

# On the mental toughness of self-aware athletes: Evidence from competitive tennis players

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This study examined the relationship between mental toughness (MT) and self-awareness in a sample of 175 male and 158 female South African tennis athletes (mean age = 29.09 years, s.d. = 14.00). The participants completed the Sport Mental Toughness Questionnaire and the Self-Reflection and Insight Scale to assess MT (confidence, constancy, control) and self-awareness (self-reflection and self-insight) dimensions, respectively. Linear regression indicated that self-insight ( $\beta=0.49$ ), but not self-reflection ( $\beta=0.02$ ), predicted global MT. Multivariate regression analyses were significant for self-reflection ( $\eta_p^2=0.11$ ) and self-insight ( $\eta_p^2=0.24$ ). Self-reflection predicted confidence and constancy ( $\eta_p^2=0.05$  and 0.06, respectively), whereas self-insight predicted all three MT subcomponents ( $\eta_p^2=0.12$  to 0.14). The findings extend prior qualitative research evidence supporting the relevance of self-awareness to the MT of competitive tennis athletes, with self-reflection and insight forming prospective routes through which athletes' MT may be developed.

## Significance:

- Self-awareness attributes were predictive of higher levels of mental toughness among competitive tennis players.
- Dimensions of self-awareness may offer routes for developing athletes' mental toughness.

## Introduction

Mental toughness (MT) is widely recognised as a fundamental attribute for attaining success in sport.<sup>1</sup> Mentally tougher athletes maintain performance levels during adversity; perceive pressure as a challenge and a catalyst for prospering; and maintain emotional, cognitive and behavioural control despite situational stressors.<sup>2</sup> Considering the appeal that these cognitive and behavioural signatures have to athletes, MT has become a prominent research area in the sport performance literature.<sup>3</sup>

Scholars' primary interest in MT is based on the capacity to acquire MT attributes through sport and non-sport developmental influences and experiences<sup>4</sup>, as well as through psychological interventions<sup>5</sup>. However, determining the MT dimensions that may be taught and the most effective approaches to develop them requires resolutions to the current conceptual and operational disparities that exist. Some researchers contend that MT is a narrow personality trait that is situationally stable<sup>5,6</sup>, whereas others suggest MT is state-specific and may fluctuate depending on the situation<sup>7,8</sup>. In addition to MT manifestation distinctions, these conceptualisations differ in the extent to which MT may be developed. However, in support of the mutual inclusivity of these perspectives, Gucciardi et al.<sup>3</sup> reported that a combination of intraindividual (i.e. within person) and interindividual (i.e. between person) differences may be attributed to the variability of MT. Accordingly, an athlete may display enduring patterns of MT across similar situations, but varied levels of MT across dissimilar situations.

Although the multidimensionality of MT has generally been supported<sup>9</sup>, the type and quantity of constituents comprising MT remains unclear<sup>10</sup>. In addition to dimensional discrepancies between sport types,<sup>11</sup> within-sport MT differences have been found. For instance, Coulter et al.<sup>12</sup> reported that risk-taking is an integral MT component in soccer, whereas Thelwell et al.<sup>13</sup> indicated that MT in a soccer player involved affecting one's opponents. The characterisation of MT variations are reflected in the range of instruments that often diverge in the types of MT that are measured. To illustrate, affective intelligence is included as a subfactor on the Cricket Mental Toughness Inventory<sup>14</sup>, but is not contained within the Australian Football Mental Toughness Inventory<sup>15</sup>.

