

**CORE BELIEFS AS PREDICTORS OF MENTAL
TOUGHNESS AMONGST COMPETITIVE ADOLESCENT
TENNIS PLAYERS**

by

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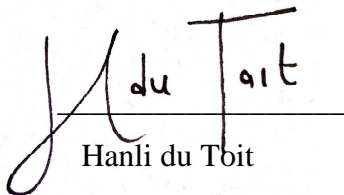
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*Opgedra aan my ouers, Johan en Alma, wat my gewys het wat “mental toughness” is, nog
voor ek daarvan in boeke kon lees.*

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Abstract

Research interest in mental toughness (MT) has increased significantly over the past decade. Numerous theories regarding the nature and development of MT have been proposed, however, no attempt appears to have been made to explore the cognitive behavioural mechanisms that might underpin MT. Consequently, this study aims to investigate whether core beliefs, as defined from within a Rational Emotive Behaviour Therapy (REBT) perspective, are predictive of MT. To this end, a convenience sample of 134 competitive adolescent tennis players aged between 14 and 19 years ($M = 15.57$; 46.3% female) was recruited and asked to complete measures of MT and core beliefs.

Rational beliefs were positively correlated with MT, while irrational beliefs were generally negatively correlated with MT. Moderated hierarchical regression analyses revealed that level of competition moderated the relationship between core beliefs and the control component of MT. The results of the hierarchical regression analyses indicated that while rational beliefs failed to predict a significant proportion of the variance in the sample's MT, irrational beliefs did emerge as a significant predictor of MT. Irrational beliefs were negatively associated with self-confidence and control. At the level of specific irrational beliefs, demand for achievement and need for approval were predictive of control among the less accomplished players in the sample. These forms of irrational thinking were also negatively associated with control among these participants. Self-downing beliefs predicted determination and positive cognition in the total sample. Self-downing was negatively correlated with these particular components of MT. Other-downing also emerged as a predictor of positive cognition. Moreover, this irrational belief was negatively associated with positive cognition.

The study suggests that certain core beliefs are predictive of MT amongst competitive adolescent tennis players. Irrational beliefs appear to be a statistically and practically significant predictor of various aspects of MT in this population. These findings suggest that REBT is a suitable perspective from which to conceptualise the cognitive behavioural mechanisms involved in MT. Furthermore, REBT-based interventions may have utility in the development and maintenance of MT among adolescent athletes.

Keywords: Mental toughness, Control, Determination, Positive cognition, REBT, Rational beliefs, Irrational beliefs, Demand for achievement, Need for approval, Self-downing, Other-downing, Adolescents, Tennis.

Opsomming

Die belangstelling in *mental toughness* (MT) navorsing het beduidend tydens die laaste dekade toegeneem. Verskeie teorieë rakende die aard en die ontwikkeling van MT is voorgestel. Geen pogings is egter aangewend om die kognitiewe gedragsmeganismes wat moontlik onderliggend aan MT is, te ondersoek nie. Gevolglik poog die studie om ondersoek in te stel of kernoortuigings, soos gedefinieer vanuit 'n Rationele Emotiewe Gedragsterapie (REBT) perspektief, voorspellend van MT is. 'n Gerieflikheidsteekproef van 134 kompeterende adolessente tennisspelers, tussen die ouderdom van 14 en 19 jaar ($M = 15.57$; 46.3% vroulik), is vir die studie gewerf. Deelnemers het meetinstrumente van beide MT en kernoortuigings voltooi.

Rationele oortuigings is positief met MT gekorreleer, terwyl irrasionele oortuigings oor die algemeen 'n negatiewe korrelasie met MT gehad het. Gemodereerde hierargiese regressie analise dui daarop dat vlak van kompetisie die verhouding tussen kern oortuigings en die MT komponent, beheer, modereer. Hierargiese regressie analise resultate dui daarop dat rasionele oortuigings nie daarin slaag om 'n beduidende proporsie van die variansie in die steekproef te voorspel nie, terwyl irrasionele oortuigings wel as beduidende voorspeller van MT bepaal is. Irrasionele oortuigings is negatief geassosieer met selfvertroue en beheer. Op spesifieke irrasionele oortuiging vlak, was behoefte aan prestasie en behoefte aan goedkeuring voorspellend van beheer onder die laer presterende spelers in die steekproef. Hierdie irrasionele denkvorms is ook negatief geassosieer met die steekproef se beheer komponent. Self-afbrekende oortuigings was vir die totale steekproef voorspellend van determinasie en positiewe kognisie. Self-afbreking was ook negatief gekorreleer met dieselfde komponente van MT. Ander-afbreking was ook voorspellend van positiewe kognisie. Verder was irrasionele oortuigings ook negatief geassosieer met positiewe kognisie. Die studie dui

daarop dat sekere kernoortuigings voorspellend van MT onder kompeterende adolessente tennisspelers is. Irrasionele oortuigings blyk beide 'n statisties en pratiese beduidende voorspeller van verskeie aspekte van MT vir die populasie te wees. Hierdie bevindinge stel dus voor dat REBT n toepaslike perspektief is om die kognitiewe gedragsmeganismes betrokke in MT te konseptualiseer. Verder mag REBT-gebaseerde intervensies gebruik hê vir die ontwikkeling en instanthouding van MT onder adolessente atlete.

Sleutelwoorde: Mental toughness, Beheer, Determinasie, Positiewe kognisie, REBT, Rasionele oortuiginge, Irrasionele oortuiginge, Behoefte aan prestasie, Behoefte aan goedkeuring, Self-afbreking, Ander-afbreking, Adolessente, Tennis.

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Chapter 1

Introduction

1.1 Background

The sporting milieu has drastically changed during the last few decades (Sheard, 2010). It is no longer a social and amateur pastime, but has evolved into a booming multi-billion rand international industry, constantly pushing and redefining excellence (Robinson, 2003). Therefore, a vast amount of medical and sport science research has been conducted and implemented in order to optimise athletes' physical ability to perform better than their opponents (Sheard, 2010). As a result, competition has become tougher as more athletes compete as professionals and perform well at the highest level of competition. In an attempt to further distinguish consistently successful athletes from the rest, sport researchers have highlighted not only the roles of skill and physical prowess, but also the impact of psychological states such as mental toughness on optimal performance within the sporting environment (Crust, 2007; Gould, Dieffenbach, & Moffet, 2002). Given the value widely attributed to mental toughness by athletes, coaches, sport psychologists, media and the public in general, researchers have become focussed on better understanding this construct. This has led to development of more specific definitions of mental toughness. Research interest in the mechanisms underlying mental toughness is increasing, and numerous interventions aimed at facilitating mental toughness have been proposed, and in some instances, evaluated (Bull, Shambrook, James, & Brooks, 2005; Crust, 2007; Jones, Hanton, & Connaughton, 2002; Golby, Sheard, & Van Wersch, 2007).

1.2 Problem Statement

Despite the reported importance of mental toughness in sport performance, research on mental toughness appears to have focussed predominantly on the definition of the construct and examining how athletes' developmental histories have enabled them to become mentally tough (Sheard, 2010). Very little research has focussed on the cognitive and behavioural mechanisms that might underpin mental toughness (Crust, 2007). Notwithstanding this apparent lack of a theoretical understanding of the building blocks of mental toughness, a number of interventions aimed at fostering or improving mental toughness have been developed. These interventions have generally been developed from within the broader cognitive behavioural framework (e.g. Bull et al., 2005; Gucciardi, Gordon, & Dimmock, 2009b; Sheard & Golby, 2006). However, to date no attempt appears to have been made to explore mental toughness from within a specific cognitive behavioural paradigm.

Rational emotive behaviour therapy postulates that core beliefs are central to emotional well-being and emotional distress. Moreover, REBT theory hypothesises that rigid and inflexible irrational beliefs result in poor emotional self-regulation, self-defeating behaviour and difficulty in achieving personally meaningful life goals (Browne, Dowd, & Freeman, 2010; Dryden, 2009). By contrast, holding flexible and non-dogmatic rational beliefs is proposed to result in effective regulation of emotion and behaviours that promote goal attainment (Caserta, Dowd, David, & Ellis, 2010; Dryden, 2011). It would thus appear that REBT might provide a specific and suitable theoretical framework for the understanding of some of the psychological processes that underpin mental toughness. More specifically, a better understanding of the specific role that core beliefs play in the development or

limitation of a performance mind-set such as mental toughness will inform a more theoretically-grounded approach to intervention.

1.3 Aims and Objectives

The aim of this study is to explore the role of core beliefs in mental toughness in a sample of competitive adolescent tennis players. Of particular interest is the extent to which core beliefs (rational and irrational beliefs) can predict the various components of mental toughness. Three broad assumptions will be explored in this regard. First, it is expected that core beliefs will predict mental toughness. Second, rational beliefs are expected to exhibit a positive relationship with mental toughness. Finally, it is proposed that mental toughness will be negatively related to irrational beliefs.

1.4 Chapter Exposition

Chapter two begins with a review of the most prominent definitions of mental toughness in order to develop a working definition of mental toughness within which to contextualise this study. The available literature will then be reviewed in order to identify the core components of mental toughness. Empirical studies investigating the relationship between mental toughness and various aspects of sporting performance will then be dealt with. Finally, the limited intervention literature will be explored.

Chapter three provides an overview of a particular school of cognitive behaviour therapy, REBT. Specific attention will be paid to the hypothesised role of irrational beliefs in emotional distress and the proposed role of rational beliefs in emotional-wellbeing and performance enhancement. The literature relating to rational beliefs and positive

psychological states or performance-promoting mind-sets will then be reviewed. Finally, the fledgling body of research on REBT and sporting performance will be discussed.

Chapter four provides a formulation of the aims and objectives of the study. An exposition of the sampling methodology and measuring instruments employed to pursue these aims and objectives is then provided. The characteristics of the sample are reported and the statistical analyses employed in the study are explained.

The results of the data analyses are reported in Chapter five. Initially the correlations between the measures of MT and core beliefs are presented. The results of the hierarchical regression analyses for each criterion variable (component of MT) with core beliefs as predictors are reported. While all statistically significant results will be reported, results that are judged to also be of practical significance will be highlighted.

Chapter six considers the major findings of the study. These findings are discussed with reference to the relevant theoretical and empirical literature on MT and REBT. The principle findings are then summarised, followed by an exploration of the limitations of the study. Finally, the possible theoretical and practical implications of the study are explored before considering the recommendations for future research.

Chapter 2

Mental Toughness

2.1. Introduction

Mental toughness (MT) is a widely used concept within sport and sport psychology (Sheard, 2010). It has often been described by researchers as an umbrella term for a variety of positive psychological attributes associated with success in sport (Fourie & Potgieter, 2001; Jones, et al., 2002; Loehr, 1995; Middleton, Marsh, Martin, Richards, & Perry, 2004; Thelwell, Greenless, & Weston, 2008). Despite some theoretical conceptual differences, MT is described as a psychological or mental skill that helps athletes maximise their potential in order to achieve success (Durand-Bush & Salmela, 2002; Goldberg, 1998; Gould, et al., 2002; Hodge, 1994; Loehr, 1982/1986; Tunney, 1987; Williams, 1988). However, there appears to be very little consensus regarding exactly what MT is.

Athletes with high levels of MT have been described as able to maintain their levels of self-belief and stay positive regardless of the challenges they are confronted with (Jones, Hanton, & Connaughton, 2007; Sheard, 2010). MT has been associated with athletes having desirable thought patterns which allow them to cope well during stressful situations (Loehr, 1986), to seek out challenging situations (Coulter, Mallet, & Gucciardi, 2010) and to take risks (Jones et al., 2007). Furthermore, MT has been reported to enable athletes to cope well with anxiety, to be disciplined, motivated and maintain high levels of performance (Bull, et al., 2005). MT also results in more effective goal setting, reflecting on how to perform better and increasing effort in order to obtain these goals (Bull et al., 2005; Jones et al., 2007). Furthermore, mentally tough athletes are regarded as being mindful of thoughts and emotions (Bull et al., 2005; Jones et al., 2002), possessing the ability to regain control of thoughts and

emotions, and being able to focus attention on what is required in specific sporting situations (Bull et al., 2005; Jones et al., 2002). MT has also been linked to lower ratings of effort during higher intensity exercise (Clough, Earle, & Sewell, 2002), as well as higher pain endurance (Crust & Clough, 2005).

The available literature suggests that possessing MT enables an athlete to perform more consistently according to his/her highest ability (Loehr, 1994), as well as to think and behave effectively under pressure (Loehr, 1986). Possessing and developing MT would therefore appear to have important implications for improving performance and achieving success in sport. Sheard (2010), however, states that MT is often used as an umbrella term for any desirable psychological attribute within sport. This undifferentiated use of the term therefore makes it difficult to accurately define MT, determine what characterises mentally tough athletes and develop an understanding of the psychological processes that underpin MT.

In this chapter an attempt will be made to formulate a working definition of MT based on a review of the existing definitions of MT in the literature. Next, the most salient characteristics of MT will be discussed, and particular attention will be paid to the purported relationship of these characteristics with improved athletic performance. The available empirical evidence supporting a link between MT and improved sporting performance will also be reviewed. Finally, the interventions most commonly employed to develop MT will be briefly explored.

2.2. Defining Mental Toughness

In order to understand how MT contributes to improved performance, it is necessary to first understand what MT is. Loehr (1994, p. 7) defined MT as ‘the ability to consistently perform toward the upper range of your talent and skill regardless of competitive circumstances’. This particular definition appears to emphasise three components of MT: (1) performing according to the athletes’ highest ability, (2) performing consistently and (3) effectively managing the demands of sport.

Jones and colleagues (2002) define MT as:

Having the natural or developed psychological edge that enables you to generally, cope better than your opponents with the many demands (competition, training, and lifestyle) that sport places on a performer. Specifically, be more consistent and better than your opponent in remaining determined, focussed, confident and in control under pressure. (p. 209)

Thus, much in line with the definition offered by Loehr (1994), Jones et al., (2002) emphasise that MT is the ability to cope effectively with the demands of sport and to be consistent in one’s performance. However, Jones et al., (2002) also suggest that mentally tough athletes have the ability to better regulate their behaviours and emotions. They are said to be able to remain determined and focussed, as well as being confident in their abilities and possess superior self-control.

Clough and colleagues (2002) define mentally tough performers as:

Individuals [that] tend to be sociable and outgoing; as they are able to remain calm and relaxed, they are competitive in many situations and have lower anxiety levels than others. With a high sense of self-belief and an unshakeable faith that they can

control their destiny, these individuals can remain relatively unaffected by competition or adversity. (p. 38)

Similar to the two preceding definitions of MT, this definition highlights the ability to control one's emotions and behaviours, as well as the high level of self-confidence that mentally tough individuals display. In keeping with the previous definitions, Clough et al. (2002) note that mentally tough athletes are able to effectively cope with the pressures and challenges inherent in many sporting situations. However, additional to the definitions offered by Loehr (1994) and Jones et al. (2002), Clough et al. (2002) view competitiveness or an appetite for challenge as an important aspect of MT.

Gucciardi, Gordon and Dimmock, (2009a) defined MT as:

The presence of some or the entire collection of experientially developed and inherent values, attitudes, emotions, cognitions, and behaviours that influence the way in which an individual approaches, responds to and appraises both negatively and positively construed pressures and challenges and adversities to consistently achieve his or her goals. (p. 67)

This definition of MT, similar to the others reviewed thus far, emphasises the use of inherent characteristics or qualities of the athlete (e.g. cognition, attitudes and emotion) in successfully dealing with challenges and maximising performance. However, unlike previous definitions, Gucciardi et al. (2009a) highlight that MT is not only the ability to successfully deal with adversity, but also the ability to deal successfully with positive situations within the sporting arena (e.g. when things are going the athlete's way). In addition, this particular definition emphasises that MT is largely developed through the athlete's previous experiences.

Based on the preceding review of the most widely accepted definitions of MT, it would appear that while theorists differ on what exactly MT is, there does seem to be a large

amount of consensus. All the definitions reviewed agree that MT is a multidimensional construct comprising emotions, behaviours, attitudes, values and personality characteristics. In addition, there seems to be agreement that central to MT are the abilities to effectively regulate one's own emotions and behaviours, deal effectively with the challenges and pressures inherent in the sporting arena, and effectively apply various mental skills in order to consistently perform to one's sporting potential/ability. Competitiveness and a willingness to take risks have also been identified by some theorists as important aspects of MT. More recently, definitions of MT have begun to allude to the manner in which this construct may develop. The athlete's experiential history appears central to the development of MT. . There also appears to be agreement that MT is associated with improved performance outcomes, self-management and distress tolerance within the sporting environment. Consequently, for the purposes of the current study, MT can be defined as a constellation of characteristics such as values, attitudes, cognitions and emotions that influence the manner in which athletes view and approach situations. The manner in which mentally tough athletes view and approach sporting situations allows these athletes to more effectively deal with the challenges inherent in their sporting environments and more consistently achieve their desired performance outcomes.

2.3. Characteristics of Mental Toughness

It is apparent from the preceding section that a number of definitions of MT have been developed in the sport and performance psychology literature. Similarly, mentally tough athletes or performers have been reported to exhibit a wide variety of characteristics. Coulter et al., (2010) suggest that despite the variability in mental and physical skills associated with success in specific sports, a basic constellation of attributes characteristic of

MT might be applicable across the majority of performance arenas. In addition, Sheard (2010) has suggested that focussing on the characteristics that all mentally tough individuals share might be the most effective way in which to develop an understanding of the construct. Consequently, in this section the available literature will be reviewed in an attempt to identify the attributes that are generally thought to characterise mentally tough athletes.

Loehr (1986) arguably made the first systematic attempt to conceptualise MT. He stated that mentally tough athletes possess the following characteristics: they believe that they can perform well and be successful (self-confidence); these athletes can cope with their emotions, as well as externally determined events (negative energy control); they are able to remain focussed (attention control); to think positively in images and to control the flow of these images in a beneficial manner (visualisation and imagery control); to set significant goals, to persevere with training despite challenges (motivation); and to have positive energy, as well as possessing the ability to regulate and reflect on their thought patterns in order to succeed (attitude control).

2.3.1. Empirical approaches to characterising mental toughness

Jones and colleagues (2002/2007) appear to have been the first to attempt to empirically establish the attributes common to mentally tough athletes. In two qualitative studies, Olympic champions from a number of disciplines were asked to identify what they perceived to be the most salient characteristics of mentally tough athletes. Jones et al. (2002) concluded that the Olympians in their study identified twelve attributes as being characteristic of mentally tough athletes. The attribute that the participants in these two studies viewed as most significantly differentiating mentally tough athletes from other competitors was confidence in their ability to consistently achieve the goals they set for themselves. Mentally tough athletes were also perceived as having higher levels of internal motivation and a greater

desire to succeed, which enabled them to more effectively and quickly recover from setbacks. Furthermore, mentally tough athletes were generally viewed as possessing unique qualities (whether it is their way of training; their way of approaching things, or their belief in the fact that they are the best person for the job) that differentiate them from other competitors. Mentally tough athletes are perceived as able to maintain focus on the task at hand despite potential distractions, both within the sporting arena and their personal lives. Mentally tough athletes are regarded as able to switch a sport focus on and off as required. In addition mentally tough athletes are described as able to quickly and effectively regain psychological control following unexpected and uncontrolled events in competition. The participants viewed mentally tough athletes as accepting that anxiety was an inevitable part of competition and that they are consequently better able to successfully cope with it. Mentally tough individuals are perceived as being able to excel in high pressure situations and not be affected by their competitors' performance. Finally, mentally tough athletes are perceived as better able to maintain technique and effort while challenged by physical and emotional pain from failure.

