

# **Mental Toughness in Cricket**

by

**Gary Ivan Steele**

submitted in accordance with the requirements for

the degree of

**DOCTOR OF PHILOSOPHY**

in the subject

**Psychology**

at the

**UNIVERSITY OF SOUTH AFRICA**

**SUPERVISOR: Prof. F.J. van Staden**

November 2017

# CONTENTS

List of Appendices .....	6
DECLARATION .....	7
ACKNOWLEDGEMENTS .....	8
SUMMARY .....	9
Key Terms.....	9
CHAPTER 1: INTRODUCTION .....	10
Introducing sport psychology and mental toughness research .....	10
Defining Mental Toughness.....	12
Characteristics of Mental Toughness.....	14
Assessing Mental Toughness .....	17
Models of Mental Toughness.....	18
Mental Toughness Development .....	21
The early years.....	21
The middle years.....	22
The later years.....	23
Maintaining mental toughness .....	23
Motivational climate .....	25
Aims.....	26
References.....	27
Table 1: Summary of mental toughness characteristics	14
Figure 1: Bull et al.'s (2005) Model of Mental Toughness	17
Figure 2: Connaughton et al's. (2007) model of Mental Toughness development	17

CHAPTER 2: EXTRA-PERSONAL CONTRIBUTIONS TO THE DEVELOPMENT AND IMPLEMENTATION OF INDIVIDUALISED GROUP MENTAL TOUGHNESS PROGRAMMES.....33

Abstract.....33

Context.....34

Research base for the present study .....39

Integrative analytical procedure to identify extra-personal aspects associated with the development and implementation of a mental toughness programme.....55

    Action Research .....58

    Psychological Skills Training (PST).....62

    Extra-personal factors involving the coach and social support .....68

    Extra-personal factors involving knowledge of sport psychology and timing of the programmes.....82

Conclusion .....98

References.....100

Table 1: Comparison of the projects conducted by McInerney (2010) and Pattison (2011) 38

CHAPTER 3: PSYCHOMETRIC PROPERTIES OF TWO MENTAL TOUGHNESS INVENTORIES IN A SOUTH AFRICAN SAMPLE .....115

Abstract.....115

Context.....116

Method .....121

    Participants.....121

    Instruments.....122

    Procedure .....124

    Data analyses .....124

Results and Discussion .....125

Psychological Performance Inventory (PPI-A) .....	125
Sports Mental Toughness Questionnaire (SMTQ) .....	129
Athlete Burnout Questionnaire (ABQ) .....	131
Correlations: Convergent and Discriminant validity .....	134
Conclusion .....	135
References .....	138

Table 1 Means, standard deviations and corrected item-total correlations for the PPI-A .....	123
Table 2: Correlations of subscales for the PPI-A .....	125
Table 3: Subscales correlation of the PPI-A with one another, obtained in the present study, along with those found in the studies conducted by Golby et al. (2007) and Gucciardi (2012). .....	126
Table 4: Means, standard deviations and corrected item-total correlations for the SMTQ .....	127
Table 5: Correlations of subscales for the SMTQ .....	128
Table 6: Correlations of each of the subscales of the SMTQ with one another, obtained in the present study, along with those found by Sheard et al. (2009) .....	129
Table 7: Means, standard deviations and corrected item-total correlations for the ABQ .....	130

CHAPTER 4: MENTAL TOUGHNESS IN CRICKET: DEMOGRAPHIC CHARACTERISTICS OF SOUTH AFRICAN CRICKETERS ON THE SMTQ AND THE PPI-A.....	145
Abstract.....	145
Context.....	146
Method .....	152
Participants.....	152
Administration .....	153
Data analysis .....	154
Results and Discussion .....	155

Sports Mental Toughness Questionnaire (SMTQ) .....	155
Psychological Performance Inventory-Alternative (PPI-A) .....	162
Conclusion .....	167
References.....	171
Table 1: SMTQ means and standard deviations (Sheard et al., 2009)	145
Table 2: Descriptive statistics for the SMTQ across independent variables (Cowden & Meyer-Weitz, 2016)	146
Table 3: Means and standard deviations of PPI-A subscales	148
Table 4: Sample sizes, means and standard deviations of subgroups in the study	149
Table 5: Means and SD for Sex, Age, Ethnicity and Competitive level for the SMTQ	154
Table 6: Means and SD for SMTQ for Sex, Age, Ethnicity, and Competitive level for the SMTQ and subscales	157
Table 7: Means and SD for Sex, Age, Ethnicity and Competitive level for total scores on the PPI-A	160
Table 8: Means and SD for Sex, Age, Ethnicity and Competitive level for total scores on the PPI-A and subscales	162
CHAPTER 5: CONCLUSION .....	175
Lack of awareness and overestimation of psychological skills .....	176
Developmental/Age related findings .....	182
Ethnicity.....	187
Other demographics that hold implications .....	188
Use of Action Research methodological approach.....	192
Findings on measurement and the nature thereof .....	194
References.....	198
Figure 1: Diagrammatic presentation of convergent findings of the current mental toughness research	172

## **List of Appendices**

Appendix A - u15A action plan – Mental Toughness programme booklet

Appendix B - 1st XI action plan - Mental Toughness programme booklet

Appendix C - 1st XI - pre and post programme performance profile results

Appendix D - 1st XI pre and post programme PPI-A scores

Appendix E - Positive outcomes of u15 MT programme

## DECLARATION

Name: Gary Steele

Student number: 45743398

Degree: Doctor of Philosophy

Exact wording of the title of the dissertation or thesis as appearing on the copies submitted for examination:

Mental Toughness in Cricket

I declare that the above dissertation/thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

Article 1 in Chapter 2 forms part of an extended collaborative project on mental toughness. The material in this article is based on fieldwork, data collection, and project specific analysis performed by S. Patterson and M. McInerney under the direct supervision of the author/principal researcher. The research data and analyses conducted by these individuals were limited to the development and implementation of the mental toughness programmes tailored to a specific team and to accessing the team members' experiences of the programmes. It is declared that the principal researcher conceptualised the two projects as part of his broader research into mental toughness in cricket and made analytical and interpretive contributions to the respective projects and performed additional conceptual, analytical and interpretive contributions to this article. The two projects on which this article is based are unpublished.

---

SIGNATURE

November 2017

---

DATE

## ACKNOWLEDGEMENTS

First and foremost, I would like to thank Tessa, my wife, and Emily and Callen, my two children, for the many sacrifices made while we were on this journey together. I look forward to spending more time with all of you.

I would like to acknowledge Prof Fred van Staden, my promoter, for his support and guidance throughout this process. I have learned a lot from him and I am especially thankful for his modelling of supervision that helped me reflect on my role as a supervisor for my post-graduate students and how I would like to work with them.

I would like to thank Michael Webb for his assistance with developing and maintaining the data collection website for Article 3. His high-quality web design work and willingness to go the extra mile make him a fantastic working partner and even better friend.

Thank you to Stuart Pattison and Michael McInerney for the work they did on projects on which Article 1 is based. They are both very good researchers and sport psychology practitioners who will help the discipline in South Africa go far.

I would like to thank Dr Michael Sheard for granting me permission to use his data collection tools and for providing me with scoring guidelines.

I would like to acknowledge the Thuthuka funding I received from National Research Foundation and the Research Committee funding I received from Rhodes University.

## SUMMARY

Mental toughness is accepted to be an important component of sporting performance, especially so in the domain of cricket. It has been called many names, such as *Big Match Temperament*, *bottle*, and *mettle* and it is widely believed that it plays a role in how successful a cricketer may be, although very difficult to define and explain. James Loehr described it as one's ability to consistently perform to the upper limit of your talent and skill and numerous researchers have since tried to define the construct based on more empirical research. This research project consists of three articles on mental toughness. The first focuses on the consideration of extra-personal influences on the development and implementation of mental toughness programmes. The second focuses on examining the psychometric properties of the paper-and-pencil versions of the Sports Mental Toughness Questionnaire (SMTQ) and the Psychological Performance Inventory-Alternative (PPI-A). The third examines the differences in the demographic characteristics of a sample of cricketers on the online versions of the SMTQ and the PPI-A. The results suggest that extra-personal influences are exceptionally important in the development and implementation of mental toughness programmes for school level cricketers, especially motivational climate and social support. While the PPI-A and the SMTQ displayed some promising psychometric properties in the current study, researchers should apply these mental toughness inventories with circumspection, taking into account questions regarding dimensionality, item formulation and variation in sample characteristics (e.g., age and sporting code), until more research can be conducted using these inventories with larger and more varied samples and the understanding of the mental toughness construct improves. The examination of the demographic differences on scores of the SMTQ and PPI-A revealed inconclusive results on age, sex, and ethnicity, while competitive level was the only distinguishing characteristic in which respondents at high levels produced higher mental toughness scores. The three studies comprising this "by articles" format PHD dissertation will be referred to as Article 1, Article 2, and Article 3 and can be found in Chapters, 2, 3, and 4 respectively.

### Key Terms

Sport psychology, mental toughness, psychometric testing, Action Research, SMTQ, PPI-A, PST, Psychological Skills Training, performance psychology, mental skills, extra-personal influences, youth.

## CHAPTER 1: INTRODUCTION

### **Introducing sport psychology and mental toughness research**

The field of sport psychology has been around for many years and is by no means a new discipline. While the first experiments in sport psychology occurred in the late 19<sup>th</sup> Century, it is only since the 1960s that the field of sport psychology has really started flourishing in continents/countries/regions such as USA, Europe, and Australasia. Researchers have also discovered that Russia and the former Eastern Bloc countries focused a great deal of attention on sport psychology and anecdotal reports suggest Russia to be the birth place of sport psychology.

Many of the first sport psychologists emanated from the disciplines of sport science and it was only later that psychologists started becoming more interested in the field. Currently sport psychology is a vibrant field consisting of researchers from both domains, although the way the field is divided up between the two differs from country to country and the power differential also varies. In parts of the world such as certain parts of the USA, many of the consultants and most prolific researchers are sport scientists. This is not true for all of the USA and one also finds that in many parts of Europe, clinical, counselling, and sometimes educational, psychologists are leaders in the field of sport psychology.

In South Africa, there are far fewer people working in the field of sport psychology than in countries like the USA, UK, and Australia. Those who do work in the field are registered as clinical or counselling psychologists, people from the domain of sport science, and people who are practising Neuro-Linguistic Programming (NLP). Regardless of the origins of the practitioners, most people working in the field are involved with consulting, rather than research. There is little structure and regulation to the field of sport psychology in South Africa and, unfortunately, there are numerous sports people, teams and coaches who have a negative

perception of sport psychology because of unsavoury consultants (a problem not isolated to South Africa). The situation is changing as more researchers are becoming involved in sport psychology who aim to develop the field and improve the quality and quantity of research into sport and exercise psychology. Some of these researchers are actively working towards creating an association or society for sport and exercise psychology in South Africa and are currently working with the *South African Society of Sport and Exercise Psychology (SASSEP)*. The challenge is to find a way to include all sport psychology practitioners, regardless of their academic domains into the development of the field.

Sport psychology researchers who have been focusing on mental toughness have been working to identify the definition and characteristics of mental toughness in a bid to understand this construct that has for many years been commonly used by sports men and women, commentators, business people, performing artists, and researchers, but was not well understood until recently (Gordon & Sridhar, 2005; Jones, Hanton, & Connaughton, 2002; Loehr, 1982; 1986; Thelwell, Weston, & Greenlees, 2005). Once there is a better understanding of the construct, the natural progression would be towards devising forms of mental toughness assessment and then ways to develop mental toughness in particular groups of people. For example, is mental toughness universal or is it different for different sports? Is team mental toughness different to individual mental toughness? And, how best to develop mental toughness in various settings? It is at this point that the present research project enters the foray into mental toughness research as the intention is to develop mental toughness training programmes for two school-level cricket teams, conduct a psychometric investigation of two mental toughness assessment tools, and conduct a large scale survey of mental toughness amongst cricketers in South Africa, using the same two mental toughness assessment tools (something that has never been done in South Africa, nor anywhere else in the world).

## **Defining Mental Toughness**

Mental toughness is a relatively new field of research, although it has been informally discussed under numerous names for many years, for example, people have called it Big Match Temperament (BMT), bottle, and mettle. Fourie and Potgieter (2001) published a paper on mental toughness that reignited worldwide interest into researching the meaning of the construct. In the decade after the publication of this paper, very little mental toughness research was published in South Africa (Gibson, 2010). The current researcher started a programme on mental toughness research at Rhodes University and a number of interesting research projects have been conducted by post-graduate students into mental toughness in cricket and ballet. Before the Fourie and Potgieter (2001) research, the most prominent information published on mental toughness was by James Loehr (1995, p. 5), who defined mental toughness as “the ability to consistently perform toward the upper range of your talent and skill, regardless of competitive circumstances”. Since the Fourie and Potgieter (2001) article was published, more than two dozen articles have been published on mental toughness in numerous sporting, performing, and business contexts and by researchers in the USA, UK, Europe, Australia, and the Far East. It has become a highly researched area with many researchers initially focussing on defining and developing the characteristics of the construct. Research findings prior to 2002 were unfortunately based, in large part, on anecdotal evidence and methodologically unsound research projects. The work of Fourie and Potgieter (2001) was seminal in that it initiated a plethora of research into the construct of mental toughness from researchers around the world that concentrated on producing methodologically sound projects and findings. They identified 12 components of mental toughness, based on their research with 131 expert coaches and 160 elite athletes from 31 sporting codes. These included motivation level, coping skills, confidence maintenance, cognitive skill, discipline and goal-directedness, competitiveness, possession of prerequisite physical and mental requirements, team unity, preparation skills, psychological

hardiness, religious convictions and ethics. Since 2002, starting with the research conducted by Jones et al. (2002), research findings are largely based on empirical research projects which has greatly benefited mental toughness research specifically and sport psychology in general. The lack of empirical research conducted before 2002 has, nevertheless, slowed the progress that could have been made in mental toughness research.

Focussed research on developing and refining our understanding of mental toughness has led to numerous definitions of mental toughness (Gucciardi, 2008; Gucciardi, Gordon, & Dimmock, 2008b; Jones et al., 2002). The definition provided by Jones et al. (2002, p. 209) has, to date been the one most often cited by authors when writing about mental toughness. The concluded that

mental toughness is having the natural or developed psychological edge that enables you to:

- 1) Generally, cope better than your opponents with the many demands (competition, training, lifestyle) that sport places on a performer;
- 2) Specifically, be more consistent and better than your opponents in remaining determined, focused, confident, and in control under pressure.

While this has been a useful definition and it has helped in terms of further developing our understanding of mental toughness, the focus of the definition on being better than ones' opponents situates mental toughness in the realm of ego orientation, rather than task orientation which is focused on developing mastery. In addition, Middleton et al. (2005, p. 1) criticised this definition, arguing that it described "what mental toughness allows one to do, rather than defining mental toughness itself". Gucciardi, Gordon, and Dimmock (2009c, p. 67) provided

the most comprehensive definition of mental toughness to date when they defined mental toughness as

a collection of experientially developed and inherent sport-general and sport-specific values, attitudes, cognitions, and emotions that influence the way in which an individual approaches, responds to, and appraises both negatively and positively construed pressures, challenges, and adversities to consistently achieve his or her goals

This definition, provided by Gucciardi et al. (2009c), is very useful in that it extends the understanding of mental toughness to acknowledge that it is a multidimensional construct that consists of values, attitudes, cognitions, and emotions. The definition also addressed the fact that mental toughness is not only about performing when there is a great deal of pressure (as was the belief prior to this as is evident by terms such as BMT), it is also about maintaining high performance levels when things are going well; something other definitions had omitted up to this point.

### **Characteristics of Mental Toughness**

In the past decade, researchers have explored the construct of mental toughness, with some studies investigating samples drawn from numerous sporting codes and/or groups of athletes, and others investigating sport specific characteristics of mental toughness (Bull, Shambrook, James, & Brooks, 2005; Connaughton, Hanton, & Jones, 2007; Gucciardi, 2009; Gucciardi & Gordon, 2009a; Gucciardi, Gordon, & Dimmock, 2009a; Gucciardi & Gordon, 2009b; Gucciardi, Gordon, & Dimmock, 2009b). These studies have not resulted in consensus in terms of a general definition of mental toughness, nor have they produced definitions that clearly

distinguish the construct in one sport from another. Research to date has also not yet managed to form a general definition of mental toughness compared to a sport specific definition. While there is still some disagreement amongst researchers as to the most suitable definition of mental toughness, especially in regard to different contexts and different levels of skilled people, there is somewhat more consensus in terms of the characteristics that constitute mental toughness. Researchers focusing on various sports and various samples have found numerous characteristics that are believed to constitute mental toughness. There has been some consensus in the argument for specific characteristics that constitute mental toughness; in fact, there are a number of core mental toughness characteristics that have emerged from the research, such as self-belief/confidence, attentional control, self-motivation/work ethic, positive and tough attitude, enjoy and handle pressure, resilience, and awareness (Driska, Kamphoff, & Armentrout, 2012; Gucciardi & Gordon, 2009a; Gucciardi, 2010; Gucciardi, Jackson, Hodge, Anthony, & Brooke, 2015; Petrie, Deiters, & Harmison, 2013; Stamp, Crust et al., 2015)). Table 1 highlights the five main characteristics that are found in mental toughness research in numerous sporting settings (Bull et al., 2005; Connaughton et al., 2007; Fourie & Potgieter, 2001; McInerney, 2014; Middleton et al., 2004) and, under each of the five headings, characteristics are highlighted that have been found in various mental toughness research projects.

Table 1

*Summary of mental toughness characteristics*

<b>Self-awareness</b>	<b>Motivation</b>	<b>Self-belief</b>	<b>Focus</b>	<b>Handling adversity</b>
awareness and control of thoughts and feelings, self-reflection, maintain self-focus, honest self-appraisal	motivational level, an insatiable desire and internalized motives to succeed, long-term goals as the source of motivation, goal commitment, perseverance, needing to earn success, determination to make the most of ability, discipline & goal directedness, pushing yourself to the limit, personal bests	self-belief, confidence, self-efficacy, resilient confidence, robust self-confidence, overcoming self-doubts, positivity, positive comparisons (positive perception of self), potential (beliefs about the future) mental self-concept	cognitive skill, focus, task specific attention, good decision-making, thinking clearly,	coping skills, psychological hardiness, thrive on pressure, deal with anxiety, handling failure, stress minimisation, thrive on competition, surviving early setbacks

The five common themes and the characteristics listed under each one in Table 1 can often be found in Psychological Skills Training (PST) programmes. This is such a common occurrence that some find the distinction between mental toughness and PST somewhat obscure. Gucciardi et al. (2009a) conducted research into the difference between a mental toughness training programme and a PST programme and found both programmes were equally effective in improving mental toughness. A finding such as this one might lead one to equate PST with mental toughness, in a similar manner to which Clough, Earle, and Sewell (2002) equated mental toughness to hardiness in a sporting context, with the addition of confidence. This simplistic view of mental toughness has been criticised by other researchers on conceptual

grounds as well as their conclusions being based on anecdotal findings (Connaughton & Hanton, 2009). Weinberg and Gould (2016, p. 248) define PST as the “systematic and consistent practice of mental or psychological skills for the purpose of enhancing performance, increasing enjoyment, or achieving greater sport and physical activity self-satisfaction.” Mental toughness is therefore a broader construct and PST would be a component that contributes to the development of mental toughness.

Connaughton and Hanton (2009) provide a useful consideration of the different approaches to mental toughness research over the last two to three decades by distinguishing between anecdotal and empirical research conducted during this time. Definitions and descriptions of mental toughness that authors have developed based on anecdotal evidence need to be tested empirically before they can be accepted into mainstream research into mental toughness. Connaughton and Hanton (2009) argue that the first truly empirical research into mental toughness that produced a definition is that of Jones et al. (2002).

### **Assessing Mental Toughness**

While there is still some uncertainty as to the most suitable definition, enough empirical research studies have found similar characteristics to warrant proceeding to the next phases of mental toughness research. Research into mental toughness has progressed from a focus on the definition and characteristics to assessing and developing the construct (Gucciardi, Gordon, & Dimmock, 2008a; Gucciardi et al., 2008b; Gucciardi & Gordon, 2009b; Middleton et al., 2005; Sheard, Golby, & van Wersch, 2009). The process of developing valid and reliable mental toughness assessment tools will assist researchers in terms of fine tuning the knowledge base required to develop the definition into a format acceptable to most mental toughness researchers. The long-term goal is to enhance the collective understanding of assessing and

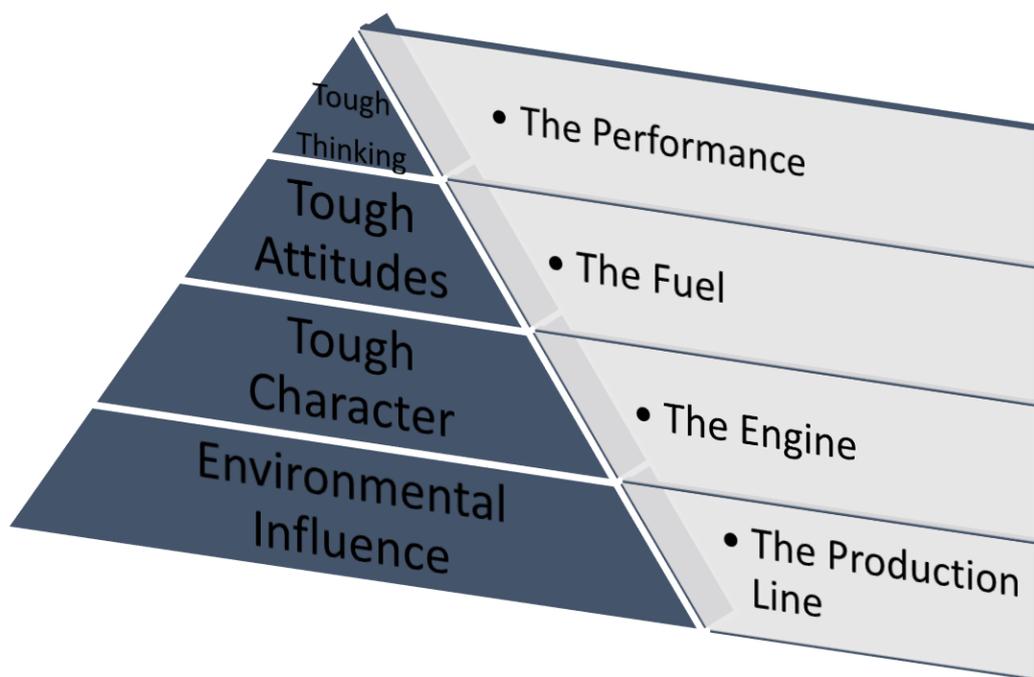
developing mental toughness to a point where one can identify a person's needs and prepare a programme to help that person develop mental toughness.

### **Model of Mental Toughness in the current research**

Research into mental toughness has progressed as more researchers realise the importance of this construct to areas of performance, sport, business, and everyday life. Even more welcoming is the awareness that is being raised amongst the general public and amongst administrators in these various fields. The improved understanding that researchers have achieved and the advancement towards researching the assessment and development of mental toughness bodes well for mental toughness research in general. It is worrying, though, that there is no generally accepted definition of mental toughness, nor is there a model that can be used and applied to different contexts. There is also still debate as to whether it is better to strive for sport specific definitions and models of mental toughness, or rather aim to develop a general model that can be applied to any context (Bull et al., 2005; Connaughton et al., 2007; Gucciardi & Gordon, 2009b).

Bull et al.'s (2005) research with English cricketers identified as being mentally tough was very useful in furthering the goal of developing a model of mental toughness. The empirical nature of the research and their attempt to begin identifying the factors influencing mental toughness development make this research integral to understanding how different elements of mental toughness work together. The research also assists researchers in distinguishing mental toughness development strategies from the more general mental skills training. Based on their research findings, they constructed a model of mental toughness in cricket which highlighted the importance of environmental influence on the development of three categories of mental toughness, namely, tough character (personality characteristics, enduring), tough attitudes (allows effective exploitation of characteristics), and tough thinking

(thought patterns associated with winning in competition) (Bull et al., 2005). These categories were presented in the form of a pyramid of mental toughness; with the environment as the base on which tough character, the second layer is built. Tough attitudes are manifestations of these characteristics, and tough thinking is the pinnacle of the pyramid which “represents the key psychological properties of a ‘mentally tough’ mind” (Bull et al., 2005, p. 225). The importance of environment influences on mental toughness can be demonstrated in the manner in which a broader and deeper base would provide a more stable foundation for the development of character, attitudes and thinking, and would make each element stronger in the face of pressure and adversity (Bull et al., 2005).



*Figure 1.* Bull et al.’s (2005) Model of Mental Toughness

Bull et al. (2005) identified a number of factors that would play a role in developing a suitable environment for the development of mental toughness. Parental support is important, especially in the players’ formative years, and will influence the players’ approach to cricket. Parents will

also model behaviours and attitudes that greatly influence children. “Childhood background” was also found to be important in terms of how a child deals with the environment. Experiences influence resilience and how a child deals with setbacks. If managed correctly, setbacks can be useful in that they provide children with positive learning experiences and a realisation that success was “earned” and required hard work (Bull et al., 2005).

