Mental toughness and success levels among elite fencers

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ABSTRACT

The present study aimed to investigate mental toughness in two groups of elite fencers with different levels of success. It also set to study the relationship between the subscales of mental toughness and levels of success in elite fencers so as to determine the major factors affecting athletic success. The participants of the study consisted of 30 fencers on the top of world ranking at the age range of 18 to 29 (Mean=24.48, SD=6.01) and 30 Iranian fencers at the age range of 21 to 30 (Mean=25.3, SD=5.12). Analysis of data using independent t test showed that there is no significant difference in the subscales of mental toughness between the two groups. Linear regression analysis revealed that the two variables of commitment and emotional control predict the fencers’ success more significantly than other subscales. The results showed that mental toughness does not (except commitment and emotional control) play a significant role at the highest levels of athletic success (while controlling the variables type of sport, age and experience) and there may be other factors to determine success. It is recommended that such factors as education, cultural issues and mental skills training be investigated as potential variables affecting athletic success. Considering the fact that commitment and emotional control are highly associated with training, it is recommended that mental skills training be used to improve mental toughness in athletes.

Key words: Mental toughness, Success, Elite fencers

Introduction

In studies on mental toughness in sports, it has always been controversial as to what characterizes mental toughness, what processes it works through and what consequences it is to bring about [5]. Despite challenges to delineating a concept of mental toughness, researchers have recently made significant progress in outlining major features of mental toughness via drawing upon qualitative methods and studying successful elite athletes [6 & 17].

Though general research already carried out on participants in a variety of sports types facilitates the administration of many tests, researchers have recently conducted more specialized studies so as to discover more specific components of mental toughness or other psychological aspects (4, 12, 14 & 20).

Gucciardi et al. (2009a) defined mental toughness as a set of values, approaches, perceptions and inherent emotions acquired through experience with sports in general or a specific sport in particular as a procedure adopted by the individual to examine and respond to conflicts, challenges and pressures [16]. Clough et al. (2002) proposed the 4C’s model of mental toughness including: (1) control (emotions and life) which refers to inclination towards emotions and behaviors as if the individual is influential, (2) commitment which refers to substantial involvement in the task at hand, (3) challenge which refers to seeking opportunities for personal growth, and (4) self-confidence (in abilities and in interpersonal) which refers to high self-confidence and resolute faith in one's ability to achieve success [2].

According to Crust (2007), other important features of mental toughness include effective coping with pressure and hardships, recovering from retreats and failures, persistence and refusal to submit, insensitivity or flexibility, overcoming pressure and bearing superior mental skills [7]. It seems that there is no consensus on the efficacy of mental toughness yet. For example, comparing the attitudes of elite football coaches and players toward mental toughness, Crust, Nesti and Littlewood (2010) reported a significant difference not only between coaches and players in their attitudes toward mental toughness but also among the coaches’ attitudes as well [11].
Golby and Sheard (2004) investigated mental toughness in a sample of 115 rugby players at the international, super league and first league levels. They reported insignificant differences among the participants in terms of negative energy and control of focus. However, comparison of athletes with more distant levels of success may reveal more substantial differences [13]. Shin and Lee (1994) studied and compared mental toughness between elite and non-elite Korean female athletes. They found that elite athletes enjoyed higher levels of mental toughness comparing with their non-elite counterparts. However, there was no difference between either group in terms of control of focus and motivation [29].

An important variable is the relationship between athlete’s level of success and mental toughness. Gucciardi (2010) reported that there is significant relationship between mental toughness and level of success in the athletes [18]. Connaughton et al. (2008) reported that competitive experience is critical to the development of mental toughness in athletes [3]. Also, Gucciardi (2009) investigated mental toughness in two groups of invested and specialized soccer players and found no significant difference in mental toughness between the two groups [15].