Jones et al. (2002) suggested that the characteristics of mentally tough athletes reviewed above can be classified into five categories: (1) performance-related attributes (self-belief, desire, motivation and focus), (2) lifestyle-related characteristics (focus), (3) external attributes (dealing with competition-related pressures), (4) internal attributes (arousal control), and (5) qualities enabling them to deal effectively with physical and emotional pain or discomfort. Jones and colleagues' (2002) characterisation of MT has been criticised by a number of authors. The extent to which the findings may be generalised beyond the relatively small samples employed has been questioned (Crust, 2007/2008; Gucciardi et al., 2009a). In addition, Gucciardi and colleagues (2009a) question the extent to which these attributes, derived exclusively from the study of elite athletes, may be applicable to athletes at

other levels of competition or in sporting codes not represented in the studies. Sheard (2010) questions the validity of these findings on the basis that only the views of athletes were taken into account. This methodology may have resulted in an incomplete perspective on what characterises mentally tough athletes, as the views of other role players such as sports psychologists and coaches were not elicited.

Bull and colleagues (2005) attempted to identify the characteristics shared by mentally tough elite English cricketers. One hundred and one coaches were asked to rank their top 10 mentally tough English cricketers who played during the 1980s and 1990s. Fifteen cricketers were eventually identified. Twelve of these players were then interviewed. Bull et al. (2005) identified four broad attributes shared by the cricketers in the study. Firstly, they exhibited high levels of personal responsibility (independence, highly competitive) and had a mentally tough attitude which led them to set themselves challenging goals, work hard at their preparation and make the most of opportunities to learn and develop. Secondly, these players exhibited high levels of dedication and commitment. These attributes were often reflected in their perseverance in overcoming setbacks, their willingness to put in the effort required to achieve their goals and a “*never say die*” attitude. The third attribute that characterised these cricketers was a high level of self-belief. Bull and colleagues (2005) state that this self-belief was expressed as resilient self-confidence, believing that they were able to make a difference, the ability to maintain focus under all conditions and tough thinking or a tough mind-set. Finally, these individuals appeared better able to cope with the pressure of competition. More specifically, they reported thriving on competition, being willing to take risks, being able to think clearly and make good decisions under pressure, as well as honestly appraise their abilities and shortcomings.

Coulter and colleagues (2010) attempted to better understand MT amongst Australian soccer players. Four male professional coaches, six male professional soccer players, who

were identified by the four coaches as mentally tough, as well as the parents of the identified players, participated in the study. Coulter et al. (2010) describe a mentally tough athlete as someone who believes in themselves, who possesses the physical toughness necessary to push the pain barrier and maintain the focus necessary for consistently high levels of performance. These athletes have a work ethic that pushes the athlete to achieve their goals. They are resilient and have their own set of personal values that allows them to become a better person and player. These athletes can focus their attention on the tasks at hand despite adversities. They are acutely aware of their performance and are capable of evaluating it accurately. These individuals possess sport intelligence, a tough attitude and are able to cope effectively under pressure. They are willing to take risks and maintain high levels of effort irrespective of the situations they may find themselves in. Mentally tough soccer players are also regarded as being able to effectively manage their emotions. In addition, Coulter et al., (2010) noted the athletes' desire to win as a driving force to overcome adversity both on the field of play and within their personal lives. Being more focussed on the process of achieving their goals rather than on the eventual outcome was also highlighted as being characteristic of MT in this study.

The relatively limited number of studies conducted to date has identified a diverse list of attributes that are thought to characterise MT. However, certain recurrent themes appear to emerge across these studies. Mentally tough athletes can be described as individuals who can control their emotions which allow them to cope effectively with stressors and maintain high levels of performance despite the challenges they face (Bull et al., 2005; Coulter et al., 2010; Jones et al., 2002; Loehr, 1986). They display an unshakeable confidence in their ability to control performance outcomes (Bull et al., 2005; Clough et al., 2002; Coulter et al., 2010; Jones et al., 2002; Loehr, 1986) and demonstrate resilience as a result of a strong desire to be successful (Bull et al., 2005; Clough et al. 2002; Coulter et al., 2010; Jones et al., 2002;

Loehr, 1994;). These mentally tough athletes have challenging goals and are motivated and committed to achieve these goals (Bull, et al., 2005; Coulter, et al., 2010; Jones, et al., 2002; Loehr, 1986). Mentally tough athletes also view challenges as opportunities to be successful and take risks in order to achieve success (Bull et al., 2005; Coulter et al., 2010). Furthermore, mentally tough athletes have superior mental skills (Bull et al., 2005; Coulter et al., 2010; Loehr, 1986) which allow them to focus and quickly regain control when their focus is disrupted (Bull et al., 2005; Coulter et al., 2010; Jones et al., 2002; Loehr, 1994).

2.3.2. Conceptual approaches to characterising mental toughness

In the interests of developing a clearer understanding of what MT is, attempts have been made to establish broad categories into which the identified characteristics of mentally tough athletes may be classified. Clough et al., (2002) has proposed that MT is characterised by four broad forms of behaviour or modes of thinking: control, commitment, challenge and confidence. *Control* is the athlete's strong belief in their ability to control/influence the outcomes of competition. This belief forms the basis for the ability to make use of knowledge, skills and choices in order to interpret stressful events in a manner that is consistent with the athlete's long-term goals, and promotes performance. Clough and colleagues (2002) describe *commitment* as the individual's tendency to engage in challenges and activities rather than to disconnect from them. Cognitively this allows the individual to reinterpret potentially negative situations as an opportunity and to give meaning to new situations which, in turn reinforces proactive behaviour (Clough et al., 2002). *Challenge* refers to the individual's belief that change, rather than stability, is normal, and that challenges provide the opportunity for growth rather than representing a threat to their achievement or self-confidence. Clough and colleagues (2002) indicate that viewing a stressful situation as a challenge, moderates the stress experienced by the individual,

allowing them to utilise opportunities to develop and grow rather than focus on protecting their current abilities. *Confidence* is described by Clough et al. (2002) as believing in your own ability to manage and overcome negative life experiences.

Golby, et al. (2007) utilised psychometric analysis within Loehr's (1986) theoretical framework to identify the characteristics of MT. This analysis identified four factors central to MT: determination, self-belief, positive cognition and visualisation. Golby et al. (2007) view *determination* as the athlete's dedication with regard to setting goals and working hard to obtain them, as well as his/her motivation to do whatever it takes to achieve these goals. *Self-belief* is the ability to maintain high levels of confidence, constructive thoughts and positive emotions throughout competition. *Self-belief* is dependent upon the ability to effectively reflect upon and evaluate one's performance. *Positive cognition* relates to the athlete's ability to appraise or reformulate crisis situations as opportunities. Effective management of one's thoughts and emotions (arousal control) is also considered to be an aspect of positive cognition. *Visualisation* represents the mentally tough athlete's superior ability to make use of visualisation skills as part of training and preparation for competition.

Sheard (2010) characterises MT as consisting of three components: confidence, constancy and control. *Confidence* is viewed as the athlete's belief in their ability to achieve their goals. However, this component also encompasses the athlete's belief that they are different and better than their opponents. Sheard (2010) states that high levels of confidence enable athletes to retain a positive mind-set in the face of challenges. *Confidence* is also seen as a precursor to high-level athletic performance. *Constancy* is described as the athletes' attitude towards the demands of training and competition, goal setting, and focussing on the tasks at hand. This particular mind-set or orientation is integral to the athlete's dedication and commitment in both practice and competition. The third characteristic of MT, according to Sheard (2010), is *control*. Control relates to the athlete's resilience or hardiness and is

viewed as referring specifically to the individual's belief that their attitude and actions have a significant influence on their sporting outcomes.

2.3.3. The characteristic of mental toughness

The preceding review of both the explorative studies and the more conceptual work (Clough et al., 2002; Golby et al., 2007; Sheard, 2010) suggests that some degree of consensus has been reached regarding the characteristics of MT. It appears that MT is characterised by superior confidence or self-belief, as well as superior mental skills (particularly the regulation of arousal and the use of visualisation). MT is also characterised by a strong sense of self-efficacy or the belief that one has the ability to control or influence outcomes in competition and training. In addition, there appears to be agreement that mentally tough athletes demonstrate the determination to focus on what they want to achieve and to continuously work towards their goals irrespective of the challenges they face (constancy). Furthermore, the role of adaptive or positive cognition is highlighted in maintaining focus, remaining confident and effectively dealing with challenge and adversity. MT could thus tentatively be viewed as being comprised of confidence (self-belief), constancy (determination, commitment and challenge), control (challenge) and superior mental skills or particularly efficient application of mental skills (visualisation and positive cognition). The extent to which the available empirical literature provides evidence for this particular characterisation of MT will be explored in the next section.

2.4. Existing Empirical Research

Despite the widespread interest in MT, relatively few studies appear to have directly investigated the relationship between MT and sporting performance. In this section the available empirical literature will be reviewed in order to firstly determine whether a relationship between MT and sporting performance can be established and, secondly, to determine the evidence for the characterisations of MT reviewed in the previous section. Published studies in this area appear to have addressed the relationship between MT and level of sporting performance, MT and coping, MT and mental skills, MT and motivation, and MT and recovery from injury.

2.4.1. Mental toughness and sporting performance

Despite the widely held belief that MT is associated with improved sporting performance, no studies appears to have directly investigated the relationship between MT and sporting performance. Two studies could be found that have explored the association between MT and level of competition. Golby and Sheard (2004) investigated whether individuals competing at different levels of professional rugby exhibited differing levels of MT and hardiness. Levels of MT and hardiness were compared across three levels of competition in professional rugby in Britain (International, Super League and Division One). Both hardiness and MT were found to be correlated with level of competition. Players competing at international level were found to score significantly higher on commitment, control and challenge than Super League and Division One players. In addition, commitment, control and challenge were reported to account for 100% of the variance in level of competition. The international players also scored significantly higher on measures of negative energy control and attention control than players at the other two levels of competition. Furthermore, these

two constructs were found to jointly account for 15% of the variance in level of competition. MT characteristics, more specifically control and constancy, would thus appear to explain significant proportions of the variance in level of competition amongst professional British rugby players. While not specifically aimed at determining the relationship between MT and level of competition, a study by Crust and Azadi (2010) found that in a small sample of athletes, those who competed at county level reported significantly higher MT than those who competed at university or club level. Some evidence thus exists to suggest that MT might be positively associated with level of competition amongst athletes.

Nicholls, Polman, Levy and Backhouse (2009) investigated whether differences in MT exist with regard to gender, age, sport type, experience and level of competition. Athletes competing at international, national, county, club/university and beginner levels participated in the study. Males were found to score significantly higher than females on the measure of MT employed in the study. Furthermore, MT appeared to increase with age and experience. However, no significant differences in MT were apparent with regard to level of competition. The results of this study thus suggest that a significant relationship does not exist between MT and level of competition. The very limited research available on the relationship between MT and level of competition is contradictory. However, the research literature in this particular area is very limited and further investigation is required before any definite conclusions can be drawn regarding the relationship between MT and level of competition or sporting performance.

2.4.2. Mental toughness and coping

Mentally tough individuals are viewed as being better able to deal with the inherent stress of athletic competition (Bull et al., 2005; Jones et al., 2002). Nicholls, Polman, Levy, and Backhouse (2008) explored the relationship between MT and coping, as well as the

relationship between MT, optimism and pessimism. Approach or active coping generally demonstrated significant positive associations with MT, while avoidant coping tended to be negatively correlated with MT. Similarly, significant negative correlations were observed between MT and pessimism, while MT demonstrated significant positive correlations with optimism.

Kaiseler, Polman, and Nicholls (2009) investigated the relationship between MT, stressor appraisal, coping strategies and coping effectiveness in an athlete sample. Significant correlations were found between MT and problem-focused, emotion-focused and avoidant coping strategies. MT was found to be positively correlated with problem-focused coping strategies, while avoidant and emotion-focused coping were negatively correlated with MT. Moreover, regression analyses revealed that participants with higher levels of MT were more inclined to employ problem-focused coping strategies and less likely to engage in avoidant or emotion-focused coping. Not only were the mentally tough athletes in this study more inclined to employ problem-focused coping strategies, they also tended to rate their coping as being more effective when employing problem-focused coping strategies. By contrast, they were inclined to view their coping as less effective when employing avoidant or emotion-focused coping strategies.

There would appear to be some evidence to suggest that mentally tough athletes are more inclined to employ problem-focused coping when confronted with a stressor (Kaiseler et al., 2009; Nicholls et al., 2008). They also appear to evaluate their coping efforts as being more effective when employing problem-focused coping. Higher levels of confidence appear to be particularly significant predictors of athletes employing problem-focused coping strategies. Similarly, athletes who perceive themselves to have a greater degree of control over their lives (control characteristic of MT) are not only more inclined to make use of problem-focused coping strategies, but are less inclined to engage in avoidant or emotion-

focused coping (Kaiseler et al., 2009; Nicholls et al., 2008). Avoidant and emotion-focused coping strategies are generally negatively correlated with MT and are viewed as less effective by mentally tough athletes when they do employ them.

It might be argued that mentally tough athletes may not necessarily be better at employing effective (problem-focused) coping strategies than less mentally tough individuals, but that they are perhaps less intensely affected by stress (Horsburgh, Schemer, Veselka, & Vernon, 2009). However, Crust (2009) found no significant relationship between MT and affect intensity. This suggests that mentally tough individuals do not inherently experience more or less intense emotions compared to other individuals. Therefore, it is hypothesised, that mentally tough individuals are better at employing effective means of dealing with stressful situations (Crust, 2009). Kaiseler and colleagues (2009) report that in their study athletes with higher levels of MT were inclined to subjectively experience less stress and perceive themselves to be more in control when compared to those with lower levels of MT irrespective of the type of stressor they were confronted with.

2.4.3. Mental toughness and mental skills

Most definitions of MT make reference to mentally tough athletes either possessing superior mental skills or being more effective at implementing/making use of mental skills than less mentally tough competitors (Bull et al., 2005; Clough et al., 2002; Coulter et al., 2010; Gucciardi et al., 2009b; Jones et al., 2002/2007; Sheard, 2010). The available empirical literature on MT and mental or psychological skills is limited. Very few studies have examined whether, as the majority of definitions of MT suggest, mentally tough athletes demonstrate superior mental skills. The majority of research in this area has been interventional in nature and has examined the impact of mental skills training on MT (e.g. Gucciardi et al., 2009b; Sheard & Golby, 2006).

Crust and Azadi (2010) explored the relationship between MT and the use of psychological strategies during practice and competition in a small sample of athletes from a variety of sports. MT was found to significantly correlate with the use of mental skills during training and competition. MT was positively correlated with the use of goal setting, relaxation, self-talk and activation, as well as with emotional control techniques during competition. Of these, self-talk, emotional control techniques and relaxation demonstrated the strongest association with MT in competition. Within the practice or training context, MT demonstrated significant correlations with relaxation, automaticity, self-talk and emotional control techniques. It is thus apparent that relaxation, self-talk and emotional control strategies were significantly correlated with MT during training and competition. However, the strongest correlation reported in the study was the negative relationship between MT and negative thinking.

The relationship between specific aspects of MT (confidence, commitment/constancy and control) and the use of mental or psychological skills was also investigated. Commitment (constancy) was found to be most consistently related to the use of psychological or mental skills, particularly with the use of imagery in both competition and training (Crust & Azadi, 2010). The authors interpret this finding as possibly indicative of a tendency for more committed athletes to acquire and implement a wide range of strategies to improve their performance. Confidence was positively correlated with the use of a number of psychological skills; most notably with self-talk during practice. Control, specifically emotional control, demonstrated a significant positive correlation with the employment of emotional control techniques during competition.

Mattie and Munroe-Chandler (2012) examined the relationship between MT and the use of imagery in a sample of university athletes. The use of cognitive specific imagery (mental rehearsal of a specific skill) was significantly correlated to control, commitment,

challenge and confidence, as were the use of cognitive general imagery (mentally rehearsing strategies, game plans and routines) and motivational general-mastery imagery (images of feeling in control, confident and/or mentally tough). With the exception of confidence, none of the components of MT correlated significantly with the use of motivation specific imagery (imagery involving goal-oriented achievements or responses). Similarly, the use of motivational general-arousal imagery (imagery focussing on anxiety and arousal control) did not demonstrate significant correlations with any facet of MT.

Hierarchical multiple regression analyses revealed that motivational general-mastery imagery was the strongest individual predictor of all facets of MT investigated in the study (Mattie & Munroe-Chandler, 2012). The use of motivational general-arousal imagery was found to be a significant predictor of control, challenge and confidence. However, this form of imagery demonstrated a negative relationship with the aforementioned facets of MT. Cognitive specific and cognitive general imagery predicted a limited amount of the variance in MT in addition to that explained by the motivation focussed forms of imagery. Nonetheless, the use of cognitive general imagery was a significant individual predictor of confidence, control and commitment. Confidence was significantly predicted by the use of cognitive specific imagery.

The limited empirical research suggests that a relationship does exist between MT and the use of mental or psychological skills amongst athletes. MT, in both competition and practice, was found to be positively associated with various mental or psychological skills (Crust & Azadi, 2010). In addition, cognitive and motivational imagery were found to be predictors of various facets of MT (Mattie & Munroe-Chandler, 2012). Despite the need for further research, there would appear to be evidence of an association between MT and the use or more effective use of mental skills.

2.4.4. Mental toughness and risk-taking

Bull et al. (2005) identified a tendency toward taking calculated risks as an attribute that most mentally tough cricketers in their study shared. Crust and Keegan (2010) investigated the association between MT and risk-taking attitudes in a small sample of undergraduate athletes drawn from a number of sporting codes. A significant correlation was found between MT and attitudes indicative of disregarding danger and enjoying taking physical risks. However, no correlation was found between MT and attitudes towards engaging in activities that are not generally approved of by society (psychological risks). Challenge was the only facet of MT found to predict positive attitudes towards taking physical risks. Interpersonal confidence was the only MT attribute to significantly predict positive attitudes towards taking psychological risks. In this study men were found to score significantly higher than women on measures of MT, confidence and risk-taking. There thus appears to be limited evidence for a positive association between MT, particularly challenge and confidence, and risk-taking.

2.4.5. Mental toughness and motivation

Jones and colleagues (2002/2007) have suggested that mentally tough athletes differ from less mentally tough competitors with regard to motivation. Mentally tough individuals are viewed as possessing higher levels of motivation and as being better able to motivate themselves. Gucciardi (2010) explored the relationship between MT and motivation in a sample of non-elite male Australian adolescent footballers. Sport motivation mean scores indicated that external regulation (to obtain rewards or avoid punishment) was most often used by the sample of athletes. However, the use of identified regulation (personal value regarding the outcome), as well as intrinsic motivation was also reported as often used, therefore, indicating that athletes make use of various forms of motivation. Athletes with

higher levels of MT reported significantly higher levels of intrinsic motivation, identified regulation and external regulation, while no significant correlation was reported between MT levels and integrated or introjected regulation or amotivation. These findings would therefore suggest that mentally tough adolescent male athletes are motivated by both intrinsic, as well as less self-determined factors.

2.4.6 Summary

It is evident that only a limited amount of empirical research has been conducted on mental toughness and performance. Furthermore, contradictory evidence regarding aspects such as the relationship between MT and level of competition, further limits the extent to which definite conclusions may be drawn regarding MT and sporting performance, as well as MT and its theoretically postulated relationship with other variables.

The empirical research, however, highlighted some conclusive findings. It would appear that mentally tough individuals not only make more use of effective coping strategies, but also perceive their attempts at coping with stressors to be more effective. In addition, some studies have found MT (or specific facets of MT) to be positively associated with the effective use of certain mental skills (e.g. self-talk, emotional control, relaxation).