These authors argued that the environment was the most suitable place to focus resources because of its importance in developing mental toughness. Confusion over when and how these factors actually influence a player’s development has made this process difficult. Questions one needs to ask are: What form should ‘childhood background’ and ‘parental influence’ take?; Which backgrounds are healthy and which are not?; What kind of influences enhance mental toughness and what kind of influences are detrimental ... and how does context affect the outcome of these? It is clearly vital that the role of environmental factors on the development of mental toughness is clarified (Connaughton et al., 2007). To begin this process of research into the environmental influences on mental toughness development, researchers need to apply the current understanding of the mental toughness construct to the development of mental toughness programmes and to assessment. Developing and implementing mental toughness programmes, using an Action Research framework, will allow researchers to document the process and gain a better understanding of how they work in practice. Even more so, using Action Research will allow researchers to document the process when aspects of the programmes do not work well and valuable information will also be gained about the environmental influences when implementing and evaluating mental toughness programmes. This will inform the development of quantitative research.

Researchers need to actively develop mental toughness programmes and evaluate their effectiveness in numerous settings in order to determine how well the current understanding of mental toughness functions in various contexts. Researchers also need to evaluate models of

mental toughness and work creatively with various models and characteristics in order to better understand a multidimensional construct that is made up of other multidimensional constructs, something that makes defining mental toughness extremely difficult. Crust (2007) raised the possibility of taking a top-down approach to mental toughness development, where, if one takes the Bull et al. (2005) framework as an example, tough thinking would influence the development of tough attitudes, which could impact on the development of tough character. They also stressed the need to put the developmental model to further empirical testing, something that can be done with models borne out of both empirical and more anecdotal research.

### **Mental Toughness Development**

According to Connaughton et al. (2007), the development and maintenance of mental toughness can be grouped into three main areas – early (mean age 8.3 years), middle (mean age 11.1 years) and later years (mean age 13.7 years) – based on Bloom’s three career phases.

#### **The early years**

The early years incorporates Vealey’s (2007) foundation phase of mental toughness development, where the important attributes of self-belief in ability to achieve, self-belief in personal skills and strengths, and having an insatiable desire and internalised motives to succeed are promoted (Connaughton et al., 2007). They suggest that the mechanisms involved in this development include, mastery of skills; modelling of superior, more experienced athletes; and enjoyment and encouragement. The mechanisms involved in developing mental toughness in the early years, appear to work in combination with each other, rather than independently, and help develop a motivational climate that is challenging, rewarding and enjoyable (Connaughton et al., 2007).

Environmental factors that play important roles in this phase include the impact of coaches and their leadership skills, as well as the roles of parents and the social support network in providing support, encouragement, knowledge and inspiration, and constructing the right environment (Connaughton et al., 2007; Driska et al., 2012; Gucciardi et al., 2015; Stamp et al., 2015). Teaching youngsters to focus on the development of mastery and helping build their confidence in sport and physical activity is vital at this stage because it will help them stay involved in sport and physical activity for longer and will help them focus on continually improving themselves as opposed to merely trying to win at all costs. This will, in turn, increase their motivation for their sport.

Overcoming critical incidents was another important factor that Connaughton et al. (2007) found that contributed to the development of mental toughness in this phase of development, an idea developed further by Collins and MacNamara (2012). Bull et al. (2005) made a similar argument regarding the importance of enduring setbacks. Researchers need to identify the role of these setbacks and incidents in providing players with the required skills and abilities that assist them in developing mental toughness. They also need to develop ways of developing these skills without having to subject youngsters to those experiences, perhaps through the use of techniques like simulation, role play and imagery.

### **The middle years**

Connaughton et al. (2007) identified six further attributes that the middle years are instrumental in developing. These are experiencing performance setbacks; pushing the boundaries of physical and emotional pain; coping with competitive anxiety; thriving on the pressure of competition; and regaining control following uncontrollable events (Connaughton et al., 2007). The three attributes developed in the early years (self-belief in ability, personal skills and insatiable desire and motivation) are developed further during this stage and are instrumental

in developing the new attributes. Creating a positive environment is therefore essential. Additional mechanisms such as competitive and sibling rivalry began to play a role in developing mental toughness, with rivalry and social support being shown to play a substantial role in the development of motivational characteristics, which facilitate the recovery from performance setbacks (Connaughton et al., 2007). The increasingly competitive nature of this stage of development results in performers learning to deal with pressure and anxiety and having a heightened determination to succeed. The learning in this stage needs to be managed by coaches and parents. Good role models allow the performers to approximate and develop the skills required to deal with this more competitive environment (Connaughton et al., 2007).

### **The later years**

In the later years the attributes already in place continue to be cultivated, as reflection allows performers to draw on successful experiences and increased exposure to competition allows them to feel more comfortable in competitive environments. Focus and eliminating distractions are abilities that are developed at this stage and are facilitated by increasingly competitive experiences and the application of psychological strategies and skills in combination with improved physical preparation (Connaughton et al., 2007).

### **Maintaining mental toughness**

Connaughton et al. (2007) suggest that mental toughness will peak three years after exposure to competition at the highest level. This implies that the increased exposure, experience and maturity that are associated with competition at the highest level, contribute to the peaking of mental toughness to which Connaughton et al. (2007) refer. This is somewhat problematic as it suggests that competition at the highest level is necessary to achieve this peak of mental toughness and it links mental toughness directly to physical talent or skill, rather than

acknowledging that a recreational athlete may develop high levels of mental toughness. Connaughton et al. (2007) commented on the need to maintain mental toughness in order to avoid decreasing levels and mentioned three factors that appear to play important roles in maintaining high levels of mental toughness. The first is an insatiable desire and internalised motivation to succeed which would result in boundaries constantly being pushed and the avoidance of deceleration. Social support networks inside and outside of sport not only help develop mental toughness, they also help maintain levels of mental toughness both directly and indirectly. Psychological skills contribute to the maintenance of mental toughness and a decline in mental toughness levels would result without continued practice of skills and techniques such as self-talk, imagery, cognitive reconstruction, pre-performance and pre-race routines, and goal-setting (Connaughton et al., 2007; Connaughton & Hanton, 2009).

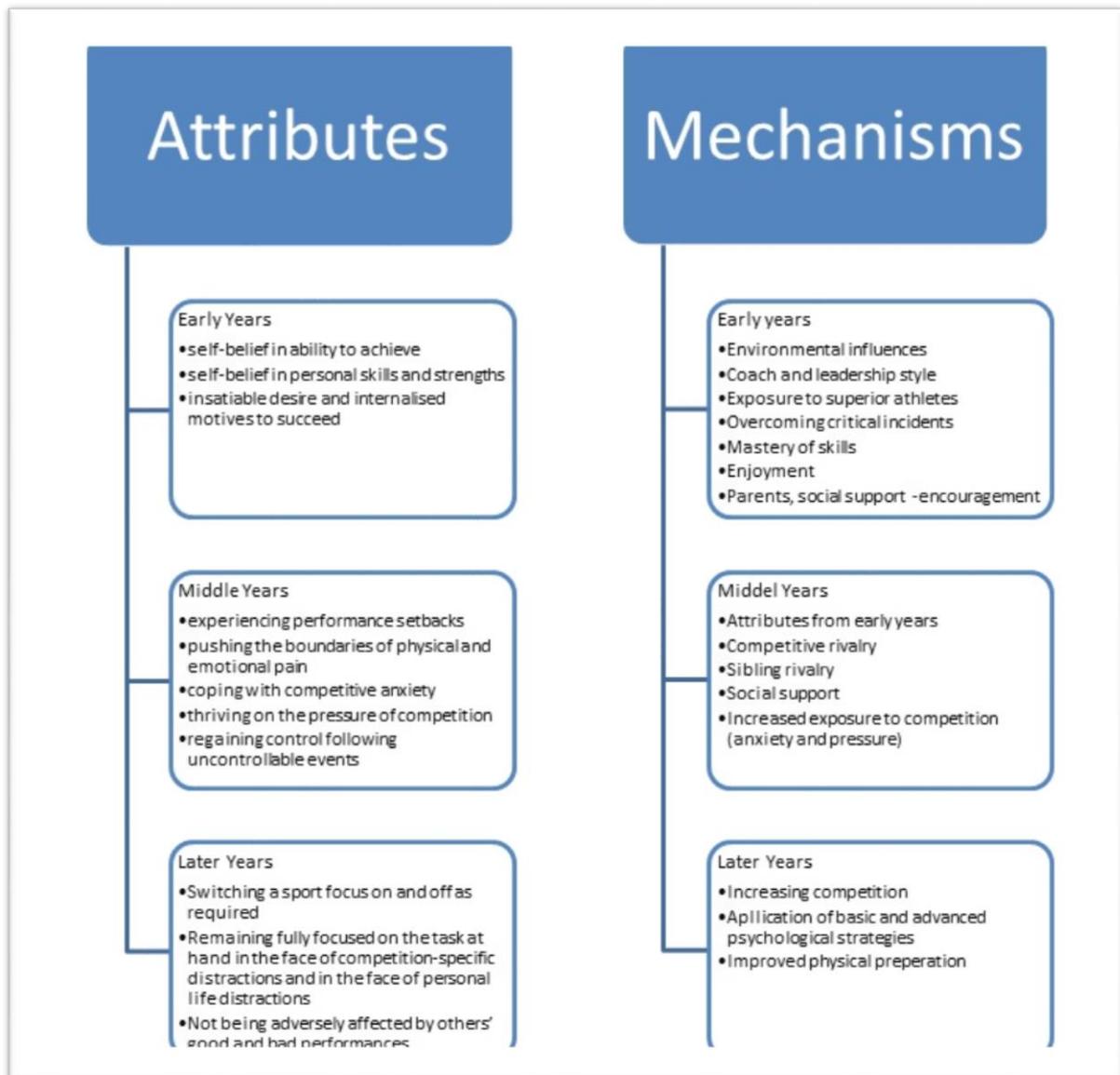


Figure 2. Connaughton et al.'s (2007) model of Mental Toughness development

### Motivational climate

Connaughton et al. (2007) emphasise enjoyment and mastery as key factors in the development of early mental toughness. Crust's (2008) review of mental toughness research reiterated this idea in stressing the importance of creating the right motivational climate for the development of mental toughness in youth athletes. However, Crust (2008) suggests that because the nature of elite sport is focussed on outcomes and winning the motivational climate should reflect this in a harsher, performance-based climate. The work of Connaughton et al. (2007) appreciates

this, but advocates for the type of climate to be examined in context, that in each career phase the climate will need to become increasingly competitive, but that early focus on performance and outcomes might be detrimental to mental toughness development.

Early research into the area of mental toughness development has posed the question: Is mental toughness caught or taught (Gordon & Sridhar, 2005)? Jones et al. (2002) reject the dichotomous view of mental toughness by acknowledging that athletes may possess natural or inherited characteristics, but will be able to learn new skills associated with mental toughness. Recent research in mental toughness development has highlighted that particular factors may be more appropriate during a specific stage of development and may have a greater impact on the development of one attribute rather than another (Bull et al., 2005; Connaughton et al., 2007; Gucciardi et al., 2015; Petrie et al., 2013).

### **Aims.**

This project investigates mental toughness in cricket and consists of three phases. The first phase of the mental toughness research will investigate the process of developing, implementing and evaluating two mental toughness programmes, specifically tailored to the needs of school level cricketers, with a primary emphasis of this component of the research exploring extra-personal factors that are important in developing mental toughness programmes. This research will focus on under 15A and 1st XI cricketers attending a private school in Grahamstown and will use an Action Research framework, namely the Organizational Development Process model (McLean, 2006). Using an Action Research framework will allow the researcher to focus on the process of developing and implementing such a programme. Group and individual contact sessions will enable the researcher to investigate the environmental factors that influence such mental toughness programmes. The present author/researcher, who is the principal researcher, will be responsible for the

conceptualisation of these two projects, while the data collection, development and implementation of the two projects will be conducted by two post-graduate students, supervised by the principal researcher, who will then further analyse the data to extract extra-personal factors affecting mental toughness programmes.

The second phase of the mental toughness research will investigate the psychometric properties of two of the currently available mental toughness inventories in a sample of club, university, and school level cricketers in the Eastern Cape, South Africa. The inventories are the Psychological Performance Inventory-A (Golby, Sheard, & van Wersch, 2007) and the Sports Mental Toughness Questionnaire (Sheard et al., 2009). Paper-and-pencil versions of these inventories will be administered to cricketers after which descriptive statistics, internal consistency, and construct validity of the scored inventories will be examined. The sample will be structured in a manner that will aim to access cricketers with varying levels of socio-economic status and from a diverse range of cultural groups. Differences and similarities between groups will be explored and discussed.

The third phase of the mental toughness research will investigate the levels of mental toughness in a large sample of South African cricketers from all playing levels and investigate differences in demographic categories. This research project will use electronic versions of the two mental toughness inventories used in the second phase of the mental toughness research, namely the Psychological Performance Inventory-A (Golby et al., 2007) and the Sports Mental Toughness Questionnaire (SMTQ, Sheard et al., 2009).

## **References**

Bull, S. J., Shambrook, C. J., James, W., & Brooks, J. E. (2005). Towards an understanding of mental toughness in elite English cricketers. *Journal of Applied Sport Psychology*, *17*(3), 209-227. doi:10.1080/10413200591010085

- Clough, P., Earle, K., & Sewell, D. (2002). Mental toughness: The concept and its measurement. In I. Cockerill (Ed.), *Solutions in sport psychology* (pp. 32-43). Cornwall: Thomson.
- Collins, D. & MacNamara, A. (2012). The rocky road to the top: Why talent needs trauma. *Sports Medicine*, 42(11), 907-914. doi: 10.2165/11635140-000000000-00000
- Connaughton, D., Hanton, S., & Jones, G. (2007). A framework of mental toughness in the world's best performers. *The Sport Psychologist*, 21, 243-264.
- Connaughton, D., & Hanton, S. (2009). Mental toughness in sport: Conceptual and practical issues. In D. Mellalieu, & S. Hanton (Eds.), *Advances in applied sport psychology: A review* (pp. 317-346). Cornwall: Routledge.
- Crust, L. (2007). Mental toughness in sports: A review. *International Journal of Sport and Exercise Psychology*, 5, 270-290.
- Crust, L. (2008). A review and conceptual re-examination of mental toughness: Implications for future researchers. *Personality and Individual Differences*, 45(7), 576-583.  
doi:10.1016/j.paid.2008.07.005
- Driska, A., Kamphoff, C., & Armentrout, S. (2012). Elite swimming coaches' perceptions of mental toughness. *The Sport Psychologist*, 26, 186-206.
- Fourie, S., & Potgieter, J. R. (2001). The nature of mental toughness in sport. *South African Journal for Research in Sport, Physical Education and Recreation*, 23(2), 63-72.

- Gibson, D. (2010). Constructions of masculinity, mental toughness and the inexpressibility of distress among a selected group of South African veterans of the 'Bush War' in Namibia. *Journal of Psychology in Africa*, 20(4), 613-621.
- Golby, J., Sheard, M., & van Wersch, A. (2007). Evaluating the factor structure of the Psychological Performance Inventory (PPI). *Perceptual and Motor Skills*, 105(1), 309-325. doi:10.2466/pms.105.1.309-325
- Gordon, S., & Sridhar, C. (2005). Identification and development of mental toughness in elite cricket. In T. Morris, P. Terry, S. Gordon, S. Hanrahan, L. Ievleva, G. Kolt & P. Tremayne (Eds.), *Psychology promoting health and performance for life: proceedings of the ISSP 11th world congress of sport [CDROM]* (). Sydney: International Society of Sport Psychology.
- Gucciardi, D. F. (2008). *Mental toughness in Australian football*. (Unpublished Doctoral thesis). University of Western Australia, WA, Australia.
- Gucciardi, D. F. (2009). Do developmental differences in mental toughness exist between specialized and invested Australian footballers? *Personality and Individual Differences*, 47(8), 985-989.
- Gucciardi, D. F. (2010). Mental toughness profiles and their relations with achievement goals and sport motivation in adolescent Australian footballers. *Journal of Sports Sciences*, 28(6), 615-625.
- Gucciardi, D. F., & Gordon, S. (2009a). Construing the athlete and exerciser: Research and applied perspectives from personal construct psychology. *Journal of Applied Sport Psychology*, 21(1), 17-33.

- Gucciardi, D. F., & Gordon, S. (2009b). Development and preliminary validation of the Cricket Mental Toughness Inventory (CMTI). *Journal of Sport Sciences*, 27(12), 1293-1310. doi:10.1080/02640410903242306
- Gucciardi, D. F., Gordon, S., & Dimmock, J. (2008a). Development and preliminary validation of a mental toughness inventory for Australian football. *Psychology of Sport and Exercise*, 10(1), 201-209. doi:10.1016/j.psychsport.2008.07.011
- Gucciardi, D. F., Gordon, S., & Dimmock, J. (2008b). Towards an understanding of mental toughness in Australian football. *Journal of Applied Sport Psychology*, 20(3), 261-281. doi:10.1080/10413200801998556
- Gucciardi, D. F., Gordon, S., & Dimmock, J. (2009a). Evaluation of a mental toughness training program for youth-aged Australian footballers: I. A quantitative analysis. *Journal of Applied Sport Psychology*, 21(3), 307-323. doi:10.1080/10413200903026066
- Gucciardi, D. F., Gordon, S., & Dimmock, J. (2009b). Evaluation of a mental toughness training program for youth-aged Australian footballers: II. A qualitative analysis. *Journal of Applied Sport Psychology*, 21(3), 324-339. doi:10.1080/10413200903026074
- Gucciardi, D. F., Gordon, S., & Dimmock, J. A. (2009c). Advancing mental toughness research and theory using personal construct psychology. *International Review of Sport and Exercise Psychology*, 2(1), 54-72. doi:10.1080/17509840802705938
- Gucciardi, D., Jackson, B., Hodge, K., Anthony, D., & Brooke, L. (2015). Implicit theories of mental toughness: Relations with cognitive, motivational, and behavioral correlates. *Sport, Exercise, and Performance Psychology*, 4(2), 100-112. doi:10.1037/spy0000024

- Jones, G., Hanton, S., & Connaughton, D. (2002). What is this thing called mental toughness? An investigation of elite sport performers. *Journal of Applied Sport Psychology, 14*, 205-218. doi:10.1080/10413200290103509
- Loehr, J. E. (1982). *Mental toughness training for sports: Achieving athletic excellence*. Lexington, Massachusetts: The Stephen Greene Press.
- Loehr, J. E. (1986). *Mental toughness training for sports: Achieving athletic excellence*. Lexington, Massachusetts: The Stephen Greene Press.
- McInerney, M. (2014). *The development and implementation of a mental toughness training programme for cricketers*. (Unpublished MA). Rhodes University, Grahamstown, South Africa.
- McLean, G. N. (2006). *Organization development: Principles, processes, performance*. San Francisco: Berrett-Koehler Publishers.
- Middleton, S. C., Marsh, H. W., Martin, A. J., Richards, G. E., & Perry, C. (2005). Developing a test for mental toughness: The mental toughness inventory (MTI). *Australian Association for Research in Education. Conference, Parramatta*.
- Middleton, S. C., Marsh, H. W., Martin, A. J., Richards, G. E., Savis, J., Perry, C., & Brown, R. (2004). The Psychological Performance Inventory: Is the mental toughness test tough enough? *International Journal of Sport Psychology, 35*(2), 91-108.
- Petrie, T., Deiters, J., & Harmison, R. (2013). Mental toughness, social support, and athletic identity: Moderators of the life stress-injury relationship in collegiate football players. *Sport, Exercise, and Performance Psychology, 3*(1), 13-27. doi:10.1037/a0032698

Sheard, M., Golby, J., & van Wersch, A. (2009). Progress toward construct validation of the Sports Mental Toughness Questionnaire (SMTQ). *European Journal of Psychological Assessment, 25*(3), 186-193. doi:10.1027/1015-5759.25.3.186

Stamp, E., Crust, L., Swann, C., Perry, J., Clough, P., & Marchant, D. (2015). Relationships between mental toughness and psychological wellbeing in undergraduate students. *Personality and Individual Differences, 75*, 170-174.

Thelwell, R., Weston, N., & Greenlees, I. (2005). Defining and understanding mental toughness within soccer. *Journal of Applied Sport Psychology, 17*(4), 326-332. doi:10.1080/10413200500313636

Vealey, R. (2007). Mental skills training in sport. In G. Tenenbaum, & R. Eklund (Eds.), *Handbook of sport psychology*. (3rd ed., pp. 287-309). Chichester: John Wiley and sons.

## **CHAPTER 2: EXTRA-PERSONAL CONTRIBUTIONS TO THE DEVELOPMENT AND IMPLEMENTATION OF INDIVIDUALISED GROUP MENTAL TOUGHNESS PROGRAMMES**

This manuscript has been prepared according to the editorial guidelines of the *Journal of Applied Sport Psychology*.

Tables and figures have been placed in text.

### **Abstract**

The present study examined the results of two studies that focused on the development and implementation of mental toughness programmes for two cricket teams at a high school in the Eastern Cape; considering the extra-personal factors that influence the development and implementation of mental toughness programmes. Both studies made use of an Action Research framework, specifically the Organizational Development Process Model (McLean, 2006). Extra-personal factors such as motivational climate, social support, seasonal demands, competition level, and team stability emerged as vital to consider when planning mental toughness programmes. Further, the results suggest mental toughness programmes for school level cricketers should be age appropriate and highly structured, there should be group and individual learning opportunities, and focus on personal development. Extra-personal influences were found to function in creating environments conducive to both the development and maintenance of mental toughness.

## **Context**

Mental toughness is an important construct in sport psychology and is widely believed to play a part in performances, and notably in consistent performances, of people in a variety of sports and at all levels (Bull, Shambrook, James, & Brooks, 2005; Golby & Sheard, 2004; Golby, Sheard, & van Wersch, 2007; Gucciardi, Gordon, & Dimmock, 2008a; Gucciardi, Gordon, & Dimmock, 2009a; Gucciardi, Gordon, & Dimmock, 2009b; Sheard, Golby, & van Wersch, 2009). Considerable effort over the past decade has been dedicated to conceptualising the construct and working towards developing a more widely accepted definition. While there have been a number of contrasting views as to what constitutes this multidimensional construct, progress has been made in terms of a general understanding of what mental toughness is and components that constitute the construct of mental toughness. More research is needed, and is ongoing, and such research that is focused on developing and implementing mental toughness programmes from the perspective of participants (especially collaborating with participants as co-investigators) could assist researchers in identifying positive and negative aspects of these programmes. Research such as the current study might contribute to the generation of theory in regard to particular contexts, and in so doing, could improve understanding of the construct of mental toughness and how best to assist sports people and performers in maximising mental toughness to improve performances. Methodologically, the applied nature of the research process may benefit from a participative approach such as Action Research, where the method becomes part of the intervention, with the researcher collaborating with the participants, allowing examination of the process of developing and implementing mental toughness programmes.

While anecdotal evidence suggests that natural learning experiences and life adversities contribute to the development of mental toughness, Connaughton, Wadey, Hanton, and Jones (2008) contend that developing mental toughness is a long-term process

and is related to aspects associated with the prevailing motivational climate, thus reinforcing the notion that mental toughness is learned. Similarly, Gould, Diefenbach, and Moffett (2002) research with elite Olympic athletes supported findings of Bloom (Bloom, 1985; Cutietta, 1985) and Csikszentmihalyi, Rathunde, and Whalen (1997), that the psychological development of top athletes occurs over a long period of time and is influenced by numerous factors, which include teaching and modelling, with a strong support system necessary for this process to be successful. Connaughton et al. (2008) furthered the argument of a long-term process concluding that mental toughness “encompasses a multitude of underlying mechanisms” (p. 83), operating in a combined manner. They concluded that these mechanisms related to characteristics associated with motivational climate (e.g. enjoyment, mastery, autonomy), interactions with individuals (i.e., coaches, parents, friends, family, senior athletes, sport psychologists, team-mates), experiences in and outside sport (all of which relate to external or extra-personal aspects that influence the individual), as well as psychological skills and strategies, and an insatiable desire and internalized motives to succeed (which relate to internal or intra-personal aspects). Learning then becomes an important way for mental toughness to be acquired through direct methods, such as teaching or emphasising psychological lessons, and indirect methods, such as modelling, interpersonal interactions, and/or creating particular motivational climates conducive to developing mental toughness (whether knowingly or not). These are often referred to by researchers in the mental toughness literature as the environment or environmental factors (Bull et al., 2005; Connaughton et al., 2008; Gould et al., 2002; MacNamara, Button, & Collins, 2010); factors in the external surroundings of the person, or extra-personal factors, that influence their learning and development, which, in turn, contribute to the development and the maintenance of intra-personal aspects such as mental toughness.