Connaughton et al. (2010) contended that mental toughness is an important factor in athletic success [5]. Others believe that the level of training and experience are highly associated with mental toughness in athletes [19]. The major drawback with previous studies is that they have compared athletes from different types of sports or the participants have not been elites [15, 16, 17 & 19]. Minnix (2010) investigated the relationship between mental toughness and level of success in martial art athletes. Counterintuitively, the results did not support the notion that mentally tough athletes achieve higher levels of success [25]. Similarly, Golby and Sheard (2004) contended that differences in the levels of athletic success are least significant or rather insignificant, and there are other factors such as physical characteristics, technical skills or other mental factors which may predict the success more accurately [13]. Still, one must note that very few elite athletes participated in Minnix’s study to compare athletes with different levels of success. Literature on mental toughness suggests that conceptualizations and definitions of mental toughness adopted solely in regard to elite coaches’ and athletes’ performance may suffer from severe limitations [5].

Therefore, the present study aimed at comparing mental toughness between two groups of elite fencers at different levels of world ranking. Also, the study set to investigate the relationship between the subscales of mental toughness and levels of success in the fencers.

Method:

Participants:

Participants were 30 super elite male epee fencers, who were the top thirty fencers of 2011 world ranking, were selected as the participants in the first group (M_age=24.48 years, SD= 6.01). On average, they used to participate in 12 valid tournaments annually. At the time of the study, they were participating in a qualification tournament for London 2012 Olympics. The second group comprised 30 Iranian epee fencers who were members of the national fencing team (M_age=25.3, SD=5.12). They were ranked between 120 and 400 in world fencer ranking. On average, they used to participate in 5 international tournaments every year.

Material and Procedure:

Mental toughness questionnaire (MTQ48) was used to examine mental toughness in the two groups [2]. The questionnaire comprises 48 items subsumed under 6 subscales including confidence in own abilities, interpersonal confidence, commitment, emotional control, challenge and life control which are on a 5-point Likert-type scale. The answers ranges from 1= strongly disagree to 5= strongly agree, and it takes 10 to 15 minutes to complete the questionnaire [8]. In the present study, the reliability of the questionnaire was calculated to be r= 0.76 using internal consistency method. Recent research has confirmed that MTQ48 bears respective psychological features. Besides, both exploratory and confirmatory analyses have supported the structural design of this scale [21]. Claugh et al. (2002) contended that MTQ48 has high construct validity, and it is significantly associated with optimism, self-knowledge, life satisfaction, self-sufficiency and specific anxiety [2]. Other studies have also supported the high construct validity of the scale [26]. In addition, MTQ48 shows high correlation with other mental functions including coping with pain, commitment, anxiety and life satisfaction [7 & 24].

Procedure:

The participants were informed of the research aims briefly before they were asked to fill in the questionnaire. They were to complete and sign informed consent forms before they set to complete MTQ48. The study was approved by the research ethics committee in Islamic Azad University. Either group completed the questionnaire at rest and away from competitive pressure.

Data analysis:
Kolmogorov–Smirnov and Levene's tests were run to analyze the data pertaining to fencers' age and experience. Table 1 illustrates the results of Kolmogorov–Smirnov and Levene's tests.

Table 1: Results of Kolmogorov–Smirnov and Levene's tests of fencers' age and experience in two groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean Difference</th>
<th>Z (K-S test)</th>
<th>Leven's test for equality of variances</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>Sig</td>
</tr>
<tr>
<td>Age</td>
<td>25.7</td>
<td>0.011</td>
<td>4.541</td>
</tr>
<tr>
<td>Experience</td>
<td>14.8</td>
<td>0.008</td>
<td>5.570</td>
</tr>
</tbody>
</table>

With regard to the fulfillment of parametric test assumptions, independent t test was run to compare the subscales of MTQ48 between the two groups. Moreover, logistic linear regression analysis was used to examine the relationship between the subscales of mental toughness and level of success. Accordingly, the fencers' level of success in either group was regarded as the dependent variable, and the 6 subscales of mental toughness were the independent variables.

Results:

Table 2 illustrates the descriptive statistics pertaining to the fencers' age and level of experience as well as the independent t test results of the comparison of 6 subscales of MTQ48. As shown in the table, there is no significant difference in the subscales challenge, commitment, interpersonal confidence, confidence in own abilities, emotional control and life control between the two groups. Despite the present research assumptions, fencers in the second group earned higher scores than those in the first group though the difference was not significant.

As the results of linear regression (stepwise) test show, the two subscales of commitment and emotional control tend to predict the fencers' level of success in either group, respectively.

Table 2: Independent t test results of the comparison of MTQ48 subscales between the two groups.