2.5. Developing Mental Toughness

It is continuously debated as to whether MT is predominantly a mental skill (Loehr, 1994), a personality trait (Clough, et al., 2002; Horsburgh et al., 2009) or some combination of the two (Bull et al., 2005; Gordon, 2005). Flowing from this debate is the question of whether MT is an inherent ability or whether it can be developed, at least to some degree.

Clough et al., (2002) view MT as a growth-orientated personality style consisting of a combination of cognitions, emotions and behaviours. Horsburgh and colleagues (2009) suggest that MT might be strongly genetically determined, and contend that it would be easier to culture some aspects of MT rather than the overall trait. Gordon (2005) is of the opinion that at least some aspects of MT can be taught. However, he did not identify the specific aspects that he thinks can be cultivated. Bull and colleagues (2005) view MT as being composed of both stable characteristics and more malleable aspects such as mental skills. These authors specifically identified attitudes and patterns of thought as aspects of MT that might be more readily influenced by interventions or taught. Thus, while there still appears to be much debate regarding the extent to which MT can be taught or developed, and to what extent this attribute is the result of genetics and early formative experiences, there does appear to be some consensus that certain aspects of MT can be taught, or at least improved by some form of skills-based intervention.

A limited number of studies have evaluated the efficacy of mental skills training programmes as methods of developing or improving MT. Sheard and Golby (2006) evaluated the effect of a seven-week mental skills training programme on the performance and positive psychological development (including MT) of a group of competitive adolescent swimmers. The participants underwent a 45 minute mental skills training session once a week for seven weeks. The intervention programme focussed on goal setting, relaxation training, visualisation, concentration and thought control strategies. Significant post-programme improvements were reported in three swimming strokes, as well as for most aspects of positive psychological functioning, including MT. Significant increases in self-confidence, negative energy control, attention control, visualisation and imagery control were reported.

Gucciardi et al. (2009b) compared the efficacy of a specific MT training intervention to that of a traditional psychological skills training intervention amongst adolescent Australian Rules football players. Three football teams (competing in the under 15 age group), a parent of each player, as well as the coaching staff from each team participated in the study. The three teams were randomly assigned to the control, psychological skill training and MT training conditions. Self-ratings of MT, resilience and flow were obtained from all the players prior to the interventions. Coaches and parents also rated the participants with regard to the aforementioned attributes prior to the interventions. Both intervention groups participated in a two hour session which took place once a week for six consecutive weeks, prior to the competitive season. Both programmes consisted of practical group and psycho-educational sessions. The psychological skills training group focussed on the development of general abilities such as regulatory skills (self and arousal), mental skills (mental rehearsal and attention control), self-efficacy and ideal performance states. The MT training sessions were specifically aimed at developing key MT characteristics such as self-belief, concentration and focus, resilience, motivation and having a tough attitude.

Athletes completed self-report measures of MT, resilience and flow post-season. Post-season ratings were also completed by coaches and parents. Participants assigned to the intervention conditions (mental skills training and MT specific mental skills training) were rated significantly higher than those in the control condition with regard to MT, resilience and flow. However, no significant differences were found between the two intervention groups with regard to MT, resilience or flow. The authors argue that common/overlapping mental skills components such as self-regulation, arousal regulation, mental rehearsal, attention control, self-efficacy and fostering an ideal performance state accounted for the improvement in the MT, resilience and flow in both the MT and general mental skill groups.

They contend that development of these mental skills results in improvements in MT irrespective of the format (MT specific vs. general mental skills) in which they are presented.

Parkes and Mallet (2011) conducted a study amongst rugby players in order to better understand whether MT can be taught using attribution style intervention. The intervention is based on theory indicating that optimism is an underlying mechanism of MT (Coulter et al., 2010). Seven male premier club rugby players took part in a four week programme which consisted of 30 minute face-to-face sessions, twice a week, and prior to training. Sessions consisted of psycho-educational information, as well as sessions aimed at implementing the newly learned skills while drawing from previous rugby experiences. The material was structured according to a cognitive-behavioural therapy workbook which focussed on attribution styles. Data was gathered using quantitative pre-and-post intervention collection (pen and paper, as well as online questionnaire completion); as well as qualitative data gathered by the researcher, during sessions, training and competition, and post-intervention via focus groups and semi-structured interviews. Results indicated that the participants reported an increase in optimism levels towards their sport. Participants also reported changes in cognitive processes. Specifically changes in attribution styles were identified. Participants were more inclined to attribute setbacks to external factors, and success to internal factors. Participants also reported being more aware of their own thought processes and not dwelling on mistakes as often. Post intervention data also suggests an increase in resilience (behavioural) and confidence (feeling) levels.

Taken together, the intervention studies reviewed above suggest that MT can to some extent be improved through mental skills training. The limited evidence available indicates that mental skills interventions presented in a specific MT format are not necessarily more effective at improving MT than those presented in a generic manner. The studies reviewed indicate that specific cognitive-behavioural intervention strategies such as learning or

improving emotional regulation skills, attention control, self-talk, relaxation training and cognitive restructuring might be helpful in improving MT. However, the extent to which the findings from these studies may be generalised beyond the context of competitive adolescent sport is not known.

2.6. Summary

MT has been portrayed as a fundamental skill or attribute in performance enhancement. The possession of this attribute or skill has been associated with improvements in the management of challenges during practice and competition, which in turn enables success. Considering the pertinent theoretical perspectives discussed in the literature reviewed, MT is described as a multidimensional construct consisting of emotions, behaviours, attitudes and values, as well as personality characteristics. These characteristics impact the athlete's interpretation of situations, as well as their approach towards it, which allows the athlete to effectively manage sport specific challenges, perform more consistently and ultimately achieve their goals.

In this chapter, some consensus has been established regarding the characteristics of MT. These characteristics include the athlete's possession of superior confidence in his/her ability to perform and achieve goals. MT is also characterised by the athlete's mind-set and behaviour to work towards and achieve goals regardless of the challenges set (constancy). Mentally tough athletes are also characterised by the belief that they can control outcomes in their different sporting environments (competition and practice). MT characteristics also include possessing and effectively applying mental skills such as self-regulatory and visualisation skills.

Despite the limited empirical research available for review, some evidence was found to support MT theory stating that MT enables athletes to better manage challenges and therefore perform better. MT, as well as its individual characteristics have been associated with more effective coping strategies, as well as better management of stress. The importance of mental skills amongst mentally tough athletes has also been highlighted. Research findings indicate that MT is associated with making more and better use of mental skills during both practice and competition.

The limited intervention study findings would suggest that aspects of mental toughness can be developed or taught. Research further suggests that mental skill programmes can be used as an effective form of intervention to increase aspects of MT such as confidence and resilience. Specifically the use of cognitive-behavioural interventions was identified as effective in developing aspects of MT.

Chapter 3

Rational Emotive Behavioural Therapy

3.1 Introduction

During the last few decades, the cognitive aspects involved in sport psychology have been well-researched (Moran, 2009; Smith, 2006). Specifically the importance of cognitive processes in sport performance has been highlighted (Abernethy, Maxwell, Jackson, & Masters, 2007; Moran, 2009). Abernethy and colleagues (2007) emphasised the role of cognitive processes such as attention control, memory, knowledge acquisition and visual search, while Moran (2009) highlights the use of cognitive processes which enable the athlete to perform complex skills and movement despite sport-specific challenges. Cognitive behavioural therapy (CBT) has also played an integral role in understanding the psychology of sport and performance (Luiselli, 2012; McArdle & Moore, 2012; Puig & Pummel, 2012).

A significant body of literature within sport psychology suggests that cognitive processes are central to sporting performance. Furthermore, numerous psychological interventions aimed at improving sporting performance have been developed from within the broader CBT paradigm (Blakeslee & Goff, 2007; Gucciardi et al., 2009b; Hays, Thomas, Maynard, & Butt, 2010; Hatzigeorgiadis, Zourbanos, Mpoupaki, & Theodorakis, 2009; Sheard & Golby, 2006). In fact, it could be argued that the majority of sport psychology interventions applied in practice are, to some degree, CBT-based (Moran, 2009; Smith, 2006). These interventions generally emphasise the role of cognition in the effective management of behaviour and emotions within the sporting environment and in other areas of athletes' lives (Parkes & Mallet, 2011; Smith, 2006). It would thus appear that CBT theory provides an appropriate and popular framework from which to understand the psychology of

sport and performance, as well as from which to design and implement performance-enhancement interventions. To date, however, there appears to have been little attempt to understand MT from a CBT perspective. Consequently, this chapter will attempt to provide an overview of a particular school of CBT, namely Rational Emotive Behaviour Therapy (REBT) (Ellis, 1957). Furthermore, the extent to which the principles of REBT might be applied to the understanding of MT within the sporting context will be explored.

3.2. Rational Emotive Behavioural Therapy (REBT)

REBT, a form of CBT, was developed by Albert Ellis. REBT, like other forms of CBT, is based on the premise that cognition, rather than an event or the environment, is the most important determinant of human behaviour and emotion (DiGiuseppe, Doyle, Dryden, & Backx, 2014; Ellis, David, & Lynn, 2010; Westbrook, Kennerley, & Kirk, 2007). REBT theory thus proposes that our behaviour and emotional state are not elicited primarily by our environment or events, but are mainly the result of our interpretations and evaluations of these events, as well as our role in them or their relevance to our well-being, identity or integrity. Thoughts or cognitions are thus viewed as being at the core of emotional distress and emotional well-being (Dryden, 2009/2011; Ellis et al., 2010).

According to REBT theory, cognitions can be inferential or evaluative in nature (DiGiuseppe et al., 2014; Ellis et al., 2010). Inferences refer to individuals' perceptions and interpretations of reality. These inferences may be accurate (i.e. reflect reality) or inaccurate. Inaccurate or distorted inferences might contribute to the development of emotional distress or behavioural difficulties (Westbrook et al., 2007; Beck, 1976). However, from an REBT perspective, inaccurate inferences are not considered to be the primary cause of emotional distress (DiGiuseppe et al., 2014; Ellis et al., 2010). Evaluative cognitions are seen to be at

the root of all emotional distress and psychological disturbance. According to REBT theory, individuals tend to disturb themselves by interpreting events in a manner that involves an absolutistic evaluation of themselves, others or the world (DiGiuseppe et al., 2014; Ellis et al., 2010). It is theorised that these evaluative beliefs reflect an individual's core beliefs, which in essence are their rules for living. These core beliefs can be either rational or irrational. Rational beliefs (RBs) are said to promote psychological flexibility which, in turn, promotes emotional well-being, effective coping and facilitates the pursuit of important life goals (Dryden, 2011). By contrast, irrational beliefs (IBs) are viewed as maintaining psychological rigidity and consequently resulting in emotional distress, ineffective coping and the inhibition of the effective pursuit of important life goals (Dryden, 2011). Irrational and rational beliefs will now be explored in more detail.

3.2.1. Irrational Beliefs (IBs)

IBs tend to be rigid or extreme, inconsistent with reality, illogical, non-pragmatic (holding IBs most often prevent individuals from reaching the goals they strive for) and result in emotional distress or psychological disturbances (Browne, et al., 2010; DiGiuseppe et al., 2014; Dryden, 2009). According to REBT theory, IBs reflect a tendency to elevate a strong preference to the level of a demand (DiGiuseppe et al., 2014). Individuals are thus said to disturb themselves when they demand that a desirable state of affairs exists (e.g. "I absolutely must be successful in all my sporting endeavours") rather than realising that while such a state of affairs is highly desirable (e.g. "I really want to be successful in all my sporting endeavours"), this desirability is not sufficient justification for their preference being elevated to the level of a universal law. Rigid demands that individuals hold with regard to themselves, others and the world around them are viewed as the primary cause of the emotional distress they experience. Consequently, demands are viewed as the primary form

of IBs along with three derivative IBs (awfulising beliefs, low frustration tolerance beliefs and depreciation beliefs) that often flow from the demands individuals hold or are activated when these demands are not met (DiGiuseppe et al., 2014; Dryden, 2009).

3.2.1.1 Demands

As stated above, demands are considered by REBT theorists to be at the core of emotional distress, behavioural difficulties and psychopathology (Browne et al., 2010; DiGiuseppe et al., 2014; Dryden, 2009). The majority of people hold very strong preferences in one or more areas of their lives. These reflect goals they would dearly like to achieve, events they may strongly wish to avoid or how they would like their environment to be. These preferences are viewed as being a normal, necessary and functional part of life. However, according to REBT theory, humankind has an innate tendency to demand that what they strongly desire absolutely must occur (Ellis et al., 2010). Consequently, human beings tend to elevate their preferences to the level of demands. Demands are thus rigid and absolutistic beliefs that people hold about how they should be, about how others should behave and about how the world around them must be (DiGiuseppe et al., 2014).

REBT theory views emotional distress as resulting in situations where individuals' rigid demands are not met. Individuals often experience depression, shame and guilt when they do not live up to the rigid standards of behaviour that they demand of themselves (DiGiuseppe et al., 2014; Dryden, 2009). Similarly, an individual can become depressed or angry when other people do not treat him or her in the manner that they demand to be treated. According to Dryden (2009), depression and anxiety often have their root in the demands that individual's place upon the world around them (e.g. predictability, safety and fairness). When the irrational demands that individuals hold are not met, beliefs or rules that these individuals hold with regard to the consequences of their demands not being met are

activated. These derivative IBs serve to intensify and maintain the emotional distress experienced by these individuals (Browne et al., 2010; DiGiuseppe et al., 2014; Dryden, 2009).

3.2.1.2 Awfulising beliefs

Awfulising beliefs are extreme irrational beliefs that individuals hold with regard to their demands not being met (DiGiuseppe et al., 2014). Awfulising beliefs tend to focus on how terrible or catastrophic it is that a demand has not been met. The rigid and extreme nature of awfulising beliefs is often evident when individuals are convinced that an event they demanded not occur (e.g. their child never be diagnosed with a life-threatening illness) is absolutely the worst thing that could have happened or that absolutely no good could come from such an event (Browne et al., 2010; DiGiuseppe et al., 2014; Dryden, 2009). Awfulising thus represents an absolutistic or dichotomous way of thinking that most often results in a dysfunctional emotional response such as anxiety, whereas holding a more flexible or rational belief under the exact same circumstances might lead to more appropriate and functional feelings of concern.

3.2.1.3 Low frustration tolerance

Low frustration tolerance (LFT) also derives from rigid demands not being met. Central to LFT is (1) the belief that the situation resulting from one's needs not being met is intolerable and (2) that one will not be able to stand or bear the inconvenience or discomfort resulting from not having one's demands met (Browne et al., 2010; DiGiuseppe et al., 2014). LFT has been implicated in the development of numerous negative emotional states, including clinical anger and depression (Dryden, 2009). Furthermore, LFT contributes to a mind-set where individuals irrationally believe that they should achieve everything they set

out to accomplish without having to experience any disappointment and without having to put in much effort (Browne et al., 2010; DiGiuseppe et al., 2014; Dryden, 2009). LFT is thus counterproductive with regard to striving for challenging and meaningful life goals.

3.2.1.4 Depreciation beliefs

According to REBT theory, human beings display an inherent tendency to make negative global judgements of worth with regard to themselves, others and the world around them when their inflexible demands are not met (DiGiuseppe et al., 2014; Dryden, 2009). These depreciation beliefs are based on the illogical premise that the worth of an individual may be determined on the basis of his or her actions or attributes. This results in individuals evaluating themselves negatively when they fail to live up to the demands they place upon themselves, negatively evaluating others when they fail to meet their demands and concluding that the world around them is deficient in some way because it does not align with their rigid demands (DiGiuseppe et al., 2014; Dryden, 2009). Self-depreciation beliefs tend to result in depression, guilt and shame, whereas other-depreciation beliefs have been implicated in the development and maintenance of clinical anger (Dryden, 2009). Life-depreciation beliefs (the belief that life is worthless or unfair because one's environment does not promote the satisfaction of one's demands) place individuals at risk of various forms of emotional distress including hopelessness and depression (Dryden, 2009).

3.2.1.5 The role of IBs in dysfunctional emotion and self-defeating behaviour

REBT is, as previously stated, based on the principle that beliefs (cognitions) play a central role in the origin and maintenance of human emotions and behaviours. Ellis's (1957) cognitive theory of emotions proposes that IBs and RBs are involved in the development and maintenance of qualitatively distinct emotional states. According to REBT theory, holding a

RB in a specific situation will result in a functional positive emotion (e.g. happiness) or a healthy negative emotion (e.g. sadness), while holding an IB in exactly the same situation will be associated with the experience of a dysfunctional positive emotion (e.g. mania) or an unhealthy negative emotion (e.g. depression). REBT theorists do not view the emotions associated with RBs as merely quantitatively less intense than those resulting from IBs. They are regarded as qualitatively distinct emotional states (DiGiuseppe et al., 2014; Dryden, 2013; Ellis et al., 2010; Ellis & DiGiuseppe, 1993). Similarly, the behaviours and cognitions associated with IBs are considered to be qualitatively distinct from those stemming from RBs (Dryden, 2013; Ellis & DiGiuseppe, 1993). Perhaps more specific to sport psychology, is that IBs are said to result in performance-handicapping behavioural, cognitive and emotional consequences, whereas RBs are purported to result in qualitatively distinct behaviours, cognitions and emotions that facilitate goal achievement and promote performance (DiGiuseppe et al., 2014; Dryden, 2009/2013).

The theoretical contention that IBs are associated with emotional distress, self-defeating cognitive patterns and dysfunctional behaviour has been borne out in a number of empirical studies. David and colleagues (David, Schnur, & Belloiu, 2002; David, Ghinea, Macavei, & Kallay, 2005) have demonstrated that a significant positive correlation exists between IBs and dysfunctional emotions such as anxiety, depression, guilt and anger. In addition, Jibeen (2013) found LFT to be a significant predictor of anxiety, while Stankovic and Vukosavjevic-Gvozden (2011) showed both emotional and discomfort intolerance (LFT) to be significant predictors of depressed mood. Furthermore, IBs and RBs have been found to exhibit different relationships to physiological states associated with emotional distress. In a study by Harris, Davies and Dryden (2006), IBs were associated with an elevation in systolic blood pressure, while RBs were related to reductions in systolic blood pressure.

IBs have also been found to be associated with sub-clinical forms of emotional distress and self-defeating behaviour. Ndika, Olagbaiye and Agiobu-Kemmer (2009) have demonstrated a relationship between IBs and lower levels of self-esteem among adolescents. A more recent study conducted among undergraduate students revealed that IBs were positively correlated with academic procrastination (Balkis, Duru, & Bulus, 2013). In a similar vein, McCown, Blake and Kaiser (2012) reported that procrastination was positively correlated with LFT, as well as with self- and other-depreciation. In addition to being positively related to emotional distress and self-defeating behaviour, IBs have been found to demonstrate negative correlations with measures of subjective well-being and with the experience of healthy negative emotions such as concern, sadness or remorse (Sporrle, Strobel, & Tumasjan, 2010; David et al., 2005).

It appears apparent from the preceding review that IBs underpin the development and maintenance of unhealthy negative emotions, as well as self-defeating behaviour and dysfunctional cognitive patterns. Furthermore, it seems widely accepted within the field of REBT that IBs result in qualitatively distinct emotional reactions from those that sprout from RBs. The impact of these rigid beliefs on emotion, behaviour and cognition has been demonstrated in a number of studies across both clinical and sub-clinical populations. The role of RBs in emotional-wellbeing and the facilitation of constructive, goal-directed behaviour will now be discussed.

