**	.02	14	.16	-.05	.14
2	.06	**.41**	.17	17	.28	.01	.25
3	.29	**.47**	.29	36	.35	.03	.27
5	.29	**.65**	-.05	38	.24	.01	.19
Eigen Value					5.41	4.38	4.27
% of Variance					13.52	10.95	10.68
Cumulative %					13.52	24.47	35.15

Note. Items with .40 or above loading are boldfaced.

The first factor comprised 15 items denoted to a personal sense of competence and worthiness and having trust on oneself, therefore was titled as *Sense of Personal Competence;* second factor comprised of 10 items referred to having problems focused approach was tilted as *Problem Solving Skills;* and the last factor consist of 10 items denotes to having interpersonal skills and we tilted it as *Social Competence*.

Confirmatory Factor Analysis (CFA)

In the current research, the factor structure of the Mental Toughness Scale using confirmatory factor analysis and maximum likelihood estimate with AMOS 7.0 was computed (Arbuckle, 2006). Maximum likelihood estimation is based on the assumption that data is normally distributed and variables are continuous. In order to determine the normality of the data of Mental Toughness Scale (MTS), skewness and kurtosis values should be zero, yet few researchers agreed that the value ranges from -2 to +2 can also be considered as normality of data (e.g. Mindrilaˇ, 2010). The skewness value for MTS ranges from .37 to 1.02 and kurtosis values ranged between -.89 to 1.17.

Table 2

Confirmatory Factor Analysis of Mental Toughness Scale in University Students (N=152)

	X^2	CFI	TLI	NFI	IFI	RMSEA
Model 1	203.23	.71	.75	.65	.78	.07
Model 2	95.22	.92	.89	.84	.92	.05

Note. X^2 = chi square; CFI = comparative fit index; TLI = tucker lewis index; NFI = normed fit index; IFI = incremental fit indices; RMSEA = root mean square error of approximation.

All of the correlated errors were modified in a separate analysis and adding error covariance between four of the indicators of the same variables resulted into reduced chi-square. After a closer examination of these items and after the initial and few more models testing on CFA, it was found that these correlations were theoretically acceptable due to the overlap in the meaning of the items. Since mental toughness is considered to be a highly cohesive, consistent, and complementary phenomenon, therefore, a conceptual overlap exists in this construct. To sum up, by adding all theoretically appropriate correlations, the final model fits significantly and showed that the chi-square/degrees of freedom index was 95.22. The CFI (Comparative Fit Index) shows a value of .92; the TLI (Tucker-Lewis Index) gives a value of .89, NFI = .84 and IFI = .92 which is a good fit explanation of the covariance matrix. Similarly, the RMSEA (Root Mean Square Error of Approximation) show values of .05. Therefore, the result indicate that the model is good fit model of the mental toughness in university students.

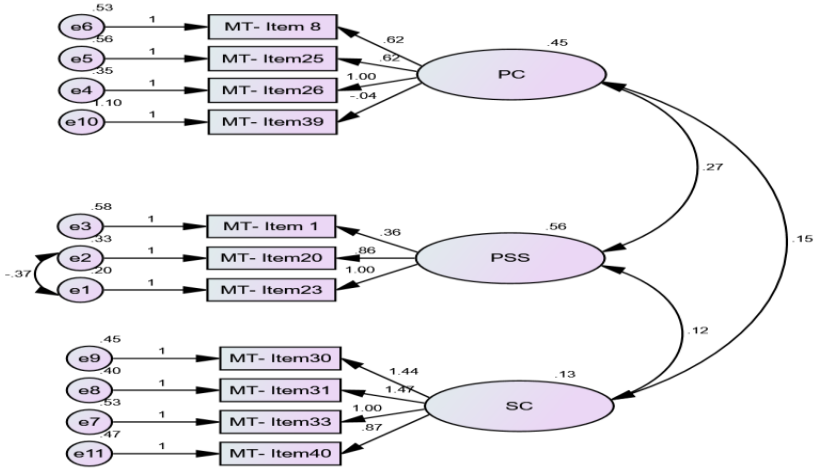

Figure 2. Confirmatory factor analysis of the mental toughness scale.