Although unequivocally determining the components that constitute MT is necessary, there are several components that are repeatedly referred to in the literature.<sup>16</sup> These components include confidence or self-belief; emotional and cognitive control; accepting, persevering and thriving through challenges; and commitment and determination.<sup>2,17</sup> Accordingly, MT refers to a collection of personal resources (inherent and developed) associated with athletes' pursuit of optimal athletic performance levels, irrespective of positive and negative situational demands.<sup>18,19</sup>

In the extant literature, considerable attention has been devoted towards examining the characteristics associated with MT. Commonly identified correlates of MT include effective coping, the use of self-talk, relaxation strategies and mental imagery.<sup>20-22</sup> Mentally tougher athletes have greater flow experiences (concentration, autotelism)<sup>23</sup>, perceive stressors as less intense<sup>24</sup>, and utilise performance- and mastery-approach achievement goals<sup>25</sup>. Collectively, MT is related to a number of positive psychological characteristics. However, self-awareness, also referred to as psychological self-mindedness, is one concept that has received limited quantitative MT research attention. Self-awareness represents the capacity to attend to, recognise and examine one's thoughts, physiological sensations, emotions and behavioural reactions, either as they occur or retrospectively.<sup>26,27</sup>

Although the self-awareness process is multifaceted and associated with an array of corollaries and self-directed attention areas<sup>28</sup>, common conceptualisations encompass two primary components: engagement in self-reflection and the attainment of self-insight<sup>28-30</sup>. Self-reflection involves emotional, cognitive and behavioural self-introspection, whereas self-insight refers to clarifying and obtaining a deeper understanding of such experiences.<sup>29</sup>

Even though self-reflective activities may not automatically result in self-insight<sup>31</sup>, self-awareness represents an important process for identifying and replacing maladaptive responses as well as establishing progress towards achieving positive psychobehavioural changes<sup>28,32</sup>.

In sport, awareness of one's emotions has been linked to superior performance.<sup>33</sup> In particular, maintaining peak performance levels is at least partly dependent on the ability to recognise negative emotions and cognitions and effectively control or avoid the detrimental effects of such experiences.<sup>34</sup> With research supporting the emotional and cognitive control of mentally tough athletes<sup>35</sup>, along with the understanding that MT is associated with positive performance outcomes<sup>3</sup>, self-awareness attributes may be relevant to athletes' MT.

Recent qualitative research has posited the relevance of several forms of self-awareness (e.g. emotional and cognitive) in relation to MT. Bull et al.<sup>25</sup>, for instance, qualitatively established *thinking clearly* (awareness, focus and control of thoughts) as an essential component of MT in elite cricket. Slack et al.<sup>36</sup> extended this finding to denote cognitive *awareness of own emotions* as indicative of mentally tough English Premier League football referees. There is also evidence to suggest that self-awareness promotes or facilitates heightened levels of MT<sup>37</sup> – a finding that supports early heuristic MT perspectives<sup>38</sup>.

Taken together, these findings provide preliminary support for the applicability of self-awareness characteristics to the MT of athletes. However, prior MT studies have not specified what embodies self-awareness, and, despite recent qualitative findings, there is a dearth of knowledge about the role of emotional, cognitive and behavioural self-awareness in relation to MT. Therefore, the purpose of the current study was to explore the relationships between MT and self-awareness components (i.e. self-reflection and self-insight) in competitive tennis players. It was hypothesised that MT and each of its subcomponents would be significantly predicted by both (1) self-reflection and (2) self-insight.

## Method

### Participants

The participants were 175 male (mean(s.d.) age = 31.99(15.64) years) and 158 female (mean(s.d.) age = 25.89(11.12) years) tennis players competing at various levels: county club ( $n=58$ ), local county tournament ( $n=21$ ), university league ( $n=147$ ), national tournament ( $n=76$ ) and international tournament ( $n=31$ ). The athletes had played tennis for a minimum of 5 years (mean(s.d.) of 17.13(12.27) years) and had engaged in tennis competition within 2 weeks prior to their participation in the study.