3.2.2 Rational Beliefs (RBs)

REBT theory proposes that just as emotional distress and psychopathology result from the psychological rigidity of IBs, holding RBs promotes the psychological flexibility necessary for experiencing non-extreme and appropriate emotions, coping effectively with life's challenges, and effectively pursuing meaningful life goals (DiGiuseppe et al., 2014; Caserta,

et al., 2010). RBs are characterised by flexibility, logic and consistency with reality. In addition, RBs are non-extreme and are generally associated with functional emotions and behaviours (DiGiuseppe et al., 2014; Dryden, 2011). At the core of rational thinking are non-dogmatic preferences. Non-dogmatic preferences are contrary to rigid demands in that they emphasise the individual's strong preferences without elevating these to absolutistic, universal laws. Put differently, provision is made for the probability that despite one strongly preferring a specific outcome or state of affairs, these should not materialise purely as a result of this preference (Dryden, 2011). While non-dogmatic preferences are at the core of rational thinking, three rational derivatives have also been identified: non-awfulising beliefs, discomfort tolerance and acceptance beliefs.

3.2.2.1 Non-dogmatic preferences

REBT theorists describe non-dogmatic preferences as the core of healthy emotions and constructive behaviour, as well as playing a central role in realistic and balanced thinking (DiGiuseppe et al, 2014; Dryden, 2011; Still, 2010). Non-dogmatic preferences, in essence, refer to holding flexible beliefs with regard to wanted or unwanted life occurrences. According to Dryden (2011), flexible beliefs vary in intensity, in that preferences can range from mild to very strong. However, in contrast to demands, non-dogmatic beliefs, while often being based on very strong preferences, do not include a rigid insistence that a desirable state of affairs exists or that undesirable situations not exist. Contrary to rigid demands, logical and empirical support can be found for the non-dogmatic beliefs that individuals hold (Caserta et al., 2010; DiGiuseppe et al, 2014).

Holding non-dogmatic preferences is viewed by REBT theorists as a prerequisite for consistent adaptive emotional, cognitive and behavioural functioning (DiGiuseppe et al., 2014; Dryden, 2011). Holding strong preferences with regard to one's goals and desires

enhances motivation, while not rigidly demanding that these preferences must become a reality enables functional and flexible adaptation to adversity (Dryden, 2011). Individuals who hold non-dogmatic preferences rather than rigid demands are theorised to experience healthy negative emotions such as sadness or concern, rather than emotional distress (e.g. depression or anxiety) in situations where the achievement of their goals is frustrated or thwarted (DiGiuseppe et al., 2014; Dryden, 2011). Furthermore, non-dogmatic preferences are associated with emotional states and behavioural patterns that enable individuals to more effectively pursue their goals.

3.2.2.2 Non-awfulising beliefs

Non-awfulising beliefs are described as logical, evidence-based and helpful in the evaluation of and adjustment to, an unwanted event (DiGiuseppe et al, 2014). As stated previously, awfulising beliefs are inflexible, catastrophic beliefs regarding the consequences of a rigid demand not being met. By contrast, non-awfulising beliefs reflect a realistic appraisal of the probable repercussions of the frustration or thwarting of a non-dogmatic preference (DiGiuseppe et al., 2014; Dryden, 2011; Still, 2010). Thus non-awfulising beliefs reflect the realisation that while a strongly desired outcome has not been realised, this is not necessarily the worst possible outcome in the particular circumstances. The inherent undesirability of the situation is recognised, but it is also accepted that the situation is not the worst possible outcome, and that some good may still come out of it (Dryden, 2011). Non-awfulising beliefs can be logically and empirically validated. Furthermore, these beliefs facilitate adaptive emotional reactions (e.g. disappointment or concern), constructive behaviours (e.g. perseverance or problem-focussed coping) and realistic thinking (e.g. keeping the situation in perspective) in the face of adversity (Dryden, 2011).

3.2.2.3 Discomfort tolerance

Dryden (2011) states that all individuals struggle with discomfort when their positive preferences (likes) are not immediately met. LFT or discomfort intolerance beliefs tend to focus on the perceived intolerability of the situation, as well as on the individual's perceived inability to cope with not having his or her needs met (DiGiuseppe et al., 2014; Dryden, 2009). Conversely, rational, high frustration tolerance (HFT) or discomfort tolerance beliefs acknowledge the undesirability of not having one's needs met in a specific situation, but do not construe this state of affairs as intolerable. Moreover, discomfort tolerance beliefs emphasise that emotional discomfort experienced in a specific situation is not predictive of one's ability to experience pleasant emotions in the future. Therefore having discomfort tolerance beliefs enables the individual to place current discomfort within the context of their long-term goals and ambitions. According to Dryden (2011), discomfort-tolerance beliefs are comprised of three components: (1) acknowledging that not having a preference met is undesirable and unpleasant, (2) realising that the accompanying discomfort can be tolerated even though it is unpleasant to do so, and (3) realising that it is worth tolerating the frustration or discomfort in order to achieve a desired goal. Consequently, discomfort tolerance results in disappointment and irritation when a desired outcome is thwarted, rather than anger. Discomfort tolerance beliefs also facilitate perseverance and motivation, which in turn promote long-term goal attainment (Dryden, 2011).

3.2.2.4 Acceptance beliefs

Acceptance beliefs are described by Dryden (2011/2012) as logical, helpful and evidence-based beliefs about life in general, about others and about the self that are activated when an individual's strong preferences are not met or thwarted. In contrast, depreciation beliefs are illogical global and dichotomous judgments of the world, of others and their own

worth, that people hold when their rigid demands are not met (Browne et al., 2010; DiGiuseppe et al., 2014). Depreciation beliefs result in unhelpful emotions and behaviour such as depression, hopelessness and clinical anger (Chamberlain & Haaga, 2001; Ciarrochi, 2004). Acceptance beliefs, by contrast, allow the individual to accept that despite their preferences that things were different, both life and people are complex, and consist of positive, negative and neutral aspects (Dryden, 2011/2013).

Dryden (2011) notes that acceptance beliefs or unconditional acceptance beliefs are generally applicable to three areas: unconditional self- acceptance (USA), unconditional other-acceptance (UOA) and unconditional life-acceptance (ULA). Beliefs relating to unconditional acceptance of people (USA and UOA) enable individuals to realistically evaluate themselves or others without making attributions of worth based on how they would like people to behave or the world to be (DiGiuseppe et al., 2014; Ellis et al., 2010). This allows individuals to acknowledge that others, and/or themselves possess unwanted negative attributes or lack wanted positive attributes without generalising these observations to global judgements of their worth as human beings (Dryden, 2013). Holding unconditional acceptance beliefs enables the individual to realise that both life and people are too complex to be classified according to a dichotomy of good or bad (Bernard, 2009). Consequently, the worth of an individual cannot logically or empirically be determined on the basis of his or her actions or attributes (Dryden, 2013). Holding unconditional acceptance beliefs thus enables people to accurately evaluate their strengths and weaknesses without concerns about what their weaknesses might say about them as people. Similarly, they are able to acknowledge that other people and the world in general often do not fall in with their strong preferences without becoming fixated, judgemental or disillusioned about life. When people are less inclined to make global ratings of their own human worth and the worth of others, they are often in a better position to view their situation realistically, experience functional emotions

and more effectively pursue their goals (Caserta et al., 2010; DiGiuseppe et al., 2014; Dryden, 2011/2013). In short, they are more likely to be in an emotional and behavioural state that facilitates performance.

3.2.2.5 The role of RBs in adaptive emotions and goal-directed behaviour.

Traditionally, despite acknowledging the role of RBs in adaptive behaviour and emotions, REBT has tended to focus on the role of cognition in emotional disturbance. Much of the emphasis within the field has been on identifying and addressing IBs (e.g. Browne et al., 2010; DiGiuseppe et al., 2014; Ellis, 1957/1997; Ellis & Bernard, 1985). It might also be argued that until recently within REBT, as within a number of other therapeutic approaches, emotional well-being has been viewed more as the absence of emotional distress rather than the presence of flourishing (Seligman & Csikszentmihalyi, 2000). More recently, however, a greater focus on the effect of RBs on emotional well-being and goal-directed behaviour has begun to emerge (e.g. Caserta et al., 2010; Dryden, 2011; Grieger, 2007; Grieger & Fralick, 2007). According to Caserta et al. (2010), psychological well-being requires the fervent pursuit of desires and preferences, whilst guarding against elevating these to the level of rigid demands. Perhaps of particular relevance to the field of sport and performance psychology, is that REBT theorists (e.g. Caserta et al., 2010; Dryden, 2011) have begun to more clearly articulate the role of RBs in resilience, motivation and self-discipline.

Dryden (2011) postulates that holding irrational beliefs regarding the uncertainty and discomfort that often accompanies adversity lies at the root of emotional distress, and consequently threatens emotional well-being. It is thus not the perceived lack of control that often accompanies uncertainty or the discomfort that is associated with adversity that threatens one's emotional well-being, but rigid demands for predictability and control, as well as discomfort-intolerance that represent the biggest challenges to maintaining emotional well-

being. Consequently, it has been hypothesised that holding RBs acts as a protective factor during times of adversity and is central to maintaining emotional or psychological well-being (Caserta et al., 2010).

Dryden (2011) maintains that flexibility facilitates the maintenance of emotional or psychological well-being by enabling an individual to acknowledge their strong preference for certainty and the fulfilment of their desires, while not dogmatically demanding that this necessarily occur. Similarly, it is proposed that distress tolerance enhances emotional well-being by enabling the individual to focus more effectively on his or her long-term goals, rather than being caught up in their current adversity (Dryden, 2011; Tarfrate & Kassinove, 1998). Non-awfulising beliefs promote emotional well-being by enabling the individual to maintain a realistic perspective on their current situation, as well as helping to create the emotional space necessary to formulate and evaluate alternative means of dealing with the adversity they are confronted with (DiGiuseppe et al., 2014; Dryden, 2011).

Dryden (2011) proposes that non-awfulising beliefs, distress tolerance and flexibility facilitate resilience, motivation and self-discipline. Resilience is viewed as “an individual’s stability or quick recovery (or even growth) under significant adverse conditions” (Leipold & Greve, 2009, p. 41). From an REBT perspective, RBs primarily promote resilience by fostering a mind-set in which the individual realises that no matter how important their desired life goals are, these do not absolutely have to be realised, nor should they never be frustrated or thwarted in the pursuit of their goals (Dryden, 2011).

Non-awfulising beliefs are thought to facilitate resilience in two ways. Firstly, non-awfulising beliefs help maintain perspective regarding how bad or severe a specific adversity or situation really is. This perspective, in turn, enables the individual to maintain an emotional state and cognitive orientation that are more conducive to the generation and evaluation of alternative means of reaching their goal than the anxiety, panic and worry that

usually result from awfulising beliefs (DiGiuseppe et al., 2014; Dryden, 2009). Secondly, awfulising beliefs are inclined to result in hopelessness as a result of viewing the adversity an individual faces as the absolute worst possible outcome (Dryden, 2009). By contrast, non-awfulising beliefs facilitate hope by placing the adversity in a more realistic context and thus highlighting the future beyond the obstacles the individual currently faces (Dryden, 2009/2011; Jarrett, 2013).

Self-motivation is considered to be an integral component of psychological well-being as it enables the individual to both set goals and work towards obtaining these goals (Haggard & Chatzisarantis, 2007). REBT theory states that holding flexible beliefs helps promote the consistent and disciplined pursuit of personally meaningful goals (Ellis, 1994). Holding flexible beliefs allows the individual to acknowledge that even though it would be preferable to always feel optimally motivated and enthusiastic in pursuing their goals, it is not a necessary prerequisite for working towards one's goals (Dryden, 2011). Similarly, holding discomfort tolerance beliefs enables the individual to realise that despite the absence of situations conducive to optimal motivation and the presence of adversity, the often frustrating process of pursuing one's goals is tolerable (Dryden, 2013; Haghbin, McCaffrey, & Pychyl, 2012). Moreover, discomfort tolerance facilitates motivation by helping the individual place their current frustrations in the appropriate context and thus realise that the current lack of motivation they might experience or the challenges they face are not proof that they will never feel motivated again (Dryden, 2011). Consequently, individuals with high discomfort tolerance are able to demonstrate goal-directed behaviour despite unfavourable circumstances or lapses in motivation (Ellis, 1994). Furthermore, unconditional self-acceptance (USA) facilitates motivation by preventing self-condemnation and the associated depression, guilt or despondency at not progressing as quickly or easily towards one's goals as one might prefer (Caserta et al., 2010; Dryden, 2011; Ellis, 1994).

According to Dryden (2011), holding RBs facilitates self-discipline. He views self-discipline as being composed of two elements. First, in order to exercise self-discipline an individual has to demonstrate the ability to forgo the gratification of achieving short-term goals which might hinder the achievement of long-term goals. Second, self-discipline requires the insight that it is human nature to want the pleasure associated with the immediate gratification of needs or desires, but realising that it is in one's best interests to continue striving for one's long-term goals despite short-term discomfort and the postponement of gratification (Dryden, 2011). Holding IBs like demands for immediate gratification or LFT with regard to short-term discomfort in the pursuit of long-term goals are thus inconsistent with self-discipline (DiGiuseppe et al., 2014; Dryden & Neenan, 2004). Moreover, IBs relating to negative ratings of one's worth as a person for wanting to enjoy short-term pleasure at the cost of long-term success, self-damning for lapses in self-discipline or negative ratings of life in general result in emotional and cognitive states that are not conducive to the disciplined pursuit of long-term goals (Dryden, 2011).

Bernard (2009) notes that RBs, unlike IBs, allow an individual to realise that despite their preference for comfort and immediate gratification, these conditions are not necessary for the self-disciplined pursuit of long-term goals. Similarly, discomfort tolerance beliefs enable an individual to accept that the pursuit of valued long-term goals does not have to be without difficulty, that he or she is able to tolerate the frustration of not obtaining immediate gratification and that it is worthwhile tolerating discomfort and sacrificing pleasure to achieve one's goals (Dryden, 2013). Dryden (2011) states that USA beliefs allow an individual to be accepting of the urges they might have to pursue short-term pleasure at the cost of their long-term objectives without ascribing such urges to a lack of self-discipline or to a personal shortcoming. Consequently, the individual is able to experience these urges, or even occasionally act on them, without engaging in negative evaluation of their self-worth.

This, in turn, prevents the individual from developing negative emotional states and self-defeating behaviours that would undermine their efforts to achieve their long-term goals (Dryden, 2011/2013).

It is evident from this discussion on the role of RBs in adaptive emotions and goal-directed behaviour, that flexible, non-dogmatic beliefs are not only associated with the absence of psychopathology, but also facilitate psychological well-being. RBs appear to facilitate a mind-set which enables the individual to enthusiastically set and pursue goals without viewing lapses in self-discipline as evidence of their worthlessness as people. In addition, RBs promote resilience, perseverance and self-discipline. It would thus appear that not only can rational thinking prevent negative emotions and self-defeating behaviours, but that holding flexible and non-absolutistic beliefs also promotes self-discipline, motivation and performance in the face of adversity.

3.3 Core beliefs and mental toughness

The preceding discussion appears to suggest that RBs underpin a number of behaviours, cognitions and emotions that could be argued to represent, or be related to aspects of MT. Similarly, IBs could be argued to result in self-defeating behaviours, emotions and thought patterns that are not conducive to the development and maintenance of MT. There may thus be some basis for inferring that RBs may promote MT, while IBs may be detrimental to MT. However, despite the apparent logic of the connection between core beliefs and a performance-enhancing mind-set such as MT, as well as the strong emphasis on cognitive behavioural processes in many sport and performance psychology interventions (e.g. Blakeslee & Goff, 2007; Hatzigeorgiadis et al., 2009; Hays et al., 2010; Sheard & Golby, 2006), to date, there has been no attempt to understand MT from an REBT

perspective. Some attempt has been made to understand general sporting performance from within the REBT framework and it might be worthwhile reviewing what has been done in this regard.

Bernard (1985) seems to have been the first to apply REBT principles to the enhancement of sport performance. He developed a mental skills training programme to target confidence, consistency, commitment, concentration and calmness under pressure amongst Australian Rules Football players. The programme included standard sport psychology interventions such as relaxation training, imagery training and goal setting. However, REBT was also applied as a means of teaching athletes' how to "overcome fear and worries through winning attitudes and positive thinking" (Bernard, 1985, p. 281). Bernard (1985) identified demands with regard to the level of sporting performance that athletes think they should maintain and awfulising about the implications or meaning of isolated mistakes or episodes of poor skill execution as being particularly damaging to athletes confidence in their abilities. This particular application of REBT to the sporting arena, despite having potentially identified a link between IBs and suboptimal performance, was not supported by an independent measure of potential changes in the sporting performance of the participants or of changes in their core beliefs. Moreover, this approach could be argued to perpetuate the clinically-derived notion that the absence of IBs and associated emotional difficulties equates to the presence of RBs and performance-promoting emotions and behaviours.

Recently, Turner and Barker (2014) have attempted to continue the application of REBT principles to the understanding of sporting performance. These authors contend that assisting athletes to develop and adopt RBs will enable them to more effectively deal with adversity and improve their ability to perform consistently under pressure. Turner and Barker (2014) advocate identifying IBs that are at the root of athletes' suboptimal performances and

teaching them to replace these with RBs. This process is purported to eliminate the dysfunctional behaviours, cognitions and behaviours associated with these irrational core beliefs, and in so doing, remove the obstacles to optimal athletic performance.

Turner and colleagues have examined the effects of REBT interventions on anxiety in elite youth cricketers (Turner & Barker, 2013), as well as on the emotional well-being and functioning of elite youth soccer academy players (Turner, Slater, & Barker, 2014). Turner and Barker (2013) reported a significant reduction in irrational beliefs and cognitive-anxiety (from pre-test to post-test) in three of the four elite youth cricketers who underwent three-session REBT intervention. The authors contend that as the reduction in the participants' anxiety coincides with the introduction of the REBT intervention and is associated with a reduction in IBs, that the reduction in anxiety can be attributed to the effects of the intervention. However, they do concede that, as no follow-up measures were included in the study, no deductions can be made with regard to the durability of the apparent effects of the intervention. Moreover, the effect of the reduced cognitive-anxiety on the participants' cricketing performance was not determined.

Turner et al. (2014) examined the effect of a single session REBT workshop targeting rigid demands with regard to sporting performance and the awfulising associated with falling short of these rigid standards in a group of 15 elite adolescent soccer players. Immediate post-intervention measures indicated a reduction in total irrational beliefs, demands with regard to achievement, discomfort intolerance and demands for fairness. However, these effects were no longer evident at follow up (six weeks later). The brief REBT intervention thus appears to have had an immediate effect on irrational thinking which regressed to pre-intervention levels by follow-up. As with the previous study, no attempt was made to determine the effect of the intervention and ensuing changes in core beliefs on the sporting performance of the participants.

The limited literature on the role of core beliefs on sporting performance suggests that, similar to other populations, athletes exhibit a tendency to hold IBs with regard to performance, ability and self-worth. Furthermore, there appears to be an assumption that IBs give rise to cognitive, behavioural and emotional difficulties, which in turn negatively impact upon sporting performance. However, to date, this proposed sequential model of causality has not been empirically tested within an athlete population. Two intervention studies suggest that REBT interventions may hold potential for addressing sport-related IBs. The longevity of the effects of such interventions, as well as the impact of these interventions on actual sporting performance remains undetermined. Taken together, the existing literature tentatively suggests that REBT may be a useful theoretical framework from which to understand the interaction between cognition (particularly core beliefs) and sporting performance. More pertinent to the current study, is the possibility that the specific emphasis that REBT places on the effects of core beliefs on emotion and behaviour in the face of adversity might make this specific theoretical orientation particularly suitable for understanding the manner in which cognition may facilitate perseverance, hope, confidence and self-discipline in the face of challenge. This seems to be of particular utility with reference to MT.

