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Among of Psychological Skills Training on Mental Toughness and Psychological Well-Being of Volleyball Players

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ABSTRACT

This study examined Among of a psychological skills intervention (PST) designed to enhance the mental toughness and psychological well-being of Volleyball Players in Dr.YSR Horticulture University affiliated colleges in Andhra Pradesh State. University Volleyball Players (N = 16). Within this context, PWB was conceptualized by an amalgamation of the following psychological constructs; self-esteem, perceived self-efficacy, positive affect and dispositional optimism. Progress was examined at three times evenly dispersed over the course of the six-month intervention, pre-, mid and post-intervention. The intervention was solution-focused and informed by Dweck's (2009) theory of a growth mindset and Goldberg's (1998) psychological strategies to develop mental toughness. The study design was a 2 (group) × 3 (time) two-way MANOVA with repeated measures on one factor (time). Various measures of mental toughness and positive psychological constructs were utilized. Over the course of the intervention, MT significantly improved, in addition to perceived self-efficacy, self-esteem and positive affect. Positive significant relationships were observed between components of MT and each of the positive measures; which lends support to the conceptualization of MT as a positive psychological construct which fosters positive psychological states. Further research is warranted to examine the development of MT on negative psychological constructs.

Keywords: Volleyball Players, Mental Toughness, Psychological Well-Being, Positive Psychology, Psychological Skills Training.

Introduction

The concept of mental toughness (MT) originated from the literature on hardiness (Maddi, 2002). Hardiness is defined by three characteristics; commitment (an involvement in life regardless of stress), control (made evident by a belief that the individual has the power to influence outcomes) and challenge (viewing it as a positive opportunity to develop and grow; Kobasa, 1979; Maddi, 2006). With these constructs in common (Golby & Sheard, 2004; Sheard, 2009), both hardiness and mental toughness possess the propensity to enhance performance, whilst evoking a buffering effect against psychological distress (Gerber et al., 2013; Sheard, 2012). Clough and colleagues (2002) drew attention to a prominent discrepancy, arguing that hardiness failed to capture the "unique nature of the physical and mental demands of competitive sport" (Sheard, 2012: p. 61), whereas mental toughness could better account for this with the inclusion of confidence as a dominant construct. An "unshakeable belief in ones abilities" is a pertinent feature of MT and widely supported to be key to athletic success (Lane, 2014). Definitional consensus of MT is yet to be established (Gucciardi et al., 2015) however the four key attributes alluded to within this paper are supported throughout the extant literature (Bull et al., 2005; Clough et al., 2002; Gucciardi et al., 2008), in addition to other qualities such as positive cognition, the ability to visualize success and constancy when in the pursuit of goals (Golby, Sheard, & van Wersch, 2007; Sheard, Golby, & van Wersch, 2009).

Whilst researchers have been examining the defining of mental toughness, many have also explored suitable paradigms. Extensive research supports the application of MT to the paradigm of Positive Psychology (PP) especially within the context of sport. Positive psychology closely examines orientations of psychological well-being (PWB; Lambert, Passmore, & Holder, 2015) and generates knowledge which endeavors to increase human flourishing and thriving (Hefferon, 2013: p. 2). MT appears to imitate these effects amongst athletic populations. Research to support this alludes to the promotion of markers of psychological health as a result of self-reported MT (Rusk & Waters, 2013). Stamp et al. (2015) noted a close association between MT and constructs closely associated to psychological well-being, such as positive affect (Mahoney et al., 2014) and dispositional flow (Crust & Swann, 2013).

When examining PWB, the literature advises the use of both hedonic (assessment of positive emotions and sensations) and eudemonic (measuring constructs which enhance a great sense of life satisfaction; Russel, 2007) related measures (Henderson & Knight, 2012; Huta & Ryan, 2010). Dispositional optimism and positive affect are categorised as hedonic. However they differ in the sense that positive affect is derived from a bottom-up theory of PSW which suggests that it is the accumulation of positive affective experiences which dictate the overall sense of wellness. Alternatively, dispositional optimism encompasses a top-down approach as it assesses PWB as an innate propensity to view the world in a certain way (Lambert, Passmore, & Holder, 2015). Perceived self-efficacy and self-esteem are more closely related to eudemonic strands; self-efficacy beliefs are intrinsically linked to autonomy

and a greater sense of control outlined by the Self-Determination (Ryan & Deci, 2000); whereas self-esteem relates to self-acceptance which is highlighted in Ryff's theory of psychological well-being (Ryff, 1989). Both positive constructs represent cognitions which may prove useful to individuals looking to bolster their psychological health and create a more satisfactory life. Thus, the inclusion of each ofthe four measures within the present study provided a comprehensive view of the participant's state of psychological well-being.