### Materials

#### Mental toughness

The Sports Mental Toughness Questionnaire (SMTQ)<sup>17</sup>, which comprises 14 Likert-type items rated from 1 ('not at all true') to 4 ('very true'), was used to ascertain MT. As a multidimensional measure of MT developed from the most common components of MT identified in the literature,<sup>39</sup> the SMTQ measures control, confidence and constancy. There are four control items (e.g. 'I am overcome by self-doubt'), six confidence items (e.g. 'I interpret potential threats as positive opportunities') and four constancy items (e.g. 'I take responsibility for setting myself challenging targets'). The subscales may be combined for a global measure of MT. The selection of the SMTQ was based on the demonstrated validity (i.e. factorial, divergent, discriminative) and reliability of the instrument reported in the initial validation study.<sup>17</sup> Subsequent studies have supported the convergent validity<sup>40,41</sup> and internal consistency of global MT.<sup>42,43</sup> In this study, Cronbach's alpha for global MT was 0.75.

With alpha inclined to underestimate internal consistency when fewer than 10 items are included on a scale, mean inter-item correlations are important for assessing scalar homogeneity.<sup>44</sup> According to Briggs and Cheek<sup>45</sup>, mean inter-item correlation values with a range of 0.2–0.4 indicate appropriate item homogeneity. The internal consistency estimates

(and mean inter-item correlations) for confidence, constancy and control were 0.64 (0.23), 0.56 (0.25) and 0.66 (0.33), respectively.

#### Self-awareness

The Self-Reflection and Insight Scale (SRIS)<sup>29</sup> was used to assess self-awareness. The SRIS comprises 20 Likert-type items (1 = 'strongly disagree', 6 = 'strongly agree') on two subscales: self-reflection (12 items) and self-insight (8 items). Self-reflection measures one's need for and engagement in self-evaluation (e.g. 'I frequently examine my feelings') and self-insight assesses the lucidity of one's thought, emotional and behavioural understanding (e.g. 'I usually know why I feel the way I do'). The SRIS has received construct, convergent and cross-cultural validity support<sup>29,46</sup> and both subscales have evidenced acceptable internal consistency and test-retest reliability<sup>29,47-48</sup>. Internal consistency for self-reflection in this study was 0.90, and alpha (and the mean inter-item correlation) for self-insight was 0.78 (0.30).

### Procedure

Permission letters were obtained from relevant tennis organisations in order to acquire institutional ethical approval to conduct the study. Full ethical approval was subsequently granted by the University of KwaZulu-Natal Humanities and Social Sciences Research Ethics Committee (HSS/0740/013D). Suitable tennis tournaments were identified, and the organisers were approached in order to request permission to access the competitive tennis players. Various tennis tournament and club venues across South Africa were attended and the self-administered questionnaires were distributed in groups of approximately 5 to 10 athletes at a time, according to the players' availability. Informed consent was obtained prior to the players' participation, and all relevant Declaration of Helsinki principles were adhered to. A quiet and comfortable venue was established at each location for completion of the questionnaire. The inventories required approximately 15 to 20 minutes to complete; each player completed the SMTQ followed by the SRIS. The participants were requested to consider the extent to which each item applied to them, generally, in relation to their participation in competitive tennis.

### Data analyses

Box-plot assessment revealed a small number of gross outliers on the global MT scale and subscales. These individual case values were removed before computing the analyses (see Table 1). Normality estimates (i.e. skewness and kurtosis) were within acceptable limits (i.e.  $\pm 2$ )<sup>49</sup> for proceeding with parametric computations. Along with these estimates, the descriptive statistics for each variable and bivariate relationships are reported in Table 1. After satisfying the hypothesis testing assumptions associated with conducting parametric regression analyses (e.g. normality, homoscedasticity), multiple linear regression and multivariate regression were used to determine whether self-reflection and self-insight predicted global MT and each of the MT components, respectively. For significant multivariate analyses, a Bonferroni adjustment was applied to follow-up univariate  $p$ -values to preserve familywise alpha. An alpha value of 0.05 was used for each statistical test.

## Results

### Bivariate analyses

According to Cohen's<sup>50</sup> effect size standards, the correlations between global MT and self-reflection ( $r^2=0.02$ ) and self-insight ( $r^2=0.25$ ) were small and large, respectively (see Table 1). With the exception of control, which was not significantly associated with self-reflection ( $r^2 = 0.00$ ), the relationships between the MT subcomponents and self-reflection and insight were medium in effect size ( $r^2 = 0.06$  to 0.15).