Psychological Skills Training (PST) contributes to the development of mental toughness, possibly by developing skills that enhance and encourage self-regulation, task-involvement and self-referenced criteria for success, which lead to the development of a task-involving, positive motivational climate that fosters cohesion and mental toughness by enhancing psychological and life skills that contribute to athletic performance and promotion of personal growth (Duda & Whitehead, 1998; Gucciardi et al., 2009a; Gucciardi et al., 2009b; Gucciardi, Mallett, Hanrahan, & Gordon, 2011; Gucciardi, Jackson, Hodge, Anthony, & Brooke, 2015; Johnson, Hrycaiko, Johnson, & Halas, 2004). A seven-week PST programme conducted by Sheard and Golby (2006) that focused on relaxation, concentration, goal-setting, visualization, and thought stopping found positive effects on a range of positive psychological constructs which included mental toughness. Gucciardi et al. (2009a; 2009b) conducted research evaluating the effectiveness of two separate psychological skills training programmes; one a more traditional mental skills programme (focusing on self-regulation, arousal regulation, attention control, self-efficacy, mental rehearsal, and ideal performance state) and the other a programme that focused on keys to mental toughness identified by Gucciardi et al. (2008b). The mixed-methods research consisted of both quantitative and qualitative data collection and the researchers found that both were equally effective in enhancing the mental toughness of youth-aged Australian footballers in comparison to a control group.

Bull et al. (2005) developed a model of mental toughness that emphasised the importance of the environment on the development of three categories of mental toughness, namely, tough character (personality characteristics), tough attitudes (which allow for effective exploitation of characteristics), and tough thinking (thought patterns associated with winning in competition). The researchers focused on cricket and argued that it is a sport requiring “chronic” mental toughness for a competitor to reach the top and maintain that

world class level of performance (Bull et al., 2005). Cricket players are required to bat, bowl, and field for long periods of time and a game can last from three hours (for a limited 20-overs game) to as long as five full days (in the case of Test cricket). The competitive cricket matches occur frequently and often in very hot conditions. An individual scoring 100 runs can take six hours or more of intense concentration and one lapse in concentration can result in the person batting losing his/her wicket. A number of poor performances in succession can result in the loss of a place on the team, a loss of self-esteem, and/or a potential loss of income for a professional cricketer. Bull et al. (2005) identified the environment as providing the foundation for the development of mental toughness on two key levels, namely, upbringing and transition into an appropriate cricket environment (both extra-personal factors). The researchers identified a number of environmental factors that contribute to developing a suitable environment for mental toughness development. During their formative years, parental influence, “childhood background”, and setbacks were important contributors to the development of mental toughness (Bull et al., 2005). The authors further suggested that the environment (or extra-personal factors as described in the current research) is the most appropriate area to focus resources, and interventions because of its importance in developing mental toughness. An interpretation of Bull et al.’s findings could be that the development of tough minded qualities, all seemingly intra-personally rooted, are elicited and, to some extent, sustained by optimal external conditions. There is a need to refine our understanding of optimal extra-personal conditions in the development of mental toughness to when and how these factors operate in a player’s development (Clough, Earle, & Sewell, 2002).

In research examining the development and maintenance of mental toughness, Connaughton et al. (2008), used the same categories to subdivide their participants’ careers as Bloom’s (1985) three career phases: early (mean age 8.3 years,  $s= 1.7$ ), middle (11.1 years,  $s= 1.9$ ) and later years (13.7 years,  $s= 2.1$ ). They found that, starting in the early years and

continuing into the middle and later years, observations of older, elite performers in both training and competitive environments, advice from parents, coaches and other important figures, and effective leadership were instrumental in nurturing motivation and an appropriate motivational climate that was rewarding, challenging, and enjoyable, which helped the athlete develop a sense of discipline and work ethic (Connaughton et al., 2008; Durand-Bush & Salmela, 2002; Gould et al., 2002). Overcoming critical incidents was considered important in the development of mental toughness (Connaughton et al., 2008), which resonates with the findings of Bull et al. (2005) regarding the importance of enduring setbacks. The challenge as researchers is to identify the role of these setbacks and incidents in providing players with the required skills and abilities, and develop ways of developing these skills without having to go through those experiences, perhaps through the use of techniques like simulation, role play and imagery.

Connaughton et al. (2008) found social support networks inside and outside of sport helped to maintain mental toughness both directly and indirectly. Psychological skills were also shown to maintain mental toughness, with the use of techniques like self-talk, imagery, cognitive reconstruction, pre-performance and pre-race routines, and goal-setting, impacting on levels of confidence and anxiety, while without continued practice the effectiveness of these skills and mental toughness in general, could decline (Clough et al., 2002; Connaughton et al., 2008; Gucciardi & Gordon, 2008). These are initially externally induced but develop into internalised behaviour patterns that need to continuously be both internally and externally reinforced. The research on mental toughness emphasises the importance of the right motivational issues and motivational climate for the development of mental toughness, especially in youth athletes (Crust, 2008), and more researchers are arguing that emphasis on enjoyment and mastery are integral in developing mental toughness, long-term participation in sport, improved performance, and intrinsic motivation (Connaughton & Hanton, 2009;

Crust, 2008; Duda et al., 2013; Duda, 2013; Gucciardi et al., 2008b; Gucciardi et al., 2015; Hodge, Henry, & Smith, 2014). Research has shown that, in the face of challenging tasks, intrinsic motivation tends to decrease in areas such as children's perceived competence (Eccles, Roeser, Wigfield, & Freedman-Doan, 1999; J. G. Nicholls, 1978; Stipek & Iver, 1989), pursuit of learning goals (e.g., Anderman & Midgley, 1997; Maehr & Anderman, 1993; Midgley, Anderman, & Hicks, 1995), valuing of effort (e.g., Covington, 1984), and mastery behaviours (e.g., Rholes, Blackwell, Jordan, & Walters, 1980). Interestingly, research by Carol Dweck and others into incremental and entity self-theories suggests that those with incremental theories of self (or growth mindsets) often show increased effort in the face of many of these challenging tasks (Blackwell, Trzesniewski, & Dweck, 2007; Dweck, Chiu, & Hong, 1995a; Dweck, Chiu, & Hong, 1995b; Dweck, 2007; Dweck, 2017; Levy, Stroessner, & Dweck, 1998; Mangels, Butterfield, Lamb, Good, & Dweck, 2006). Intrinsic motivation is positively correlated with performance and achievement, whilst extrinsic motivation remains reasonably constant and is generally negatively correlated with achievement and performance over the long term (Lepper, Corpus, & Iyengar, 2005).

### **Research base for the present study**

The current research paper focuses briefly on describing two separate research studies in which mental toughness programmes were developed and implemented for an under 15A cricket team and a 1<sup>st</sup> XI cricket team respectively. The extra-personal contributions to the development and implementation of individualised group mental toughness programmes identified in these research projects will be presented and the importance of these contributions to the development of mental toughness programme will be considered. Both studies made use of an Action Research framework and incorporated Bull et al.'s (2005) model of mental toughness in order to assist the players develop their mental toughness, with

the aim to contribute to the theoretical and practical understanding of developing and implementing mental toughness programmes in a school-level cricketing context. To achieve this, both studies documented the process of developing and implementing mental toughness programmes for school level cricketers and evaluated the perceptions of the respective participants regarding the value of the programmes. Youth sport in SA typically occurs within a very competitive school context, with club sport in most cases only occurring after completion of school.

The Action Research framework in both studies made use of McLean's (2006) Organisational Development Process (ODP) model of Action Research to guide the process in the development and implementation of the mental toughness programmes. Action Research allows the researchers to make use of the action and reflection cycle to incorporate theory and practice in a participatory framework that allows the participants to be partners in the process of constructing the research (Reason & Bradbury, 2008). The benefit of this approach is that it allows for the development of both theory and practice (McNiff & Whitehead, 2006), because the method becomes part of the intervention. Such processes are aimed at practical outcomes and reflection on these processes provide opportunities to develop new forms of understanding and contribute to the existing knowledge base. This is very useful in sport psychology because the focus is on making positive changes in the lives of participants, while systematically recording and incorporating outcomes over time, in so doing, constantly contributing to the development of theory.

In this paper, the aspects of psychological environment discussed by authors such as Bull et al. (2005), Gould et al. (2002), and Gucciardi et al. (2008; 2008a; 2009; 2009a; 2012; Gucciardi et al., 2015) will be incorporated under the term "extra-personal" to refer to contributions or conditions because the term environment is a holistic construct that includes

context, individual, community, coach, and family, as well as a range of other aspects that include aspects like ecology, computers, and outdoor settings.

Table 1 outlines the projects conducted by McInerney (2010) and Pattison (2011), which were conducted independently of one another. Both were conceptualised and supervised by the principal researcher as part of a larger research project into mental toughness in cricket (of which the current paper forms part), with this phase of the larger project designed to provide useful research opportunities for post-graduate students in sport psychology and to contribute to the discourse on extra-personal influences in developing mental toughness.

Table 1

*Comparison of the projects conducted by McInerney (2010) and Pattison (2011)*

<b>McInerney</b>	<b>Pattison</b>
<b>Goals/Research Question</b>	
<p>UNDER 15A: This study focused on the development and implementation of a mental toughness programme for the under 15A cricket team members, with the goals to assess their understanding of mental toughness, develop and implement a mental toughness programme tailored to their needs, document the process of the programme and the participants' experience of the programme in order to contribute to theory.</p>	<p>1<sup>st</sup> XI: How will the development and implementation of a mental toughness programme, tailored to the needs of [the school's] 1<sup>st</sup> XI cricket team members and assist in adding value and theoretical knowledge to the current body of knowledge regarding the development and implementation of mental toughness programmes.</p>
<b>Sample</b>	
<p>The sample for each study initially consisted of 12 members from the 1<sup>st</sup> XI and 11 members from the under 15A cricket team squads, respectively, along with the coaches of</p>	

each of the teams. Participants were boarders and the coaches of the teams indicated that all but two of the team members of the under 15A team and three of the 1<sup>st</sup> XI team members were separated from their families who lived in other cities in South Africa. An average of nine team members completed the programme of which eight were consistent in their participation, attending all session. Results are based on those who attended regularly.

### **Procedure and establishment of trustworthiness of the information sets**

Both studies made use of Action Research, specifically the ODP model (McLean, 2006) as a methodological framework, which involved eight phases, namely, Entry, Start-up, Assessment and feedback, Action plan, Implementation, Evaluation, Adoption, and Separation as detailed by McLean. Data was collected via mixed methods approaches, in which focus groups, interviews, and Performance Profiles (Butler & Hardy, 1992; Weston, Greenlees, & Thelwell, 2011) were conducted during the Assessment and Evaluation phases of each of the two studies. The study with the 1<sup>st</sup> XI also involved the administration of the Psychological Performance Inventory-Alternative (Golby et al., 2007) before and after the programme was implemented. Thematic Analysis (Braun & Clarke, 2006) was used to analyse the information gathered from the Assessment phases of the studies to respectively to develop the programmes for each team. Thematic analysis was also used to analyse the information gathered from the Evaluation phases of each of the studies.

#### **Phases 1 & 2: Entry & Start-up**

The initial conceptualisation of the two research studies and negotiation with the school, coaches and players were conducted by the principal researcher of the broader research project. Meetings were held with the stakeholders and expectations and scope of the research were clarified between all parties. Ethical clearance was obtained from the tertiary education institution of the author and formal consent forms were signed and permission letters were obtained before commencing with the research. All participants were given a detailed and honest description of the research.

Phase 3: Assessment

Information gathering: Assessment Phase

A focus group and Performance Profile (which included a mental skills list generation) were conducted with the team. Thereafter, an individual interview was conducted with the coach of the team. Interview and focus group schedules were based on Bull et al.'s (2005) model of mental toughness.

Analytical process: Assessment Phase

Data were analysed thematically, using Braun and Clarke's (2006) six phase thematic analysis outline. The following themes were generated from both the focus group and the interview with the team coach: 1) Self-belief and Confidence; 2) Concentration; 3) Motivation; and 4) Communication.

The pre-programme Performance Profile revealed the following categories with scores the participants assigned to themselves as a team: a) Confidence – 8; b) Concentration – 5; Positive attitude – 7; d) Discipline – 4; e) mental preparation – 6; f) Dealing with failure – 7; g) Self-belief – 7; and h) Maturity – 5.

Information gathering: Assessment Phase

An initial data collection session was conducted which included a focus group with the team and a Performance Profile (which included a mental skills list generation). Thereafter, individual interviews were conducted with the team captain and coach and the Performance Profile Inventory – Alternative (Golby et al., 2007) was administered to the team members. Interview and focus group schedules were based on Bull et al.'s (2005) model of mental toughness.

Analytical process: Assessment Phase

Data were analysed thematically, using Braun and Clarke's (2006) six phase thematic analysis outline. The following themes were generated after analysis of the focus group for the 1<sup>st</sup> XI cricketers: Big Match Temperament; Self-belief; Visualisation; Concentration; Decision-making; Bouncing back; Consistency; Patience; and Concentration. The themes extracted from the individual interviews with the coach and the captain were: Big Match Temperament; Self-belief; No fear of failure; Confidence; Decision-making; Composure; Concentration; Patience; and Visualization.

	<p>The pre-programme Performance Profile revealed the following categories with the scores the participants assigned to themselves as a team – (maximum score of 10): Calm under pressure – 7; Confidence – 9; Concentration – 4; Decision-making – 8; Patience – 6; Discipline – 5; Goal directedness/orientation – 6; Determination – 7.</p> <p>PPI-A results</p> <p>The participants self-scored themselves with high ratings on the PPI-A, even though they had indicated little, if any, PST involvement or knowledge before this project. They rated themselves on average: 77% of the maximum score for determination, 77% of the maximum score for self-belief, 73% of the maximum score for positive cognition, and 63% of the maximum score for visualisation.</p>
Phase 4: Action Plan	
<p>The themes extracted from the focus group, the interview with the coach, and the Performance Profile (and PPI-A results for the 1<sup>st</sup> XI) were examined, compared with literature, and an individualised mental toughness programme was developed for each team and presented to the respective participants for discussion, modification, and approval, before being implemented.</p> <p>UNDER 15A: The following four areas were identified, in collaboration with the team members, as most useful to address the needs of the team: 1) Self-belief; 2) Motivation; 3)</p>	

Communication; and 4) Concentration. The under 15A action plan that describes the programme can be found in Appendix A.

1<sup>st</sup> XI: The following five areas were included in the final programme: 1) Concentration and Focus; 2) Self-belief and Self-confidence; 3) Visualisation; 4) Positive Self-talk and Communication; 5) Decision-making and Goal-orientation. The 1<sup>st</sup> XI action plan that describes the programme can be found in Appendix B.

#### Phase 5: Implementation

Each programme was structured according to Weinberg and Gould's (2015) three suggested phases of Psychological Skills Training programmes, namely, education phase, acquisition phase, and practice phase, which were incorporated into each session of the programme.

UNDER 15A: The programme consisted of five sessions that varied from 30 to 75 minutes, conducted during the off season: session one – introduction to the programme, PST, and encouraging self-awareness; Session 2 – motivation; Session 3 – confidence and self-belief; Session 4 – communication; and Session 5 – concentration.

1<sup>st</sup> XI: There were seven sessions in total (ranging from 45 to 120 minutes), which covered the five themes agreed upon in the action plan: Session 1 – an introductory session on the power of the mind (winning mind, winning environment, what is mental toughness, and practical exercises); Session 2 – Concentration and Focus; Session 3 – Self-belief and Self-confidence; Session 4 – Visualisation; Session 5 – Positive Self-talk and Communication; Session 6 – Decision-making and Goal-orientation; and Session 7 – Concluding session (focusing on bringing all the aspects of the programme into a cohesive whole).

#### Mentor system:

The under 15A programme included a mentor system that required the members of the 1<sup>st</sup> XI cricket team to serve as mentors to the under 15A team members. The mentor system was designed to address the role of environmental (or extra-personal) factors, particularly social support factors in the development of mental toughness (Connaughton et al., 2008; Bull et al., 2005). Each UNDER 15 player was paired with a 1st XI cricketer who would

act as their mentor for the duration of the programme. By meeting on a weekly basis, the player and mentor could use short sessions (under 30min) to combine a physical training session (such as a net, throw downs, or fielding practice) with the new psychological skills they were learning. The goal of this mentor programme was to try and increase the players' awareness of the role mental aspects play in their performance and to integrate the mental toughness training with physical training, allowing the players to apply the theory to their own game. The integration of the mental toughness training and physical training is particularly important for the programme to be effective (Williams & Krane, 2014).

Phase 6: Evaluation

Information gathering: Evaluation Phase

After the conclusion of the programme implementation, a team focus group an individual interview with the team coach, and a post-programme Performance Profile (rating themselves on the eight characteristics identified in the first assessment) were conducted in order to investigate the participants' experience of the programme. The participants had not seen the first Performance Profile again after completing and discussing it during the Assessment phase (approximately six months earlier).

Analytical process: Evaluation Phase

The scores from the post-programme Performance Profile conducted during the evaluation phase are included (with the scores from the pre-programme one conducted during the assessment phase in parentheses: a) Confidence – 8 (8); b) Concentration – 6 (5); Positive attitude – 7

Information gathering: Evaluation Phase

Once the programme was completed, in collaboration with feedback from the respective participants, a focus group and a post-programme Performance Profile were conducted with the team, an individual interview was conducted with the coach, and the PPI-A was administered to the team in order to investigate the participants' experience of the programme. The participants had not seen the first Performance Profile again after completing and discussing it during the Assessment phase (approximately six months earlier).

Analytical process: Evaluation Phase

The results of the Performance Profile were as follows (with the corresponding value the team assigned to each category in the first Performance Profile in parentheses): Calm under pressure – 8 (7); Confidence – 10 (9); Concentration – 6 (4); Decision-making – 9 (8); Patience – 7 (6); Discipline – 7 (5);

(7); d) Discipline – 6 (4); e) mental preparation – 8 (6); f) Dealing with failure – 7 (7); g) Self-belief – 9 (7); and h) Maturity – 6 (5).

The post programme Focus Group and the interview with the coach were analysed using thematic analysis (Braun & Clarke, 2006).

Goal directedness/orientation – 6 (5); Determination – 8 (7). See Appendix C for excerpts from the original projects depicting the graphs from the pre and post programme performance profiles. Analysis of the pre and post performance profile results revealed a significant improvement in scores ( $t(7) = -7.63, p < 0.001$ )

The results from the PPI-A administration revealed a higher mean for the post-programme scores but no significant difference between the pre-programme and post-programme scores on the PPI-A. The breakdown of scores (pre and post PPI-A results) is available in Appendix D. An interesting finding and one that requires further research was that the participants self-scored themselves with high ratings on the PPI-A and, after learning about mental toughness and going through the programme, some participants decreased scores on some subscales of the PPI-A, with one even decreasing scores on all four subscales. This raises the question of how well they understood what they were rating before the programme and the impact the programme had on their knowledge of mental toughness. Scores on the PPI-A can range from 14-70 and the pre-programme PPI-A scores ranged from 48-60 with the post-programme PPI-A scores ranging from 51-65 (see Appendix D).

	<p>The post programme Focus Group and the interview with the coach were analysed using thematic analysis (Braun &amp; Clarke, 2006).</p>
<p>Phases 7 &amp; 8: Adoption &amp; Separation</p>	
<p>Researchers emphasised throughout the programme that a collaborative approach was required between the players, the coach and the researcher in order to maximise the potential of the programme and that the programme would provide a framework from which the coaches could continue to address mental toughness with their teams. Players and coaches in both research projects were provided with documentation during and at the conclusion of the programme to facilitate their ongoing use of the principles and skills learned during the programme. The researchers presented findings to the participants and coaches and any queries were clarified by the presenters. The final reports were also made available to the participants, coaches, and the school as negotiated in the set-up phase.</p>	
<p style="text-align: center;"><b>Findings</b></p>	
<p>The programme design, structure, and content were highlighted by the participants as being strong points of the programme. This perception was highlighted by a comment from one of the team members who said the content of the sessions <i>“pretty much hit the nail on the head for me”</i>. The participants believed that there were a number of positive outcomes; some that would be evident in the long-term (Coach: <i>“Like I said, the seed that you planted will maybe only grow in two or three of them, but it’s planted the seed and got them thinking about this, that it’s not just how far I hit</i></p>	<p>Analysis of the data produced in the post-programme focus group and interview showed the participants indicating the following results: a) there was an improved understanding of what mental toughness incorporated and entailed; b) the participants felt they gained a better understanding of the importance of incorporating mental toughness training into their training routines; c) the respondents felt they obtained a competitive advantage over opponents; and d) they believed there were substantial changes in the team (such as learning to block out external and negative thoughts and comments, obtaining an</p>

<p><i>the ball, how fast I bowl, that there's a whole other side to cricket, so that's definitely a massive positive that they are aware of this idea of mental toughness, and there's something to think about, and when they do get a bit older and start assessing their game a bit more mental toughness will definitely be a role in that")</i></p> <p>and a number of short-term positive effects. The immediate, short-term effects centered around the development of self-awareness which appeared to play a facilitative role in the development of other components (confidence/self-belief, motivation, concentration) through the use of particular mental toughness strategies and techniques (goal-setting, self-talk, pre-performance routines).</p> <p>The participants' experiences of the programme also highlighted the need to pay close attention to contextual factors, when designing and implementing mental toughness programmes, in order to use appropriate strategies and appropriate timing (when and how long) for the particular age group and team context (team environment and level of competition). Age appropriate strategies and knowledge of the competitive experience of the participants is very important and this is highlighted by a comment from the coach that under 15</p>	<p>improved and increased level of concentration and focus, knowing how to bounce back from failing and adversity, being able to think in the moment, achieving an increased level of team spirit, team cohesion and chemistry, obtaining a heightened sense of self-belief and confidence, improving faith in team mates abilities, learning the effectiveness of positive self-talk and increasing their sense of mental toughness awareness) and changes in individual performances as a direct result of exposure to the programme and its contents. Participants indicated that, after the programme, they experienced positive improvements in team spirit, team chemistry and a sense better team cohesion. Participants felt that the psychological skills training by means of exposure to mental toughness programmes helped them learn about psychological skills and helped them improve their own specific mental skills which can help them create a positive attitude and a winning environment, which is an environment that athletes need to make a conscious effort at creating (Bull, 2006). Linked to the sense of improvement the participants experienced in their team cohesion, they also indicated an improved and increased faith in the ability of their team members to perform their specific roles within the team. In this process they indicated that they felt there was no need to</p>
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<p>cricketers “<i>are barely out of the little stage of cricket</i>” implying an immaturity and relative inexperience in more competitive environments.</p> <p>In a statement borne out by experience working with the group in this study, the coach described “<i>one of the biggest hurdles</i>” in working with the age group was related to the “<i>insecurities that come with voicing your opinion when you’re fifteen years old</i>”, impacting on the ease with which one can facilitate group discussions, particularly around abstract topics that require the interrogation of thoughts and feelings. A summary of the positive outcomes identified by the participant can be found in Appendix E.</p> <p>Environmental (extra-personal) factors such as age, level of competition, and when the programme is implemented need to be taken into consideration when making use of models such as Connaughton et al.’s (2007) understanding of mental toughness based on Bloom’s (1985) career phases of early years, middle years, and later years. More research is needed in a South African context to explore whether certain developmental factors are particularly important or influential for a certain age group regardless of contextual factors such as</p>	<p>worry about other person and they could focus more of their energy on their own tasks.</p>
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------

level of competition. Would the most appropriate factors to target for an 18-year-old (later years) be different if the player was just entering a sport, compared to if they were competing internationally? One would need to consider what might be the impact be of participants not having access to factors associated with earlier phases of development, that is, not being exposed to vicarious experience, sibling rivalry, critical incidents and competitive experience. Offering the programme in the “off-season” for school level learners is also problematic as the participants merely swap cricket (a Summer sport in South Africa) for sports such as Rugby, Soccer, or Hockey (traditional Winter sports in South Africa). This makes it very difficult for the participants to focus on cricket and it makes sense to start such mental toughness interventions at the beginning of the season, or during pre-season planning.

Mentor system.

The mentor system encouraged the 1<sup>st</sup> XI team members to each work with an under 15A team member to mentor them in general aspects of their game. The impact of contextual factors on the implementation of the programme, extended to the mentor system which was initially designed to provide an opportunity

for both 1<sup>st</sup> XI and under 15 players to come together to use what they learned from the mental toughness programmes. It's main aim was to integrate practical application with theory, while also developing the factors of social support, vicarious learning and modelling of superior athletes, outlined in the literature. The system had however, relied on the simultaneous implementation of both under 15 and 1<sup>st</sup> XI programmes. In implementation the same contextual factors that had impacted on the players in this study were exaggerated and multiplied in the lives of the 1<sup>st</sup> XI players, and resulted in the mentors having little time or inclination to participate in the mentor aspect of the programme. In the focus group these factors emerged clearly in comments like, *“my mentor had an injury”*, *“my mentor was always busy sir, and we had too much sport on”*, and *“my mentor had a girlfriend sir”*.

