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Higher-order structure of mental toughness and the analysis of latent mean differences between athletes from 34 disciplines and non-athletes

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ABSTRACT

The aim of this study was to investigate the higher-order structure of mental toughness and to examine differences in mental toughness between athletes and non-athletes. Participants of this study – 927 athletes and 931 non-athletes – completed a battery of questionnaires designed to assess four characteristics of mental toughness: hope, optimism, perseverance and resilience. The higher-order structure of mental toughness was found to be the same for both athletes and non-athletes. The latent mean differences analyses showed that athletes scored higher in mental toughness when compared to non-athletes. Taken together, these findings support the theoretical assumption that mental toughness is a higher-order construct encompassing different characteristics and that sport participation is associated with higher mental toughness.

1. Introduction

Mental toughness has been defined as "a collection of values, attitudes, emotions, and cognitions that influence the way in which an individual approaches, responds to, and appraises demanding events to consistently achieve his or her goals" (Gucciardi, Gordon, & Dimmock, 2009, p. 54). It is a concept that was developed within the setting of sport psychology and it refers to what we usually call the higher mental abilities of an athlete (Crust, 2008). However, the question of whether athletes differ from non-athletes regarding their mental toughness still needs to be answered.

Gucciardi et al. (2009) suggest that mental toughness is more a function of environment than domains, and as such, mental toughness is potentially important in any environment that requires performance setting, challenges, and adversities, i.e., business, the military, and medicine. Two recent studies examined mental toughness in a non-sport sample (Gerber et al., 2013a, 2013b), however no comparison was made with athletes. In addition, those two studies made the assumption that the structure of mental toughness was similar in athletes and non-athletes without verifying this supposition. In summary, mental toughness has almost exclusively been tested within the sporting domain. This exclusive focus on one population has not only limited our theoretical understanding, but it has also limited the application of mental toughness elsewhere.

With this in mind, it is important to question whether mental toughness should be viewed as a trait, or a constellation of characteristics that are required for high performance. The theoretical answer provided by Gucciardi et al. (2009), which is grounded in personal construct psychology, argues that mental toughness is a phenomenon involving one's interpretation of events, and also the sense that an individual is making of such events rather than a fixed personality trait. As such, mental toughness should be viewed as a constellation of key characteristics that influence the way a person approaches and appraises both the positive and negative events s/he encounters. The effects of these characteristics are seen in the individual's ability to consistently achieve his or her goals. Despite recent conceptual advances (see Gucciardi et al., 2009), one important drawback of the theory supporting mental toughness relates to how the exact relationship between mental toughness and its supposed key characteristics has been determined. To date, this relationship has predominantly either been established by interviews (e.g., Jones, Hanton, & Connaughton, 2002) or by correlating mental toughness inventories with other dimensions (e.g., Nicholls, Polman, Levy, & Backhouse, 2008). As there is still no clear structure for the expected characteristics of mental toughness, the first aim

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of this study is to clarify whether mental toughness represents a higher-order construct of several characteristics that are usually associated to it, and whether this structure is consistent between athletes and non-athletes.

Where does mental toughness originate? Mental toughness seems to be strongly linked with the developmental experiences of an individual (Jones & Parker, 2013), and, perhaps more importantly for our study, there are suggestions that sport participation develops mental toughness. This is a view we see revealed in interviews with elite athletes (Thelwell, Such, Weston, Such, & Greenlees, 2010) precisely because sport participation offers challenges, adversity, performance setting, and it requires long-term commitment in order to achieve one's goals. However, once more interviews only provide anecdotal evidence to support this idea. This study aims to address this problem and provide a quantitative perspective on this matter. In addition, we aim to investigate the higher-order structure of mental toughness in relation to the key characteristics that are usually associated to it. Using the theoretical approach of Gucciardi et al. (2009), these characteristics are identified as hope, optimism, perseverance, and resilience. However, as a strong theory that justifies the combination of certain individual constructs into higher-order constructs is one of the bases for establishing a higher-order construct (Johnson, Rosen, Chang, Djurdjevic, & Taing, 2012), a review of each of these characteristics shall be provided in turn, detailing the theoretical arguments that justify their integration into the higher-order construct of mental toughness.

Hope is defined as an expectation of success relative to goals (Snyder et al., 1991). According to Gucciardi's approach to mental toughness, the notion of consistence in goal achievement is a central idea (Gucciardi et al., 2009), and the unshakeable self-belief in one's ability to achieve competition goals is mentioned as one of the major aspects of mental toughness (Jones et al., 2002).