3.4 Summary

Cognitive behaviour theory appears to have become a very popular framework from which to understand the role of cognition in sporting performance. However, to date, no attempt appears to have been made to develop a systematic understanding of MT from a CBT perspective. This chapter reviews the basic principles of REBT, particularly the manner in which IBs are hypothesised to contribute to negative emotion and dysfunctional behaviour,

while RBs facilitate functional behavioural, cognitive and emotional outcomes. The nature of non-dogmatic preferences, non-awfulising beliefs, discomfort tolerance beliefs and acceptance beliefs was dealt with in detail. In addition, the role of these particular core beliefs in functional emotional states and goal-directed behaviours was reviewed. The effect of RBs on resilience, motivation and self-discipline was of particular interest. Finally, the limited research on the influence of core beliefs on sporting performance was reviewed with specific emphasis on what REBT theory might have to offer with regard to the understanding of MT. It was concluded that, given the potential role of core beliefs in the maintenance of resilience, functional emotion and goal-directed behaviour in the face of adversity, REBT appears to hold promise as a theoretical orientation from which to explore and better understand MT and the cognitive processes underlying this desirable performance state.

Chapter 4

Methods

4.1 Introduction

This chapter deals with the research methods and procedures employed to determine the extent to which rational beliefs (RBs) and irrational beliefs (IBs) predict the mental toughness of competitive adolescent tennis players. This study aims to investigate three broad research statements:

1. Core beliefs (rational and irrational) predict mental toughness amongst competitive adolescent tennis players.
2. Rational beliefs are positively associated with mental toughness amongst competitive adolescent tennis players.
3. Irrational beliefs are negatively associated with mental toughness amongst competitive adolescent tennis players.

This chapter provides an overview of the data gathering procedures utilised in the study, the composition of the sample, the measuring instruments used and the specific statistical procedures employed.

4.2 Data Gathering Procedure

Ethical clearance for the study was granted by both the Research Committee in the Department of Psychology and the Committee for Title Registration in the Faculty of the Humanities at the University of the Free State. Permission to conduct the study was obtained

from the Free State Tennis Board, as well as from the organisers of a large annual youth tournament held in the Eastern Cape. Participants were purposefully sampled from private tennis schools in Bloemfontein, as well as from amongst individuals competing at the National Junior Tennis Tournament held in Bloemfontein, and from the Marelle Moolman Tennis Tournament held in Cradock. Permission to approach potential participants was obtained from their tennis coaches. Only individuals between the ages of 14 and 19 years were included in the study. Competitive status, as defined by representing their school or playing tennis at a higher level, was also a criterion for inclusion.

Written informed consent was obtained from participants and their legal guardians prior to the administration of the measuring instruments. As part of the informed consent, all participants were informed of the purpose of the research and that the findings would be used to obtain an academic qualification. In addition, participants were informed that the results of the study could be published in an academic journal and/or be used in conference presentations. All participants who completed questionnaires were entered into a lucky draw for a tennis racquet. Due to the aforementioned participation incentive, questionnaires were not completed anonymously. However, the identities of the participants and their responses on the questionnaires were treated in the strictest confidence. Data was gathered between games or in the evenings during the tournaments mentioned above. Participants recruited from tennis schools in Bloemfontein completed the questionnaires prior to or following practice, depending upon the preferences of the participant and coach involved. The researcher supervised the administration of the questionnaires and was available at all data gathering sessions to answer questions.

4.3 Participants

A total of 134 competitive adolescent tennis players with a mean age of 15.57 years (SD = 1.217; range = 14 - 19) participated in the study. The demographic characteristics of the sample with regard to gender and level of competition are reflected in Table 1.

Table 1

Frequency Distribution of Participants According to Gender and Level of Participation

Biographical Variable	N	%
<i>Gender</i>		
Male	72	53.7
Female	62	46.3
<i>Level of competition</i>		
National	38	29.5
Provincial	48	37.2
Regional	17	13.2
School	26	20.1

According to Table 1, gender was evenly distributed across the sample with 72 (53.7%) male and 62 (46.3%) female participants. Furthermore, approximately 67% of the sample reported competing at either national (29.5%) or provincial (37.2) level, with a further 13.2% competing at regional level. It would thus appear that most of the participants included in the sample play tennis at a highly competitive level.

4.4 Measuring Instruments

The Shortened General Attitudes and Beliefs Scale (SGABS) (Lindner, Kirby, Wertheim, & Birch, 1999) was used to measure RBs and IBs, while the Sport Mental Toughness Questionnaire (SMTQ) (Sheard, Golby, & Van Wersch, 2009) and the alternate version of the Psychological Performance Inventory (PPI-A) (Golby, Sheard, & Van Wersch, 2007) were employed as measures of MT.

4.4.1 The Shortened General Attitudes and Beliefs Scale (SGABS)

The SGABS (Lindner et al., 1999) is a 26-item self-report measure of RBs and IBs. Responses are indicated along a five-point Likert-type scale anchored by *strongly disagree* and *agree strongly*. The SGABS yields scores on one rationality scale and six irrationality scales (Need for achievement, Need for approval, Need for comfort, Demand for fairness, Self-downing and Other-downing). *Rationality* is measured by four statements (e.g. ‘I have worth as a person even if I do not perform well at tasks that are important to me’). The higher an individual’s score on this scale, the more inclined they are to hold RBs. *Need for achievements* is measured via four statements (e.g. ‘It’s unbearable to fail at important things, and I can’t stand not succeeding at them’), while *Need for approval* is measured by way of three statements (e.g. ‘It’s awful to be disliked by people who are important to me and it is a catastrophe if they don’t like me’). *Need for comfort* (e.g. ‘It’s unbearable being uncomfortable, tense or nervous and I can’t stand it when I am’), *Demand for fairness* (e.g. ‘I can’t stand a lack of consideration from other people, and I can’t bear the possibility of their unfairness’) and *Self-downing* (e.g. ‘If important people dislike me, it is because I am an unlikeable, bad-person’) are measured by four statements each. Three statements (e.g. ‘When I am treated inconsiderately, I think it shows what kind of bad and hopeless people there are

in the world') are used to measure *Other-downing*. The higher the score on each of the irrationality scales, the more strongly the respondent holds the relevant IBs.

Lindner et al. (1999) report test-retest reliability coefficients for the SGABS ranging from 0.79 for the Need for achievement and Need for approval scales to 0.84 for the Rationality and Self-downing scales in a community sample of adults in the USA.

4.4.2 The Sport Mental Toughness Questionnaire (SMTQ)

The SMTQ (Sheard et al., 2009) is a 14-item multidimensional measure of MT. Responses are indicated along a four-point Likert-type scale anchored by *not at all true* and *very true*. The SMTQ yields scores on three subscales (confidence, constancy and control). *Confidence* is measured by six items (e.g. 'I have what it takes to perform well while under pressure'), while *Constancy* (e.g. 'I get distracted easily and lose my concentration') and *Control* (e.g. 'I am overcome by self-doubt') are measured by four items each. The higher the score on each of the subscales, the more strongly the individual possesses the attribute measured by the particular subscale. The following internal consistency coefficients are reported for the SMTQ by Sheard et al. (2009): $\alpha = 0.80$ for Confidence, $\alpha = 0.74$ for Constancy and $\alpha = 0.71$ for Control.

4.4.3 Psychological Performance Inventory – A (PPI-A)

The PPI-A (Golby et al., 2007) is a 14-item self-report multidimensional measure of MT. Responses are indicated along a five-point Likert-type scale anchored by *almost never* and *almost always*. The PPI-A yields scores on four subscales (Determination, Self-belief, Positive cognition, and Visualisation). *Determination* is measured by three statements (e.g. 'The goals I've set for myself as a player keep me working hard'); while *Self-belief* is

determined according to responses on four statements (e.g. ‘I lose my confidence very quickly’). *Positive cognition* is measured by four statements (e.g. ‘I can change negative moods into positive ones by controlling my thinking’); while *Visualisation* is measured by three statements (e.g. ‘I mentally practice my physical skills’). Two of the items are negatively worded and therefore have to be reverse scored. The higher the score on each subscale, the more strongly the individual possesses the measured attribute. Gucciardi (2012) reported internal reliability coefficients ranging from 0.60 for the Positive cognition subscale to 0.69 for the Visualisation subscale in a sample of adolescent Australian footballers.

4.4.4 Translation procedures

The aforementioned measuring instruments were translated from English into Afrikaans using the back translation method (Brislin, 1970). The measuring instruments were translated into Afrikaans by the researcher. They were then translated back into English by a bilingual psychologist with knowledge of both REBT and MT. The back translated versions of the questionnaires were compared to the original English versions in order to detect any discrepancies. Problematic items (i.e. items on the Afrikaans translations that had been back translated in a manner that differed significantly from the corresponding item on the original English measure) were then reworded to more accurately convey the meaning of the original English items. This process was effected by consensus between the researcher and the other psychologist.

4.4.5 Measures of central tendency and reliability

Means, standard deviations and reliability coefficients were calculated for the SGABS, SMTQ and PPI-A. This data is reported in Table 2.

Table 2

Descriptive Statistics and Reliability Data for the SAGBS, SMTQ and PPI-A

Measures	<i>N</i>	<i>M</i>	<i>SD</i>	Range	α
SAGBS Rationality	132	15.45	2.888	8 - 20	.616
SAGBS Need for achievement	132	11.85	3.726	4 - 20	.740
SAGBS Need for comfort	132	11.33	3.652	4-19	.741
SAGBS Self-downing	132	7.59	3.850	4 - 18	.830
SAGBS Other-downing	132	7.64	2.733	3 - 15	.615
SAGBS Need for approval	132	8.36	2.872	3 - 15	.696
SAGBS Demand for fairness	132	14.53	3.129	5 - 20	.632
SMTQ Confidence	134	16.46	3.145	8 - 23	.730
SMTQ Constancy	134	12.41	2.394	6 - 16	.621
SMTQ Control	134	10.97	2.618	5 - 16	.660
PPI-A Determination	131	11.71	2.950	3 - 15	.806
PPI-A Self belief	131	14.00	3.053	6 – 20	.605
PPI-A Positive cognition	131	14.73	3.314	5 – 20	.785
PPI-A Visualisation	131	10.34	3.007	3 - 15	.742

It is apparent from Table 2 that the Cronbach's α coefficients for the SAGBS, SMTQ and PPI-A scales range from .605 to .830. These scales thus exhibit acceptable levels of internal consistency (Vogt, 2005) and were consequently all included in the subsequent analyses.

4.5 Research Objectives

Based on the literature reviewed in chapters 2 and 3, the following research statements were formulated:

1. Core beliefs (rational and irrational beliefs in combination) account for a statistically significant proportion of the variance in the mental toughness of competitive adolescent tennis players.
2. Rational beliefs are significantly positively associated with mental toughness.
3. Irrational beliefs are significantly negatively associated with mental toughness.

The specific analytical strategies and methods employed to investigate these objectives are discussed in the section below.

4.6 Statistical Procedures

Hierarchical regression analyses were employed to investigate the stated objectives (Howell, 2009). RBs and IBs (Rationality, Need for achievement, Need for comfort, Self-downing, Other-downing, Need for approval and Demands for fairness scales of the SGABS) were employed as predictor (independent) variables, while MT (Confidence, Constancy and Control scales of the SMTQ, and the Determination, Self-belief, Positive cognition and Visualisation scales of the PPI-A) served as criterion (dependent) variables. The analytic strategy was to first determine the combined variance in each of the criterion variables accounted for by the full predictor model (all independent variables combined). Thereafter,

the unique contribution of RBs (Rationality scale of the SAGBS) and IBs (Need for achievement, Need for comfort, Self-downing, Other-downing, Need for approval and Demands for fairness scales of the SGABS) to the explanation of the variance in MT was investigated. The contributions of RBs and IBs were explored both independently (contribution of each form of rational or irrational thought) and as categorical sets of predictors (i.e. RBs and IBs). R^2 (squared multiple correlation coefficient) indicates the percentage of variance in the criterion variable that is accounted for by a specific predictor variable. The hierarchical F -test was used to determine whether the contributions made by specific predictor variables to the R^2 -value were statistically significant.

In addition to determining the statistical significance of an increase in R^2 , it is also necessary to calculate the effect size of the contribution made by a specific predictor or set of predictors to the explanation of the variance in the criterion variable. Effect sizes provide an indication of the contribution to R^2 with regard to the proportion of unexplained (residual) variance in the full model (all predictors included). According to Cohen (1992), in the case of regression analyses an effect size of $f^2 \leq .01$ is indicative of a small effect, while $.15 \leq f^2 \leq .34$ suggests a medium effect and $f^2 \geq .35$ indicates a large effect.

Prior to conducting the hierarchical regression analyses as described above, moderated hierarchical regression analyses were carried out in order to determine the possible effect of gender and level of competition on the relationship between core beliefs (predictor variables) and mental toughness (criterion variable). Both the 5% and 1% levels of significance were used in all analyses. All analyses were conducted using the Statistical Package for the Social Sciences Version 20.0 (SPSS v 20.0) (SPSS Incorporated, 2011).

4.7 Summary

This chapter provides a description of the methodology used in the present study. The aim of this study was to investigate whether core beliefs (RBs and IBs) would account for a statistically significant proportion of the variance in the mental toughness of competitive adolescent tennis players. The ethical considerations and data gathering procedures, as well as the measuring instruments used were described. Participants were discussed according to gender and level of competition (national, provincial, regional and school). Three research objectives were formulated and an exposition of the statistical procedures employed to investigate these was provided. The results of the statistical analyses are reported in Chapter five.

Chapter 5

Results

5.1 Introduction

The results of the statistical analyses are reported in this chapter. The results of the correlation analysis will be reported first. Thereafter, the results of the moderated hierarchical regression analyses conducted to investigate the possible effect of gender and or level of competition on the relationship between core beliefs and MT will be presented. Finally, the results of the hierarchical regression analyses conducted independently for each of the criterion variables (SMTQ Confidence, SMTQ Constancy, SMTQ Control, PPI-A Determination, PPI-A Self-belief, PPI-A Positive cognition and PPI-A Visualisation) will be reported. Only results that are statistically and practically significant will be emphasised in the reporting of the results. Findings with a corresponding effect size of $f^2 \geq .15$ will be considered to be of practical significance (Cohen, 1992).

5.2 Correlations

Pearson's product moment correlation coefficients were calculated for the independent (predictor) and dependent (criterion) variables prior to conducting the regression analyses. These coefficients are reported in Table 3.

Table 3

Correlations between the SGABS Scales and the SMTQ and PPI-A Scales for the Total Sample (n = 131)

		SMTQ scales			PPI-A scales			
SGABS scales		Confidence	Constancy	Control	Determination	Positive Cognition	Self -Belief	Visualisation
Rationality		.147	.186*	.021	.265**	.218*	.059	.220*
Need for achievement	for	-.342**	-.067	-.216*	-.292**	.282**	-.306**	-.181*
Need for comfort		-.339**	-.175*	-.245**	-.325**	-.322**	-.328**	-.231**
Self-downing		-.263**	-.200	-.142	-.485**	-.407**	-.221*	-.262**
Other-downing		-.260**	-.241**	-.242**	-.314**	-.399**	-.228**	-.283**
Need for approval		-.322**	-.204*	-.280**	-.320**	-.340**	-.329**	-.291**
Demands for fairness	for	-.093	-.051	-.140	-.018	-.077	-.148	.005

** $p \leq .01$; * $p \leq .05$

Table 3 indicates that the Rationality scale of the SGABS demonstrates positive correlations with all aspects of MT measured in the study. These correlations are statistically significant at the 5% level in the case of the SMTQ Constancy scale, as well as the PPI-A Positive cognition and Visualisation scales. The PPI-A Determination scale was significantly correlated to the SGABS Rationality scale at the 1% level. It would thus appear that a positive relationship exists between MT and an adaptive, flexible and rational mind-set. By contrast, the Need for comfort, Other-downing and Need for approval scales of the SGABS exhibit significant negative correlations with all aspects of MT measured in the study. Consequently, IBs regarding one's need for comfort and approval from others, as well

as IBs relating to the rating of others' human worth appear, to be inversely related to MT. The SGABS Need for achievement scale demonstrated significant negative correlations with all aspects of MT, with the exception of the SMTQ Constancy scale. An unhealthy need for achievement is thus significantly negatively related to most aspects of MT. The tendency to irrationally negatively evaluate one's worth on the basis of one's achievements (SGABS Self-downing scale) exhibits significant negative correlations with all aspects of MT, excluding those measured by the Constancy and Control scales of the SMTQ. The SGABS Demands for fairness scale failed to correlate significantly with any aspect of MT. Taken together, the data in Table 3 suggests that MT is generally negatively correlated with IBs and positively associated with RBs.

Prior to conducting the hierarchical regression analyses to investigate the contributions of RBs and IBs in the explanation of the variance in the current sample's MT, it was necessary to investigate the possible effects of gender and level of competition on the relationship between the independent (core beliefs) and the dependent (MT) variables. Moderated hierarchical regression analyses were employed for this purpose.

5.3 Effect of Gender and Level of Competition on the Relationship between Core Belief and Mental Toughness

Multiple regression analyses were conducted in order to test for the possible effects of gender (2a) and level of competition (2b) on the relationship between the independent (core beliefs) and the dependent (MT) variables. The results of these analyses are reported in Table 4. In order to make use of the categorical data in the analyses, these were re-coded into dichotomous variables by creating dummy variables (gender: 1=male, 0=female; level of competition: 1=national and provincial, 0=district and school). The analyses were conducted separately for each MT construct (confidence, constancy, control, determination, positive cognition, self-belief and visualisation).

Table 4

Moderation Effects of Gender and Level of Competition in the Relationship between Core Beliefs and Mental Toughness

Dependent variable	Model	R	R ²	Adjusted R ²	Change statistics				Sig F Change
					R ² change	F change	df1	df2	
Confidence	1	.436	.190	.145	.190	4.165	7	124	.000
	2a	.438	.192	.139	.002	.200	1	123	.656
	1	.456	.208	.162	.208	4.470	7	119	.000
	2b	.482	.233	.181	.025	3.754	1	118	.055
Constancy	1	.314	.099	.048	.099	1.937	7	124	.069
	2a	.342	.117	.059	.018	2.556	1	123	.112
	1	.309	.096	.042	.096	1.797	7	119	.094
	2b	.318	.101	.040	.005	.728	1	118	.395
Control	1	.350	.123	.073	.123	2.478	7	124	.020
	2a	.351	.123	.066	.000	.050	1	123	.823
	1	.321	.103	.050	.103	1.951	7	119	.068
	2b	.369	.136	.078	.033	4.572*	1	118	.035
Determination	1	.507	.257	.214	.257	6.026	7	122	.000
	2a	.521	.271	.223	.014	2.398	1	121	.124
	1	.521	.271	.228	.271	6.218	7	117	.000
	2b	.542	.294	.245	.023	.022	1	116	.057
Positive cognition	1	.481	.231	.187	.231	5.237	7	122	.000
	2a	.481	.231	.181	.000	.057	1	121	.812
	1	.513	.263	.219	.263	5.961	7	117	.000
	2b	.513	.263	.213	.000	.074	1	116	.786
Self-belief	1	.401	.161	.113	.161	3.342	7	122	.003
	2a	.418	.174	.120	.013	1.981	1	121	.162
	1	.422	.178	.129	.178	3.613	7	117	.001
	2b	.424	.180	.124	.002	.346	1	116	.558
Visualisation	1	.383	.146	.098	.146	2.991	7	122	.006
	2a	.384	.147	.091	.001	.131	1	121	.718
	1	.422	.178	.129	.178	3.621	7	117	.001
	2b	.429	.184	.128	.006	.875	1	116	.352

Note: Model 1 = SAGBS-scales

Model 2a = SAGBS scales + gender

Model 2b = SAGBS scales + level of competition

**p≤ .01,*p≤ .05

It is apparent from Table 4 that only in the case of control does the addition of level of participation (model 2b) result in a statistically significant change in the R^2 value. Consequently, it can be deduced that level of participation moderates the relationship between the independent variable (core beliefs) and the dependent variable (control) in this particular instance. The addition of level of competition to the regression equation accounts for an additional 3.3% of the variance in control [$\Delta R^2 = .033$; $F(1;118) = 4.572$; $p = .035$]. The effect of level of competition thus needs to be taken into account in further analyses involving the SMTQ Control scale.