Interventions designed to foster a growth-mindset include subtle strategies such as modifying feedback, avoiding statements which attribute success to innate qualities and instead praising effort and practise (Ratten et al., 2015). Within this study the analysis of past performance was also encouraged so weaknesses could be identified and targeted, instilling the belief that consistent practise is the key to success, in turn promoting a growth mindset and healthier attitude towards failure (Dweck, 2009). Encouraging a growth mindset has been found to foster psychologically safe learning environments (Spitzer & Aronson, 2015). The utilisation of the simplistic strategies mentioned has generated significant improvements in motivation and performance; despite not being the panacea for poor performance, they appeared to prime individuals to perceive and respond to situations in a more efficient manner (Dweck, 2012; Rattan et al., 2015; Yeager et al., 2016). Beyond anecdotal evidence, studies have reported neurological differences, those allocated to the growth mindset condition demonstrated greater error-related attention allocation, whereas the fixed mindset group attended to adaptive post-error performance to a greater extent. This highlights how a growth mindset increases awareness of weaknesses/mistakes (Schroder et al., 2014). The notion of a growth mindset is supported by newly emerging research on the neuroplasticity of mature brains (Yamaguchi et al., 2016) which demonstrate how adult brains form new neural pathways and develop in response to practise (Ericsson, Krampe, & Tesch-Romer, 1993).

There is evidence that mental toughness can be developed in a number of ways (Bull et al., 2005), however there is no research to date identifying the superiority of any method (Clough & Strycharczyk, 2012). Psychological skills training remains one of the most utilized procedures which has been demonstrated simultaneously to foster positive psychological development (Beauchemin, 2014; Williams & Krane, 2001). This makes it a favorable approach for the vulnerable athletic populations (e.g., Olympic athletes, student-athletes). PST was developed to enhance performance by providing athletes with an enhanced sense of control over effective movement coordination during training and competition (Martens, 1987; Rushall, 1992) and is underpinned by cognitive-behavioural techniques (e.g., Meichenbaum, 1977). The present study adopted a collaborative, adaptive approach, whereby assessments of the psychometric measures of mental toughness were used to assess and identify weakness from the onset and throughout the intervention, to inform the content of subsequent PST sessions. This approach made better use of the restricted time and enhanced the individualization of the psychological skills training session.

Purpose:

This study was designed to examine the effects of PST on MT and psychological well-being amongst a sample of female student-rowers over the course of the competitive season. More specifically, to assess whether PST improved MT in addition to constructs closely associated to psychological well-being. Furthermore, the purpose of secondary analysis was to examine the relationship between MT and PWB.

Mental Toughness:

Session content and rationale for use of specific strategies and techniques

- **a)** Personal Introductions
- **b)** Purpose of the PST
- **c)** Logbook

Assessment 1 **Rowers received a link to the online survey**

a) Feedback from the squad's first psychometric assessment

b) Technique 1: Self-Talk

c) Technique 2: Thought-stopping

d) Technique 3:Thought Control

e) Technique 4: Concentration Skills & Focus

Assessment 2

a) Feedback from the squad's second psychometric assessment

b) Building self-confidence - Awareness of "U"

c) Technique 5: Expect success and Positive imagery

Assessment 3

a) Psychometric scores

b) Debrief of the session

Psychological Well-Being:

Self-esteem: The Rosenberg Self Esteem Scale (RSES; Rosenberg, 1965) was used, the RSES is a 10-item measure which denotes a global feeling of self-worth utilising a four-point Likert scale ranging from "strongly agree" to "strongly disagree" to statements such as "I feel I have a number of good qualities".

Perceived self-efficacy: Self-efficacy was assessed using The Generalised Self-Efficacy Scale (GSES; Schwarzer & Jerusalem, 1993). The GSES is a 10-item measure based on a Four-point Likert scale whereby agreement is categorised as "not at all true", progressing through to "extremely true" to statements such as "I am confident I could deal efficiently with unexpected events".

Dispositional optimism: The Life Orientation Test (LOT; Scheier & Carver, 1985) was administered to examine dispositional optimism. The LOT is contrived of eight items on a Five-point Likert scale. The items denote level of agreement ranging from "I agree a lot" to "I disagree a lot" to statements such as "most days, life is really interesting for me".