The above figure is representing the best fit model and it was identified by removing few items from each factor. The current generated model shows the more precise and sophisticated manifestation of Mental Toughness in the university students.

Internal Consistency of Mental Toughness Scale

Cronbach Alpha was measured to determine the internal consistency of subscales and total score of MTS. The total score on MTS was found to have high internal consistency (.91). The internal consistency is presented in Table 3 with means and standard deviations of total and subscales of MTS.

Split half Reliability

The split half reliability of mental toughness scale using odd and even method was found .90 ($p < .001$). The Cronbach alpha for two splits was found to be .82 and .79, respectively.

Test-retest Reliability

One week test-retest reliability of mental toughness scale on $n = 45$ participants was found to be $r = .86$.

Discriminant Validity

SPCL was used to determine the discriminant validity of the MTS. Theoretically speaking, mental health concerns are found to be a consequence of lack of mental toughness (e.g., Clough et al. 2002). An inverse correlation was hypothesized between the scores of MTS and SPCL. The results supported that a significant negative correlation was found between scores of MTS and SPCL (Table 3).

Construct Validity

The construct validity of the MTS was established with the scores of the Resilience Scale (Khadim, 2015). Literature has revealed that the construct of resilience is considered to be conceptually either as correlate or an outcome of mental toughness (Crust, 2008). Therefore, it was hypothesized that a positive correlation would be found between mental toughness and resilience. Correlation analysis was carried out between three factors of MTS and four factors of Resilience Scale and it was found that significant positive correlation exist between scales (Table 3).

Table 3

Means, Standard Deviations, Cronbach Alpha and Correlations of Mental Toughness Scale, with SPCL and The Resilience Scale (N = 306)

Factors	F1	F2	F3	FT	SPCL	RS1	RS2	RS3	RS4
SR	---	.61***	.58***	.86***	-.29**	-.29**	.36***	.45***	.42***
RES	---	---	.64***	.86***	-.37***	-.33**	.44***	.49***	.47***
PER	---	---	---	.85***	-.42***	-.19*	.49***	.55***	.45***
MT	---	---	---	---	-.34***	-.37***	.50***	.57***	.52***
M	28.05	25.85	22.90	76.80	63.81	23.77	28.69	17.54	12.64
SD	7.17	6.36	6.34	17.09	22.00	9.67	9.67	9.67	9.67
a	.84	.77	.87	.91	.93	.87	.87	.87	.87

Note. SR = Self Reliance, RES = Resilience, PER = Perseverance, MT = Mental Toughness, and SPCL = Student Problem Checklist, RS1 = Lack of Emotion Regulation, RS2 = Self-Confidence, RS3 = Robustness, and RS4= Problem-Solving

df=305 $^{*}p < .05$. $^{**}p<.01$. $^{***}p<.001$.

Gender Differences on Mental Toughness Scale

In order to test for gender and age differences of the participants (N = 306) on three subscales on Mental Toughness Scale Independent Sample t-test and ANOVA was performed. With reference to gender, results indicate that no significant difference was found between males and females participants ($p > 0.05$).

Discussion

The current research describe the development and validation of Mental Toughness Scale for university students from Pakistani cultural context. The study was carried out in series of phases comprising exploring the characteristic features of mental toughness while using a holistic, cohesive and complementary approach. Both exploratory and confirmatory factor analysis revealed three dimensions of MT namely Self-Reliance, Resilience and Perseverance. These three components are consistent with the previous literature, in the earlier studies the construct of Mental toughness is considered and taken as the multidimensional construct and same findings are presented that underlying the phenomenon of mental toughness there are combination of three factors that address the toughness of the university students (Clough et al., 2002; Gucciardi et al., 2009b).