<table>
<thead>
<tr>
<th>Sub scales</th>
<th>N</th>
<th>T</th>
<th>P</th>
<th>Standard error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life control</td>
<td>30</td>
<td>-1/523</td>
<td>0/135</td>
<td>-3/347</td>
</tr>
<tr>
<td>Interpersonal confidence</td>
<td>30</td>
<td>-1/113</td>
<td>0/216</td>
<td>-2/0518</td>
</tr>
<tr>
<td>Commitment</td>
<td>30</td>
<td>-1/225</td>
<td>0/237</td>
<td>-3/560</td>
</tr>
<tr>
<td>Challenge</td>
<td>30</td>
<td>0/170</td>
<td>0/866</td>
<td>1/785</td>
</tr>
<tr>
<td>Confidence in own abilities</td>
<td>30</td>
<td>-1/975</td>
<td>0/056</td>
<td>-1/755</td>
</tr>
<tr>
<td>Emotional control</td>
<td>30</td>
<td>-1/322</td>
<td>0/091</td>
<td>-2/799</td>
</tr>
</tbody>
</table>

Table 3: Linear regression results of the relationship between the fencers' level of success and subscales of mental toughness in the two groups.

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>Beta ln</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>commitment</td>
<td>0.033</td>
<td>0.406</td>
<td>2.845</td>
<td>0.007</td>
</tr>
<tr>
<td>Emotional control</td>
<td>-0.12</td>
<td>0.346</td>
<td>2.512</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Discussion:

The present study aimed to compare mental toughness between two groups of fencers at different levels of success. The results showed that there is no significant difference in the subscales of mental toughness between the two groups of participants. Despite the research assumptions, the group at lower levels of success earned higher scores of mental toughness comparing with the more successful group though the difference was not significant.

The present findings did not support the assumption that athletes at higher levels of success have higher mental toughness. This is consistent with the findings of Nicholls et al. (2009). However, some studies have reported higher levels of mental toughness in more successful athletes. For example, Sheard (2009) reported that successful university athletes had higher levels of mental toughness comparing with their less successful counterparts [27]. One of the limitations of such studies is that their subjects do not enjoy high levels of success.

A notable point with the present study was that subelite athletes had higher levels of mental toughness though the difference was not significant. It may be that factors other than mental toughness contribute to athletic success. Comparing the attitudes of elite athletes, Thelwell et al. (2010) reported that such factors as sports environment, sports management, athlete's personality and cultural differences contribute to athletic success. They contend that cultural factors affecting the athletes' development play a significant role in the athletes' mental toughness [30].

Previous studies differ from the present one in that they did not control such factors as age, level of experience, gender, and the type of sport (except, Nicholls et al., 2009), and/or the subjects did not
Both club and university athletes, Crust and Azadi (2010) reported a significant positive relationship between mental toughness and components of mental skills among which commitment was the most influential factor, which is consistent with the present finding. As yet, there is no consensus over whether mental toughness is a holistic construct or a combination of cognitive skills peculiar to a specific filed which may be improved via training [9]. Jones, Hanton and Connaughton (2007) contend that mental toughness can be either innate or acquisitive [22]. This assumption may contribute to understanding the importance of nature and nurture in recent studies [13]. A recent research revealed significant improvement in mental toughness among adult elite swimmers following 7 weeks of mental skills training [28] though it may still be that mental toughness is, at least to some extent, innate.

Therefore, further studies may be required to identify factors involved in elite athletes' mental toughness and to investigate more relative factors. Overall, it can be concluded from the present findings that factors other than mental toughness may have influenced the attainment of higher levels of success in international athletes. Though either group of the participants enjoyed high levels of mental toughness which may have facilitated their success, it seems that other variables are also influential in achievement and maintenance of athletic success at the highest levels of championship. Besides, regarding the significant correlation between athletic success and the two subscales of commitment and emotional control, it is recommended that acquisitive aspects of mental toughness be considered seriously and included in training programs. Furthermore, it is also recommended that future studies investigate other factors such as gender, age, personality, athletic experience and/or the type of sports in association with mental toughness.

As a limitation of the present study, cultural and attitudinal differences among the athletes (Iran and other countries) have not been considered, which may have affected the present findings. Thus, it is recommended that future studies manage to control these factors as well.

Reference