5.4 Hierarchical Regression Analyses

The proportion of the variance in each of the aspects of MT accounted for by core beliefs (RBs and IBs) was investigated. Hierarchical regression analyses were conducted separately with regard to each of the dependent variables (PPI-A and SMTQ scales).

5.4.1 Hierarchical regression analysis with confidence as criterion variable

The results of the hierarchical regression analysis with confidence as the criterion variable are reported in Table 5.

Table 5

Contributions of Rational Beliefs and Irrational Beliefs to R^2 with Confidence as Criterion

Variable

Variables in equation	R^2	Contribution to R^2 : full minus reduced model	F	f^2
1. [RB]+[IB]	.190	1-8 = .168	4.252**	.21
2. [RB]+Self-downing	.070	2-8 = .048	6.606*	.05
3. [RB]+Other-downing	.075	3-8 = .053	7.334**	.06
4.[RB]+Need for comfort	.120	4-8 = .098	14.255**	.11
5. [RB]+Need for approval	.114	5-8 = .092	13.291**	.10
6. [RB]+Need for achievement	.141	6-8 = .119	17.732**	.14
7. [RB]+Demand for fairness	.042	7-8 = .020	2.672	-
8. [RB]	.022			
9. [RB]+[IB]	.190	9-10 = .006	.152	-
10. [IB]	.184			

** $p \leq .01$, * $p \leq .05$

Key: [RB=Rational Beliefs; IB=Irrational Beliefs]

It is evident from Table 5 that the combination of RBs and IBs (core beliefs) measured by the SGABS accounts for 19% ($F_{7,124} = 4.165$; $p \leq .01$) of the variance in the SMTQ Confidence scores of the sample. IBs as a set of predictors, account for 16.8% of the variance in the confidence scores of the competitive adolescent tennis players. This finding is significant at the 1% level and the corresponding effect size ($f^2 = .21$) suggests that it is of moderate practical significance. RBs do not independently explain a significant proportion of the variance in the confidence scores of the participants ($R^2 = .006$; $F_{7,124} = .152$). Core beliefs (RBs and IBs) appear to be a significant predictor of the MT attribute of confidence

amongst adolescent tennis players. However, it is not clear from the correlation coefficients in Table 3 whether core beliefs, operationalised as the combination of RBs and IBs, are positively or negatively associated with confidence. Irrational thinking, as represented by the full set of IBs, also predicts a statistically and practically significant proportion of the variance in these players' confidence. In this instance, given that Table 3 indicates that all the IBs measured by the SGABS are negatively correlated with MT confidence, it can be deduced that irrational thinking is negatively related to confidence amongst the participants.

The results in Table 5 suggest that five of the SGABS scales independently make a significant unique contribution to the explanation of the variance in the tennis players' confidence. Self-downing accounts for 4.8% ($F_{1;128} = 6.606$; $p \leq .05$; $f^2 = .05$) of the variance in the confidence of competitive adolescent tennis players. Other-downing, need for comfort, need for approval and need for achievement respectively explain 5.3% ($F_{1;128} = 7.334$; $p \leq .05$; $f^2 = .06$); 9.8% ($F_{1;128} = 14.255$; $p \leq .01$; $f^2 = .11$); 9.2% ($F_{1;128} = 13.291$; $p \leq .01$; $f^2 = .10$) and 11.9% ($F_{1;128} = 17.732$; $p \leq .01$; $f^2 = .14$) of the variance in the participants' confidence. The relevant effect sizes suggest that these findings are of limited practical significance. It is evident from the relevant correlation coefficients in Table 3 that self-downing, other-downing, need or comfort, need for approval, and need for achievement are all significantly and negatively related to SMTQ Confidence amongst the competitive adolescent tennis players who participated in the study. However, these results, while statistically significant, appear to be of limited practical significance.

5.4.2 Hierarchical regression analysis with constancy as criterion variable

The results of the hierarchical regression analysis with constancy as the criterion variable are reported in Table 6.

Table 6

Contributions of Rational and Irrational Beliefs to R^2 with Constancy as Criterion Variable.

Variables in equation	R^2	Contribution to minus model	R^2 : full reduced	F	f^2
1. [RB]+[IB]	.099	1-8 = .064		1.456	-
2. [RB]+Self-downing	.052	2-8 = .017		2.295	-
3. [RB]+Other-downing	.075	3-8 = .040		5.535*	.04
4. [RB]+Need for comfort	.054	4-8 = .019		2.571	-
5. [RB]+Need for approval	.067	5-8 = .032		4.390*	.03
6. [RB]+Need for achievement	.040	6-8 = .005		.667	-
7. [RB]+Demand for fairness	.035	7-8 = .000		.000	-
8. [RB]	.035				
9. [RB]+[IB]	.099	9-10 = .007		.159	-
10. [IB]	.092				

** $p \leq .01$, * $p \leq .05$

Key: [RB=Rational Beliefs; IB=Irrational Beliefs]

Table 6 indicates that core beliefs (RBs and IBs) measured by the SGABS account for 9.9% ($F_{7,124} = 1.937$; $p \geq .05$) of the variance of the SMTQ Constancy scores of the participants. However, this finding is not statistically significant. Consequently, core beliefs, as a unitary construct, do not explain a statistically significant percentage of the variance in the constancy of competitive adolescent tennis players. Furthermore, neither do RBs nor IBs (as a set of predictors) account for a statistically significant proportion of the variance in the participants' SMTQ Constancy scores.

Two IBs make statistically significant contributions (at the 5% level) to the explanation of the variance in the sample's SGABS Constancy scores. Other-downing independently accounts for 4% ($F_{1;128} = 5.535$; $p \leq .05$; $f^2 = .04$) of the variance in adolescent tennis players' constancy, while need for approval explains 3.2% ($F_{1;128} = 4.390$; $p \leq .05$; $f^2 = .03$) of the variance. However, the corresponding effect sizes indicate that these findings are of limited practical significance.

5.4.3 Hierarchical regression analysis with control as criterion variable

The results of the moderated hierarchical regression analyses reported earlier (Table 4) indicated that level of competition should be taken into account when investigating the relationship between the independent variable (core beliefs) and the dependent variable (control). Consequently, separate hierarchical regression analyses were conducted for the two levels of competition: (1) national and provincial competitors and (2) regional and school competitors. The results of the hierarchical regression analysis for the adolescents competing at national and provincial level are reported in Table 7.

Table 7

Contribution of Rational and Irrational Beliefs to R^2 with Control a Criterion Variable for the Participants Competing at National and Provincial Level.

Variables in equation	R^2	Contribution to R^2 : full minus reduced model	F	f^2
1. [RB]+[IB]	.171	1-8 = .123	3.041**	.15
2. [RB]+Self-downing	.049	2-8 = .001	.135	-
3. [RB]+Other-downing	.105	3-8 = .057	8.152**	.06
4. [RB]+Need for comfort	.055	4-8 = .007	.948	-
5. [RB]+Need for approval	.052	5-8 = .004	.540	-
6. [RB]+Need for achievement	.052	6-8 = .004	.540	-
7. [RB]+Demand for fairness	.048	7-8 = .000	.000	-
8. [RB]	.048			
9. [RB]+[IB]	.171	9-10 = .023	.569	-
10. [IB]	.148			

** $p \leq .01$, * $p \leq .05$

Key: [RB=Rational Beliefs; IB=Irrational Beliefs]

It is evident from Table 7 that the full set of independent variables (all seven scales of the SGABS) accounts for 17.1% ($F_{7;76} = 2.237$; $p \leq .05$) of the variance in SMTQ Control scores of the adolescent tennis players competing at national and provincial level. This result is statistically significant at the 5% level. Core beliefs thus account for a statistically significant proportion of the variance in the control of the national and provincial players in the sample. Table 7 also indicates that, as a set of predictors, IBs explain 12.3% ($F_{7;76} = 3.041$; $p \leq .01$; $f^2 = .15$) of the variance in the national and provincial players' control. The corresponding effect size indicates that this finding is of moderate practical significance. RBs failed to account for a statistically significant proportion of the variance ($R^2 = .023$; $F_{7;76} =$

.569; $p \geq .05$) in the SGABS Control scores of the provincial and national players. Core beliefs (RBs and IBs) appear to be a significant predictor of the MT attribute, control, amongst adolescent tennis players competing at national and provincial level. IBs predict a moderate but significant percentage of the variance in these players' control. Given the negative correlation between all the IBs measured by the SGABS and MT control reported in Table 3, it can be deduced that irrational thinking is significantly and negatively associated with control amongst the participants.

Only one subscale of the SGABS significantly accounts for a unique proportion of the variance in the national and provincial players' control. Other-downing independently explains 5.7% ($F_{1,82} = 8.152$; $p \leq .01$; $f^2 = .06$) of the variance in this variable. However, the associated effect size suggests that this finding is of limited practical significance.

The results of the hierarchical regression analysis for the adolescent tennis players competing at regional and school level with control as independent variable are reported in Table 8.

Table 8

Contribution of Rational and Irrational Beliefs to R^2 with Control a Criterion Variable for the Participants Competing at Regional and School Level

Variables in equation	R^2	Contribution to R^2 : full minus reduced model	F	f^2
1. [RB]+[IB]	.387	1-8 = .340	11.370**	.56
2. [RB]+Self-downing	.142	2-8 = .095	14.172**	.11
3. [RB]+Other-downing	.048	3-8 = .001	.134	-
4. [RB]+Need for comfort	.152	4-8 = .105	15.849**	.12
5. [RB]+Need for approval	.344	5-8 = .297	57.951**	.45
6. [RB]+Need for achievement	.201	6-8 = .154	24.671**	.19
7. [RB]+Demand for fairness	.127	7-8 = .080	11.729**	.10
8. [RB]	.047			
9. [RB]+[IB]	.387	9-10 = .025	.836	-
10. [IB]	.362			

** $p \leq .01$, * $p \leq .05$

Key: [RB=Rational Beliefs; IB=Irrational Beliefs]

The data displayed in Table 8 indicates that all seven independent variables in combination (core beliefs) account for 38.7% ($F_{7;35} = 3.155$; $p \leq .05$) of the variance in the SMTQ Control scores of the participants competing at district and school level. It is further evident from Table 8 that the full set of IBs accounts for 34% ($F_{7;35} = 11.370$; $p \leq .01$; $f^2 = .56$) of the variance in the control of the school and regional players. The corresponding effect size indicates that this finding should be considered to be of practical significance. RBs, however, failed to explain a significant proportion of the variance ($R^2 = .025$; $F_{7;35} = .836$; $p \geq .05$) in the SGABS control scores. Core beliefs appear to be a significant predictor

of the MT attribute of control amongst adolescent tennis players competing at regional and school level. It is, however, unclear from the correlations reported in Table 3 whether core beliefs (RBs and IBs) are positively or negatively associated with MT control. The full set of IBs independently predicts a statistically and practically significant proportion of the variance in the SMTQ Control scores of adolescent tennis players competing at regional and school level. Given the negative correlation between all the IBs measured by the SGABS and SMTQ Control scale (Table 3), it can be deduced that irrational thinking is significantly and negatively related to control amongst adolescent tennis players competing at regional and school level.

Five IBs independently account for statistically significant proportions of the variance in the control of the adolescent tennis players competing at school or regional level. Need for approval explains 29.7% ($F_{1;41} = 57.951$; $p \leq .01$; $f^2 = .45$) of the variance. According to the corresponding effect size, this finding should be considered to be of practical significance. Self-downing, need for comfort, need for achievement and demands for fairness respectively account for 9.5% ($F_{1;41} = 14.172$; $p \leq .01$; $f^2 = .11$); 10.5% ($F_{1;41} = 15.849$; $p \leq .01$; $f^2 = .12$); 15.4% ($F_{1;41} = 24.671$; $p \leq .01$; $f^2 = .19$) and 8.0% ($F_{1;41} = 11.729$; $p \leq .01$; $f^2 = .10$) of the variance in control amongst the school and regional level participants. The corresponding effect sizes suggest that these findings should be considered of limited to moderate practical significance. It is evident that need for approval, need for achievement, demand for fairness, self-downing and need for comfort are all statistically and negatively related to MT control (as indicated in Table 3, all IBs are negatively correlated with the SMTQ scales). Need for approval appears to be a practically significant predictor of control, while the statistically significant contribution made by need for achievement to the explanation of the variance in the control scores of the school and regional level participants

should be considered of moderate practical significance. Demand for fairness, self-downing and need for comfort, however, seem to be of limited practical significance in this regard.

5.4.4 Hierarchical regression analysis with determination as criterion variable

The results of the hierarchical regression analysis with determination as criterion variable are reported in Table 9.

Table 9

Contribution of Rational and Irrational Beliefs to R^2 with Determination as Criterion Variable

Variables in equation	R^2	Contribution to R^2 : full minus reduced model	F	f^2
1. [RB]+[IB]	.257	1-8 = .187	5.159**	.25
2. [RB]+self-downing	.238	2-8 = .168	28.220**	.22
3. [RB]+other-downing	.135	3-8 = .065	9.618**	.09
4. [RB]+need for comfort	.147	4-8 = .077	11.554**	.09
5. [RB]+need for approval	.151	5-8 = .081	12.212**	.10
6. [RB]+need for achievement	.158	6-8 = .088	13.377**	.11
7. [RB]+demand for fairness	.080	7-8 = .010	1.391	-
8. [RB]	.070			
9. [RB]+[IB]	.257	9-10 = .006	.166	-
10. [IB]	.251			

** $p \leq .01$, * $p \leq .05$

Key: [RB=Rational Beliefs; IB=Irrational Beliefs]

It is evident from Table 9 that the full set of independent variables (all seven scales of the SGABS) accounts for 25.7% of the variance ($F_{7,122} = 6.026$; $p = .000$) in the PPI-A

Determination scores of the participants. In combination, IBs explain 18.7% ($F_{7;122} = 5.159$; $p \leq .01$; $f^2 = .25$) of the variance in the PPI-A Determination scores of the competitive adolescent tennis players. The associated effect size indicates that this finding should be considered to be of moderate practical significance. RBs, however, did not account for a significant proportion ($R^2 = .006$; $F_{7;122} = .166$; $p \geq .05$) of the variance in the PPI-A Determination scores of the participants. Core beliefs (RBs and IBs combined) appear to be a statistically and practically significant predictor of the MT aspect of determination amongst adolescent tennis players. However, it is not clear from Table 3 whether core beliefs are negatively or positively associated with determination. IBs independently predict a statistically and practical significant proportion of the variance of the determination of the adolescent tennis players who participated in this study. Furthermore, the negative correlations reported between IBs and determination in Table 3, suggest that IBs are negatively related to determination amongst the participants.

Five IBs independently account for statistically significant percentages of the variance in the determination of the adolescent tennis players. Self-downing accounts for 16.8% ($F_{1;121} = 28.220$; $p \leq .01$; $f^2 = .22$) of the variance. The accompanying effect size indicates that this finding should be considered to be of moderate practical significance. Other-downing, need for comfort, need for approval and need for achievement account for 6.5% ($F_{1;121} = 9.618$; $p \leq .01$; $f^2 = .09$); 7.7% ($F_{1;121} = 11.554$; $p \leq .01$; $f^2 = .09$); 8.1% ($F_{1;121} = 12.212$; $p \leq .01$; $f^2 = .10$) and 8.8% ($F_{1;121} = 13.377$; $p \leq .01$; $f^2 = .11$) of the variance in determination respectively. The corresponding effect sizes indicate that these findings should be considered to be of limited practical significance. It is thus evident that self-downing is a statistically and practically significant predictor of determination amongst competitive adolescent tennis players. Furthermore, the relevant correlations in Table 3 suggest that self-downing is negatively associated with determination amongst these players.

5.4.5 Hierarchical regression analysis with self-belief as criterion variable

The results of the hierarchical regression analysis with self-belief as criterion variable are reported in Table 10.

Table 10

Contribution of Rational and Irrational Beliefs to R^2 with Self-Belief as Criterion Variable

Variables in equation	R^2	Contribution to R^2 : full minus reduced model	F	f^2
1. [RB]+[IB]	.161	1-8 = .157	3.836**	.19
2. [RB]+Self-downing	.045	2-8 = .041	5.495*	.04
3. [RB]+Other-downing	.052	3-8 = .048	6.481*	.05
4. [RB]+Need for comfort	.108	4-8 = .104	14.924**	.12
5. [RB]+Need for approval	.108	5-8 = .104	14.924**	.12
6. [RB]+Need for achievement	.098	6-8 = .094	13.339**	.11
7. [RB]+Demand for fairness	.033	7-8 = .029	3.838	-
8. [RB]	.004			
9. [RB]+[IB]	.161	9-10 = .000	.000	-
10. [IB]	.161			

** $p \leq .01$, * $p \leq .05$

Key: [RB=Rational Beliefs; IB=Irrational Beliefs]

The data displayed in Table 10 indicate that core beliefs account for 16.1% ($F_{7,122} = 3.342$; $p = .003$) of the variance in the participants' PPI-A Self-belief scores. This result is statistically significant at the 1% level. Core beliefs (all SGABS scales in combination) would thus seem to account for a statistically significant percentage of the variance in the PPI-A Self-belief scores of the adolescent tennis players who participated in the study. It is

also evident from Table 10 that IBs (as a set of predictors) explain 15.7% ($F_{7;122} = 3.836$; $p \leq .01$; $f^2 = .19$) of the variance in the PPI-A Self-belief scores of the participants. The corresponding effect size suggests that this finding should be considered to be of moderate practical significance. RBs failed to explain a significant percentage ($R^2 = .000$; $F_{7;122} = .000$; $p \geq .05$) of the variance in the samples' PPI-A Self-belief scores. It thus appears that core beliefs are a statistically and practically significant predictor of the participants' self-belief. It is, however, not clear (see Table 3) whether core beliefs, as a unitary construct, are positively or negatively related to self-belief. IBs, in combination, are a statistically and practically (moderately) significant predictor of self-belief in the current sample. Table 3 also indicates that IBs are negatively correlated with self-belief.

Five IBs independently account for statistically significant percentages of the variance in the self-belief of the participants. Self-downing and other-downing account for 4.1% ($F_{1;121} = 5.495$; $p \leq .05$; $f^2 = .04$) and 4.8% ($F_{1;121} = 6.481$; $p \leq .05$; $f^2 = .05$) of the variance in the adolescent tennis players' PPI-A Self-belief scores respectively. The relevant effect sizes indicate that these results should be considered to be of limited practical significance. Need for comfort, need for approval and need for achievement respectively explain 10.4% ($F_{1;121} = 14.924$; $p \leq .01$; $f^2 = .12$); 10.4% ($F_{1;121} = 14.924$; $p \leq .01$; $f^2 = .12$) and 9.4% ($F_{1;121} = 13.339$; $p \leq .01$; $f^2 = .11$) of the variance in the participants' PPI-A self-belief scores. The corresponding effect sizes indicate that these findings should also be considered to be of limited practical significance.

5.4.6 Hierarchical regression analysis with positive cognition as criterion variable

The results of the hierarchical regression analysis with positive cognition as criterion variable are reported in Table 11.