Positive affect: The Positive and Negative Affect Schedule (PA-NAS, Watson, Clark, & Tellegen, 1988) was used to assess experiences of positive affective states. The PANAS is a 20-item measure based on a Five-point Likert scale. Each item requires the participant to retrospectively sum-up the degree to which they feel a certain way (i.e., interested, inspired…). Items range from "not at all to" to "extremely". Adequate psychometric properties have been reported for each of the four measures (Makikangas & Kinnunen, 2003; Schwarzer & Jersalem, 1993; Iwanaga et al., 2004; Crocker, 1997).

Design:

A 2 (group) × 3 (time) two-way MANOVA with repeated measures on one factor (time) was implemented. The two levels of the independent group variable of perceived performance was University Volleyball Players (N = 4), versus the remaining Volleyball Plyers. The three levels of the repeated time variable were classified as pre-, mid- and post-intervention.

Statistical Analysis:

Analysis was conducted using SPSS 21.0. The data was screened for normality and outliers. Significant correlations were interpreted with Pearson's moment-correlation (Hinkle, Wiersma, & Jurs, 1998) and a two-way multivariate analysis of variance with repeated measures on one factor (time) was administered followed by post-hoc testing to examine differences. As the success of psychological skills training was dependent not only on the progress of the squad, but each participant's progress, the reliable change index (RCI; Jacobson and Traux, 1991) was calculated (Zahra, 2010). This warranted a test-retest study on a representative sample of Dr.YSR Horticulture University Volleyball Players (N = 30) over a two-week period. Due to the limited sample size, a two-way random effect interclass correlation was used to establish a measure of reliability for both measures of MT (*SMTQ*; ICC(3) = 0.915, $p < 0.001$ and *PPI-A*; ICC(3) = 0.948, $p < 0.001$) (see **Table 1** for reliability statistics).

Results:

Descriptive statistics suggested a discernible improvement over time in MT, self-efficacy, positive affect, selfesteem and dispositional optimism; however not all improvements were statistically significantly.

Table 1: Reliability statistics

Measure	Alpha	Pearson's correlation co-efficient	Inter-class correlation co-efficient
PPI-A	0.913	0.840**	0.915**
SMTQ	0.948	0.903*	0.948**

****p* < 0.001.**

Table 2: Descriptive statistics.

	Pre-intervention	Mid-Intervention	Post-intervention
	Mean (SD)	Mean (SD)	Mean (SD)
SE	31.2 (3.1)	32.0 (4.2)	34.8 (3.2)

DO	24.3 (3.8)	24.7 (3.4)	25.5 (3.3)
PSE	32.9 (3.6)	32.8 (3.7)	34.6 (3.4)
PA	37.3 (5.4)	41.3 (4.9)	42.7 (5.2)
SMTQ	42.0 (5.0)	44.0 (5.0)	48.0 (3.0)
Conf.	17.3 (2.9)	18.1 (3.6)	20.7 (2.1)
Const.	14.3 (1.4)	14.8 (1.0)	14.7 (1.0)
Cont.	10.1 (2.8)	11.4 (2.2)	12.6 (2.0)
PPI-A	53.0 (6.0)	55.0 (7.0)	59.0 (4.0)
D	13.2 (1.5)	13.3 (1.6)	14.0 (1.0)
SB	14.8 (2.8)	15.1 (2.9)	16.4 (2.0)
PC	14.6 (2.5)	15.0 (2.4)	16.5 (1.6)
V	10.7 (2.4)	11.6 (2.8)	12.1 (2.0)

SE = Self-Esteem; DO = Dispositional Optimism; PSE = Perceived Self Efficacy; PA = Positive Affect; SMTQ; Total MT Score of Sports-related Mental Toughness Questionnaire; Conf. = Confidence; Const. = Constancy; Cont. = Control; PPI-A; Total MT Score of Psychological Performance Inventory-Alternative; D = Determination; SB = Self-Belief; PC = Positive Cognition; V = Visualisation.

Table 3: Correlations

	SE	DO	PSE	PA	SMTQ	Conf.	Const.	Cont.	PPI-A	D	SB	PC	V
SE	1												
DO	0.384	1											
PSE	0.477*	0.490*	1										
PA	0.159	0.601*	0.701**	1									
SMTQ	0.317	0.204	0.553*	0.665**	1								
Conf.	0.43	0.652**	0.202	0.434	0.719**	1							
Const.	0.003	0.236	0.229	0.468*	0.670**	0.4	1						
Cont.	0.129	0.421	0.662*	0.557*	0.802**	0.237	0.343	1					
PPI-A	0.432	0.204	0.641**	0.373	0.689**	0.357	0.324	0.725**	1				
D	0.155	−0.037	0.540*	0.407	0.296	−0.148	0.191	0.522*	0.473*	1			
SB	0.343	0.241	0.402	0.188	0.507*	0.409	0.192	0.441	0.722**	−0.136	1		
PC	0.106	0.298	0.474*	0.411	0.735**	0.606**	0.4	0.572*	0.756**	0.331	0.555*	1	
V	0.465*	−0.060	0.286	0.02	0.167	−0.124	0.043	0.357	0.554*	0.342	0.147	−0.020	1