### Univariate and multivariate analyses

The multiple linear regression results indicated that self-insight ( $\beta=0.49$ ,  $p<0.001$ , 95% CI [0.41, 0.57]), but not self-reflection ( $\beta=0.02$ ,  $p=0.652$ , 95% CI [-0.09, 0.13]), significantly predicted global MT:  $F(2, 327)=54.38$ ,  $p<0.001$ ,  $r^2=0.25$ , 95% CI [0.17, 0.33].

**Table 1:** Normality estimates, descriptive statistics and bivariate relationships

Variable	Global mental toughness	Confidence	Constancy	Control	Self-reflection	Self-insight
Global mental toughness	–	0.74**	0.72**	0.72**	0.14*	0.50**
Confidence	–	–	0.41**	0.27**	0.24**	0.34**
Constancy	–	–	–	0.30**	0.24**	0.39**
Control	–	–	–	–	-0.07	0.37**
Self-reflection	–	–	–	–	–	0.25**
Self-insight	–	–	–	–	–	–
<i>n</i>	330	330	327	330	333	333
Mean (s.d.)	41.53 (4.66)	18.26 (2.25)	12.93 (1.71)	10.51 (2.26)	50.41 (10.12)	34.28 (5.80)
Skewness	0.15	0.23	-0.09	0.30	-0.17	-0.09
Kurtosis	-0.17	0.07	-0.54	-0.54	-0.30	-0.34

Note: \* $p < 0.05$  (two-tailed); \*\* $p < 0.001$  (two-tailed)

Multivariate regression revealed self-reflection,  $F(3, 318)=12.87$ ,  $p < 0.001$ , Wilk's  $\Lambda=0.89$ ,  $\eta_p^2=0.11$ , 95% CI [0.05, 0.17], and self-insight,  $F(3, 318)=33.43$ ,  $p < 0.001$ , Wilk's  $\Lambda=0.76$ ,  $\eta_p^2=0.24$ , 95% CI [0.15, 0.31], significantly predicted one or more subcomponent of MT. Specifically, self-reflection predicted confidence,  $F(1, 320)=16.85$ ,  $p < 0.001$ ,  $\eta_p^2=0.05$ , 95% CI [0.01, 0.10], and constancy,  $F(1, 320)=21.72$ ,  $p < 0.001$ ,  $\eta_p^2=0.06$ , 95% CI [0.02, 0.12], but not control,  $F(1, 320)=1.47$ ,  $p=0.678$ ,  $\eta_p^2=0.01$ , 95% CI [0.00, 0.03]. Self-insight was a significant predictor of confidence,  $F(1, 320)=44.01$ ,  $p < 0.001$ ,  $\eta_p^2=0.12$ , 95% CI [0.06, 0.19], constancy,  $F(1, 320)=51.46$ ,  $p < 0.001$ ,  $\eta_p^2=0.14$ , 95% CI [0.08, 0.21], and control,  $F(1, 320)=51.37$ ,  $p < 0.001$ ,  $\eta_p^2=0.14$ , 95% CI [0.08, 0.21].

## Discussion

The purpose of the present study was to examine the relationships between MT and self-awareness dimensions among competitive tennis players. The results provided partial support for the hypotheses, as global MT was predicted by self-insight (i.e. clarity of thought, emotional and behavioural understanding) and not by self-reflection (i.e. need for and engagement in psycho-behavioural self-evaluation). In addition, confidence and constancy were each predicted by self-reflection and self-insight, although control was only predicted by self-insight. Collectively, the results support superior thought, emotional and behavioural awareness among mentally tougher tennis athletes, which is consistent with qualitative research denoting the relevance of various forms of self-awareness to MT.<sup>25,36</sup>

The finding that self-insight was the single significant predictor of global MT suggests the phase is particularly important to athletes' MT. However, given that attaining insight requires introspection and evaluation of the self,<sup>31</sup> self-reflection is a necessary part of the self-awareness process. Considering the markedly larger effect size between MT and self-insight, as compared to self-reflection, mentally tougher athletes appear to be better at progressing from self-reflective activities to achieve higher levels of self-insight. With prior studies reporting that self-awareness promotes the development of MT,<sup>37</sup> attaining maximal MT benefits might require athletes to engage in and proceed beyond mere self-introspection toward generating a profounder level of psycho-behavioural clarity and understanding.