Importantly however, the few instances where mentors and players managed to get together (2 players, 6 sessions) were very well received as both players described the mentor sessions as positive experiences and as something they would continue with,

*“Obviously they have a wider cricket knowledge cos they're more experienced and like my mentor, R\*, he helped me at*

*stuff that I was doing wrong, and he points them out and stuff, so I think in a way it did help sir, and yeah it helped quite a lot.”*

The findings relating to the impact of context on the implementation of the programme are indicative of the difficulties in controlling the extra-personal factors that are so important in developing mental toughness. Designing interventions requires a creative approach that demonstrates an awareness of the difficulties in directly influencing the environment, and an appreciation of the varied impact that context can have on intervention. Combining this creativity in design with flexibility in implementation, should provide the foundation for mental toughness programmes.

**The coach’s approach and appraisal of the development and implementation of the mental toughness programme – reflections from the researchers.**

The coach was closely involve with the programme and from the start of the intervention the coach demonstrated that he viewed addressing mental aspects of sport as integral to a coaching approach. The coach assisted in getting the participants to sessions and attended and participated in some sessions, appearing eager to learn. His support was a strong factor in facilitating “buy in” to the

The coach was perceived by the researcher to be less interested in mental skills training and in the mental toughness programme. Efforts to include the coach were unsuccessful with the coach attending none of the sessions, leaving the participants to arrive on their own, and not participating in the initial discussion sessions before the programme started. While the coach had voiced his support of mental skills training

programme as well as a productive working relationship.

In building on the coach's existing understanding of sport psychology, and mental toughness particularly, the intervention provided an opportunity for the coach to formalise his framework of knowledge (*"it's something I've done more informally, but really something I'm going to start doing more formally"*) and provided access to a structured approach to developing mental toughness. The coach indicated that he might have been lacking in a structured approach to mental skills training - *"the one thing is maybe structure, breaking things down into specific areas that need to be focused on..."*.

Data from the coach's interview also granted insight into the impact of the programme on the coach himself, as he described it as *"an eye-opener for myself... which is brilliant and I've definitely learnt from it"*. This outcome represented the understanding in the programme's design, of the vital need to address the role of the coach in mental toughness, seen so strongly in the literature (Connaughton et al., 2007; Gucciardi et al., 2009). For the coach, as someone serious about coaching and with ambitions to improve, the

and the programme, his behaviour seemed to suggest otherwise. Some of the participants showed a general lack of enthusiasm, with some missing sessions and numerous cancellations of sessions at the last minute. The coach referred to this in the post-programme interview:

*Um, I suppose, we probably covered those already I suppose but just to add those maybe, one of the ways of looking at it is you know what would my role be in it, I've tried to stay out of it for a very good reason, I didn't want them to see it coming from my side, I wanted them to see it as a professional person from outside coming in and doing it, so I've tried remain on the outside and let the guys work with you but maybe one of the answers there is not having such a distant from it, um, but I suppose also its more ideal for you to work without a staff member there, I think a staff member probably brings a lot more discipline to maybe to attendance, to participation and whatever it is, but at the same time you want the freedom of them speaking out, also I think a lot of the things is, it's quite nice to chat without your coach listening to everything, I mean that's why we have mental coaches.*

programme appeared to provide an opportunity to build on a passion of his, and it was clear that he viewed mental toughness as a vital part of sport in general and cricket in particular.	
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--

**Integrative analytical procedure to identify extra-personal aspects associated with the development and implementation of a mental toughness programme**

The current article aims to analyse the findings of the two research projects detailed in Table 1 with the purpose of addressing the following question:

*What insights can be gained in regard to the extra-personal contributions from the development and implementation of two separate mental toughness programmes, tailored exclusively to the needs of the 1<sup>st</sup> XI and under 15A cricket team members respectively from a high school in the Eastern Cape?*

The two studies presented in Table 1 describe the development and implementation of mental toughness programmes for two school level cricket teams, namely, the under 15A and 1<sup>st</sup> XI teams from the same school in the Eastern Cape. Both studies made use of Action Research frameworks to document the process and, in so doing, contribute to the advancement of theory relating to developing and implementing mental toughness programmes for cricketers. Both programmes relied primarily on Psychological Skills Training (PST), which has been shown to improve mental toughness (Gucciardi et al., 2009b) and the researchers also introduced extra-personal (environmental) factors, in line with the suggestions of Connaughton et al. (2008) and then Bull et al.'s (2005) discussion of a 'winning

environment', which was explained as an environment that is conducive to developing mental toughness and one that athletes need to make a conscious effort at creating. Improving team spirit, team cohesion, and team chemistry influences and is influenced by the motivational climate that contributes to creating a culture that is conducive to winning. Cohesion is very important in the team environment and a lack of cohesion in a team, especially if there is social exclusion, can lead to impairment of self-regulation (Baumeister, DeWall, Ciarocco, & Twenge, 2005). The findings from the two studies presented in Table 1 support the holistic nature of developing and implementing mental toughness programmes for cricketers and highlight the importance of, empowering, extra-personal aspects in developing mental toughness, and the challenges arising when they are less prominent or dis-empowering, thus supporting previous research (Bull et al., 2005; Connaughton et al., 2008; MacNamara et al., 2010). The extra-personal aspects observed influencing the programmes in the two studies reflected the prominence and importance of extra-personal factors, constituted by motivational climate, interactions with others, and experiences in and outside sport, when developing and implementing the mental toughness training programmes for these young cricketers (Connaughton et al., 2008).

Training mental aspects of performance by means of exposure to PST has been shown to help athletes improve their mental toughness (Gucciardi et al., 2009a) and also assists in creating a winning attitude and a winning environment (Bull et al., 2005). In order to develop effective mental toughness, athletes should start with the correct attitude and correct state of mind, that is, intra-personal characteristics that contribute to the development of the mental toughness categories Bull et al. (2005) called Tough Character, Tough Attitude, and Tough Thinking and, in turn, an empowering motivational climate. Attending to extra-personal aspects (motivational climate, motivational issues, interactions with others, and experiences in and outside sport) assist in creating a winning environment, winning culture,

and a cohesive team. This echoes former javelin world record holder Steve Backley's (1996) concept of the 'winning mind', which is indicative of a mindset that maximises opportunities and enables the person to maximise their chances of success; and is remarkably similar to the original definition of mental toughness suggested by Loehr (1986). Carol Dweck (2007) identified an incremental self-theory (or phrased growth mindset for popular consumption) as beneficial in approaching situations where one is always striving to reach optimal performance potential, regardless of the outcome of the competition (Blackwell et al., 2007; Dweck et al., 1995a; Dweck et al., 1995b; Dweck, 2017; Elliott & Dweck, 1988; Levy et al., 1998; Mangels et al., 2006). This would undoubtedly be beneficial before, or at the beginning of, a mental skills training programme or mental toughness programme, in order to maximise the effectiveness of such a programme. It is a focus on learning, always giving one hundred percent, and making use of appropriate or adapted strategies to enhance learning. Dweck's presentation of incremental and entity self-theories (growth and fixed mindsets) is based on her research into implicit theories of self and she called a person who aligns more with an entity theory in certain situations a person with a fixed mindset, and a person who aligns more with an incremental theory in certain situations a person with a growth mindset. People with a growth mindset see intelligence and ability as malleable, believing that they can be learned and improved upon; an idea supported by findings relating to the neuroplasticity of the brain (Demarin, Morovic, & Bene, 2014). Effort and constantly working to evaluate and improve strategies for learning and performance are at the heart of a growth mindset, which could be considered a winning mind, or at the very least, a foundation for the development of one. Combined findings from the two studies in Table 1, suggests a cyclical process in which intra-personal aspects (e.g., PST, mental toughness training, and developing a growth mindset) influence the development of mental toughness and extra-personal aspects conducive to performing, while extra-personal aspects, in turn, influence the person in a

manner that enhances intra-personal aspects and maintains mental toughness and psychological skills.

### **Action Research**

When deciding to make use of an Action Research framework, literature suggested it would allow the researchers to focus on the team and work with group processes and education in order to influence the extra-personal factors, while being flexible enough to allow one-on-one interaction with the participants (McNiff & Whitehead, 2006; Reason & Bradbury, 2008; Reason, 2006). Psychological Skills Training would then need to be tailored to both the team as a whole and the individual members of the team, making use of group work in the education phase (Weinberg & Gould, 2015) and using both group and individual techniques in subsequent phases. Using group settings to address the education phase of PST (Weinberg & Gould, 2015) reduced the time each player was required to commit to the programme and both the use of Action Research and the mental toughness programme improved the cohesion of the team according to those who attended. An Action Research approach proved to be useful because the research method formed part of the intervention in that the group focus required the researchers and the teams to focus on group processes which assist in developing cohesion. The process-orientated focus of Action Research incorporates well with the principles of sport psychology research and maintaining focus in the present moment. It was, however, important to clarify the role and timing of the group activities so that the participants were aware of what they were being asked to do and why. This provided the structure that the participants seemed to require and enabled the clarification of the link between group activity and individual work. A number of authors have identified cohesion (in some form or another) as a component of mental toughness. Fourie and Potgieter (2001) listed “team unity” as one of their mental toughness characteristics, while Thelwell et al.

(2005) referred to 'striving for involvement', which can be closely linked to cohesion and unity, and Gucciardi et al. (2008b) identified "team success" and "team role responsibility" which are also linked to cohesion.

Making use of a group strategy to assess the players' perspectives initially and conduct the education phases of the interventions appeared to be most beneficial to the group of players who attended the sessions regularly. Some of these players identified that team spirit, cohesion and chemistry developed from attending the programme sessions regularly as part of a group more than it would have if the programme was implemented only on an individual basis.

*I think all of us doing this programme together actually helps sort of like spirit and like team chemistry sort of thing, so, I think if all of us did it one by one it wouldn't have been as beneficial as all of us doing it together.*

*Ya I think also as he said, as our individual performances get better through our own mental toughness the whole team comes together and the performances also then grows and gets better and better.*

According to this participant, the improvement of mental toughness assisted in improving their performances, which created more team unity/cohesion, which led to improved team performances. This supports research cited earlier in this paper arguing that PST programmes contributed to the development of empowering motivational climates. The improvement in cohesion, as claimed by this participant, is an important component of an empowering motivational climate, in particular a peer motivational climate. The statement made by the

participant also raises the question of a possible link between individual and team mental toughness through the development of empowering motivational climates.

The sentiments from the two quotes above support the use of Action Research in the development and implementation of a mental toughness programme for these teams as the players who attended regularly believed it was more beneficial learning about mental toughness and mental skills as a group rather than working through the programme as individuals. It would be interesting to research the difference between group and individual approaches because the players in the current studies only experienced the group approach.

There were a number of aspects involving working with the groups in the two studies. To begin with, the researchers conducted Performance Profiles (Butler & Hardy, 1992) with the groups, in which the players in the respective groups, together, decided on the psychological skills they deemed most important to cricket. Thereafter, focus groups were conducted with the groups in which the players had the opportunity to speak about mental toughness and about mental aspects of cricket where they felt they did well and where they felt there were challenges. The individual interviews with the captain and coach provided useful triangulation of data collection that assisted the researchers in validating the data. Once the data from the focus groups had been analysed and information from the Performance Profiles and sport psychology literature had been incorporated, the researchers presented these findings back to the groups to validate the data. The researchers then presented a proposed action plan for the intervention of the programme and the groups of players, along with the coaches and researchers, reached consensus on the precise nature of the interventions. Action Research proved useful as it allowed more collaboration between the researchers and participants. The constant action and reflection allowed the researchers to adapt the programme elements to the participants in the very dynamic school environment. The educational sessions (Weinberg & Gould, 2015) were then conducted with the groups of

players and each educational session was designed to incorporate an educational component that constituted the programme that would allow the players to develop an understanding of the concepts under discussion and an awareness of their role in mental toughness and improved performance (Weinberg & Williams, 2006). The importance of self-awareness in mentally tough athletes has been established in the literature, and a focus of this programme was to develop in the players a more conscious awareness of the psychological processes occurring at various points in their performance (Bull et al., 2005; Connaughton et al., 2007; Gucciardi et al., 2009d). The educational aspect of the programme is important as it creates awareness which allows the person to be open to identifying extra-personal aspects that help or hinder mental toughness. Awareness of the psychological processes one engages in when performing well or poorly improves the ability to self-regulate, which is the ultimate goal of psychological skills training (Vago & Silbersweig, 2012; Weinberg & Gould, 2015). Being aware of when one's performance drops or is dropping is very important as this allows the person to take responsibility for their own performance and implement strategies to rectify the situation. Situational awareness and awareness of the extra-personal aspects that can influence their performance would contribute to players and coaches being able to influence the extra-personal factors in a manner that is conducive to improving mental toughness. The education sessions were, therefore, extra-personal aspects that were internalized to contribute intra-personally to the development of mental toughness. This cyclical process of education, practice, and awareness needs to be sustained after the departure of the researchers, ideally by the coach and the organisation. Action Research is useful in this regard because the reflective nature and cyclical process of the Action Research cycle empowers participants through participation (Reason & Bradbury, 2008). By incorporating an Action Research approach with PST, the researchers hoped that the players would be better equipped to self-regulate

and take responsibility for their future PST and mental toughness development to a greater extent.

### **Psychological Skills Training (PST)**

One of the often-mentioned barriers to teams making use of sport psychologists is that PST takes a lot of extra time and the players already have minimal free time (Weinberg & Gould, 2015). One of the coaches<sup>1</sup> reinforced this belief, which Weinberg and Gould (2015) list as one of the myths of PST, that there is not enough time to train mental skills.

*I mean I've never had the time to do it with the team, maybe on a lot smaller scale, maybe one session a season, if I'm lucky, but I think it's brilliant that it's given them the opportunity to voice their opinions and learn a little bit more.*

PST has been found to enhance performance, which has a strong relationship with cohesion (Weinberg & Gould, 2015), something that most coaches would attest to anecdotally, based on their own observations, if asked about the importance of the mental side of the game and cohesion or team unity. When a coach (as in the quote above), who has a favourable view of PST, believes that a lack of time prevents the training of mental skills, it raises the question as to why and/or how this belief is maintained. One possible reason emanating from the present paper could be the knowledge coaches have about PST and sport psychology.

PST refers to “systematic and consistent practice of mental or psychological skills for the purpose of enhancing performance, increasing enjoyment, or achieving greater sport and physical activity self-satisfaction” (Weinberg & Gould, 2015, p. 248) and has been found to

---

<sup>1</sup> Reference to specific coaches and teams will generally not be made in this paper because the focus is more on the principles as opposed to the comparison between the teams. Where necessary, the level of team concerned will be identified.

be instrumental in developing and maintaining mental toughness (Connaughton et al., 2008; Connaughton, Thelwell, & Hanton, 2011; Gucciardi et al., 2009a; Thelwell, Such, Weston, Such, & Greenlees, 2010). Gucciardi et al. (2009a) previously found two different PST packages to be effective (in equal measures) in improving mental toughness in comparison to a control group that only completed a standard physical training programme. One of the groups in their study attended sessions that covered more general psycho-educational skills and group experiential work that focused on arousal regulation, ideal performance state, self-regulation, mental rehearsal, attentional control, and self-efficacy. The second group in their study also attended psycho-educational skills and experiential group sessions, but these were focused more on key mental toughness characteristics identified by Gucciardi, Gordon, and Dimmock (2008b) and covered personal and team values, work ethic, tough attitude, self-motivation, self-belief, concentration and focus, resilience, emotional intelligence, sport intelligence, and physical toughness.

Training psychological skills involves influencing an intra-personal aspect that is focused on the individual in that it helps an individual improve their performance, with the ultimate goal of PST being self-regulation (Weinberg & Gould, 2015). In order for this to occur, it is important to encourage self-awareness in the participants and the link between self-awareness and self-belief, one of the most important and consistently identified components of mental toughness, is one that has come up repeatedly in the literature (Bull et al., 2005; Gucciardi et al., 2009b). Creating awareness was an important part of both programmes and, after one of the exercises early in the programme, a participant commented, *“I’ve heard about this strong power of the mind stuff sir, but I’ve never believed it till then”*, highlighting the awareness that was emerging. This is an important point because many cricketers (and sports people in general) believe that people are born with a skill or mental toughness and one either possesses the ability or not. This perspective resonates with

Dweck's entity self-theory (fixed mindset) and this is why it is important to start an intervention by encouraging participants to use incremental self-theory (growth mindset) orientated, understanding that the brain can grow and create new pathways through neuroplasticity (Chambers, 2010; Demarin et al., 2014; Fuchs & Flügge, 2014).

The mental toughness programmes in the two studies discussed in this paper covered very similar psycho-educational skills. Both started with a focus on PST and creating awareness, then continued on to confidence and self-belief, communication, and concentration. While the programme with the under 15A team formally included motivation and the programme with the 1<sup>st</sup> XI formally included visualisation, positive self-talk, decision-making and goal orientation, both covered all of these in one form or another.

The participants believed that the mental toughness programme led to them learning to “*manage their own space*” and become more responsible and self-regulated in regard to their own performances. The participants felt that this led to an increase in the individual performances, which ultimately resulted in an increase of the value and worth of the team's overall performance potential. This increased value seemed to improve faith in the team's ability which could ultimately result in an increased self-belief which would have positive ripple effects of its own, like contributing to developing cohesion which, in turn, would contribute to the development of a positive motivational climate. The abovementioned aspects were captured by means of the quote presented below.

*Ya I feel like now everyone now can manage their own space which makes it easier for the big decision makers in the side to make crucial decision at the right time so that they don't have to be thinking for everyone else. So like the captain will know that if he puts you in a position and you are always concentrating and stuff and you are aware of what's happening and what the plan is all the time, and I think doing it*

*as a group we all know, uh so I'll know, where all my other team mates are on a mental level, stuff like that, so I think it's definitely helped.*

These improvements in self-regulation that were identified by participants mean that the captain of the team does not need to spend as much time focusing on what other players are doing and can use that energy to focus on the game and his own performance. One might argue that, for these players, this development of intra-personal mental skills has led to the enhancement of extra-personal group functions, like role clarity, trust, cohesion, and, therefore, motivational climate. Another quote from one of the participants reinforced the idea that the mental toughness programme improved intra-personal aspects like concentration, self-regulation and a greater sense of responsibility, while also improving extra-personal aspects closely linked to motivational climate, motivational issues, and social support.

*Ya, like I'm more aware of like my surroundings and also quite focused on the job that I am meant to be doing, like I still try and get involved in what's happening on the outside, like with your team mates and stuff, and also while focusing in on your part of the deal.*

The improvements in self-awareness and self-regulation were also noticeable to those involved, identifying that the difference could be seen between those team members attending and not attending the sessions. It would be important to encourage the team members who did not attend regularly to become more involved, because as the enhanced cohesion improves self-awareness and self-regulation, social exclusion impairs self-regulation (Baumeister et al., 2005).

*You can see the guys who have been going to the mental training from the guys who haven't been going, like there's a big difference in team mates.*

*The guys who have been going like, they have just got a bit more on the guys that haven't been coming.*

These sentiments are also evident in the participants' comments about the benefits of the programme in terms of the skills they developed and on their performance.

*I think I think more on the field, not necessarily batting but like fielding I like just think more for the whole team sort of thing.*

*Probably become more disciplined on the cricket field, like being able to leave balls alone instead of just going at them or something.*

From the two excerpts above, it can be seen that these participants felt the programme helped improve their decision-making, awareness, self-regulation, and consideration for the team. Participants also felt that the programme benefitted their resilience and their ability to take responsibility for their own performance.

*Um, I feel like it's definitely helped me getting out of slumps, like I've recently been through quite a form dip, I scored three ducks in a row and like I've come back and scored three fifties in a row straight after that. ... three fifties in a row, just from*

*working the problem out in my head instead of finding a technical error or something, just telling myself.*

The development of these skills and the positive improvements that result from improving performance and taking more responsibility for their own and the team's success may lead to constructive interactions with fellow team mates, character building experiences while being members on the team, and to an empowering motivational climate. Connaughton et al.'s (2008) finding that the reported underlying mechanisms of mental toughness are related to characteristics associated with motivational climate, interactions with individuals, and experiences in and outside sport, which include psychological skills and strategies, and an insatiable desire and internalized motives to succeed. Psychological Skills Training improves mental toughness, which has been reported to have a relationship with motivational issues and motivational climate. Analysis of the data from the two mental toughness programmes conducted with the under 15A and 1<sup>st</sup> XI cricket teams revealed results in line with the findings of Bull et al. (2005) and Connaughton et al. (2008), in that the influence of the coach and social support are important extra-personal characteristics that play a role in the successful implementation of the mental toughness programme. In order to benefit the most from psychological interventions such as this mental toughness programme, the right attitude needs to be adopted by the players. A growth mindset and a *winning mind* need to be encouraged and the most effective environment for fostering a positive, strong and resilient mental athlete needs to be developed and cultivated. The winning mind and winning environment are inextricably linked.

### **Extra-personal factors involving the coach and social support**

The discussion and the quotes cited in the preceding section regarding the role and importance of PST in the development of mental toughness reinforced the research findings from the literature that developing mental toughness is a long-term process (Connaughton et al., 2008; Csikszentmihalyi et al., 1997; Gould et al., 2002). In their research on developing mental toughness, Connaughton et al. (2008) argued that the mechanisms that operated together to develop mental toughness were related to characteristics associated with motivational climate (such as enjoyment, mastery, autonomy and competence), interactions with individuals (such as coaches, parents, friends, family, senior athletes, sport psychologists and team mates), experiences in and outside sport, psychological skills and strategies, and the desire and internalised motives to succeed.

Many of the quotes of the players and coaches in the previous PST section highlight the importance of interactions with individuals, especially the coach, and motivational issues and motivational climate as integral extra-personal factors in the development of mental toughness (Ames, 1992). Motivational climate can be considered to be the situational goal structure of the team environment that is created by interactions with significant others such as coaches, peers and parents. Coaches are very important in the process of developing mental toughness as they play a critical role in the way they influence the experiences of the youth with whom they interact (Connaughton et al., 2008; Greendorfer, 2002; Williams & Krane, 2015). Through their behaviour, leadership, and communication, coaches model the behaviour and motivational climate to which they ascribe and this will inevitably influence the players on their teams and often result in these players adopting the same attitudes (Alvarez, Balaguer, Castillo, & Duda, 2012). Alemayehu, Mengistu, and Beker (2016) conducted research with 163 players and 21 coaches from South East Ethiopian National league football clubs and found the leadership behaviour of coaches to have a statistically

significant and positive relationship with the motivational climate of teams and that coaches exhibited higher training and instruction and democratic behaviour.

Motivational climate is usually explained as being either task-involving or ego-involving. A task-involving climate involves self-referenced criteria for success, in which evaluations are made based on effort and individual improvement. An ego-involving motivational climate emphasises normative ability to define success and failure with social comparison providing the basis for evaluating achievement (Chi & Duda, 1995; Duda & Whitehead, 1998). Ewaldz (2016) highlights that task-involving motivational climates created by coaches have been linked to more adaptive achievement patterns and more positive cognitive and emotional states (Duda & Balaguer, 2007), for example, greater enjoyment, sport satisfaction and positive affect (Carpenter & Morgan, 1999; Ntoumanis & Biddle, 1999; Seifriz, Duda, & Likang, 1992; Treasure, 1993; Vazou, Ntoumanis, & Duda, 2005; Walling, Duda, & Chi, 1993), higher self-reports of performance and improvement (Balaguer, Duda, & Crespo, 1999), increased use of adaptive coping strategies (i.e., problem-solving) (Kim, Duda, & Gano-Overway, 2011), a belief that success is obtained mostly through effort (Seifriz et al., 1992; Treasure, 1993), higher perceptions of competence (Reinboth, Duda, & Ntoumanis, 2004), a lower probability of burnout (Duda, Balaguer, Moreno, & Crespo, 2001), and an increased collective efficacy (Kao & Watson, 2014). Ego-involving coach-created motivational climates have generally been found to result in more negative or maladaptive outcomes, such as, experiencing greater amounts of conflict with peers (Ommundsen, Roberts, Lemyre, & Miller, 2005), perceiving one's ability as a reference to others' ability (Boixados, Cruz, Torregrosa, & Valiente, 2004), and links to higher reported anxiety, specifically, performance-related anxiety (Ntoumanis & Biddle, 1999; Papaionannou & Kouli, 1999; Pensgaard & Roberts, 2002; Walling et al., 1993).

The mental toughness programmes implemented with the two teams focused on developing task-involving motivational climates, as explained above, which involves self-referenced criteria for success, in which evaluations are made based on effort and individual improvement. The link between a task-involving motivational climate and mental toughness is interesting and raises an important question about the widely accepted definition of mental toughness developed by Jones (2002, p. 213), which alludes heavily to an ego-involving understanding of mental toughness when it states that

mental toughness is having the natural or developed psychological edge that enables you to:

- Generally, cope better than your opponents with the many demands (competition, training, lifestyle) that sport places on a performer.
- Specifically, be more consistent and better than your opponents in remaining determined, focused, confident, and in control under pressure.

The parts of the definition above referring to ego-involvement are “... *psychological edge ... cope better than your opponents ... be more consistent and better than your opponents ...*”. A useful definition of mental toughness would rather have a task-involving focus than an ego-involving focus.

Both studies considered by the current research paper focused on Action Research and making use of PST with the teams and individuals, and they also both acknowledged the importance of extra-personal factors (or environmental as previously explained) in the development of mental toughness. The mentor system was designed to assist the players in terms of social support, in which players from both teams were tasked with working together in pairs, with the respective 1<sup>st</sup> XI team member being the mentor to an under 15A team

member. The inclusion of the mentor system in the two programmes would, theoretically, have enhanced social support and interaction with others.