The first component of MTS with six items is Self-Reliance which denotes to personal abilities of a person to face the adversities of life. In encompasses having strong sense of self –belief which enables an individual to cope with the life challenges and stressors. Strong faith on abilities with a great sense of competence. The sample items include, “Self-confidence”, “Strong decision making”, and “Being mentally strong”. During university time an individual finds the need of her personal strength many times and the significance of personal strength, strong decision making, bravery, and being mentally strong is very high during the stressful environment (Duckworth, et al., 2007; Singh & Jha, 2008). During university years, an individual without self-confidence would be at more risk to develop mental health problems and its presence in one’s life may make the path less narrow for one’s journey for developing better mental health functioning.

The second dimension is the Resilience that denotes to one’s ability to bounce back from stressful situations that becomes a buffer against mental health problems. Resilience factor also comprised 6 items including “self-sufficient”, “optimism”, “initiative taking”, and

so on. University living is quite demanding and sometimes it gets stressful because of unmet self-expectations and others' expectations so perceiving things negatively and lacking the positive filter in oneself can bring more challenges and may worsen the situation. Therefore, being in such a pressure environment a person needs to be resilient to thrash the upcoming challenges and increasing demands of changing emotional and social world. For a student to survive in a university it is quite important to be armed with positive thinking, problem solving abilities and being hopeful for a healthy survival (Duckworth et al., 2007).

The third factor of MTS is Perseverance denotes to a sense of persistence, consistency and being goal directed. This factor has a great deal of importance to university years which are considered as stressful time of continuous adjustment. Since individual is learning new skills to handle and cope the ever changing demands of social world, a sense perseverance provides shield and protection for better adjustment.

Mental Toughness Scale was found to have sound psychometric properties. An inverse relationship between MTS and Student Problem Checklist indicate that university students who are mentally tough had less mental health problems which indicated a high implication of the component of mental toughness in university population (Gucciardi et al., 2008). Also the relationship was found to be significant as the population selected for the current study usually goes through stressful time and they need to have such protective factors as mental toughness. If we look at our culture the student does not just have to fulfill their own expectations but also have to fulfill other's expectations including father, mother, siblings, teachers, mentors and friends. Therefore, in such an environment, the student needs to be mentally strong in order to fight with mental health issues. Similarly, a positive relationship between MTS and Resilience Scale also indicate that mental toughness and resilience are two overlapping constructs yet having similar function of a protective factor against adversities and stressful life events.

There was no statistical significance difference found between males and female on mental toughness. Although literature shows that males are more mentally tough than females but it's more based on the studies done in the domain of sports and as males were more dominant in sports so result was more inclined towards males (Cohen, 1993). Moreover, if we look at it from the cultural point of view it is quite clear that in our culture both men and women has to play distinct roles and responsibilities. Therefore, both need to learn new skills to handle new demands and expectations of university years.

Limitation and Suggestions

The current research is a seminal work in understanding and studying mental toughness in a sample of university students. There are certain limitations of the current study firstly, only urbanized sample is recruited to explore the dimensionality of mental toughness. Secondly, since this research is used only cross-sectional research design, more longitudinal data is needed to assess the stability of mental toughness over time. Future researches should focus on identifying various psycho-social and emotional determinates of mental toughness in general population. More attention is needed to demonstrate the effectiveness of skills trainings to develop this valuable constructs

Implication

The current study is providing an indigenous knowledge in the field of positive psychology by focusing more on Mental Toughness according to our cultural. This will provide a strong foundation that how clinical psychologists and counselling psychologists needs to focus on the strength based assessment and intervention when university students experiences any psychological distress.

Conclusion

A systematic empirical evidence emerged that encompasses three positive attributes of mental toughness which are cohesive, consistent and interlinked**.** It is also important to note that MT should be studied outside sport context to enhance ones potentials and functionality in stressful life situations. Furthermore, more focused and empirical attention is needed to determine how mentally tough individuals behave in other areas of their lives.MTS showed strong psychometric characteristics having good construct validity, discriminant validity and internal consistency.

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