SE = Self-Esteem; DO = Dispositional Optimism; PSE = Perceived Self Efficacy; PA = Positive Affect; SMTQ; Total MT Score of Sports-related Mental Toughness Questionnaire; Conf. = Confidence; Const. = Constancy; Cont. = Control; PPI-A; Total MT Score of Psychological Performance Inventory-Alternative; D = Determination; SB = Self-Belief; PC = Positive Cognition; V = Visualisation.

$p < 0.001$, partial $\eta 2 = 0.44$, SMTQ $F(2, 30) = 18.64$, $p < 0.001$, partial $\eta 2 = 0.55$, positive affect $F(2, 30) = 4.49$, $p = 0.020$, partial $\eta 2 = 0.23$, self-esteem $F(2, 30) = 13.98$, $p < 0.001$, partial $\eta 2 = 0.48$ and perceived self-efficacy, $F(2, 30) = 4.69$, $p = 0.017$, partial $\eta 2 = 0.24$ also significantly changed over the course of the intervention. However, no significant change was observed amongst group means for dispositional optimism $F(2, 30) = 1.93$, $p = 0.16$, partial $\eta 2 = 0.11$. Pair-wise comparisons identified that the majority of significant change occurred pre- to post-intervention (SMTQ $p < 0.001$; PPI-A p

= 0.002; self-esteem $p < 0.001$; positive affect $p = 0.037$) excluding perceived self-efficacy and dispositional optimism; there were no significant differences between group means when analysing pre- to mid-scores (SMTQ $p = 0.08$; PPI-A p.53; perceived self-efficacy $p = 1.00$; dispositional optimism $p = 1.00$; self-esteem $p = 0.97$; positive affect $p = 0.09$). The RCI highlighted the number of individual significant improvements and deteriorations ($p < 0.05$) amongst the squad (refer to **Table 4** for details).

Discussion

The objective of the study was to examine the effects of a psychological skills training (PST) intervention incorporating principals of Dweck's (2009) theory of a growth mindset on the MT and psychological well-being, namely self-esteem, perceived self-efficacy, positive affect, and dispositional optimism of a sample of studentathletes, as well as to examine the relationship between MT and both eudemonic and hedonic measures of subjective well-being. The total MT score (SMTQ; Sheard et al., 2009) was significantly related to perceived self-efficacy, dispositional optimism and positive affect.

Table 4: Reliable change index for measures of mental toughness. Green signifies a significant increase and red denotes a significant deterioration.

SMTQ				PPI-A			
Participant	Pre-score	Post-score	RCI	Participant	Pre-score	Post-score	RCI
1	41.07	45.89	1.54	1	52.76	59.04	3.54
2	40.34	42.34	2.78	2	50.35	54.9	3.29
3	45.03	46.23	3.76	3	52.82	56.35	0.98
4	42.34	43.24	2.9	4	55.89	60.08	4.76
5	44.56	44.89	1.89	5	60.01	65.36	3.99
6	48.43	50.34	1.56	6	59.24	63.46	1.76
7	41.09	44.23	3.72	7	53.75	53.77	0
8	40.56	42.18	4.39	8	54.36	57.87	2.49
9	48.98	51.08	2.22	9	51.1	56.79	3.09
10	46.34	50.41	3.08	10	50.28	55.37	2.1
11	41.88	44.23	5.09	11	52.91	57.98	2.6
12	40.92	44.56	2.89	12	59.9	55.78	-2.54
13	41.01	44.23	1.07	13	58.54	59.78	0.78
14	40.99	41.65	1.99	14	56.89	60.45	2.09
15	47.13	51.23	1.56	15	62.98	67.89	3.28
16	43.96	45.89	3.87	16	59.09	64.78	2.45
17	41.02	44.23	3.25	17	55.5	60.74	1.98
18	40.62	41.23	1.9	18	49.07	54.89	2.08
19	40.39	46.08	4.76	19	52.9	56.87	3.56