The second extra-personal aspect drawn from both programmes related to the influence of the coach. The researchers discussed with the coaches before and at the start of the research the importance of the role of the coach in developing mental toughness and both coaches were very supportive of the research and their players' participating in the mental toughness programme, with both coaches verbalising their interest of and belief in the importance of the mental component of cricket. The relationship between the researcher and coach was discussed as one of collaboration in which both parties would work together to enhance PST and environmental aspects (which were discussed between both sets of researchers and coaches as encompassing issues around motivational climate and social support). With the exception of the first focus group with each team, in which the coaches were requested not to participate (initiated by the team members and researchers), the coaches were invited to participate in all aspects of the programmes and were provided with information throughout the duration of the programmes. Coaches were both interviewed individually, with the focus on the players in their teams, and results were compared to focus group results. The coaches were also requested to assist in arranging venues at the school and facilitate the scheduling of the sessions based on the availability of the participants as they mostly under the age of 18. The role of the coach in the development of the players' mental toughness is critical (Connaughton et al., 2008) and the researchers, in their initial interviews with the coaches, began the process of providing them with access to skills to help identify and develop mental toughness after the conclusion of the intervention.

Once the programmes had commenced, the researchers focused more on optimising the research sessions, in which they educated the players on material covered in each of the sessions, thereby influencing the motivational climate of the players and interaction with

others. Participant attendance at the sessions was very erratic with players in both teams finding it difficult to meet commitments they had made, explaining their busy schedules as the cause. In an example of issues experienced by both researchers, the members of the first team found it particularly challenging to attend regularly and the researcher struggled to set up sessions with the players, with sessions that were set up often being cancelled because too many players indicated, shortly before a session, that they could not attend. There was not one instance where the entire group of 12 1<sup>st</sup> XI players could attend a session, although the same core group of eight players attended every session, which raises a question about commitment to the programme of some, rather than the sole reason for lack of attendance resulting from time schedules. The lack of attendance of some of the players had an impact on those who attended as is evident in the excerpt below.

*Well I didn't enjoy that the whole team wasn't around, I think that if the whole team was around it would have been more beneficial, especially if we could get everyone to do it.*

The players who attended regularly discussed the difference in performance during and after the programme, between those attending regularly and those who did not, commenting on the visible difference in levels of performance,

*You can see the guys who have been going to the mental training from the guys who haven't been going, like there's a big difference in team mates.*

*The guys who have been going like, they have just got a bit more on the guys that haven't been coming.*

There was a sense of disappointment from the players who attended regularly and experienced the benefits of attending the programme on their performance and cohesion as they could see the difference between them and those who did not attend. One participant commented that in order to benefit highly from programmes such as this, the players need to arrive in the right mind frame with a desire to improve their mental toughness. This echoes the importance of Bull et al.'s (2005) suggestion of adopting the right attitude, creating the right mindset, a winning mind and ensuring a competitive and winning environment is fostered for mental training. Dweck's (2007) concept of incremental self-theories (growth mindsets) is relevant as players need to approach the situation with a eagerness to learn and improve, and an attitude that something challenging is enjoyable because it will help the neural pathways develop. Developing growth mindsets should start at a very young age and parents, caregivers, teachers, and coaches should encourage the development of true growth mindsets, first in themselves and then in children with whom they interact. The participant's comment below further suggests that a lack of enthusiasm may have played a role in the attendance of the sessions,

*Uh, just not getting together obviously as a team and then some people, if you don't buy into this then it will never work, you have to like, fully buy into this and then you will realise the benefits. If you think it a stupid or some silly thing then it won't help you.*

While there were eight regular attendees, enthusiasm was an issue that affected the majority of the participants. The coach also identified the lack of enthusiasm as a challenge in the implementation of the programme when discussing potential weaknesses in the programme

and further stated that this may have been partly the reason behind the lower than expected participation levels.

*I think just, the weaknesses I don't think I know enough from your side to even pin point any weaknesses. I'd say the weaknesses have been on getting the guys together, um, maybe from their side as well, um, enthusiasm and going through the course and realising what value it probably would have added so maybe an explanation of that, as you said if it was a case of next year, it would be very easy now to know all that.*

*I think from, just chatting to some of the guys, the matric boys, were probably not as enthusiastic about it, um, simply because you know maybe it's their last year, um, but I mean I find the same thing with practices or whatever it is, the guys wanna move on the sooner the better therefore when you add something to their schedule they not going to be jumping up and down.*

When asked what the facilitators could have done to facilitate an improvement in the participation of the players, the coach said

*I don't think it's on a case of that side I think it's a case of us formalising a time better, I think we have relied on when okes [guys] are available and I think that hasn't been ideal for yourselves, more probably for yourselves than us really, but it might have been a case of, you know talking about time tables, scheduled a time whenever it is and the guys will be available on that time to see you once a week for an hour and nothing else interferes with that, would have been, whether it's a*

*problem at a school like this whether that's a possibility I don't know because the guys are so busy with different things but I think that would have been the right way to go, um because I think they would have learnt more I suppose.*

The involvement of the coach is vitally important in the development of mental toughness programmes, as the coach is one of the primary influencers of extra-personal factors contributing to mental toughness. It was clear from the current research projects that extra-personal factors, especially coach influence and social support, contributed to the process of implementing mental toughness programmes, a finding that supported previous research literature (Alvarez et al., 2012; Bull et al., 2005; Connaughton et al., 2008; Gucciardi, Gordon, Dimmock, & Mallett, 2009; Gucciardi et al., 2009a; Gucciardi et al., 2009b; Thelwell et al., 2010). While discussing the challenges in player attendance and participation with the 1<sup>st</sup> XI coach, he mentioned his involvement as a consideration point.

*Um, I suppose, we probably covered those already I suppose but just to add those maybe, one of the ways of looking at it is you know what would my role be in it, I've tried to stay out of it for a very good reason, I didn't want them to see it coming from my side, I wanted them to see it as a professional person from outside coming in and doing it, so I've tried remain on the outside and let the guys work with you but maybe one of the answers there is not having such a distant from it, um, but I suppose also its more ideal for you to work without a staff member there, I think a staff member probably brings a lot more discipline to maybe to attendance, to to participation and whatever it is, but at the same time you want the freedom of them speaking out, also I think a lot of the things is, it's quite nice to chat without your coach listening to everything, I mean that's why we have mental coaches.*

This quote from the coach raises an interesting point in regard to expectations and role definitions because the researchers and the coach clearly had differing perspectives on the role he should play. It also raises communication as vitally important as the researcher became frustrated with the lack of participation from the coach but did not address this with the coach while the programme was being implemented. Before the research project commenced, during the initial phases, and during the first interviews with both coaches, the researchers discussed the role of the coach and how important it was for the coach to be involved. While the coaches had indicated they had knowledge of sport psychology, in addition to their interest, the researchers did not make it explicitly clear what they wanted from the coach in terms of their involvement, merely that it was important for the coaches to be involved. The under 15A coach attended some of the programme sessions and was involved and displayed interest throughout the programme, while the 1<sup>st</sup> XI coach did not attend any of the sessions and seemed disinterested in and withdrawn from the programme. This may have influenced the enthusiasm and commitment from the players in each of the teams, because the under 15A team members participated more and with more enthusiasm than did the 1<sup>st</sup> XI team members. It is very important for the coach to be seen as being involved and taking an active role. If a coach is reluctant to get involved, the players may interpret the mental toughness programme as not being important or that the coach, who is a role model for the athletes, does not support the programme. The final interview with the 1<sup>st</sup> XI coach revealed his reason for the perceived disinterest, which appeared to be based on incorrect assumptions about sport psychology and the belief that it would assist the researchers if he “*kept out of their way*”. This could suggest a lack of knowledge about sport psychology and the coach did, in fact, remark that he wondered about himself, “*what would my role be in it*”, which suggests he was not sure of his role and could also have influenced

his decision to minimise his role in the programme. The coach's view expressed in the quote above also reveals that he saw the role of the psychologist as similar to the role of a therapist which contributed to the challenges faced in the current research projects. He commented that, "*it's quite nice to chat without your coach listening to everything, I mean that's why we have mental coaches*". While a sport psychology professional can perform counselling if they are qualified and registered, and it is also important for any psychological researcher to respect the privacy of anything shared in confidence, the role of the researchers was that of assisting the team improve their mental toughness through psycho-educational training. The distinction between the role of the researchers in this project and that of a therapist was discussed with the coaches and then again with the participants but it seems beliefs and stereotypes that emerge when the term "psychology" enters the situation are very powerful. There is a need to educate coaches, sports people, and the public in general on the role of the sport psychologist or sport psychology professional, so that a better environment can be created where the coach and sport psychology professional can complement one another.

It is also important that the coach experiences what the athletes learn during the programme so that they are aware of what has been done in the programme, how the players responded, and are themselves educated about sport psychology and empowered to assist the players in focusing on learning mental skills. Presently in South Africa, sports people, coaches and administrators have not embraced sport psychology as much as other top sporting nations. Ideally, a sport psychology professional should be with the team on a full-time basis but the reality of the situation is that most teams cannot afford to hire someone on a full-time basis, so the responsibility generally rests with the coach to satisfy all the different roles. From the start of the intervention the coach of the under 15A team had demonstrated that he viewed addressing mental aspects of sport as integral to a coaching approach, something that was a strong factor in facilitating buy in to the programme as well as a

productive working relationship. In assisting this coach in developing his existing understanding of sport psychology, and mental toughness particularly, he commented that the intervention provided an opportunity to formalise his framework of knowledge, saying *“it’s something I’ve done more informally, but really something I’m going to start doing more formally”*, and provided access to a structured approach to developing mental toughness.

Rouda and Kusy (1995) state that a crucial element for the successful implementation of any organisational development process is that support is obtained by top management for this type of intervention. Although Rouda and Kusy (1995) were referring to a corporate context in this regard the consideration applies to this context too, because a team in sport *is* an organisation of people and the team usually functions within a broader organisation, such a school, club, university, or other body. They also state that management (in this case the coach) must be involved intricately in the intervention process so that, after the separation phase of the ODP model, the effects of the intervention can still be seen and future interventions and programmes can be implemented. There needs to be complete commitment, ownership and involvement by all the stakeholders in order to ensure a successful intervention, something that influences and is influenced by the organisational culture within the team, coaching structures, and broader organisation. The findings presented here suggest that these considerations were lacking to some extent within this research process and contributed to some of the challenges experienced. Future programme facilitators must ensure that management and/or the coach are committed and that there is a positive, determined, loyal, and collaborative attitude and mental approach associated with the intervention. These are all aspects that speak to organisational culture. Researchers or consultants need to contract with stakeholders before the beginning of the intervention and all parties must have a clear understanding of other stakeholders’ expectations and roles. The process of working with a team is somewhat similar to the Organisation Development (OD) process. When

conducting OD, negotiating entry and contracting are very important as they constitute the initial activities of the OD process by setting parameters, allowing for a good decision to be made whether to proceed, and allowing both client and practitioner to clarify expectations (Cummings & Worley, 2015; McLean, 2006)

Research on mental toughness emphasises the importance of the right motivational climate and motivational issues for the development of mental toughness, especially in youth athletes (Crust, 2008). The coach is considered the most influential significant other in terms of the sporting experience of athletes (Alemayehu et al., 2016; Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010; Hodge et al., 2014; Weinberg & Williams, 2006; Williams & Krane, 2015) and the extra-personal characteristics created and modelled by the coach constitute the climate within which the team members both perform and learn from the interpersonal interactions with their coach and peers. Young cricketers at school level will often model their understanding of motivational climate from the example they are set by their coaches. If a coach verbalises his or her approval of mental toughness programmes or PST and then does not reinforce this behaviourally, their team members will often follow suit. Motivational climate and motivational issues are closely linked to the organisational culture and will be drawn from and will contribute to the organisational culture of the team and the broader organisation. Organisational culture has been described as “the pattern of values, norms, beliefs, attitudes and assumptions that may not have been articulated but shape the ways in which people in organisations behave and things get done” (Armstrong & Taylor, 2014, p. 120). The cultural values in an organisation are the collective beliefs, feelings, and assumptions about what is normal, good, and valuable in an organisation (Schein, 2010). Schein further explains that the elements of organisational culture are artefacts (stories, legends, rituals, ceremonies, language, physical structures, décor), shared values (conscious beliefs, evaluations of what is good or bad, right or wrong), and shared assumptions

(unconscious, taken-for-granted perceptions or beliefs, mental models of ideals). Artefacts are visible aspects of culture and shared values and shared assumptions are invisible aspects (Schein, 2010). In order to positively influence the extra-personal characteristics and developmental toughness, it would be useful for a sport psychology researcher or consultant to have an understanding of the motivational climate, motivational issues, and organisational culture within the team and the broader organisation. Introducing elements of motivational climate relating to task-involvement and intervening in elements to improve cohesion, self-regulation, awareness, and PST will be useful in improving mental toughness over the short-term. Long-term improvement would require interventions in organisational culture that would sustain the elements identified in this research around extra-personal aspects such motivational climate, motivational issues, and interactions with others, in conjunction with intra-personal approaches to educate and improve psychological functioning. The New Zealand “All Blacks” rugby team is a good example of this, because they consciously spend time working on improving life skills and developing character, using the term “Better people make better All Blacks” (Hodge et al., 2014). This approach has been reported to improve on-field performance. Culture is learned and influences motivational climate and motivational issues, while these, in turn, contribute to the learning and development of culture. This two-way relationship is one that takes time (Connaughton et al., 2008; Gould et al., 2002) to develop, requiring motivational climate to be positive and empowering over time to develop a positive and empowering culture.

The current research project on mental toughness has highlighted the importance of extra-personal factors and particularly the role of social support networks in building the mental toughness of individuals (Connaughton et al., 2008). The majority of these participants were living away from home during term time, and in all likelihood missing the social support they might receive from family if they were living at home. Most were

boarders at the school and a few were living with parents in Grahamstown. While the teachers at this school do provide their students with a lot of support, it is questionable how much they get from team mates, when the norm for young males is to “rag and ridicule” one another. The mentor system was designed to address the role of environment - particularly social factors - in the development of mental toughness (Connaughton et al., 2008; Bull et al., 2005). Each under 15A player was paired with a 1<sup>st</sup> XI player who would act as their mentor for the duration of the programme. They were asked to meet on a weekly basis so that the player and mentor could use short sessions (under 30 minutes) to combine a physical training session (a net, or throw downs, or fielding practice) with the psychological skills they were learning in the mental toughness programme. The integration of the mental toughness training and physical training is particularly important to improve the effectiveness of a programme (Weinberg & Williams, 2006). The mentor system was initially designed to provide an opportunity for both 1<sup>st</sup> XI and under 15 players to implement the knowledge gained from their respective mental toughness programmes. Its main aims were to integrate practical application with theory, while also developing the factors of social support, vicarious learning, and modelling of superior athletes, all outlined in the literature. The system had however, relied on the simultaneous implementation of both under 15A and 1<sup>st</sup> XI programmes. The same contextual factors that had impacted on the players in the implementation of this programme were exaggerated and multiplied in the lives of the 1<sup>st</sup> XI players and resulted in the mentors having little time or inclination to participate in the mentor system in the programme. In the focus group with the under 15A participants, these factors emerged clearly in comments like, “*my mentor had an injury*”, “*my mentor was always busy sir, and we had too much sport on*”, and “*my mentor had a girlfriend sir*”. Importantly however, the few instances where mentors and players managed to get together (two under 15A players with their 1<sup>st</sup> XI mentors, six sessions in total) were very well

received, as both under 15A players described the mentor sessions as positive experiences and as something with which they would continue. The one participant who had sessions with his mentor commented that

*Obviously they have a wider cricket knowledge cos they're more experienced and like my mentor, R\*, he helped me at stuff that I was doing wrong, and he points them out and stuff, so I think in a way it did help sir, and yeah it helped quite a lot.*

and the other participant who had sessions with his mentor said

*I think so sir because like they can help you sir, you know they're like a coach that's not there, all the time, if you know what I'm saying sir.*

Similarly to the finding about expectations and roles when discussing the role of the coach, it seems the mentor system could have benefitted from more structure and formalisation.

Mentoring is a skill that needs to be learned and future programmes could consider having the researcher/consultant and the coach present (at least early on in the mentor system) to guide and educate the participants on how to develop the mentor relationship.

### **Extra-personal factors involving knowledge of sport psychology and timing of the programmes**

In both studies, during the final focus groups and interviews, the researchers questioned the participants on the aspects of the programmes they felt were positive and negative. During these discussions, the players commented on how busy they were while the programmes were being implemented. One participant said, *"I think time was a huge factor because we are*

*busy people sir, and you know, we don't have times to do these things*". The coach of the 1<sup>st</sup> XI also made reference to the busy schedules the players experienced and how this affected the structure and implementation of the mental toughness sessions, explaining that *"the kids are so hell of a busy, that it's almost impossible to find a time when all eleven, twelve of them, are free at the same time, so you weren't consistently getting the same guys, but I think we got around it as best we could"*. The under 15A programme continued with minimal delays but the 1<sup>st</sup> XI programme was significantly delayed because of the many postponed sessions. The end of the year is a very demanding time for school learners in South Africa, especially those who compete at a first team level, and these learners are generally in senior grades. At the time of programme implementation these learners had a busier than normal schedule, completing end-of-year assignments and preparing for their final year examinations. The increased workload and stress may have influenced their ability and enthusiasm to attend to the learning required in the mental toughness programmes. While discussing their busy schedules, the issue of lack of enthusiasm that was discussed previously emerged when the players described a lack of motivation to dedicate extra effort beyond the sessions themselves, *"I'd be lazy too, after a long day I'd go back to hostel and I'd sleep"*. This evidence of a lack of enthusiasm influenced how the players approached the programme and players only started to experience a change in their attitude to the programme once they saw what they interpreted to be evidence that the programme was working and helping them. One of the participants commented in the final focus group, when discussing alternative times for the implementation of the programme, that *"maybe having it pre-season it wouldn't take effect to us in the normal everyday life, like on Saturday we realized, 311, we haven't made that much last season, maybe it's affected us"*. They did not necessarily believe the programme had affected them until they scored 311 runs in a 50-over cricket match

(something they had never done before) against their arch-rivals, against whom they traditionally did not perform well.

The players and coach expressed similar views around dealing with some of the challenges experienced in the programme, arguing that they believed these could be addressed by implementing the intervention during the school's cricket season. They believed that this would allow the use of a stable programme structure that integrated competitive application and did not require the players to find time between numerous other commitments. One of the players explained that *“you caught us at the wrong time a little bit because we were just finishing our rugby season, and I don't think anyone's mind had really shifted to cricket yet”*. The coach emphasised this point often, as he describes here, *“we started in the middle of rugby season, so cricket was probably the furthest thing from their mind”*.

This discussion led into the participants and the researchers discussing the timing of the programme and one of the player stating the following

*Well I think with all the sessions it would've been better if we had the sessions during our actual cricket season, so we could have a session and then like a match on Saturday, then another session the next week, then a match on the Saturday, cos I think like, we did pretty well against [competing school], but it's quite hard to implement all the different points here into one game, so it would be easier if it was spread out.*

PST literature suggests that PST programmes should run in the off-season to allow the players to learn and then practice the skills before going into a competitive situation (Weinberg & Gould, 2015). The Practice phase is the 3<sup>rd</sup> in the three phases of PST (after Education and Acquisition) that Weinberg and Gould (2015, p. 257) discuss and they argue that there are three primary objectives to this phase, namely, automating skills through

overlearning, teaching the systematic integration of psychological skills, and “to simulate skills people will want to apply in actual competition”. The participant raised a good suggestion in the quote above, which was supported by the rest of the group, as it is very important to incorporate the theoretical and practical aspects to improve learning and help the players develop the skills, so that they are more relevant to the practical and competitive situations. While the principle raised in the suggestion that theoretical and practical skills be more closely aligned is a very good one, it does raise the question whether the educational aspect about the psychological skills and how the skills develop was fully grasped by the participants, because they would need time to practice and enhance these mental skills before applying them into a competitive situation. Much like physical skills, if a person newly learns a range of psychological skills and applies them to a competitive situation before having practiced them sufficiently, they run the risk of confusing them and then performing much more poorly (McInerney, 2014). This could lead to the person, team, and/or coach developing negative attitudes towards PST in their sport. The participants seemed to suggest wanting to learn the skills during the week and then apply it to a match situation on the weekend. This speaks to the instant gratification so prevalent in society and the message researchers and consultants need to communicate is that these skills take time and need to be practiced first. To alleviate this tendency, it is suggested that PST and mental toughness programmes begin with the researcher/consultant educating the team and coach on incremental implicit theories of self, or as Dweck (2007) termed it for popular consumption, growth mindsets. Players and coaches should be encouraged to adopt an incremental theory of self, they would focus more of sustained effort and adaptive strategies for learning and on the process of learning.

The participants (coaches and players) believed that altering when the intervention was implemented would address the issue of fragmented structure, while simultaneously providing the players with the vital integration of mental/physical training and

theory/practical work, that has been highlighted in PST and mental toughness literature (Gucciardi et al., 2009a; Gucciardi et al., 2009b; Vealey, 2007). The programmes were implemented before the start of the cricket season and the players struggled to make the connections between the issues addressed by the programme and their practical experience, even though the programme sessions for both groups involved both theoretical and practical applications. Participants were also required to practice the skills learned in the sessions and the comment one of the participants made about being too tired at the end of the day and choosing to sleep rather than practice mental skills may have played a role in their enthusiasm towards the programme. The participants were also left to practice the skills on their own time but they were involved with the rugby season, which impacted on their ability to focus more on the programme and cricket. It would have been more beneficial for them if the researchers could spend time with them practicing the skills for some weeks after each skill is learned. Incorporating the theoretical and practical sessions so that players can clearly see the connections between the two is very important and is an extra-personal factor not controlled in the two studies. Future mental toughness programmes should formalise this into the design of the programme and include the researcher/consultant in a similar manner to a personal trainer working with a client. Researchers/consultants and participants/clients need to collaborate with one another to find ways to incorporate the practising of the mental skills into their normal physical practice routines, so that players and coaches do not see it as an extra burden on their already limited time.

The timing of the programme was an extra-personal factor that appeared to be a hindrance to creating a climate for the participants to maximize motivation and participation. The programme was designed to be implemented in the second half of the year, before the cricket season began, to allow the programme to be facilitated during the participants' off season, so that there would be enough time for the participants to progress through the

Education, Acquisition, and Practice phases of PST (Weinberg & Gould, 2015) in preparation for the start of the cricket season. In a school environment, and in this boarding school specifically, there is not really an off-season as there is in professional sport. When one season ends, the next one starts and the learners merely change sporting codes. Most schools in this area require learners to play at least one Summer season and one Winter season sport, which means learners are involved in sport throughout the year (cricket is a Summer season sport, taking place in the latter and early parts of the calendar year). In this particular school, many learners are involved in more than two sporting codes and are also extensively involved in extra-mural activities. Some of the players in the final focus group made an argument for starting the programme in the pre-season, or at the beginning of the year, to improve the ability of the learners to attend to the demands the programme place on them.

*I think like bringing it back to the point of if we started early in the year we wouldn't have to sort of cram into these times like especially now we've had, like we moving into exams and stuff so it has been quite difficult on us but I think if we had stretched it out over the whole year, sort of a pre-season thing, during season, it would be a whole lot better because then we could afford to miss out some stuff, so I think our schedules in general is a bit of a problem.*

*I didn't like that it started like late in the year, if we could have started like early January like when we came here it could have been more effective.*

*Because it kind of like started in the middle of the year, it was more like, you know.*

*Just the timing, I think if we could do it like pre-season then we could work on, like practice those skills before and then implement them and then go out and see how your performances get better.*

These players believed that greater success could have been achieved if the programme ran at the beginning of the year as the athletes were suggesting. There are some considerations that support implementing the programme at the beginning of the year as the participants suggested. First, school learners generally start off commitments much better than they finish them and implementing the programme at the beginning of the year could have benefitted the programme and the learners in that they may have had extra energy and possibly greater levels of concentration, determination and enthusiasm. Second, the beginning of the year is generally more relaxed for the learners and they have fewer commitments, which may result in a less stressful experience as compared to the end of the year. The cricket season would also be starting again after a long break and participants would be looking forward to the season ahead and be motivated to work harder to be selected for the teams. In the current research studies, the participants were nearing the end of the year and, for some, the end of their school career. The findings in this analysis of the extra-personal factors influencing the development and implementation of mental toughness programmes lends credence to the work of Gucciardi and his colleagues (Gucciardi et al., 2009), who identified the need to investigate the use of periodisation principles, that cycle the mental skills sessions with physical training. This would be especially important when working with young cricketers who cannot absorb large amounts of information in a relatively brief time period.