Table 11

Contribution of Rational and Irrational Beliefs to R² with Positive Cognition as Criterion Variable

Variables in equation	R ²	Contribution to R ² : full minus reduced model	F	f ²
1. [RB]+[IB]	.231	1-8 = .183	4.878**	.24
2. [RB]+Self-downing	.164	2-8 = .116	17.761**	.14
3. [RB]+Other-downing	.174	3-8 = .126	19.525**	.15
4. [RB]+Need for comfort	.128	4-8 = .080	11.743**	.09
5. [RB]+Need for approval	.145	5-8 = .097	14.521**	.11
6. [RB]+Need for achievement	.129	6-8 = .081	11.904**	.09
7. [RB]+Demand for fairness	.069	7-8 = .021	2.887	-
8. [RB]	.048			
9. [RB]+[IB]	.231	9-10 = .005	.133	-
10. [IB]	.226			

** $p \leq .01$, * $p \leq .05$

Key: [RB=Rational Beliefs; IB=Irrational Beliefs]

It is evident from Table 11 that the combination of all seven scales of the SGABS (RBs and IBs) accounts for 23.1% ($F_{7,122} = 5.237$; $p = .000$) of the variance in the PPI-A Positive cognition scores of the adolescent tennis payers. This result is statistically

significant at the 1% level. Consequently, core beliefs, as a unitary construct, explain a significant proportion of the variance in the PPI-A Positive cognition scores of the participants. It is further evident from Table 11, that IBs (as a set of predictors) explain 18.3% ($F_{7,122} = 4.878$; $p \leq .01$; $f^2 = .24$) of the variance in the sample's PPI-A Positive cognition scores. The corresponding effect size indicates that this result should be considered to be of moderate practical significance. However, RBs do not independently account for a significant proportion of the variance in the participants' Positive cognition scores ($R^2 = .005$; $F_{7,122} = .133$; $p \geq .05$). It thus appears the core beliefs are a significant predictor of the participants' positive cognition. However, it is not clear from Table 3 whether core beliefs (RBs and IBs), are positively or negatively associated with positive cognition. In combination, IBs act as a statistically significant predictor of positive cognition in the current sample. However, as one of the IBs (need for achievement) measured by the SGABS correlates positively with positive cognition and the other SGABS scales measuring IBs demonstrate negative correlations with this construct, it is not clear whether IBs (as a set of predictors) are positively or negatively related to positive cognition.

Five IBs independently account for statistically significant percentages of the variance in the PPI-A Positive cognition scores of the competitive adolescent tennis players. Self-downing and other-downing account for 11.6% ($F_{1,121} = 17.761$; $p \leq .01$; $f^2 = .14$) and 12.6% ($F_{1,121} = 19.525$; $p \leq .01$; $f^2 = .15$) of the variance respectively. The relevant effect sizes indicate that these results should be considered to be of moderate practical significance. Need for comfort, need for approval and need for achievement respectively explain 8.0% ($F_{1,121} = 11.743$; $p \leq .01$; $f^2 = .09$); 9.7% ($F_{1,121} = 14.521$; $p \leq .01$; $f^2 = .11$) and 8.1% ($F_{1,121} = 11.904$; $p \leq .01$; $f^2 = .09$) of the variance in the participants' PPI-A Positive cognition scores. The corresponding effect sizes indicate that these findings should be considered to be of limited practical significance. These results indicate that self-downing and other-downing are

statistically and practically (moderately) significant predictors of positive cognition in the current sample. Furthermore, the relevant correlation coefficients suggest that these forms of irrational thinking are significantly and negatively associated with positive cognition (see Table 3).

5.4.7 Hierarchical regression analysis with visualisation as criterion variable

The results of the hierarchical regression analysis with visualisation as the criterion variable are reported in Table 12.

Table 12

Contribution of Rational and Irrational Beliefs to R^2 with Visualisation as Criterion Variable

Variables in equation	R^2	Contribution to R^2 : full minus reduced model	F	f^2
1. [RB]+[IB]	.146	1-8 = .098	2.352*	.11
2. [RB]+Self-downing	.081	2-8 = .033	4.596*	.04
3. [RB]+Other-downing	.104	3-8 = .056	8.000**	.06
4. [RB]+Need for comfort	.084	4-8 = .036	5.031*	.04
5. [RB]+Need for approval	.117	5-8 = .069	10.002**	.08
6. [RB]+Need for achievement	.082	6-8 = .034	4.741*	.04
7. [RB]+Demand for fairness	.052	7-8 = .004	.540	-
8. [RB]	.048			
9. [RB]+[IB]	.146	9-10 = .014	.336	-
10. [IB]	.132			

** $p \leq .01$, * $p \leq .05$

Key: [RB=Rational Beliefs; IB=Irrational Beliefs]

It is apparent from Table 12 that the combined set of independent variables (all seven scales of the SGABS) accounts for 14.6% ($F_{7;122} = 2.991$; $p = .006$) of the variance in the participants' PPI-A Visualisation scores. This finding is statistically significant at the 1% level. The corresponding effect size indicates that this finding should be considered to be of moderate practical significance. Consequently, core beliefs explain a statistically significant proportion of the variance in the use of visualisation by the competitive adolescent tennis players who participated in the study. In addition, IBs (as a set of predictors) explain 9.8% ($F_{7;122} = 2.352$; $p \leq .05$; $f^2 = .11$) of the variance in the participants' PPI-A Visualisation scores. This result is statistically significant at the 5% level. However, the relevant effect size indicates that this finding is of limited to moderate practical significance. RBs failed to account for a statistically significant proportion of the variance ($R^2 = .014$; $F_{7;122} = .336$; $p \geq .05$) in participants' PPI-A Visualisation scores.

The preceding results indicate that core beliefs, as a unitary construct, is a significant predictor of the mental toughness attribute, visualization, amongst competitive adolescent tennis players. However, it is not clear from Table 3 whether core beliefs are positively or negatively correlated with visualisation. The full set of IBs is also a statistical significant predictor of visualisation use in the sample. However, this finding appears to be of limited to moderate practical significance.

Five IBs independently account for statistically significant percentages of the variance in the PPI-A Visualisation scores of the participants. Self-downing and other-downing account for 3.3% ($F_{1;121} = 4.596$; $p \leq .05$; $f^2 = .04$) and 5.6% ($F_{1;121} = 8.00$; $p \leq .01$; $f^2 = .06$) of the variance respectively. Need for comfort, need for approval and need for achievement respectively explain 3.6% ($F_{1;121} = 5.031$; $p \leq .05$; $f^2 = .04$); 6.9% ($F_{1;121} = 10.002$; $p \leq .01$; $f^2 = .08$) and 3.4% ($F_{1;121} = 4.741$; $p \leq .05$; $f^2 = .04$) of the variance in the participants' PPI-A Visualisation scores. Despite all these findings being statistically significant at either the 5%

or the 1% level, the relevant effect sizes indicate that they should be considered to be of limited practical significance.

5.5 Summary

The results of the statistical analyses were presented in this chapter. RBs were significantly positively associated with constancy, determination and visualisation. IBs characterized by need for comfort, other-downing and/or need for approval demonstrated significant negative correlations with all aspects of MT measured in the study. Self-downing was significantly and negatively associated with all aspects of MT, except for control and constancy. Level of participation (national/provincial vs. regional/school) was found to moderate the relationship between core beliefs and control.

Core beliefs significantly predicted all aspects of MT, with the exception of constancy. It was, however, not possible to determine the direction of the relationship between these variables. RBs did not predict any aspect of MT. IBs, as a unitary construct, was a significant predictor of confidence, control, determination, self-belief, positive cognition and visualisation. In addition, IBs were negatively associated with control, determination, self-belief and visualisation. However, the direction of the association between IBs and confidence, as well as that between IBs and positive cognition was not clear. Need for approval and need for achievement emerged as statistically and practically significant predictors of control among the school and regional level players. Furthermore, both of these forms of irrational thinking were negatively associated with control. Self-downing was found to be a statistically and practically significant predictor of both determination and positive cognition. Self-downing also demonstrated a significant negative association with these two components of MT. Other-downing was a statistically and practically significant predictor of positive cognition. In addition, other-downing was found

to be negatively associated with positive cognition amongst the tennis players participating in the study. In the next chapter the results reported here will be discussed within the context of the relevant MT and REBT literature.

Chapter 6

Discussion

6.1 Introduction

This study aimed to investigate the role of core beliefs (RBs and IBs) in the MT of competitive adolescent tennis players. More specifically, it was postulated that core beliefs would predict MT within this population. All statistically significant results were reported in the previous chapter. However, only findings that are statistically and practically ($f^2 \geq .15$) significant, as determined according to Cohen's (1992) criteria, will be discussed in this chapter.

6.2 Correlations between Core Beliefs and MT

RBs demonstrated significant positive correlations with constancy, determination, positive cognition and visualisation. It would thus appear that a mind-set characterised by realistic, rational and goal-directed thought is associated with the aforementioned components of MT. This finding provides further support for the idea that encouraging realistic appraisal and rational thinking could promote some aspects of MT (Gucciardi, et al., 2009b; Parkes & Mallet, 2011; Sheard & Golby, 2006; Turner & Barker, 2013/2014; Turner et al., 2014). IBs, by contrast, generally exhibited significant negative correlations with the aspects of MT measured in this study. Holding inflexible and absolutistic beliefs, as well as basing one's self-esteem solely on performance would thus appear to negatively impact upon most components of MT. This appears to be in line with the idea that irrational or dysfunctional thinking undermines the maintenance of a performance mind-set (Bernard, 1985; Hayes et al., 2010; Sheard & Golby, 2006; Turner & Barker, 2013/2014; Turner et al.,

2014). Two unexpected findings might be worth highlighting. First, need for achievement demonstrated a positive significant correlation with positive cognition. It could be speculated that prioritising achievement and focussing strongly on the need to achieve fulfils a motivational function with regard to maintaining a positive outlook in the sporting arena. Second, while demands for fairness were negatively related to most aspects of MT, these correlations were not statistically significant. It is possible, particularly given the extended time for which most participants have been playing tennis ($M = 6.2$ years), that these individuals have perhaps developed an increased tolerance for adversity and are thus less inclined to demand fairness.

Level of competition was found to moderate the relationship between core beliefs and control. Consequently, it appears as if core beliefs might differently impact upon the elite/sub-elite player's (national and provincial) ability to effectively regulate their emotions and thoughts, as compared to the less proficient players (school and regional). A player's tennis proficiency and/or level of competition appear to influence the nature but not necessarily the direction of the interaction between core beliefs and the MT aspect of control.

6.3 Core Beliefs as Predictors of MT

It was postulated that core beliefs (as a unitary construct) would be a significant predictor of MT in the current sample. Core beliefs made a statistically and practically significant contribution to the explanation of the variance in the MT components of confidence (SMTQ Confidence scale and PPI-A Self-belief scale), determination, visualisation and positive cognition. As mentioned in the results, level of competition moderated the interaction between core beliefs and control. However, although core beliefs were a practically more significant predictor of control amongst participants playing at the

school/regional level, they remained a statistically and practically significant predictor of MT across both levels of competition. As a construct, core beliefs predict numerous components of MT. This appears to be in keeping with much of the existing sport psychology literature (e.g. Gucciardi, et al., 2009b; Parkes & Mallet, 2011). These findings also appear to further support the contention within the wider REBT literature that core beliefs are central not only to the understanding of dysfunctional emotional and behavioural states, but also to the understanding of more adaptive outcomes such as self-discipline, resilience and increased motivation (Gucciardi, et al., 2009b; Dryden, 2009/2011).

6.4 Rational Beliefs as Predictors of MT

Despite being positively correlated with a number of MT aspects, RBs did not emerge as a significant predictor of any of these constructs. It could be deduced that RBs do not make a significant independent contribution to the MT of competitive adolescent tennis players. This would seem to contradict much of the literature highlighting the role of functional attribution and thinking (Gucciardi et al., 2009b; Parkes & Mallet, 2011; Sheard & Golby, 2006), and particularly the role of rational thinking within the sporting context (Bernard, 1985; Turner & Barker, 2013/2014; Turner et al., 2014). However, given that a clinical measure of core beliefs was used in this study, such an interpretation might be ill-founded. It would be advisable to replicate this study making use of more sport/performance-specific measures of rational thinking. However, a review of the available literature suggests that such a measure still has to be developed.

6.5. Irrational Beliefs as Predictors of MT

IBs significantly predicted confidence (SMTQ Confidence scale and PPI-A Self-belief scale) and determination amongst all the participants. In addition, IBs emerged as a statistically and practically significant predictor of control in both subgroups of competitors (national/provincial and regional/school). However, IBs predicted a larger proportion of the variance in control amongst the regional and school players. Furthermore, this finding is of greater practical significance for the school/regional players ($f^2 = .56$: large effect) than for the national/provincial players ($f^2 = .15$: moderate effect). The corresponding correlations suggest that IBs are negatively associated with the aforementioned aspects of MT. It would thus appear that holding rigid and inflexible beliefs is generally associated with a tendency to report less confidence, determination and control. These findings seem to support the existing literature on the negative impact of irrational thought within a performance context (Bernard, 1985; DiGiuseppe et al., 2014; Dryden, 2009; Ellis et al., 2010; Turner & Barker, 2013/2014; Turner et al., 2014). IBs also predicted a significant proportion of the variance in the positive cognition of the participants. However, given that one form of IB (need for achievement) exhibits a significant positive correlation with positive cognition the direction of the relationship between IBs and positive cognition cannot be determined.

It is apparent from the preceding discussion that IBs, as a general construct, significantly predict certain aspects of MT amongst competitive adolescent tennis players. Moreover, IBs are generally negatively associated with these MT constructs. Consequently, it is of interest to explore the specific types of IBs that predict the various components of MT.

Need for achievement appeared to be a statistically and practically significant predictor of MT only with regard to control amongst the school and regional players. It did

not significantly predict control amongst the national/provincial players. It would thus appear that rigidly demanding consistently high levels of achievement from oneself is not associated with an inability to effectively regulate one's motivation, focus, thinking and emotions in competition and training amongst all adolescent tennis players. This finding is contrary to the existing literature (Bernard, 1985; DiGiuseppe et al., 2014; Dryden, 2009; Ellis et al., 2010; Turner & Barker, 2013/2014; Turner et al., 2014). Turner et al. (2014) reported demands for achievement to be a significant source of emotional distress amongst elite soccer academy players. The findings of the current study would generally appear to contradict this. However, need for achievement was negatively associated with control amongst the school and regional tennis players. It might thus be that individuals concerned with either retaining (as in the case of the soccer academy players) or obtaining (as in the case of the school and regional tennis players) team or squad membership, are more inclined to hold strong beliefs regarding the need for achievement and are consequently more likely to elevate these to the level of rigid demands. These individuals are then more likely to experience the negative effects of holding rigid demands about success and achievement on their emotional, attentional and behavioural regulation or control.

A significant positive relationship between need for achievement and positive cognition was reported earlier. However, while need for achievement does predict a statistically significant proportion of the variance in positive cognition amongst competitive adolescent players, this finding does not appear to be of practical significance ($f^2 = .09$). The effect that holding rigid demands about achievement has on an individual's ability to maintain perspective and positively reframe situations within the sporting arena is thus not clear. Further research is required in this regard.

Need for comfort was a statistically significant predictor of confidence (SMTQ Confidence scale and PPI-A Self-belief scale), determination, positive cognition and

visualisation. Furthermore, need for comfort significantly predicted control amongst the regional and school participants. However, while statistically significant, none of these results appear to be of practical significance. Based on the available REBT and sport psychology literature, it was expected that a rigid demand for comfort or LFT would be negatively related to all aspects of MT (e.g. Bull et al., 2005; Connaughton, Wadey, Hanton, & Jones, 2008; Crust, 2008; DiGiuseppe et al., 2014; Dryden, 2009; Jones et al., 2007; Turner et al., 2014). The reason for this apparently contrary finding is not immediately clear. However, it could be reasoned that, by its very nature, a sporting environment makes consistent demands with regard to frustration tolerance and perseverance. Consequently, the participants in the current study might, through their prolonged participation in tennis, have experientially developed increased frustration tolerance. As the available measures of irrational thinking have been developed within the general population or in clinical populations, the manner in which LFT is conceptualised and measured might not be appropriate for a sporting population. Moreover, the finding might be unique to this particular sporting context. This study should thus be replicated in other sporting codes before firm conclusions are drawn regarding the role of LFT in MT.

Self-downing is a statistically significant predictor of confidence, self-belief, determination, positive cognition and visualisation in the total sample, and of control amongst the regional and school players. However, self-downing only emerged as a practically significant predictor of determination. In addition, the ability of self-downing to predict positive cognition approached practical significance ($f^2 = 0.14$). Perhaps not surprisingly, rigidly and uncritically equating one's self-image to one's performance appears negatively related to the determination to persevere in the face of adversity. This finding supports the assertion that individuals that are inclined to attribute poor performance to themselves (internalise) exhibit lower levels of mental toughness (Bull et al., 2005; Connaughton et al.,

2008; Connaughton, Hanton, & Jones, 2010; Gucciardi, Jackson, Hanton, & Reid, 2013; Jones et al., 2002/2007; Nichols et al., 2008; Sheard, 2010). The trend in which self-downing appears to approach practical significance in the prediction of positive cognition, suggests that negative self-attribution and overly critical self-appraisal are inversely related to an athlete's ability to engage in positive reframing and remain motivated in the face of adversity. This seems consistent with the general assertion in REBT that attempting to determine one's personal value on the basis of one's successes and achievements results in the experience of negative emotions, and consequently interferes with goal-directed behaviour (Dryden, 2009; DiGiuseppe et al., 2014; Ellis et al., 2010; Turner et al., 2014).

Judging others' worth on the basis of their achievements (other-downing) was significantly predictive of confidence, constancy, determination, self-belief, positive cognition and visualisation. The relevant correlations suggest that holding other-downing beliefs is generally associated with lower confidence, less constancy, reduced determination, poorer self-esteem, less positive cognition and less effective use of visualisation. In addition, other-downing also significantly predicted control amongst national and provincial tennis players. Here the corresponding correlation coefficients suggest that negatively rating others on the basis of their behaviour or achievement is generally associated with poorer self-regulation of behaviour and emotion. However, other-downing only emerged as a practically significant predictor with regard to positive cognition. It might be argued that negatively evaluating others on the basis of their performance represents some aspect of self-confidence or the external attribution of poor performance reportedly employed by individuals with high levels of MT (Crust, 2008; Parkes & Mallet, 2011; Sheard, 2010). As such, it could be assumed that other-downing should be positively associated with a tendency towards functionally reframing setbacks and a generally positive attitude towards achieving one's goals (positive cognition). However, when seen from a REBT perspective, other-downing is

a manifestation of the tendency to ascribe worth on the basis of people's performance, achievement or behaviour (DiGiusseppe et al., 2014; Dryden, 2009; Ellis et al., 2010). It thus represents the same basic form of irrational thinking that underlies negative self-appraisal, and would therefore be viewed as similarly inconsistent with effective regulation of emotion, behaviour and thoughts (DiGiusseppe et al., 2014; Dryden, 2009/2011; Ellis et al., 2010). Furthermore, if other-downing is applied with regard to teammates or coaching staff, this form of irrational thinking might have a detrimental effect on the athlete's functioning within the team and training context which could, in turn, negatively impact a number of performance-related cognitive and emotional states including MT.

Need for approval is a statistically significant predictor of all the aspects of MT measured in this study, with the exception of control amongst national and provincial players. However, need for approval only predicted control amongst the school and regional players to a practically significant degree. Consequently, a rigid insistence on approval from significant others appears to be negatively related to emotional and behavioural control amongst adolescent tennis players competing at the school and regional level. This finding seems to be consistent with the central tenants of REBT theory which state that over-reliance on the approval of others is most often associated with emotional disturbance (DiGiusseppe et al., 2014; Dryden, 2009/2011; Ellis et al., 2010). In addition, the limited literature on the application of REBT within the sporting realm suggests that a rigid demand for approval may negatively affect self-regulation and performance (Turner & Barker, 2014; Turner et al., 2014). It is interesting to note, however, that need for approval failed to demonstrate a significant predictive relationship with control amongst the provincial and national players. It may be theorised that adolescents competing at the elite/sub-elite level have more tangible indications of their relative level of tennis achievement (e.g. playing in provincial teams, winning higher percentages of matches and more positive feedback from coaches and peers).