Comparable to the global MT outcomes, the effect sizes in relation to confidence, constancy and control were larger for self-insight. Therefore, in contrast to tennis players who are largely self-reflective, those who are more self-insightful are substantially more likely to possess higher levels of confidence, constancy and control. Accordingly, the advantage of self-awareness to athletes' MT appears to depend more strongly on obtaining self-insight than on engaging in self-reflection alone.

The findings in this study indicate self-awareness is an important determinant of an athlete's confidence and belief.<sup>51</sup> In fact, Beaumont et al.<sup>52</sup> found that developing athletes' awareness of their thoughts and feelings is an effective strategy for fostering their confidence. Referring to an athlete's perceived ability to succeed<sup>53</sup>, confidence is enhanced by reflecting on events related to the self, particularly achievements and positive experiences<sup>4</sup>. This would suggest that mentally tougher athletes maintain or develop confidence levels by emphasising the strengths and encouraging features of events and their responses. Further intimating the role of reflection and insight, Jones et al.<sup>2</sup> found that mentally tough athletes' belief is cultivated from recognising the process involved in reaching their level of achievement. The optimistic perspective associated with mentally tough athletes<sup>54</sup> could also account for their persistent sense of confidence<sup>12</sup> despite the psycho-behavioural assessment and clarity that may accompany their weaknesses or negative outcomes. Whether mentally tougher athletes display a greater tendency to focus on the positive features of various situations, outcomes or consequences is an area that requires further examination.

Tennis players with greater self-reflective and insightful tendencies also exhibited higher levels of constancy. This finding suggests that athletes who think about and distinctly understand their thoughts, emotions and behaviours are more likely to remain determined and committed. Given that mentally tough athletes optimistically reflect on circumstances and events,<sup>12</sup> positive perceptions about the causes of and explanations for their psycho-behavioural responses in such moments may enable them to remain resolute in their efforts and goal pursuits. The positive appraisal orientation that characterises MT is supported by Kaiseler et al.'s<sup>24</sup> study, which found that athletes with higher levels of MT rated stressors as less intense. Furthermore, Mahoney et al.<sup>55</sup> associate MT with striving (i.e. sustained, consistent effort) and thriving (i.e. learning and growth). Through mentally tougher athletes' heightened self-awareness, these qualities likely contribute to appraising their negative responses as opportunities to overcome their weaknesses and improve (i.e. thrive), thereby promoting commitment and dedication (i.e. striving).

The finding that self-insight predicted control supports self-awareness as a fundamental prerequisite to athletes' aptitude to maintain control.<sup>56</sup> Specifically, athletes' emotional and cognitive control could be promoted by clearly and extensively understanding their emotional, cognitive and behavioural experiences. Their superior self-insight might allow mentally tougher athletes to select and effectively use psychological skills<sup>20</sup> to control their thoughts and emotions when they arise during competition. This supposition is supported by Mahoney et al.'s<sup>55</sup> notion that mentally tougher athletes' awareness of their emotional experiences enables them to choose an appropriate coping strategy to maintain desired performance levels. Considering athletes utilise a range of cognitive control strategies

(e.g. word cues) during training and competitive performance contexts,<sup>57</sup> self-insight might be critical to athletes' employment of situationally specific psychological strategies to sustain athletic performance.