Dispositional optimism has been defined as a generalized expectancy that good things will happen (Scheier, Carver, & Bridges, 1994). These expectancies are relatively stable across time and context, influencing not only one's emotions but also one's decisions about striving on or giving up. A meta-analysis revealed that dispositional optimism was associated with a more adaptive way to face stress (Solberg Nes & Segerstrom, 2006), which is linked to the fact that people with higher mental toughness handle pressure better (Gucciardi et al., 2009).

Perseverance has been conceptualized as persistence by Cloninger, Przybeck, Svrakic, and Wetzel (1994), and refers more specifically to the propensity of being eager to work hard when facing challenges, in spite of fatigue or frustration. Perseverance is supposed to be a characteristic of mental toughness, more specifically it reflects consistency in achieving one's goals and not giving up easily when facing adversity or difficulties (Gucciardi et al., 2009).

Resilience represents a positive adaptation towards risk or adversity and the ability for the individual to maintain stable levels of physical and mental function (Wagnild & Young, 1993). Seeing resilience as a trait means that the individual possesses the characteristics that enable them to adapt to changes in their environment or challenges. Resilience is considered to be one of the core components of mental toughness (Gucciardi et al., 2009).

In parallel to the key characteristics that have just been reviewed, the theory of mental toughness assumes that other variables could play a role as predictors of mental toughness. Repetitive exposure to situations involving challenges and adversities is thought to trigger the development of mental toughness (Gucciardi et al., 2009), therefore one could assume that factors such as age, the number of years a person has been practising a sport, and the quantity of training might impact on the development of mental toughness. In addition, it is thought that mental toughness is affected by environment, as such it would be interesting to evaluate whether practising an individual or a team sport provokes differences in mental toughness. However, Nicholls, Polman, Levy, and Backhouse (2009) found no difference in mental toughness based on the type of sport being practised. As only one study was available we wanted to examine this issue further here by providing another sample.

This study has been designed to examine the differences in mental toughness between athletes and non-athletes, which is here hypothesized to be a higher-order construct of the characteristics of *hope, optimism, perseverance* and *resilience*. Based on the theoretical view that mental toughness is not associated to a specific domain but is more a matter of environment (Gucciardi et al., 2009), our first hypothesis is that the higher-order structure of mental toughness will be similar in both samples (i.e., athletes and non-athletes). Second, due to the fact that mental toughness is related to higher sport performance (Gucciardi & Gordon, 2011), we hypothesize that athletes will score higher on mental toughness in comparison to non-athletes. In addition, we shall evaluate the associations between mental toughness and potential predictors, which include the amount of time spent practising sports, taking into account when training started and the weekly volume of training, and the type of sport (i.e., individual vs. team sport). We hypothesize that mental toughness is not associated with the type of sport being practised, but that there will be a positive association with the time spent practising the sport.

2. Methods

2.1. Participants

A total of 1858 participants were recruited to participate in this study, all of whom were Spanish. There were a total of 931 non-athletes: 464 males and 467 females (*M*age = 20.43 years; age range: 18–25 years old). The non-athletes who were chosen for this study had never been involved in any form of sports training or competition. There were a total of 927 athletes: 441 males and 486 females (*M*age = 20.50 years; age range: 13–26 years old. These athletes were selected from 34 disciplines: 9 team sports (242 athletes) and 25 individual sports (685 athletes). All of these athletes were currently involved either in sport training and/or sport competition. They were involved in sport practice for a mean of 6.2 years (*SD* = 3.95), and practised on average 3.9 days a week (*SD* = 1.2), with a mean of 113 min per session (*SD* = 47 min) and of 453 min per week (*SD* = 276 min). For descriptive statistics of athletes and non-athletes see Table 1. For descriptive statistics concerning each sport see supplementary material online.

2.2. Instruments

As we have already mentioned, we wanted to avoid using instruments that were specific to sports. For this reason, we chose to assess mental toughness by using separate inventories for each characteristic that had already been validated for use on the general population.

2.2.1. Hope

The Snyder's Hope Scale (Snyder et al., 1991) is a 12 item scale. Sample item: "I can think of many ways to get out of a jam". Participants have to indicate the extent to which they agree with each of the items, from 1 = "*strongly disagree*" to 8 = "*strongly agree*". In our study Cronbach's alpha for the entire scale was .80.

2.2.2. Optimism

To assess optimism, we used the Life Orientation Test-Revised (LOT-R, Scheier et al., 1994). It consists of six items, plus four filler