Linked to the consideration of time availability and timing as extra-personal factors influencing mental toughness programmes, is the level of knowledge people have about sport psychology. Weinberg and Gould (2015) argue that PST is often neglected because of a perceived lack of time, lack of knowledge on the part of the coach or players, and/or

misunderstandings about psychological skills, believing they are innate and cannot be taught. Two of these three were identified in the two projects discussed in this paper, namely, perceived lack of time and lack of knowledge.

The participants referred to their busy schedules and lack of time as reasons for not being able to participate completely in the respective programmes and these appeared to be closely linked to their attitude toward sport psychology as was discussed earlier in regard to the lack of enthusiasm shown by the participants. One of the participants commented that

*I think time was a huge factor because we are busy people sir, and you know, we don't have times to do these things.*

This sentiment was echoed by one of the coaches who noted the challenge of finding time to work on mental skills

*I mean I've never had the time to do it with the team, maybe on a lot smaller scale, maybe one session a season, if I'm lucky, but I think it's brilliant that it's given them the opportunity to voice their opinions and learn a little bit more.*

Consideration of how often players and coaches respond to questions after a game and assign reasons for poor performance that refer to aspects such as concentration, confidence, or some other mental aspect, raises the question of why coaches do not incorporate PST into their training. Based on Weinberg and Gould's (2015) summary of the research findings, it would suggest that lack of knowledge about sport psychology and implementing PST would be a major factor. However, both coaches had identified a number of mental aspects hindering their team's performance in the first interviews

conducted with them in the two projects and both indicated that they believed that both the mental side of sport and sport psychology were very important and that they possessed knowledge of sport psychology. In one of the post programme interviews a coach said

*... and because I have an interest in it, I've done quite a lot of reading into the subject so a lot of the stuff I was aware of already.*

Another comment made by a coach acknowledged that school sport does not take sport psychology seriously enough and that the mental aspect is very important.

*Absolutely, um, I think it's as you've pointed out it's probably one of the aspects we don't take seriously enough at school sports and is something I fully believe in a lot, um, and not in as much depth as you've done it but I think it's crucial that the boys do these kind of courses, if you look at any good school they going to get good coaching and when I think when the guys get to international level at under 19 or at open, at first class cricket level, they all on par, I mean all their abilities are equally good, so what's the difference then between the players. It's the players that can perform on the day, perform under pressure, um, and have the mental aspect besides the physical abilities.*

Given these assertions the importance of mental aspects and their interest in them, it is interesting to note the comment made by the coach above on the depth in which the programme covered mental toughness, indicating that it is crucial for his player to do PST but not in as much depth as was done in these programmes. This comment is one of the indications of the coaches' attitudes towards and knowledge of applying sport psychology

principles. Humara (2000) argues that many coaches are remarkably skilled at identifying and assessing an athlete's physical attributes pertaining to their success but often lack the ability to identify and develop associated psychological attributes. This point still seems relevant today based on the current research findings. These learned skills of assessing and developing physical skills may provide a level of comfort for the coaches and compensate for the unlearned skills of assessing and developing psychological skills, which may serve to maintain a sense of control for both players and coaches. Researchers have identified a lack of understanding when researching mental toughness and sport psychology (Gordon & Sridhar, 2005; Jones et al., 2002; A. R. Nicholls, Polman, Levy, & Backhouse, 2008). It is common for coaches and players to hesitate in pursuing sport psychology consultation and resist participating in psychological interventions, because there is insufficient knowledge regarding the nature and benefits of such interventions (Donohue et al., 2004). This is particularly true in the South African context and is exacerbated by the mystification of psychology and the poor understanding of it by the general population (Bodibe, 1993; Rock, 1994). The two quotes below are from the second focus group with players and the second interview with a coach respectively, in which they admit to not knowing what to expect from the researchers before the programme, despite a number of explanations and researchers asking the participants if there was anything about which they were unsure.

*Ya I think lots from our side in a sense of, probably when you guys came to us initially we weren't sure exactly what you guys wanted to do and I think that if, knowing now, if we had known it then we probably would have approached it slightly differently.*

*going through the course and realising what value it probably would have added so maybe an explanation of that, as you said if it was a case of next year, it would be very easy now to know all that.*

These quotes not only suggest a lack of understanding on the part of the participants, they also suggest that the participants either did not know or they were embarrassed to admit a lack of understanding. After the team scored 311 runs in a 50-over game for the first time, one of the players mentioned in the second focus group

*maybe having it pre-season it wouldn't take effect to us in the normal everyday life, like on Saturday we realized, 311, we haven't made that much last season, maybe it's affected us.*

The players had not realised that the mental toughness programme had any major effect on them until they experienced a notable improvement in performance, which they associated with the mental toughness programme. This delayed realisation of the effectiveness of the programme is something this researcher has personally observed on numerous occasions and is one of the aspects of evaluating PST and mental toughness programmes that needs much research in the future. Directly after completing a PST or mental toughness programme, some players do not see a marked improvement, or may even see a decline in performance if they try to implement the mental skills too soon or use too many at once. If they practice the learned skills during and subsequent to the programme implementation, they usually do see an improvement in performance but it is difficult to evaluate, using conventional evidence-based evaluation, if this improvement is due to the programme or

to other variables, due to the time that passes between the end of the programme and the improvement in performance.

Throughout both research projects, and in a number of quotes included in the current paper, participants included comments that suggested particular attitudes towards PST and/or sport psychology. The lack of knowledge, timing of the programme and other extra-personal challenges may have contributed to these comments. In fact, the lack of knowledge and poor general understanding of psychology contributes to attitudes people in the general public have of the discipline and to the mystification people have of psychology (Bodibe, 1993; Rock, 1994). This was evident in relation to sport psychology and PST as described in the quotes in the previous section, referring to the participants' uncertainty about what to expect at the beginning of the programmes and the change in their perceptions and performance after the programmes had concluded and they had improved education on the topic. Some people are influenced by myths around PST (Weinberg & Gould, 2015) due lack of understanding and education around sport psychology and the benefits of PST, namely 1) PST is for "problem" athletes only, 2) PST is for elite athletes only, 3) PST provides "quick fix" solutions, and 4) PST is not useful.

In the current research projects, one of the coaches explained his approach to dealing with a group of players he felt lacked talent the previous year compared to the group he was currently working with, which he felt had more talent. The myth of PST being for "problem" athletes was evident in that he indicated he focused more on mental aspects with less talented players and technical aspects with more talented players, as is evident in the excerpt below

*last year I had a very weak side, I think we won two out of twelve odd games, so that was an aspect I focused on a hell of a lot with them, was just the idea of "Self-belief breeds success", and they must just back themselves and don't be scared of failure.*

*But this year with a more talented side I tended to concentrate more on the technical things, than mental, which was fantastic that I could do this knowing that you were also doing that with them.*

The myth relating to PST being for elite athletes only was evident in a comment made by one of the coaches after the conclusion of the programme

*Definitely, I think even if they haven't taken all the information on board they would have been introduced to a topic, um its stuff again if probably your elite, when I say elite your better cricketers, would have spent a lot of time talking about it already, um, but to do the nuts and bolts of it was great, to do different exercises and explain to the guys why and how has been I think crucial, um, but then also for the other players who are outside that who haven't really giving it enough thought, I think it would have been even more of a benefit to those okes [guys] than the good players who probably do read your "in the zone" or whatever it might be so um, I think it's been good for all those okes [guys].*

The coach indicated in the quote above that the programme was an introduction and training mental toughness is something elite players “*would have spent a lot of time talking about*” and reference the “*good players who probably read your 'in the zone' or whatever*”. The reference is to a popular psychology book on sport psychology written by a Neuro-linguistic programming practitioner from South Africa.

The fourth myth regarding PST referred to above is that PST is not useful, something that has been shown to be incorrect (Weinberg & Gould, 2015). Two quotes discussed in the

previous section, on lack of knowledge of the benefits of PST, refer also to the attitude some of the participants had towards PST

*Ya I think lots from our side in a sense of, probably when you guys came to us initially we weren't sure exactly what you guys wanted to do and I think that if, knowing now, if we had known it then we probably would have approached it slightly differently.*

*going through the course and realising what value it [mental preparation] probably would have added so maybe an explanation of that, as you said if it was a case of next year, it would be very easy now to know all that.*

These quotes reinforce that the participants lacked knowledge and that this impacted on the way they approached the programmes. It was previously discussed that there was a lack of enthusiasm on the part of the participants (primarily among 1<sup>st</sup> XI coach and players) and the one coach believed this could have been because of the timing of the programme. It is possible that, in addition to the timing of the programme, their attitudes towards PST could also have influenced by their beliefs about the usefulness of PST.

The lack of knowledge about and attitudes towards sport psychology and PST are also evident in the following excerpt from an interview with a coach

*I thought it was brilliant, and I think under 15 is probably a bit too young to start doing things like this, but what it does do is it does plant the seed, and maybe at this stage there are two or three that pick up and really practice what you had to say, I think in a few years' time those two or three will obviously be a lot further ahead*

*than anyone else, but I think in a few years' time, at first team level it'll be more applicable and they'll be able to absorb a lot more of what you're saying, purely because they'll know cricket a little better and they'll be tested a lot more. Under 15, you're barely out of the little stage of cricket, you're only really starting to play cricket, so I don't they would've been tested mentally too many times before. So ya, but I thought it was brilliant, I love this sort of thing, especially cricket, the mental aspect of it is the most intriguing, which is brilliant, I really enjoyed it.*

The coach felt that under 15 was “*too young to start doing things like this*” because he believed the players on the team were “*barely out of the little stage of cricket, you're only really starting to play cricket, so I don't they would've been tested mentally too many times before*”. By referring to the mental toughness training not being applicable with the younger players yet because they had not been tested mentally too many times before, it reveals a misunderstanding that the coach has of the role of mental toughness training and PST. The goal of such programmes to is help prepare the participants for when they face challenges and equip them with psychological skills to weather these challenges. Sport psychology research also argues that PST is very useful for young participants (Foster, Maynard, Butt, & Hays, 2016; Weiss, 1991). Additionally, another comment made by a coach reinforces the idea that the lack of knowledge contributes to a misunderstanding of the role of PST and of the sport psychology consultant/researcher or mental coach,

*it's quite nice to chat without your coach listening to everything, I mean that's why we have mental coaches.*

The quote above suggests that this coach sees the role of a mental coach or sport psychology consultant as a sounding board for players to talk to (similar to a therapist) rather than part of the coaching team or a person who is there to assist them in enhancing performance, through applying scientific theory and method. It was mentioned previously in this paper that the role of the researchers was that of assisting the team improve their mental toughness through psycho-educational training. The distinction between the role of the researchers in this project and that of a therapist had been discussed with the coaches and then again with the participants but the understanding of sport psychology, personal beliefs, and stereotypes influence how coaches approach sport psychology and enhancement of performance through mental strategies. There is a need to educate coaches, sports people, and the public in general on the role of the sport psychologist or sport psychology professional, so that a better environment can be created where the coach and sport psychology professional can complement one another. Projects like the two discussed in this paper are very useful in educating people on the use of sport psychology in general and mental toughness and PST specifically. One participant commented the following about his learning in the project

*Ya, I think I've learnt more because before I only knew like the basic concepts of mental toughness and now I know like more in depth and like more of the skills that you can use to make our mental toughness stronger.*

Findings from the two studies suggest that even when a person feels they are knowledgeable of mental toughness and PST, participating in programmes such as these can add value and improve knowledge and the ability to apply the knowledge to practical domains. The knowledge and understanding of mental toughness and PST is an intra-personal factor that

becomes an extra-personal one that can influence the success of a mental toughness programme.

## **Conclusion**

The current paper described the two projects that were conducted with school level cricket teams and then considered the extra-personal factors that influenced the development and implementation of mental toughness programmes for these teams.

The primary extra personal factors identified in these projects were in line with findings of Connaughton et al. (2008) in that the participants indicated that the mental toughness programme improved aspects that contributed to a positive motivational climate. In so doing, improving intra-personal factors such as enjoyment, mastery, and autonomy contributed to improvement of extra-personal factors which, in turn, contributed to perceived improvements in mental toughness and enhancement of the process of implementing mental toughness programmes, suggesting a cyclical nature that needs to be investigated further. Interactions with individuals (i.e., coaches, parents, friends, family, senior athletes, sport psychologists, team-mates) and, more specifically, social support were found to be important extra-personal factors contributing to perceived improvements in mental toughness and enhancement of the process of implementing mental toughness programmes. Specific extra-personal factors that influenced the development and implementation of the mental toughness programmes included lack of attendance, involvement of the coach, and timing of the programme. Intra-personal factors that influenced the effect of the extra-personal factors included lack of knowledge about sport psychology and mental toughness, and expectations and role definitions.

The PPI-A was administered to the participants in the 1<sup>st</sup> XI cricket team before and after the implementation of the programme and the participants self-scored themselves with

high ratings, even though they had indicated little, if any, PST involvement or knowledge before this project. They rated themselves on average: 77% of the maximum score for determination, 77% of the maximum score for self-belief, 73% of the maximum score for positive cognition, and 63% of the maximum score for visualisation. An interesting finding and one that requires further research was that the participants scored themselves very high on the PPI-A and after learning about mental toughness and going through the programme, some participants decreased scores on some subscales of the PPI-A, with one even decreasing scores on all four subscales. This raises the question of how well they understood what they were rating before the programme and the impact the programme had on their knowledge of mental toughness. Scores on the PPI-A can range from 14-70 and the pre-programme PPI-A scores ranged from 48-60 with the post-programme PPI-A scores ranging from 51-65. It would be very interesting to conduct more research on self-report measures to investigate how knowledgeable cricketers (and sports people in general) in South Africa are about what they are rating when completing these self-report assessments.

Some suggestions for future mental toughness programmes would be to contract appropriately during the entry and setup phases and, although the researcher had explained the programme intentions in a comprehensive and thorough manner, it may have been beneficial to have held a pre-programme session (or sessions) with the coaches and other influencing stakeholders at the school. The purpose and design of such sessions would be to educate and illustrate to these individuals what mental toughness is, how it influences performance, the importance of mental training, and an outline of what the researcher intended on completing with the athletes and how the behaviour of these individuals could influence the programmes. Part of the entry and contracting should focus on making expectations and roles clear. Researchers/consultants need to explain what needs to happen so there are no miscommunications. The mental training sessions of the programme could also

be scheduled to run in conjunction with practices and, ideally, the researcher and coaches could collaborate to design training routines in a way that would incorporate mental training into pre-existing physical training sessions. It would be very important to allocate time for the newly learned mental skills to be practiced before the players enter into competitive match situations. Education of the mental skills should ideally occur in the pre-season and practiced before entering into the season. Once in the cricket season, these mental skills enhanced during the regular team practices so that they are ready to assist the players in competitive match situations. It would be interesting to research the difference between group and individual approaches because the players in the current studies only experienced the group approach. Teams need to have a mental skills coach present throughout the season, ideally working with the team every week and, if not possible, then working with the coach who will work with the team. Coaches should have sport psychology training as part of their qualifications and then they can have regular sessions with a sport psychology consultant where necessary and also telephonic and Skype consultations to add to their training. In general, education of coaches, sports people, and people in general on what sports psychology is and what consultants do so that they do not see it merely as a therapist joining the team.

## **References**

Alemayehu, A., Mengistu, S., & Beker, G. (2016). Coaches' leadership style and motivational climate of players in south east Ethiopian national football clubs. *Journal of Tourism, Hospitality and Sports*, 16, 1-6.

- Alvarez, M. S., Balaguer, I., Castillo, I., & Duda, J. L. (2012). The coach-created motivational climate, young athletes' well-being, and intentions to continue participation. *Journal of Clinical Sport Psychology, 6*, 166-179.
- Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Educational Psychology, 84*(3), 261.
- Anderman, E. M., & Midgley, C. (1997). Changes in achievement goal orientations, perceived academic competence, and grades across the transition to middle-level schools. *Contemporary Educational Psychology, 22*(3), 269-298.
- Armstrong, M., & Taylor, S. (2014). *Armstrong's handbook of human resource management practice* (13th ed.). London: Kogan Page.
- Backley, S., & Stafford, I. (1996). *The winning mind: A guide to achieving success and overcoming failure*. London: Aurum Press.
- Balaguer, I., Duda, J. L., & Crespo, M. (1999). Motivational climate and goal orientations as predictors of perceptions of improvement, satisfaction and coach rating among tennis players. *Scandinavian Journal of Medicine and Science in Sports, 9*(6), 381-388.
- Bartholomew, K. J., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2010). The controlling interpersonal style in a coaching context: Development and initial validation of a psychometric scale. *Journal of Sport & Exercise Psychology, 32*(2), 193-216.
- Baumeister, R. F., DeWall, C. N., Ciarocco, N. J., & Twenge, J. M. (2005). Social exclusion impairs self-regulation. *Journal of Personality and Social Psychology, 88*(4), 589-604.  
doi:10.1037/0022-3514.88.4.589

- Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development, 78*(1), 246-263. doi:10.1111/j.1467-8624.2007.00995.x
- Bloom, B. (1985). *Developing talent in young people*. New York: Ballantine Books.
- Bodibe, R. C. (1993). What is the truth? Being more than just a jesting Pilate in South African psychology. *South African Journal of Psychology, 23*(2), 53-58. doi:10.1177/008124639302300201
- Boixados, M., Cruz, J., Torregrosa, M., & Valiente, L. (2004). Relationships among motivational climate, satisfaction, perceived ability, and fair play attitudes in young soccer players. *Journal of Applied Sport Psychology, 16*(4), 301-317. doi:10.1080/10413200490517977
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. doi:10.1191/1478088706qp063oa
- Bull, S. J., Shambrook, C. J., James, W., & Brooks, J. E. (2005). Towards an understanding of mental toughness in elite English cricketers. *Journal of Applied Sport Psychology, 17*(3), 209-227. doi:10.1080/10413200591010085
- Butler, R. J., & Hardy, L. (1992). The Performance Profile: Theory and application. *The Sport Psychologist, 6*, 253-264.
- Carpenter, P. J., & Morgan, K. (1999). Motivational climate, personal goal perspective, and cognitive and affective responses in physical education classes. *European Journal of Physical Education, 4*(1), 31-44.

- Chambers, R. A. (2010). Neuroplasticity. In I. P. Stolerman (Ed.), *Encyclopedia of psychopharmacology* (pp. 856-856). Berlin, Heidelberg: Springer Berlin Heidelberg.  
doi:10.1007/978-3-540-68706-1\_442
- Chi, L., & Duda, J. L. (1995). Multi-sample confirmatory factor analysis of the Task and Ego Orientation in Sport Questionnaire. *Research Quarterly for Exercise and Sport*, 66(2), 91-98.
- Clough, P., Earle, K., & Sewell, D. (2002). Mental toughness: The concept and its measurement. In I. Cockerill (Ed.), *Solutions in sport psychology* (pp. 32-43). Cornwall: Thomson.
- Connaughton, D., & Hanton, S. (2009). Mental toughness in sport: Conceptual and practical issues. In D. Mellalieu, & S. Hanton (Eds.), *Advances in applied sport psychology: A review* (pp. 317-346). Cornwall: Routledge.
- Connaughton, D., Thelwell, R., & Hanton, S. (2011). Issues, practical implications and future directions. In D. F. Gucciardi, & S. Gordon (Eds.), *Mental toughness in sport: Developments in theory and research* (1st ed., pp. 135-162). New York, NY: Routledge.
- Connaughton, D., Wadey, R., Hanton, S., & Jones, G. (2008). The development and maintenance of mental toughness: Perceptions of elite performers. *Journal of Sports Sciences*, 26(1), 83-95.
- Covington, M. V. (1984). The self-worth theory of achievement motivation: Findings and implications. *The Elementary School Journal*, 85(1), 5-20.

- Crust, L. (2008). A review and conceptual re-examination of mental toughness: Implications for future researchers. *Personality and Individual Differences, 45*(7), 576-583.  
doi:10.1016/j.paid.2008.07.005
- Csikszentmihalyi, M., Rathunde, K., & Whalen, S. (1997). *Talented teenagers: The roots of success and failure*. Cambridge: Cambridge University Press.
- Cummings, T. G., & Worley, C. G. (2015). *Organization development & change* (10th ed.). Australia: Cengage Learning.
- Cutietta, R. A. (1985). Developing talent in young people. *Music Educators Journal Music Educators Journal, 72*(1), 58-59. doi:10.2307/3396580
- Demarin, V., Morovic, S., & Bene, R. (2014). Neuroplasticity. *Periodicum Biologorum, 116*(2), 209-211.
- Donohue, B., Dickens, Y., Lancer, K., Covassin, T., Hash, A., Miller, A., & Genet, J. (2004). Improving athletes' perspectives of sport psychology consultation: A controlled evaluation of two interview methods. *Behavior Modification, 28*(2), 182-193.  
doi:10.1177/0145445503259399
- Duda, J. L., & Whitehead, J. (1998). Measurement of goal perspectives in the physical domain. In J. L. Duda (Ed.), *Advances in sport and exercise psychology measurement* (pp. 21-48). Morgantown, WV: Fitness Information Technology.
- Duda, J. L. (2013). The conceptual and empirical foundations of Empowering Coaching (TM): Setting the stage for the PAPA project. *International Journal of Sport and Exercise Psychology, 11*(4), 311-318.

- Duda, J. L., & Balaguer, I. (2007). Coach-created motivational climate. In S. Jewett, & D. Lavallee (Eds.), *Social psychology in sport*. (pp. 117-130). Champaign, IL: Human Kinetics.
- Duda, J. L., Balaguer, I., Moreno, Y., & Crespo, M. (2001). The relationship of the motivational climate and goal orientations to burn-out among junior elite tennis players. *Association for the Advancement of Applied Sports Psychology*, Denton, Texas.
- Duda, J. L., Quested, E., Haug, E., Samdal, O., Wold, B., Balaguer, I., . . . Cruz, J. (2013). Promoting adolescent health through an intervention aimed at improving the quality of their Participation in Physical Activity (PAPA): Background to the project and main trial protocol. *International Journal of Sport and Exercise Psychology*, *11*(4), 319-327.
- Durand-Bush, N., & Salmela, J. H. (2002). The development and maintenance of expert athletic performance: Perceptions of world and Olympic champions. *Journal of Applied Sport Psychology*, *14*(3), 154-171. doi:10.1080/10413200290103473
- Dweck, C. S. (2007). *Mindset: The new psychology of success*. New York, NY: Random House.
- Dweck, C. S. (2017). *Mindset: Changing the way you think to fulfil your potential* (Updated Ed ed.). United Kingdom: Robinson.
- Dweck, C. S., Chiu, C., & Hong, Y. (1995a). Implicit theories and their role in judgments and reactions: A world from two perspectives. *Psychological Inquiry*, *6*(4), 267-285.
- Dweck, C. S., Chiu, C., & Hong, Y. (1995b). Implicit theories: Elaboration and extension of the model. *Psychological Inquiry*, *6*(4), 322-333. doi:10.1207/s15327965pli0604\_12

- Eccles, J. S., Roeser, R., Wigfield, A., & Freedman-Doan, C. (1999). Academic and motivational pathways through middle adulthood. In L. Balter, & C. S. Tamis-LeMonda (Eds.), *Child psychology: A handbook of contemporary issues*. (pp. 287-317). Philadelphia: Psychology Press.
- Elliott, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology*, *54*, 5-12.
- Ewaldz, A. M. (2016). *Understanding motivational climate and team cohesion in youth sport*. (Unpublished Master of Science). Illinois State University, Illinois.
- Foster, D., Maynard, I., Butt, J., & Hays, K. (2016). Delivery of psychological skills training to youngsters. *Journal of Applied Sport Psychology*, *28*(1), 62-77.  
doi:10.1080/10413200.2015.1063097
- Fuchs, E., & Flügge, G. (2014). Adult neuroplasticity: More than 40 years of research. *Neural Plasticity*, *2014*, 1-10. doi:10.1155/2014/541870
- Golby, J., & Sheard, M. (2004). Mental toughness and hardiness at different levels of rugby league. *Personality and Individual Differences*, *37*(5), 933-942.  
doi:10.1016/j.paid.2003.10.015
- Golby, J., Sheard, M., & van Wersch, A. (2007). Evaluating the factor structure of the Psychological Performance Inventory (PPI). *Perceptual and Motor Skills*, *105*(1), 309-325. doi:10.2466/pms.105.1.309-325
- Gordon, S., & Sridhar, C. (2005). Identification and development of mental toughness in elite cricket. In T. Morris, P. Terry, S. Gordon, S. Hanrahan, L. Ievleva, G. Kolt & P. Tremayne (Eds.), *Psychology promoting health and performance for life: proceedings of*

*the ISSP 11th world congress of sport [CDROM]* (). Sydney: International Society of Sport Psychology.

Gould, D., Diffenbach, K., & Moffett, A. (2002). Psychological characteristics and their development in Olympic champions. *Journal of Applied Sport Psychology, 14*(3), 172-204. doi:10.1080/10413200290103482

Greendorfer, S. L. (2002). Socialization process and sport behavior. In T. Horn (Ed.), *Advances in sport psychology*. (pp. 377-401). Champaign, IL: Human Kinetics.

Gucciardi, D. F. (2008). *Mental toughness in Australian football*. (Unpublished Doctoral thesis). University of Western Australia, WA, Australia.