## Practical suggestions

Given the role of self-awareness in the growth of MT<sup>37</sup>, coupled with the capacity to develop MT through specific training programmes<sup>8</sup>, self-awareness offers a potential target area for MT interventions. Recent findings have indicated reflective practices may contribute to an athlete's awareness and athletic development.<sup>58</sup> The propensity to self-reflect may be enhanced through the use of a logbook<sup>52</sup> – an exercise that also increases athletes' awareness of negative self-talk, the situations in which it occurs, and the outcomes associated with it<sup>59</sup>. A similar logbook, diary, or written prompt method could be used to facilitate players' self-reflection and enhance their understanding of the cognitive and emotional experiences that occur when training or competing. Through the process of identifying the antecedents and consequences of their particularly negative responses, more adaptive future responses that reflect MT (e.g. emotional control) may be engendered.

Using this type of framework, tennis players may engage in post-competition assessment of the moments in which they experienced positive and negative thoughts (e.g. 'I'm going to lose my serve') and behaviours (e.g. racquet tossing, self-degrading comments). Explanations for these thoughts (e.g. focusing on losing a service game when break point down) or behaviours (e.g. racquet tossing following a loss of serve), along with the outcome following such thoughts or behaviours (e.g. periodic performance slumps), could subsequently be examined. With the support of sport psychology professionals or coaches, this in-depth evaluation and identification of what, when and why thoughts, emotions and behaviours occurred may be used to replace maladaptive responses that emerged previously.

The process through which maladaptive responses are changed could be facilitated in several ways, particularly cognitively. Resulting from their heightened self-awareness, athletes' deleterious responses may be altered through more favourably reappraising the situations in which the responses were triggered.<sup>60</sup> Alternatively, athletes could develop attentional deployment skills<sup>61</sup> in order to focus on the positive features of situations (e.g. one's own physical and technical strengths). Another avenue to changing athletes' emotional and behavioural responses involves cognitive reframing – an approach that encourages the contestation and replacement of debilitating, negative ideas and beliefs with positive, facilitative thought processes.<sup>62</sup> Research has found that reframing is beneficial to generating facilitative perceptions about the influence of competitive anxiety and physiological arousal on athletes' performance.<sup>63</sup> Taken together, these cognitive strategies represent some of the mechanisms through which athletes' could control their thoughts and emotions, develop confidence and maintain commitment levels<sup>52</sup> following their self-reflective activities and attainment of insight.

## Limitations and future research directions

Selected methodological limitations should be considered alongside the contributions of this study. While a purposeful decision was made to examine MT within a specific group of athletes (i.e. competitive tennis players), the generalisability of the findings to other sports is questionable. In addition, the non-experimental approach restricts conclusions of causality among the variables included in the study. This could be addressed through experimental and longitudinal MT and athletic performance level studies that target or manipulate self-awareness. Another drawback is that the data were sourced solely from the athletes, and the inclusion of additional data sources (e.g. coaches) would have provided an opportunity to cross-verify the participants' self-reports. The measurement of participants' *average* MT and self-awareness in tennis is another limitation, with the cross-situational applicability and variability of self-awareness, MT and the relationships between the two constructs indeterminable. Future research might explore athletes' self-awareness processes and MT responses following different types of stressors (e.g. inclement weather conditions) and competitive phases (e.g. ahead versus behind). The findings should also be interpreted in

conjunction with the criticisms of the SMTQ, such as its brevity, partial conceptual coverage of MT<sup>16</sup> and logical validity concerns<sup>42</sup>. Although the SMTQ has been validated and has received psychometric support, additional validation studies may be required to refine the measure.

## Conclusion

The findings in this study support the positive association between MT and self-awareness in competitive tennis players. Most notably, the strongest predictor of MT and its subcomponents was self-insight. Notwithstanding the necessity of self-reflection in the process toward obtaining insight, the latter appears to be particularly important when considering MT and its development among athletes. Research identifying the contextual demands and situation-based use of self-awareness among mentally tough athletes is warranted, along with whether self-reflection and insight may be used to develop MT through interventions.

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