This supports the claim that characteristics of MT are closely associated to subjective psychological wellness (Mahoney et al., 2014; Sheard, 2012). However, the Adapted Psychological Performance Inventory (PPI-A) measuring the athletes attributes and awareness of mental skills was not significantly related to any of the following positive measures, despite the positive significant relationship between sub-component determinism and perceived self-efficacy. The PPI-A captures unique components of MT, it is also reasonable to argue that the discrepancies observed highlight how some, but not all characteristics of mental toughness align with positive psychological well-being; whilst lending support to nascent research identifyingrelationships between components of MT and characteristics detrimental to psychological health, such as those associated with the dark triad (specifically narcissism, psychopathy and Machiavellianism; Onley et al., 2013; Sabouri et al., 2016). Alternatively, this result may be due to a reductionist approach adopted to the assessment of psychological well-being. It is also important to be mindful that the measure itself was derived by earlier work of Loehr (1986) and despite the years of practical experience which informed development, the psychometric properties of the earlier measure came under scrutiny (Middleton

et al., 2003; Sheard et al., 2009). Despite the improvements made to the psychometric properties of the adapted Psychological Performance Inventory (PPI-A Golby et al., 2007), this may well warrant further psychometric support. The adaptive PST was found to significantly increase levels of mental toughness according to both psychometric measures. There was also a notable increase in levels of perceived self-efficacy, positive affect and selfesteem reported. Therefore it was concluded that this demonstrated convincing evidence both for the trainability of mental toughness and the development of psychological well-being as a result of adaptive-psychological skills training. Post-hoc analysis denoted that there was no significant change in dispositional optimism; this may have been due to the nature of the measure, since dispositional optimism is seen as a stable construct and present findings support this interpretation.

Future Research:

It is important to give consideration to the other variables which may have influenced the results; for instance, visualisation scores may have been susceptible to athletes imaging ability (Issac, 1992; Rodgers, Hall & Buckholtz, 1991) and boat allocation (which took place mid-way through the intervention) may have had a direct effect on the rower's confidence scores as perceived performance is closely associated to an athlete's self-belief (Krane & Williams, 2006). It is also important to note the findings are only applicable to female student-athletes and therefore future research should consider the implications amongst a male sample. Another pertinent factor may have been the participant's involvement in a new training regime as the start date of the research coincided with the beginning of the competitive season. There is evidence to suggest that physical training fosters the development of MT as well as closely related constructs such as resilience (Deuster & Silverman, 2013), and plentiful research highlighting the psychological benefits of exercise (e.g., Edwards, 2015). To substantiate findings, further research should consider measures to help to control the variables. Before MT can be firmly placed within the realms of positive psychology, research is warranted to explore other positive constructs associated to psychological wellness, such as flourishing (Diener, 1984), as well as the negative constructs evoking a detrimental

effect on psychological health (Sabouri et al., 2016). Researchers may also want to consider ways to gather follow-up qualitative data to further validate their results.

Implications

This study demonstrates promising short-term effects of psychological skills training utilizing growth mindset principals (Dweck, 2009), not only to enhance the mental toughness of athletes but also enhance their sense their psychological wellness which can also have profound benefits to overall health and performance (Mahoney et al., 2014). The use of RCI enabled an assessment of the individual participant's progress with regards to their MT and identified a greater proportion of participants experiencing a significant improvement in MT over the course of the intervention. This provided a useful, time-saving tool to decipher which athletes are making progress against those who were not, enabling the identification of athletes who may require further support. Due to ease of administration, the use of the RCI is strongly advised for those examining the effectiveness of psychological interventions amongst groups of athletes to enable assessment of individual psychological performance; however one potential limitation is the requirement of a reliability assessment (Zahra & Hedge, 2010).

Overall, this study supports the basic principles of PST and encourages practioners and coaches to implement and work collaboratively during its implementation. Positive psychology promotes optimal functioning amongst healthy individuals, helping individuals who fall within normal parameters surpass boundaries and flourish (Compton & Huffman, 2013), it is based on the premise of "not just fixing what is broken, but nurturing what is best" (Seligman & Csikszentmihalyi, 2007: p. 7). Within the current study, the participants had not reported signs of psychological distress or required treatment for a psychological problem. Therefore, the sessions were designed to nurture what was there and develop a greater sense of mental toughness and psychological wellness utilizing psychological strategies and encouraging a growth mindset (Dweck, 2006). Within sport, the pressure the athlete's experience, in addition to the focus and determination required to succeed mean it is paramount that the athlete is psychologically equipped (Lawless & Grobbelaar, 2015). These findings support previous claims that mental toughness development is primarily driven by the principals of positive psychology; to enable the athlete to surpass the norm and experience optimum psychological functioning in both sport and everyday life

(Sheard, 2012).

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