Gucciardi, D. F. (2012). Measuring mental toughness in sport: A psychometric examination of the Psychological Performance Inventory-A and its predecessor. *Journal of Personality Assessment, 94*(4), 393-403. doi:10.1080/00223891.2012.660292

Gucciardi, D. F., & Gordon, S. (2008). Personal construct psychology and the research interview: The example of mental toughness in sport. *Personal Construct Theory & Practice, 5*, 119-130.

Gucciardi, D. F., & Gordon, S. (2009). Development and preliminary validation of the Cricket Mental Toughness Inventory (CMTI). *Journal of Sport Sciences, 27*(12), 1293-1310. doi:10.1080/02640410903242306

Gucciardi, D. F., Gordon, S., & Dimmock, J. (2008a). Development and preliminary validation of a mental toughness inventory for Australian football. *Psychology of Sport and Exercise, 10*(1), 201-209. doi:10.1016/j.psychsport.2008.07.011

- Gucciardi, D. F., Gordon, S., & Dimmock, J. (2008b). Towards an understanding of mental toughness in Australian football. *Journal of Applied Sport Psychology, 20*(3), 261-281. doi:10.1080/10413200801998556
- Gucciardi, D. F., Gordon, S., & Dimmock, J. (2009a). Evaluation of a mental toughness training program for youth-aged Australian footballers: I. A quantitative analysis. *Journal of Applied Sport Psychology, 21*(3), 307-323. doi:10.1080/10413200903026066
- Gucciardi, D. F., Gordon, S., & Dimmock, J. (2009b). Evaluation of a mental toughness training program for youth-aged Australian footballers: II. A qualitative analysis. *Journal of Applied Sport Psychology, 21*(3), 324-339. doi:10.1080/10413200903026074
- Gucciardi, D. F., Gordon, S., Dimmock, J., & Mallett, C. (2009). Understanding the coach's role in the development of mental toughness: Perspectives of elite Australian football coaches. *Journal of Sports Sciences, 27*(13), 1483-1496. doi:10.1080/02640410903150475
- Gucciardi, D. F., Jackson, B., Hodge, K., Anthony, D. R., & Brooke, L. E. (2015). Implicit theories of mental toughness: Relations with cognitive, motivational, and behavioral correlates. *Sport, Exercise, and Performance Psychology, 4*(2), 100-112. doi:10.1037/spy0000024
- Gucciardi, D. F., Mallett, C., Hanrahan, S., & Gordon, S. (2011). Measuring mental toughness in sport: Current stats and future directions. In D. F. Gucciardi, & S. Gordon (Eds.), *Mental toughness in sport: Developments in research and theory* (pp. 108-132). London: Routledge.

- Hodge, K., Henry, G., & Smith, W. (2014). A Case Study of Excellence in Elite Sport: Motivational Climate in a World Champion Team. *The Sport Psychologist*, 28(1), 60-74. doi:10.1123/tsp.2013-0037
- Humara, M. (2000). Personnel selection in athletic programs. *Athletic Insight: The Online Journal of Sport Psychology*, 2(2), 1-7.
- Johnson, J. J. M., Hrycaiko, D. W., Johnson, G. V., & Halas, J. M. (2004). Self-Talk and Female Youth Soccer Performance. *The Sport Psychologist*, 18(1), 44-59. doi:10.1123/tsp.18.1.44
- Jones, G., Hanton, S., & Connaughton, D. (2002). What is this thing called mental toughness? An investigation of elite sport performers. *Journal of Applied Sport Psychology*, 14, 205-218. doi:10.1080/10413200290103509
- Kao, S., & Watson, J. (2014). The multilevel effects of motivational climate on the collective efficacy in a cheerleading team. *International Journal of Sports Science & Coaching*, 9(4), 593-603.
- Kim, M. S., Duda, J. L., & Gano-Overway, L. (2011). Predicting occurrence of and responses to psychological difficulties: The interplay between achievement goals, perceived ability, and motivational climates among Korean athletes. *Journal of Sport and Exercise Psychology*, 9(1), 31-47. doi:10.1080/1612197X.2011.563125
- Lepper, M. R., Corpus, J. H., & Iyengar, S. S. (2005). Intrinsic and Extrinsic Motivational Orientations in the Classroom: Age Differences and Academic Correlates. *Journal of Educational Psychology*, 97(2), 184-196. doi:10.1037/0022-0663.97.2.184

- Levy, S. R., Stroessner, S. J., & Dweck, C. S. (1998). Stereotype formation and endorsement: The role of implicit theories. *Journal of Personality and Social Psychology*, 74(6), 1421-1436. doi:10.1037/0022-3514.74.6.1421
- Loehr, J. E. (1986). *Mental toughness training for sports: Achieving athletic excellence*. Lexington, Massachusetts: The Stephen Greene Press.
- MacNamara, A., Button, A., & Collins, D. (2010). The role of psychological characteristics in facilitating the pathway to elite performance. Part 2: Examining environmental and stage-related differences in skills and behaviors. *The Sport Psychologist*, 24(1), 74-96.
- Maehr, M. L., & Anderman, E. M. (1993). Reinventing Schools for Early Adolescents: Emphasizing Task Goals. *The Elementary School Journal*, 93(5), 593-610.
- Mangels, J. A., Butterfield, B., Lamb, J., Good, C., & Dweck, C. S. (2006). Why do beliefs about intelligence influence learning success? A social cognitive neuroscience model. *Social Cognitive and Affective Neuroscience*, 1(2), 75-86. doi:10.1093/scan/nsl013
- McInerney, M. (2010). *The development and implementation of a mental toughness training programme for young cricketers*. (Unpublished Honours). Rhodes University, Grahamstown.
- McInerney, M. (2014). *The development and implementation of a mental toughness training programme for cricketers*. (Unpublished MA). Rhodes University, Grahamstown, South Africa.
- McLean, G. N. (2006). *Organization development: Principles, processes, performance*. San Francisco: Berrett-Koehler Publishers.

- McNiff, J., & Whitehead, J. (2006). *All you need to know about action research*. London; Thousand Oaks, Calif.: SAGE.
- Midgley, C., Anderman, E. M., & Hicks, L. (1995). Differences between elementary and middle school teachers and students: A goal theory approach. *Journal of Early Adolescence, 15*(1), 90-113.
- Nicholls, A. R., Polman, R. C. J., Levy, A. R., & Backhouse, S. H. (2008). Mental toughness, optimism, pessimism, and coping among athletes. *Personality and Individual Differences, 44*(5), 1182-1192. doi:10.1016/j.paid.2007.11.011
- Nicholls, J. G. (1978). The development of the concepts of effort and ability, perception of academic attainment, and the Understanding that difficult tasks require more ability. *Child Development, 49*(3), 800-814. doi:10.2307/1128250
- Ntoumanis, N., & Biddle, S. (1999). Affect and achievement goals in physical activity: A meta- analysis. *Scandinavian Journal of Medicine and Science in Sports, 9*(6), 315-332. doi:10.1111/j.1600-0838.1999.tb00253.x
- Ommundsen, Y., Roberts, G., Lemyre, P. N., & Miller, B. W. (2005). Peer relationships in adolescent competitive soccer: Associations to perceived motivational climate, achievement goals and perfectionism. *Journal of Sports Sciences, 23*(9), 977-989. doi:10.1080/02640410500127975
- Papaionannou, A., & Kouli, O. (1999). The effect of task structure, perceived motivational climate and goal orientations on students' task involvement and anxiety. *Journal of Applied Sport Psychology, 11*(1), 51-71. doi:10.1080/10413209908402950

- Pattison, S. (2011). *The development and implementation of a mental toughness training programme for young cricketers*. (Unpublished MA). Rhodes University, Grahamstown, South Africa.
- Pensgaard, A. M., & Roberts, G. C. (2002). Elite athletes' experiences of the motivational climate: The coach matters. *Scandinavian Journal of Medicine & Science in Sports*, *12*(1), 54-59.
- Reason, P., & Bradbury, H. (2008). *The SAGE handbook of action research: Participative inquiry and practice*. Los Angeles, Calif.; London: SAGE.
- Reason, P. (2006). Choice and quality in Action Research practice. *Journal of Management Inquiry*, *15*(2), 187-203. doi:10.1177/1056492606288074
- Reinboth, M., Duda, J. L., & Ntoumanis, N. (2004). Dimensions of coaching behavior, need satisfaction, and the psychological and physical welfare of young athletes. *Motivation and Emotion*, *28*(3), 297-313.
- Rholes, W. S., Blackwell, J., Jordan, C., & Walters, C. (1980). A developmental study of learned helplessness. *Developmental Psychology*, *16*(6), 616-624. doi:10.1037/0012-1649.16.6.616
- Rock, B. (1994). A wolf in sheep's clothing?: Theoretical diversity and the drive toward sameness. *Psychology in Society (PINS)*, *18*, 56-59.
- Schein, E. (2010). *Organizational culture and leadership*. San Francisco, CA: John Wiley & Sons.

- Seifriz, J., Duda, J. L., & Likang, C. (1992). The relationship of perceived motivational climate to intrinsic motivation and beliefs about success in basketball. *Journal of Sport & Exercise Psychology, 14*(4), 375-391.
- Sheard, M., & Golby, J. (2006). Effect of a psychological skills training program on swimming performance and positive psychological development. *International Journal of Sport and Exercise Psychology, 4*(2), 149-169. doi:10.1080/1612197X.2006.9671790
- Sheard, M., Golby, J., & van Wersch, A. (2009). Progress toward construct validation of the Sports Mental Toughness Questionnaire (SMTQ). *European Journal of Psychological Assessment, 25*(3), 186-193. doi:10.1027/1015-5759.25.3.186
- Stipek, D., & Iver, D. M. (1989). Developmental change in children's assessment of intellectual competence. *Child Development, 60*(3), 521-538. doi:10.2307/1130719
- Thelwell, R., Such, B., Weston, N., Such, J., & Greenlees, I. (2010). Developing mental toughness: Perceptions of elite female gymnasts. *International Journal of Sport and Exercise Psychology, 8*(2), 170-188. doi:10.1080/1612197X.2010.9671941
- Treasure, D. C. (1993). *A social-cognitive approach to understanding children's achievement behavior, cognitions, and affect in competitive sport*. (Unpublished Doctoral dissertation). University of Illinois, Urbana- Champaign.
- Vago, D. R., & Silbersweig, D. A. (2012). Self-awareness, self-regulation, and self-transcendence (S-ART): A framework for understanding the neurobiological mechanisms of mindfulness. *Frontiers in Human Neuroscience, 6*(296), 1-30. doi:10.3389/fnhum.2012.00296

- Vazou, S., Ntoumanis, N., & Duda, J. L. (2005). Peer motivational climate in youth sport: A qualitative inquiry. *Psychology of Sport and Exercise*, 6, 497-516.
- Vealey, R. (2007). Mental skills training in sport. In G. Tenenbaum, & R. Eklund (Eds.), *Handbook of sport psychology*. (3rd ed., pp. 287-309). Chichester: John Wiley and sons.
- Walling, M., Duda, J. L., & Chi, L. (1993). The perceived motivational climate in sport questionnaire: construct and predictive validity. *Journal of Sport & Exercise Psychology*, 15(2), 172-183.
- Weinberg, R. S., & Gould, D. (2015). *Foundations of sport and exercise psychology* (6th ed.). Champaign, IL: Champaign, Ill; Human Kinetics Publishers.
- Weinberg, R. S., & Williams, J. M. (2006). Integrating and implementing a psychological skills training program. In J. M. Williams (Ed.), *Applied sport psychology: Personal growth to peak performance*. (pp. 329-358). New York, NY: McGraw-Hill.
- Weiss, M. R. (1991). Psychological skill development in children and adolescents. *The Sport Psychologist*, 5, 335-354.
- Weston, N. J. V., Greenlees, I. A., & Thelwell, R. C. (2011). Athlete perceptions of the impacts of performance profiling. *International Journal of Sport and Exercise Psychology*, 9(2), 173-188. doi:10.1080/1612197X.2011.567107
- Williams, J. M., & Krane, V. (2015). *Applied sport psychology: Personal growth to peak performance* (7th ed.). New York, NY: McGraw-Hill Education.

# CHAPTER 3: PSYCHOMETRIC PROPERTIES OF TWO MENTAL TOUGHNESS INVENTORIES IN A SOUTH AFRICAN SAMPLE OF CRICKET PLAYERS

This manuscript has been prepared according to the editorial guidelines of the *Journal of Applied Sport Psychology*.

Tables and figures have been placed in text.

## Abstract

The current paper examined the psychometric properties of two mental toughness inventories by administering them to a sample of cricketer players in the Eastern Cape of South Africa. The sample consisted of 127 cricketers ( $M_{age} = 16.62$ ,  $SD = 4.61$ ;  $n = 118$  male,  $n = 9$  female) with the levels at which the cricketers played ranging from school to semi-professional. Paper-and-pencil versions of the Psychological Performance Inventory – Alternative (PPI-A), the Sports Mental Toughness Questionnaire (SMTQ), and the Athlete Burnout Questionnaire (ABQ) were completed by the respondents. The PPI-A displayed a moderate-to-strong level of internal consistency for global mental toughness, although the  $\alpha$  coefficients for the subscales were low and ranged from .50 to .58, raising questions about dimensionality. The SMTQ displayed a moderate internal consistency with  $\alpha = .68$  and the internal consistency of the subscales ranged from .43 to .71, with internal consistency of Constancy and Control notably affected by negatively worded items. The Total Burnout Score for the ABQ showed a high degree of internal consistency ( $\alpha = .87$ ) which compares well with the internal consistency found during the initial development of the ABQ. The convergent validity of the PPI-A and the SMTQ was assessed by correlating the total scores of these instruments and revealed a moderate correlation of  $r = .44$ , while the discriminant validity assessment found negative correlations between the mental toughness instruments and the ABQ ( $r = -.28$  with the PPI-A and  $r = -.16$  with the SMTQ).

## **Context**

The development of mental toughness assessment measures has gained momentum with the improved understanding of mental toughness that has developed since the publication of research conducted by Fourie and Potgieter (2001). The increased attention on mental toughness research has resulted in the general understanding of this multidimensional construct progressing from a much used but little understood construct (Gucciardi, Gordon, & Dimmock, 2008; Jones, Hanton, & Connaughton, 2002), to one that is believed to consist of core aspects related to all sport and peripheral aspects that are more context specific. The core aspects have been summarised by Gucciardi et al. (2008) such as self-belief/confidence, positive and tough attitudes, attentional control, personal values, self-motivation, resilience, enjoyment and thriving through pressure, and sport intelligence. The growing consensus over the theoretical understanding of mental toughness prompted researchers to turn their attention to the development of assessment measures.

Loehr (1986) developed the Performance Profile Inventory (PPI) almost two decades before the Fourie and Potgieter (2001) publication that signalled the beginning of more dedicated research interest into mental toughness around the world. The PPI is a 42-item inventory consisting of seven subscales, which together measure mental toughness using Likert type rating scales that are anchored by “Almost Always” and “Almost Never”, scored either “1” or “5” depending on whether the item was positively or negatively worded (Crust, 2007; Loehr, 1986). The inventory yields an overall mental toughness score in addition to scores on what Loehr (1986) described as the seven most essential ingredients of mental toughness: self-confidence, negative energy attention control, attitude control, motivation, positive energy, and visual and imagery control. However, no psychometric support was offered for its use and researchers have since questioned the reliability and validity of the PPI (Connaughton &

Hanton, 2009; Golby, Sheard, & van Wersch, 2007; Gucciardi & Gordon, 2009; Middleton et al., 2004). Other researchers have also criticised the psychometric properties of the proposed seven-factor PPI, despite it being a commonly used measuring instrument for mental toughness. For example, Murphy and Tammen (1998) criticised the measure and questioned its usefulness as a suitable, accurate and effective measurement of mental toughness because of the lack of validity and reliability data supporting its application. Golby et al. (2007) investigated the differences between elite rugby teams, using the PPI as a measure of mental toughness, and concluded that the psychometric properties of the PPI were not very robust. Middleton et al. (2004) administered the PPI to elite high school athletes in an attempt to evaluate the psychometric properties of the mental toughness measure and concluded that the PPI was in fact a poor model fit. Golby and Sheard (2004) used the PPI in research on the mental toughness of rugby players and found that it was not psychometrically sound and possessed “insufficient discriminative power” (p. 940). In the same research study, which compared the PPI with a hardiness measure, the researchers concluded that it was too simplistic to equate mental toughness with hardiness; something Connaughton and Hanton (2009) argued that Clough et al. (2002) did when they used Maddi’s 3Cs model (Commitment, Challenge, and Control) (Maddi, 1994; 2002) and added Confidence to constitute mental toughness. They called this model of mental toughness the 4Cs model.

Clough et al. (2002) developed the MTQ48 based on their theory of the 4Cs model of mental toughness and have used it extensively in sporting and organisational settings. The MTQ48 contains 48 items that are scored on a five-point Likert scale ranging from ‘Strongly Agree’ to ‘Strongly Disagree’. The scale yields scores for overall Mental Toughness and for each of its subscales: Commitment, Emotional Control, Life Control, Challenge, Interpersonal Confidence, and Confidence in Abilities. Connaughton and Hanton (2009) argued against the MTQ48 on the grounds that however reliable the instrument may be, it is based on a conceptual

framework that describes hardiness and not mental toughness. They argue that hardiness can be thought of as a component of mental toughness and that could be why Golby and Sheard (2004) found convergence and discrimination when comparing aspects of mental toughness and hardiness. The MTQ48 therefore assesses components of mental toughness but the belief of the previously mentioned critics of the questionnaire is that it does not coherently assess mental toughness. In addition, Gucciardi (2012) argued that there is little published evidence of the scale's psychometric properties. Its factor structure, in particular, has not been rigorously scrutinized using exploratory and confirmatory factor analysis (Gucciardi, 2012). The MTQ48 was not used in the present study because it is a commercial assessment tool and the cost of use was prohibitive.

Middleton et al. (2004) completed thorough research into mental toughness which culminated in the development of the Mental Toughness Inventory (MTI). The research was influential in that mental toughness was empirically investigated using both qualitative and quantitative methods. The MTI a 67-item mental toughness assessment instrument that measures 12 components of MT in addition to a global mental toughness factor, namely, self-efficacy, potential, mental self-concept, task familiarity, value, personal bests, goal commitment, perseverance, task focus, positivity, stress minimisation, and positive comparisons (Middleton, Marsh, Martin, Richards, & Perry, 2005). The reliability and validity of the MTI needs to be further established beyond the restricted sample used by Middleton et al. (2005) in which they found reliability coefficients ranging from .82 to .94. The MTI was not used in the present study because permission was refused by the developer.

Golby et al. (2007) assessed the construct validity of the PPI in a sample of 408 athletes drawn from eight different sporting codes. They conducted Principle Components Analysis on data from the 42-item PPI and found minimal support for the factor structure and, instead, their analyses yielded a four-factor 14-item shortened version of the PPI that they called the

Psychological Performance Inventory-Alternative (PPI-A). The PPI-A yields an overall mental toughness score, obtained from four sub-scale scores: determination (3 items), self-belief (4 items), positive cognition (4 items), and visualization (3 items). Golby et al. (2007) found the PPI-A to possess satisfactory psychometric properties, with adequate reliability and convergent and discriminant validity. Gucciardi (2012) raised concerns that the PPI-A's conceptualization of mental toughness corresponds with a particular conceptualization of mental toughness and that it lacks grounding in a theoretical framework as the PPI seems to have been based on Loehr's experience working with talented athletes and coaches, with no psychometric support offered for its use and researchers have since questioned the reliability and validity of the PPI (Connaughton & Hanton, 2009; Golby et al., 2007; Gucciardi & Gordon, 2009; Middleton et al., 2004). The construct definition and conceptual underpinning targeted by the original PPI has been found to be lacking (Golby et al., 2007) and the PPI-A was developed using the same data set to generate and test the model when assessing the PPI (Gucciardi, 2012)

Sheard, Golby, and van Wersch (2009) conducted research on the development of an assessment tool for mental toughness and developed the Sports Mental Toughness Questionnaire (SMTQ). The SMTQ is a 14-item measure of mental toughness that produces a general mental toughness score, based on three sub-scales, namely Confidence (6 items), Constancy (4 items), and Control (4 items)(Sheard et al., 2009). These authors found support for the factor structure, reliability, and validity of the measure and contend that the SMTQ improves upon a weakness of the PPI-A in that "the SMTQ is the only psychometrically acceptable mental toughness instrument that includes a measure of emotional and negative energy control, a characteristic routinely identified in the mental toughness literature" (Sheard et al., 2009, p.191).

Tibbert (2013) presented a very interesting summary of criticism of the SMTQ. While the SMTQ does appear to have adequate psychometric properties, criticism has been levelled at

the questionnaire by some researchers (Crust & Swann, 2011; Gucciardi, Mallett, Hanrahan, & Gordon, 2011). Gucciardi et al. (2011) suggested that the questionnaire lacks an explicit conceptual model underpinning its factor structure and might be considered to focus on mental skills rather than on mental toughness. Crust and Swann (2011) argued that Sheard et al. (2009) deviated from the multidimensional representation of mental toughness that appears in the literature by combining particular aspects of mental toughness into single scales. Some of the characteristics of mental toughness that have been identified in the literature, such as attention and focus and physical toughness, have also not been included in the SMTQ. Additional criticism was that a lack of clarity around the descriptions of the scales left the meanings of these scales open to interpretation (Gucciardi et al., 2011). There are questions around items, such as item 14, which appears to focus on control, yet is included in the confidence subscale. This apparent lack of operationalization could contribute to interpretive variability that might become more pronounced when a young sample is used.

Gucciardi, Gordon, and Dimmock (2008) conducted research on the definition and conceptualisation of mental toughness in Australian Rules football, before developing a mental toughness inventory for this context. Building on this research, Gucciardi and Gordon (2009) later developed the cricket Mental Toughness Inventory (cMTI), for which research findings have been promising, with Gucciardi and Gordon (2009) finding support for a five subscale, 15-item model with cricketers from several countries. The five subscales with the range of means, standard deviations and alpha coefficients found by Gucciardi and Gordon (2009) are *Affective intelligence* ( $M = 5.34 - 5.35$ ,  $SD = .96 - 1.01$ ,  $\alpha = .71 - .72$ ), *Desire to achieve* ( $M = 5.87 - 5.89$ ,  $SD = .97 - 1.01$ ,  $\alpha = .74 - .80$ ), *Resilience* ( $M = 5.65 - 5.67$ ,  $SD = .81 - .85$ ,  $\alpha = .70$ ), *Attentional control* ( $M = 5.48 - 5.55$ ,  $SD = .85 - .89$ ,  $\alpha = .69 - .70$ ), and *Self-belief* ( $M = 4.37 - 4.42$ ,  $SD = 1.26 - 1.31$ ,  $\alpha = .71 - .74$ ). These subscales have been found to be negatively correlated with all three subscales of the Athlete Burnout Questionnaire ( $r = -.15$  to  $-.43$ ), and

positively correlated with dispositional flow<sup>2</sup> ( $r = -.01 - .54$ ), hardiness ( $r = .05 - .38$ ), and resilience ( $r = .35 - .54$ ). The cMTI was not used in the present study because permission was refused by the developers.

Gucciardi and Gordon (2009) included the Athletic Burnout Questionnaire (Raedeke & Smith, 2001) in their research into the development of the cMTI in order to provide a discriminant measure against mental toughness because burnout is considered to be conceptually related to mental toughness (Crust, 2008; Gucciardi & Gordon, 2009; Middleton et al., 2004). In addition, higher levels of burnout scores have been shown to be significantly correlated with higher levels of stress and lower levels of coping ability in adolescent individuals (Nicholls, Polman, Morley, & Taylor, 2009). This is useful in the present study because Mental toughness functions as a moderator of stress, helping people manage stressors in their environment, which assists people in performing at improved levels and in responding more positively to stress (Fletcher, 2005; Gerber et al., 2013).

The current research aims to conduct psychometric testing on the PPI-A and the SMTQ, in a sample of cricketers drawn from the Eastern Cape Province in South Africa, in order to present data on the internal consistency and validity of these inventories. Convergent validity will be assessed by correlating the PPI-A and the SMTQ, and discriminant validity will be assessed by correlating scores on these inventories with scores in the ABQ.

## **Method**

### **Participants**

Cricket players from the Eastern Cape, South Africa were sampled using purposive sampling and requested to complete an assessment package consisting of a set of demographic questions,

---

<sup>2</sup> The authors reported one negative correlation of  $-.01$  between *Affective Intelligence* on the cMTI and *Time* on the *Dispositional Flow Scale - 2*

the PPI-A, the SMTQ, and the ABQ. The cricketers were approached via clubs, universities, schools, social media, and word of mouth. The response rate was slow and, in total, 127 cricketers completed the assessment packages, ranging in age from 11 -34 ( $M = 16.62$ ,  $SD = 4.61$ ). There were 118 male respondents ( $M_{\text{age}} = 16.61$ ;  $SD = 4.75$ ; age range: 11-34) and nine female respondents ( $M_{\text{age}} = 16.33$ ,  $SD = 2.24$ , age range = 13-19). The levels at which the cricketers played ranged from school to semi-professional.