Less accomplished players might thus be more susceptible to over-emphasising or prioritising approval from others. Alternatively, both the elite/sub-elite players and those competing at a lower level may place similar emphasis on external approval, but this might only be predictive of emotional and behavioural self-regulation amongst less accomplished players. The findings relating to need for approval should, however, be seen in relation to the specific population utilised in this study. Adolescence is a developmental stage characterised by acute social awareness and a strong desire for peer approval (Berndt & Murphy, 2002). Consequently, a strong desire for approval, may not be indicative of a strong irrational tendency, but rather be attributed to a transient developmental stage. The findings regarding need for approval may thus not be validly generalised to adult athletes. Furthermore, participants in the current study were all still in a relatively early stage of their tennis careers. As such, a strong sensitivity to feedback from coaches and other authority figures might not only be developmentally appropriate, but may also have specific functional value.

Demands for fairness exhibited no statistically significant predictive relationship with any aspect of MT. The reason for this finding is not clear, particularly given adolescents' general concern with fairness and justice (Hart & Carlo, 2005). Long-term involvement in a highly competitive sport, to some extent, might result in these adolescents' appreciating that outcomes are not always guaranteed and life not always fair. Alternatively, the clinically-based measure of RBs and IBs used in this study, while providing a measure of demand for fairness, may not measure this construct in a sufficiently sport-specific manner. Put differently, these adolescents might hold general demands for fairness that are not activated within the tennis context, or they may hold tennis-specific demands for fairness which do impact upon their MT, but which cannot be measured using the current clinically-oriented instrument.

6.6 Summary

In keeping with the basic principles of REBT theory (DiGiusseppe et al., 2014; Dryden, 2009/2011; Ellis et al., 2010), RBs were generally positively associated with MT, while IBs were mostly negatively related to MT. Level of competition moderated the relationship between core beliefs and the control aspect of MT. RBs failed to significantly predict MT. However, IBs did predict confidence and control. The corresponding correlations suggest that holding IBs in general was associated with lower confidence in one's abilities and less effective self-regulation. In addition, IBs were significantly predictive of positive cognition. However, the direction of the relationship between IBs and positive cognition is not clear.

At the level of specific IBs, a rigid demand for achievement was statistically and practically predictive of control amongst the less accomplished players (school/regional). A need for approval also predicted control amongst these players. The corresponding correlations suggest that control is negatively associated with demands for achievement and approval amongst the less accomplished players in the sample. The tendency to hold self-downing beliefs was predictive of determination and positive cognitions amongst all players. The theoretically-related tendency to judge others negatively based on their behaviour (other-downing) emerged as a predictor of positive cognition. The relevant correlation coefficients indicate that a tendency to attribute worth to oneself or others on the basis of their behaviour and performance is generally associated with lower levels of determination and positive cognition.

6.7 Implications

The current study appears to hold certain implications for the promotion of MT through the application of REBT theory and techniques. The significant association between core beliefs and MT suggests that REBT provides a suitable theoretical framework from which to conceptualise and implement the development of MT. More specifically, as IBs demonstrate negative associations with certain aspects of MT, interventions aimed at disputing and reframing these beliefs would seem to have utility in promoting MT. However, it should not simplistically be assumed that all forms of IBs are necessarily detrimental to all aspects of MT. This is particularly evident in instances where a strong need for achievement appears to be associated with positive cognition. Similarly, the current study suggests that interventions might need to be tailored to the specific characteristics of an athlete (e.g. developmental level, proficiency or level of competition).

The tendency to make global assessments of human worth (self or others') based on an individual's behaviour and performance seems to be significantly and negatively associated with an athlete's positive cognition and determination. Negative ratings of human worth thus appear to be a specific class of IBs that should be targeted in order to improve MT. Similarly, the ability of non-elite adolescent tennis players to efficiently regulate their emotions and behaviour might be improved by addressing demands they may hold with regard to need for achievement and need for approval. The latter appears to be in line with recommendations for intervention made by other researchers (e.g. Turner & Barker, 2014; Turner et al., 2014). The current study suggests that while deficiencies in certain aspects of MT might be addressed by disputing and restructuring IBs, the strengthening or development of RBs already held by athletes will not necessarily result in increased MT. It thus seems that IBs pose a specific threat to mental toughness and should be targeted in any intervention that

aims to improve MT. However, this conclusion is based upon data collected using clinical measures of RBs and IBs. Consequently, the implications of these findings and recommendations for a sport-specific context might need to be approached circumspectly.

6.8 Limitations

This study is not without limitations. First, a small and sport-specific adolescent sample from two particular geographic areas was utilised. Consequently, the results of this study cannot be generalised outside these specific demographic parameters. Furthermore, they cannot necessarily be generalised to other sports codes.

The measuring instruments employed in this study also present certain limitations. The SGABS is not a sport-specific measure of core beliefs. As a result, the information obtained via this instrument may not be relevant to the sport context. In addition, it is possible that, particularly with regard to RBs, the study is restricted within the clinically-oriented conceptualisation of core beliefs and their relationship to functional states such as MT. Furthermore, none of the measures used are standardised for an adolescent population. Therefore, the results yielded by this study may not be an accurate portrayal of the sample or the adolescent population in general. Furthermore, very little normative data is available with regard to the SGABS, PPI-A and SMTQ, particularly among adolescents. Consequently, it was not possible to validly determine how the IBs, RBs and levels of MT reported for the participants in this study may compare to that of other adolescent athletes.

The current study was cross-sectional in nature and thus provides a somewhat limited perspective on the role of core beliefs in the MT of adolescent tennis players. Longitudinal studies might provide more insight into the dynamics of the relationship between core beliefs and MT over time. More importantly within the context of adolescent athletes, longitudinal studies might shed light on developmental changes in core beliefs and MT during

adolescence, as well as on how the specific interaction between core beliefs and MT might change as a function of maturation.

Due to the absence of research on the relationship between core beliefs and MT, the methodology employed in the current study was largely explorative in nature. Furthermore, the study yielded data relating to predictive and correlational relationships between the variables. Consequently, it is not possible to draw any conclusions regarding possible causal relationships between core beliefs and MT. Furthermore, the interaction or causal pathways between the variables were not investigated. It is thus recommended that future research employ more structured approaches aimed at exploring or confirming causal relationships between core beliefs and MT. However, studies of this nature are expected to be hampered by the lack of a sport-specific measure of core beliefs. The development of such a measure thus appears to be priority within this particular field of research. In addition, future studies might benefit from using mixed methods designs. Using both a quantitative and qualitative approach would enable researchers to better investigate the actual relationship between core beliefs and MT.

6.9 Conclusion

There is partial evidence that core beliefs are related to MT amongst competitive adolescent tennis players. RBs were generally positively associated with MT, while IBs were mostly negatively related to MT. Furthermore core beliefs appear to predict certain aspects of MT. Despite the fact that RBs failed to significantly predict MT, IBs appear to predict most aspects of MT.

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Appendix A
Sport Mental Toughness Questionnaire (SMTQ) Afrikaans
 (Sheard, Golby, & Van Wersch, 2009)

Instruksies

Kies die mees gepaste opsie.

		Alyd waar	Meestal waar	Soms waar	Glad nie waar nie
1	Ek interpreteer bedreigings as positiewe geleenthede	1	2	3	4
2	Ek het onwrikbare vertroue in my vermoëns	1	2	3	4
3	Ek het kwaliteite wat my van ander deelnemers onderskei	1	2	3	4
4	Ek beskik oor dit wat vereis word om onder druk te presteer	1	2	3	4
5	Onder druk kan ek met vertroue besluite neem en dit met toewyding deurvoer	1	2	3	4
6	Wanneer ek ontsenu word, kan ek weer beheer verkry	1	2	3	4
7	Ek is toegewyd om dit wat ek moet doen te voltooi	1	2	3	4
8	Ek neem verantwoordelikheid om vir myself uitdagende doelwitte te stel	1	2	3	4
9	Ek gooi tou op in moeilike situasies	1	2	3	4
10	My aandag en konsentrasie word maklik afgelei	1	2	3	4
11	Ek bekommer my oor swak prestasie	1	2	3	4
12	Ek is oorweldig deur self-twyfel	1	2	3	4
13	Onverwagse gebeurtenisse wat buite my beheer is, maak my angstig	1	2	3	4
14	Ek raak kwaad en gefrustreerd wanneer dinge nie gebeur soos ek dit wil hê nie	1	2	3	4

Appendix B
Psychological Performance Inventory (PPI-A) Afrikaans
 (Golby, Sheard, & Van Wersch, 2007)

Instruksies

Omkring die mees gepaste opsie.

		Meestal	Gereeld	Soms	Min	Amper nooit
1	Die doelwitte wat ek vir myself as speler gestel het, laat my aanhou hard werk	1	2	3	4	5
2	Dit is nie nodig dat ek gedruk word om hard te oefen of te speel nie, ek is my eie beste motiveerder	1	2	3	4	5
3	Ek is bereid om alles te gee wat dit vereis om my volle potensiaal as speler te bereik	1	2	3	4	5
4	Ek verloor my selfvertroue vinnig	1	2	3	4	5
5	Ek kan sterk positiewe emosies gedurende kompetisie volhou	1	2	3	4	5
6	Ek is 'n positiewe denker gedurende kompetisie	1	2	3	4	5
7	Tydens die kompetisie is my self-spraak negatief	1	2	3	4	5
8	Ek kan inmengende emosies vinnig opsy skuif en my fokus herwin	1	2	3	4	5
9	Om aan die sport deel te neem gee my 'n opregte sin van vreugde en vervulling	1	2	3	4	5
10	Ek kan my negatiewe gemoed na 'n positiewe gemoed verander deur my denke te beheer	1	2	3	4	5
11	Ek kan 'n krisis in 'n geleentheid omskep	1	2	3	4	5
12	Ek oefen my fisiese vaardighede in my gedagtes	1	2	3	4	5
13	Ek vind dit maklik om in prentjies oor my sport te dink	1	2	3	4	5
14	Ek visualiseer voor die kompetisie reeds hoe ek deur moeilike situasies gaan werk	1	2	3	4	5

Appendix C

The Shortened General Attitudes and Beliefs Scale (SGABS) Afrikaans

(Lindner, Kirby, Wertheim, & Birch, 1999)

Instruksies:

Dui aan tot watter mate u saamstem met die onderstaande stellings.

		Stem glad nie saam nie	Stem gedeeltelik nie saam nie	Neutraal	Stem gedeeltelik saam	Stem ten volle saam
1	Dit is ondraaglik om in belangrike dinge te misluk en ek kan dit nie verdra om onsuksesvol daarin te wees nie	1	2	3	4	5
2	Ek kan nie die gebrek aan konsiderasie of moontlike onregverdigheid van ander mense verdra nie	1	2	3	4	5
3	Dit is ondraaglik om ongemaklik, senuagtig en gespanne te wees. Ek kan dit nie verdra wanneer ek so voel nie	1	2	3	4	5
4	Ek het waarde as persoon al presteer ek nie in take wat vir my belangrik is nie	1	2	3	4	5
5	Ek kan dit nie verdra om gespanne of senuweeagtig te wees nie. Ek beskou dit as ondraaglik	1	2	3	4	5
6	Dit is aaklig wanneer mense wat vir my belangrik is nie nie van my hou nie. Dit is ramspoedig as hul nie van my hou nie.	1	2	3	4	5
7	Wanneer belangrike mense nie van my hou nie, is dit omdat ek 'n ongewilde, slegte persoon is	1	2	3	4	5
8	Wanneer ek sonder konsiderasie behandel word is dit 'n bewys dat daar swak en hopelose mense in die wêreld is	1	2	3	4	5
9	Indien ek verwerp word deur iemand van wie ek hou, kan ek myself aanvaar en my waarde as mens erken	1	2	3	4	5
10	Indien ek nie goed presteer in take wat vir my belangrik is nie, is dit omdat ek 'n onwaardige slegte mens is.	1	2	3	4	5
11	Dit is aaklig om swak te presteer in belangrike dinge, en ek ervaar dit as ramspoedig as ek swak doen	1	2	3	4	5
12	Ek dink dis aaklig wanneer mense my nie met respek hanteer nie	1	2	3	4	5
13	Wanneer persone van wie ek hou my verwerp of nie van my hou nie, is dit omdat ek 'n slegte of onwaardige mens is	1	2	3	4	5

14	Ek kan dit nie verdra om onregverdig behandel te word nie en ek beskou onregverdigheid as ondraagbaar	1	2	3	4	5
15	Ek glo dat indien 'n persoon my onregverdig hanteer, hulle sleg en waardeloos is	1	2	3	4	5
16	Indien belangrike mense nie van my hou nie, wys dit hoe waardeloos ek as persoon is	1	2	3	4	5
17	Dit is aaklig om struikelblokke in my lewe te hê en om daarmee gekonfronteer te word	1	2	3	4	5
18	Ek kan dit nie verdra om swak te vaar in belangrike take nie en dit is ondraaglik om te misluk	1	2	3	4	5
19	Dit is belangrik dat mense my meestal regverdig behandel tog besef ek ek hoef nie regverdig hanteer te word net omdat ek dit so wil hê nie	1	2	3	4	5
20	Indien ek nie goed presteer in belangrike take nie, sal dit 'n ramp wees	1	2	3	4	5
21	Dit is ondraaglik om nie met respek behandel te word nie en ek kan nie hulle gebrek aan respek verdra nie.	1	2	3	4	5
22	Ek kan dit nie hanteer om struikelblokke in my lewe te hê nie.	1	2	3	4	5
23	Mense wat ek as belangrik beskou moet van my hou en my goedkeur, en ek kan dit nie aanvaar indien hul nie van my hou nie	1	2	3	4	5
24	Ek wil graag hê dat mense van wie ek hou ook van my sal hou en my sal aanvaar, maar ek besef dat hul nie van my hoef te hou net omdat ek dit wil hê nie	1	2	3	4	5
25	Wanneer mense by wie ek gewild wil wees, my verwerp of my nie goedkeur nie, kan ek hul afkeur nie verdra nie.	1	2	3	4	5
26	Wanneer mense my nie met respek hanteer nie, wys dit hoe sleg hul werklik is	1	2	3	4	5

Appendix D

Informed Consent for Marelle Moolman Tennis Tournament

CONSENT TO PARTICIPATE IN RESEARCH

The psychological or mental skills that help athletes maximize their potential are increasingly viewed as a critical element of sporting success. Mental toughness has specifically been highlighted as an attribute that most world-class athletes possess. There is thus a need for sport researchers to develop a clear understanding of mental toughness and how mental toughness can be developed amongst adolescent athletes. We are consequently interested in investigating mental toughness amongst competitive adolescent athletes. We are also interested in determining how certain psychological variables such as thought patterns, coping strategies, emotional regulation, goal-setting and motivation relate to mental toughness, specifically amongst adolescent tennis players.

We aim to collect data from competitive tennis players between 15 and 18 years of age. The organisers of the Marelle Moolman tennis tournament in Cradock have kindly granted permission for data to be collected during the tournament from 17-20 August 2011. We would thus like to request permission for your son/daughter to participate in the research project. They would be required to complete a questionnaire consisting of measures of mental toughness and the psychological variables mentioned previously. Completing the questionnaire would take 45 minutes at most and will not interfere with your child's participation in the tournament. Participation in this research is entirely voluntary. Your son/daughter will be required to give written informed consent prior to participating in the research. They also have the right to withdraw from the study at any time. Choosing not to participate in the study will not disadvantage your son or daughter in any way. Furthermore, no costs will be incurred by you or your child by participating in the research.

The research will be conducted in accordance with the highest ethical standards. It is, however, necessary for you as parent/guardian to identify your child on the enclosed permission form and for child to identify themselves on the questionnaires in order for us to be able to ensure that we have received the proper permission for the specific adolescents to participate in the study. Confidentiality is guaranteed with regard to the identity of participants, as well as to the content of the data collected from individual participants. The data collected during the tournament will be used for the purposes of obtaining an academic

qualification (Master's degree in Psychology) and may be published in scientific journals and/or presented at academic conferences. However, this will be done in such a way as to guarantee the anonymity of individual participants.

Please complete the attached consent form indicating whether you grant or refuse permission for your son or daughter to participate in this research and return it before 5 August 2011. You are welcome to contact Ms Hanli du Toit (Master's student in Psychology) on 051 401 9560 with any questions or concerns you may have regarding this research.

Sincerely

Ms Hanli du Toit
Researcher

Dr Stephen Walker
Supervisor



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INFORMED CONSENT FORM

I _____, parent/guardian of _____
_____ hereby *grant/refuse* (please *circle* the *applicable* response) permission for my child/ward to participate in research on the psychological variables associated with mental toughness amongst competitive adolescent tennis players as set out in the attached letter. Furthermore, I hereby confirm that I have read this letter and understand the nature of the research, as well as the nature and extent of my child's participation in this research.

Signature of parent/guardian

Date

Appendix E
Informed Consent General

CONSENT TO PARTICIPATE IN RESEARCH

The psychological or mental skills that help athletes maximize their potential are increasingly viewed as a critical element of sporting success. Mental toughness has specifically been highlighted as an attribute that most world-class athletes possess. There is thus a need for sport researchers to develop a clear understanding of mental toughness and how mental toughness can be developed amongst adolescent athletes. We are consequently interested investigating mental toughness amongst competitive adolescent athletes. We are also interested in determining how certain psychological variables such as thought patterns, coping strategies, emotional regulation, goal-setting and motivation relate to mental toughness, specifically amongst adolescent tennis players.

We aim to collect data from competitive tennis players between 15 and 18 years of age. We would thus like to request permission for your son/daughter to participate in the research project. They would be required to complete a questionnaire consisting of measures of mental toughness and the psychological variables mentioned previously. Completing the questionnaire would take 45 minutes at most. Participation in this research is entirely voluntary. Your son/daughter will be required to give written informed consent prior to participating in the research. They also have the right to withdraw from the study at any time. Choosing not to participate in the study will not disadvantage your son or daughter in any way. Furthermore, no costs will be incurred by you or your child by participating in the research. By participating in this research project your son/daughter will qualify to be entered into a draw for a *Prince EXO Black Team* tennis racquet valued at R 1500.00. The draw will be held at the end of the data gathering process.

The research will be conducted in accordance with the highest ethical standards. It is, however, necessary for you as parent/guardian to identify your child on the attached permission form and for your child to identify themselves on the questionnaires in order for us to be able to ensure that we have received the proper permission for the specific adolescents to participate in the study. Confidentiality is guaranteed with regard to the identity of participants, as well as to the content of the data collected from individual participants. The data collected during the study will be used for the purposes of obtaining an academic

qualification (Master's degree in Psychology) and may be published in scientific journals and/or presented at academic conferences. However, this will be done in such a way as to guarantee the anonymity of individual participants.

Please complete the attached consent form indicating whether you grant or refuse permission for your son or daughter to participate in this research and return it to their tennis coach. You are welcome to contact Ms Hanli du Toit (Master's student in Psychology) on 051 401 9560 with any questions or concerns you may have regarding this research.

Sincerely

Ms Hanli du Toit
Researcher

Dr Stephen Walker
Supervisor



.....

INFORMED CONSENT FORM

I _____, parent/guardian of _____
_____ hereby *grant/refuse* (please circle the applicable response) permission for my child/ward to participate in research on the psychological variables associated with mental toughness amongst competitive adolescent tennis players as set out in the attached letter. Furthermore, I hereby confirm that I have read this letter and understand the nature of the research, as well as the nature and extent of my child's participation in this research.

Signature of parent/guardian

Date