### **Instruments**

Two mental toughness questionnaires were used in this research, namely the Psychological Performance Inventory – Alternative (PPI-A) and the Sports Mental Toughness Questionnaire (SMTQ). The Athlete Burnout Questionnaire (ABQ) was incorporated into the research in order to provide a discriminant measure against mental toughness, in a similar manner to the research conducted by Gucciardi and Gordon (2009) during the development of the cMTI.

*Psychological Performance Inventory–Alternative:* The PPI-A consists of four subscales (Determination, Self-belief, Positive Control, and Visualization) and an overall MT score. There are 14 items in total, each assessed on a five-point Likert scale (“Almost Always”, “Often”, “Sometimes”, “Seldom”, and “Almost Never”), with overall scores ranging from 14 - 70. The Determination subscale consists of three items (scores ranging from 3 - 15), the Self-belief subscale consists of four items (scores ranging from 4 - 20), the Positive Control subscale consists of four items (scores ranging from 4 - 20), and the Visualization subscale consists of three items (scores ranging from 3 - 15). Golby et al. (2007) reported that the reliability of the PPI-A was adequate for each of the following four subscales: Determination ( $\alpha = .72$ ), Self-belief ( $\alpha = .84$ ), Positive Cognition ( $\alpha = .75$ ), and Visualization ( $\alpha = .78$ ). Correlations between the subscales of the PPI-A were as follows: Determination - Self-belief = .56, Determination -

Positive Cognition = .57, Determination - Visualization = .53, Self-belief - Positive Cognition = .63, Self-belief – Visualization = .50, Positive Cognition – Visualization = .54.

*Sports Mental Toughness Questionnaire (SMTQ)*: There are 14 items in total, each assessed on a four-point Likert scale (“Not at all true”, “A little true”, “Mostly true”, and “Very true”) that assess three subscales, namely, the Confidence subscale (consisting of six items with scores ranging from 6 - 24), the Constancy subscale (consisting of four items with scores ranging from 4 - 16), and the Control subscale (consisting of four items with scores ranging from 4 - 16). The overall score can range from 14 - 56 and the internal consistencies of the subscales have been found to be acceptable for Confidence ( $\alpha = .80$ ), Constancy ( $\alpha = .74$ ), and Control ( $\alpha = .71$ ), while the correlations between the subscales range between .22 and .48 (Sheard et al., 2009).

*Athlete Burnout Questionnaire (ABQ)*: The ABQ consists of 15 items and assesses three subscales, namely the reduced sense of accomplishment subscale, the sport devaluation subscale, and the emotional/physical exhaustion subscale (each subscale consisting of 5 items with scores ranging from 5 - 25). All items use a five-point Likert scale (“Almost Never”, “Rarely”, “Sometimes”, “Frequently”, and “Almost Always”). The Total Burnout Score is obtained by averaging the three subscale scores, with scores ranging from five to 25. Raedeke and Smith (2001; 2009) reported acceptable internal consistency results for the three subscales: reduced sense of accomplishment ( $\alpha = .78$ ), emotional and physical exhaustion ( $\alpha = .91$ ), and sport devaluation ( $\alpha = .87$ ). Other researchers have found Cronbach’s alpha coefficients of .86 – .90 for the Global ABQ score and alpha coefficients for the subscales ranging from .71 – .89 (Cresswell & Eklund, 2006; Dubuc-Charbonneau, Durand-Bush, & Forneris, 2014; Gucciardi & Gordon, 2009; Lonsdale, Hodge, & Rose, 2009). Correlation coefficients between the subscales were reported as *emotional and physical exhaustion - a reduced sense of accomplishment* = .55 (Cresswell & Eklund, 2006) and .42 (Lonsdale et al., 2009), *emotional*

*and physical exhaustion - sport devaluation* = .74 (Cresswell & Eklund, 2006) and .40 (Lonsdale et al., 2009), and *a reduced sense of accomplishment - sport devaluation* = .69 (Cresswell & Eklund, 2006) and .41 (Lonsdale et al., 2009).

### **Procedure**

An assessment package was compiled, consisting of a cover letter, demographic questions section, and the three inventories, which cricketers were asked to complete in paper-and-pencil format. The cover letter explained the study honestly and made ethical considerations clear, especially regarding the voluntary nature of participation, confidentiality and anonymity, and that anyone under 18 years of age had to have parental consent in order to participate. Gatekeepers were contacted and requests were made for the researcher to gain access in order to administer the questionnaires. Where this was not possible, the gatekeepers decided to administer questionnaires themselves. Sponsored prizes were arranged with companies (namely, a *Fernley* full junior cricket kit, *Bellingham & Smith* cricket bat, and a set of batting gloves and a ball) and participants were entered into a prize draw if they chose to include their names and contact details at the end of the assessment package. Participants were also invited to leave their names and contact details and indicate if they wanted feedback from the researcher.

### **Data analyses**

*Internal consistency and reliability.* Cronbach's Alpha ( $\alpha$ ) is the most widely used measure of internal consistency, which compares the degree to which each item in a scale correlates with each other item (Diamantopoulos & Schlegelmilch, 1997). Cronbach's Alpha considers the average correlation among all the items along with the number of items (Steele & Edwards, 2008). The value of  $\alpha$  can range from 0 (no internal consistency) to 1 (maximum internal

consistency). Nunnally (1978) has recommended that scales have  $\alpha$  of .50 to .70 for early stages of developing an instrument and .80 or above for basic research tools.

*Mean and standard deviation by item:* The means and standard deviations reported for each item are useful as they provide information on the item being assessed and the number of respondents and the level each person reports for the characteristic being measured (Steele & Edwards, 2008).

*Item-total correlations.* Item-total correlations ( $r_{tot}$ ) assess the correlation between individual responses to each item and the total scores on the scale. Black (1999) has argued that this is the best method of evaluating how individual items perform within the scale. The calculation comprises correlating the specific item with the test score minus that item, which will take into account the influence of the particular item on the test score. High  $r_{tot}$  indicates thematic relations to other items in the scale, while low  $r_{tot}$  are indicative of items that assess characteristics different to the underlying theme or construct and are usually discarded in the design of scales (Steele & Edwards, 2008).

## **Results and Discussion**

### **Psychological Performance Inventory (PPI-A)**

The  $\alpha$  coefficient for the overall PPI-A was .75, which indicates a moderate level of internal consistency. This result is slightly lower but similar to the  $\alpha = .81 - .85$  found in previous research using the PPI-A (Golby et al., 2007; Masum, 2014; Newland, Newton, Finch, Harbke, & Podlog, 2013). The average inter-item correlation was 0.17, with a mean of 55.43 and *SD* of 6.14. The overall scores on the PPI-A can range from 14 to 70, so the obtained mean of 55.43 reflects a relatively high mean score achieved by participants in this study. The mean age of participants is 16.62 (*SD* = 4.61) and less than six percent of the entire sample indicated that they spend much, if any, time practising mental skills training, with these mostly indicating

*focus* as the mental skills they practice. This raises the question whether the participants in the study may perhaps have overestimated their mental skills ability in general, and mental toughness specifically. The  $\alpha$  coefficients for the subscales were relatively low at  $\alpha = .58$  for Determination,  $\alpha = .56$  for Self-Belief,  $\alpha = .50$  for Positive Cognition, and  $\alpha = .50$  for Visualization. These are all considerably lower than those reported by Golby et al. (2007) for the four subscales: Determination ( $\alpha = .72$ ), Self-belief ( $\alpha = .84$ ), Positive Cognition ( $\alpha = .75$ ), and Visualization ( $\alpha = .78$ ). The means, standard deviations, and corrected item-total correlations for each of the items on the PPI-A are presented in Table 1, along with the item-total correlations reported by Golby et al. (2007).

Table 1

*Means, standard deviations and corrected item-total correlations for the PPI-A*

	<b>Mean</b>	<b>SD</b>	<b>r<sub>tot</sub></b>	<b>r<sub>tot</sub><sup>3</sup></b>
<b>PPIQ1</b>	3.95	0.89	.47	.64
<b>PPIQ2</b>	4.16	0.80	.49	.64
<b>PPIQ3</b>	3.40	1.15	.33	.71
<b>PPIQ4</b>	4.35	0.83	.38	.63
<b>PPIQ5</b>	3.98	1.01	.17	.56
<b>PPIQ6</b>	3.64	1.04	.27	.64
<b>PPIQ7</b>	3.66	0.81	.32	.54
<b>PPIQ8</b>	3.85	1.11	.37	.65
<b>PPIQ9</b>	4.09	1.10	.29	.57
<b>PPIQ10</b>	3.90	0.92	.41	.68
<b>PPIQ11</b>	4.50	0.73	.46	.61
<b>PPIQ12</b>	3.62	0.93	.41	.58
<b>PPIQ13</b>	4.59	0.67	.27	.49
<b>PPIQ14</b>	3.74	0.77	.36	.54

<sup>3</sup> Item-total correlations found by Golby et al. (2007)

The item-total correlations for the individual items of the PPI-A in this research range from .17 to .49 which are considerably lower than those found by Golby et al. (2007), which ranged from .49 to .71. (Mean variance of .25) Golby et al.'s (2007) sample consisted of 408 sport performers ranging in age from 12 to 63 years. The item-total correlation for *Item 5* is particularly low and does not appear to correlate well with the overall scale in this particular sample of cricketers. This item queries whether the participants' self-talk is negative during competition and 70.08% of the sample responded "Seldom" and "Almost Never", with a further 22.83% indicating that they "Sometimes" have negative self-talk during competition (92.91% of the sample in total). This is unusual for a sample of this nature and this finding reinforces the idea that the participants in the study ( $M_{\text{age}} = 16.62$ ) may have overestimated their abilities in regard to mental skills or possibly that they are not self-aware as it pertains to mental skills. The majority of the sample indicated that they had little or no exposure to mental skills training which raises the possibility that they may not have understood of the meaning of the term negative self-talk and possibly others in the research. Another consideration could be that the sample characteristics played a role in the higher scores obtained by Golby et al. (2007), because of the varied sporting codes they accessed. This consideration is addressed by Gucciardi (2012, p. 393) who argued that regardless of sampling procedure, mental toughness "consists of a core group of key components that would not vary significantly by sport." Even so, whereas mental toughness may have a universal structure at its core, some peripheral differences may occur in its experience/expression across different sporting codes. Other factors that could have played a role are sample size, age distribution, performance level, language proficiency, given 11 official languages in SA and accompanying cultural/conceptual differences of terminology.

The subscales of the PPI-A were correlated with one another and these are presented in Table 2. The correlations between the subscales ranged from .22 to .39.

Table 2

*Correlations of subscales for the PPI-A*

	<b>Self-Belief</b>	<b>Positive Cognition</b>	<b>Visualization</b>
Determination	<i>.22</i>	<i>.35</i>	<i>.38</i>
Self-Belief	-	<i>.39</i>	<i>.32</i>
Positive Cognition		-	<i>.33</i>
Visualization			-

*p* < .01

Previously, Golby et al. (2007) reported correlations for the subscales of the PPI-A ranging between .50 and .63 and Gucciardi (2012) reported correlations for these subscales ranging between .19 and .47. In the present study, the correlations ranged between .22 and .39 which are very much in line with the findings previously reported by Gucciardi (2012); mean variance = .03) and are considerably lower than those reported by Golby et al. (2007); mean variance = .22). Table 3 contains a comparison of the correlations for each of the subscales of the PPI-A with one another, obtained in the present study, along with those found in the studies conducted by Golby et al. (2007) and Gucciardi (2012).

Table 3

*Subscales correlation of the PPI-A with one another, obtained in the present study, along with those found in the studies conducted by Golby et al. (2007) and Gucciardi (2012).*

	<b>Current study</b>	<b>Golby et al. (2007)</b>	<b>Gucciardi (2012)</b>
<b>Determination – Self-belief</b>	.22	.56	.30
<b>Determination – Positive cognition</b>	.35	.57	.36
<b>Determination – Visualization</b>	.38	.53	.37
<b>Self-belief – Positive cognition</b>	.39	.63	.47
<b>Self-belief – Visualization</b>	.32	.50	.19
<b>Positive cognition – Visualization</b>	.33	.54	.45

### **Sports Mental Toughness Questionnaire (SMTQ)**

The  $\alpha$  coefficient for the overall SMTQ was .68, which indicates a moderate level of internal consistency. Nunnally and Bernstein (1994) contend that .70 may be an acceptable minimum for a newly developed scale. The average inter-item correlation was .14, with a mean of 40.66 and *SD* of 5.11. The maximum score for the scale is 56, so the cricket players in the sample again scored themselves reasonably high on mental toughness characteristics (range = 27 – 52), which may be partly due to a naïve comprehension of the construct. The  $\alpha$  coefficients for the subscales were  $\alpha = .71$  for Confidence,  $\alpha = .48$  for Constancy, and  $\alpha = .43$  for Control. The alpha coefficient found for Confidence was slightly lower than the .80 found by Sheard et al. (2009), while the other two were considerably lower than those found by Sheard et al. (2009), which were .74 (Constancy), and .71 (Control). These differences may have been impacted by Sheard et al.'s (2009) sample characteristics that were considerably different to those of the current study. Their sample consisted of 633 performers, ranging from 16 to 63 years old (427 males, 206 females;  $M_{age} = 21.5$ ;  $SD = 5.48$ ), drawn from 25 sporting codes. The sample in the

current study consisted of 127 cricketers (118 males, 9 females) ranging in age from 11 -34 ( $M_{age} = 16.62$ ,  $SD = 4.61$ ). The means, standard deviations, and corrected item-total correlations for each of the items on the SMTQ are presented in Table 4.

Table 4

*Means, standard deviations and corrected item-total correlations for the SMTQ*

<b>Means and Standard Deviations-SMTQ</b>			
	<b>Mean</b>	<b>SD</b>	<b>r<sub>tot</sub></b>
<b>SMTQ1</b>	2.84	0.75	.24
<b>SMTQ2*</b>	2.68	0.75	.13
<b>SMTQ3</b>	3.45	0.73	.44
<b>SMTQ4*</b>	1.99	1.02	.14
<b>SMTQ5</b>	3.12	0.78	.42
<b>SMTQ6</b>	2.64	0.76	.32
<b>SMTQ7*</b>	2.51	0.93	.20
<b>SMTQ8</b>	3.10	0.87	.43
<b>SMTQ9*</b>	2.93	0.94	.14
<b>SMTQ10*</b>	3.07	0.87	.16
<b>SMTQ11</b>	2.82	0.91	.28
<b>SMTQ12*</b>	3.55	0.77	.29
<b>SMTQ13</b>	3.07	0.64	.48
<b>SMTQ14</b>	2.85	0.81	.49

\* negatively worded items

Plettenberg-Lenhausen (2013) found item-total correlations ranging from .25 – .60. In the present study the item-total correlations ranged from .13 – .49. It is concerning that the negatively worded items produced such low item-total correlations. Items 2, 4, 7, 9, and 10 produced item-total correlations which ranged from .06 – .20. Data entry was re-examined and results were confirmed by statistical consultants, which raises questions around either the items

of the inventory and/or the participants' understanding of and engagement with the items. A similar situation was experienced by Hodge, Lonsdale, and Ng (2008) when conducting research using the ABQ and in their interpretation, they reported that three negatively worded items produced scores with low item-total correlations (Lonsdale et al., 2009). Hodge et al. (2008) further reported that removing the items improved the alpha scores, which could suggest a systematic problem in how the items were composed. The subscales of the SMTQ were correlated with one another and are presented in Table 5 along with those found by Sheard et al. (2009). The correlations between the subscales ranged between .16 and .53. Sheard et al. (2009) previously reported values ranging between .50 and .84. The values in the present study are lower than those found by Sheard et al. (2009).

Table 5

*Correlations of each of the subscales of the SMTQ with one another, obtained in the present study, along with those found by Sheard et al. (2009)*

	<b>Current study</b>	<b>Sheard et al. (2009)</b>
<b>Confidence-Constancy</b>	.53	.22
<b>Confidence-Control</b>	.16	.24
<b>Constancy-Control</b>	.26	.44

*p* < .01

### **Athlete Burnout Questionnaire (ABQ)**

The  $\alpha$  coefficient for the overall ABQ was .87, which indicates a high level of internal consistency. This high level of internal consistency with the same sample for which low alpha coefficients were found for the PPI-A and SMTQ, raise questions about the performance of the scales as opposed to sample issues being the reason for low alpha coefficients. The average inter-item correlation was .31, with a mean of 31.92 and SD of 9.68. The  $\alpha$  coefficients for the

subscales were  $\alpha = .82$  for Emotional/Physical exhaustion ( $M = 10.8$ ,  $SD = 4.1$ ,  $r_{tot} = .48$ ),  $\alpha = .67$  for Reduced sense of accomplishment ( $M = 11.57$ ,  $SD = 3.49$ ,  $r_{tot} = .31$ ), and  $\alpha = .79$  for Sport devaluation ( $M = 9.3$ ,  $SD = 4.3$ ,  $r_{tot} = .45$ ). Research has found values of .86 – .90 for the overall ABQ, while alpha coefficients for the subscales have been found ranging from .71-.91, with values typically found to be above .80 (J. M. Black & Smith, 2007; Cresswell & Eklund, 2004; Cresswell & Eklund, 2005a; Cresswell & Eklund, 2005b; Dubuc-Charbonneau et al., 2014; Lemyre, Treasure, & Roberts, 2006; Lonsdale, Hodge, & Rose, 2006; Lonsdale, Hodge, & Jackson, 2007; Lonsdale et al., 2009). The internal consistency levels found in the present study compare well with those found by Grobbelar, Malan, Steyn, and Ellis (2010) among student rugby players in a South African sample (Cronbach's Alpha values of .73 to .81 for the three subscales and the total burnout score). The internal consistency for reduced sense of accomplishment in this study ( $\alpha = .67$ ) was somewhat lower than was found in the literature. The means, standard deviations, and corrected item-total correlations for each of the items on the ABQ are presented in Table 7.

Table 7

*Means, standard deviations and corrected item-total correlations for the ABQ*

	<b>Mean</b>	<b>Std.Dev.</b>	<b>r<sub>tot</sub></b>
<b>ABQ1</b>	2.21	0.92	0.31
<b>ABQ2</b>	2.75	1.07	0.43
<b>ABQ3</b>	2.02	1.21	0.42
<b>ABQ4</b>	2.23	1.20	0.49
<b>ABQ5</b>	2.05	0.98	0.49
<b>ABQ6</b>	1.85	1.21	0.61
<b>ABQ7</b>	2.80	1.17	0.47
<b>ABQ8</b>	1.90	1.02	0.62
<b>ABQ9</b>	1.89	1.25	0.68
<b>ABQ10</b>	1.96	1.10	0.56
<b>ABQ11</b>	2.04	1.15	0.54
<b>ABQ12</b>	2.03	1.03	0.52
<b>ABQ13</b>	2.40	1.14	0.50
<b>ABQ14</b>	2.11	0.98	0.47
<b>ABQ15</b>	1.69	0.92	0.51

The item-total correlations found in this study ranged from .31 to .68 which is acceptable. In the very limited research citing the item-total correlations of the ABQ, DiSanti (2015) found that Item 5 (.345) and Item 9 (.305) were the items with the lowest item-total correlations.

In the current research on the ABQ, the correlation found between reduced sense of accomplishment and sport devaluation was .56 ( $p < 0.001$ ), between emotional/physical exhaustion and sport devaluation it was .53 ( $p < 0.001$ ), and between emotional/physical exhaustion and reduced sense of accomplishment it was .43 ( $p < 0.001$ ). Other researchers have found correlations between reduced sense of accomplishment and sport devaluation ranging from .47 to .74; between emotional/physical exhaustion and sport devaluation ranging from .35

to .68; and between emotional/physical exhaustion and reduced sense of accomplishment from .21 to .56 (J. M. Black & Smith, 2007; Cresswell & Eklund, 2005a; Cresswell & Eklund, 2005b; Cresswell & Eklund, 2006; Dubuc-Charbonneau et al., 2014; Lemyre et al., 2006; Lonsdale et al., 2006; Lonsdale et al., 2007; Lonsdale et al., 2009). Raedeke and Smith (2009) reported the typical correlations for the three subscales with one another as .60 for reduced sense of accomplishment and sport devaluation, .53 for emotional/physical exhaustion with sport devaluation, and .35 for emotional/physical exhaustion and reduced sense of accomplishment.

### **Correlations: Convergent and Discriminant validity**

Pearson's Correlation coefficients were calculated between the total scores of the PPI-A and the SMTQ in order to contribute towards establishing convergent validity and found a positive, significant correlation of .44 ( $p < 0.001$ ), indicating that 19% of the variation in the one instrument is explained by the other. Wieser and Thiel (2014) found a correlation of .71 in a sample of 20 male professional football players.

Discriminant validity was investigated by correlating the total scores of both the PPI-A and the SMTQ with the total scores of the ABQ. A significant, negative, correlation of -.28 ( $p = .01$ ) was found between the PPI-A and the ABQ, and a negative correlation of -.16 ( $p = .01$ ) was found between the SMTQ and the ABQ. The subscales of the ABQ were negatively correlated with those of the PPI-A (-.16 to -.38) and the SMTQ (-.09 to -.17). Gucciardi and Gordon (2009) found negative correlations between mental toughness and burnout when comparing the cricket Mental Toughness Inventory with the ABQ (-.15 to -.43). This finding is very much in line with the findings in the current research and is supported by previous research indicating

that burnout is conceptually inversely related to mental toughness (Crust, 2008; Gucciardi & Gordon, 2009).

## **Conclusion**

The goal of the current research was to conduct psychometric testing on the PPI-A and the SMTQ, in a sample of cricketers drawn from the Eastern Cape Province in South Africa, in order to present data on the internal consistency and validity of these inventories. Convergent validity would be assessed by correlating the respondents' scores on the PPI-A and the SMTQ. The scores on these two inventories would then be correlated with the respondents' scores on the ABQ in order to contribute to the discriminant validity assessment of the inventories. The current paper presents data on these analyses and considers the results in relation to previous research literature. The findings reinforce previous findings of research on these two inventories (Golby et al., 2007; Gucciardi, 2012; Middleton et al., 2005; Sheard et al., 2009).

The PPI-A displayed a moderate-to-strong level of internal consistency for global mental toughness, although the  $\alpha$  coefficients for the subscales were low and ranged from .50 to .58, raising questions about dimensionality. The global mental toughness results compare well with results found by Golby et al. (2007), Masum (2014), and Newland, Newton, Finch, Harbke, and Podlog (2013), while the subscale  $\alpha$  coefficients were considerably lower than those found by Golby et al. (2007) and more comparable, yet lower, than with the results found by Gucciardi (2012), in which the  $\alpha$  coefficients for the subscales ranged from .60 to .69. Gucciardi (2012) found encouraging factorial validity results for the PPI-A but the low internal consistency results reinforced the concerns of other research, such as Middlton et al. (2004), which suggests that there may be problems with the items that were constructed to capture the components of mental toughness measured in the PPI-A because it was derived from the PPI, which was based on anecdotal evidence and for which no psychometric properties were

provided. The correlations between the subscales of the PPI-A ( $r = .22 - .39$ ) were considerably lower than those found by Golby et al. (2007) ( $r = .50 - .63$ ) and very much in line with the subscale correlations found by Gucciardi (2012) ( $r = .19 - .47$ ). These results raise questions about the subscales, suggesting a substantial conceptual difference between the subscales.

The SMTQ displayed a moderate global internal validity with  $\alpha = .68$  and the internal consistency of the subscales ranged from .43 to .71, with internal consistency of Constancy and Control notably affected by negatively worded items. Asamoah (2013) found similar results in a South African sample with internal consistency for the subscales ranging from .41 - .67. The subscales of Constancy and Control were also particularly low ( $\alpha = .50$  and .41). In discussing the results in relation to the sample, Asamoah (2013) made reference to the “relatively poor psychological skill level of the study population” (p. 106) of his study. The results in the current study and Asamoah (2013) are considerably lower than those found by Sheard et al. (2009), namely  $\alpha$  ranging from .71 - .80. The correlations for the subscales ( $r = .16 - .53$ ) were comparable to the  $r = .24 - .44$  found by Sheard et al. (2009) and to the  $r = .25$  to .60 found by Plettenberg-Lenhausen (2013).

The Total Burnout Score for the ABQ showed a high degree of internal consistency ( $\alpha = .87$ ) which compares well with the internal consistency range of  $\alpha = .86 - .90$  that Raedeke and Smith (2001) found in their initial research of the ABQ. The internal consistency of the subscales ( $\alpha = .67 - .82$ ) are well within range of the findings in the research literature for internal consistency, which range from  $\alpha = .71 - .91$ . (Cresswell & Eklund, 2006; Raedeke & Smith, 2001). Moderate correlations were found between the subscales of the ABQ ( $r = .43 - .56$ ), which once again are within the range of the results presented in the research literature of  $r = .21 - .74$ .

The convergent validity of the PPI-A and the SMTQ was assessed by correlating the total scores of these instruments and revealed a moderate correlation of  $r = .44$ , which is lower than

the reported .71 found by Wieser and Thiel (2014). This suggests that only 19% of the variation in the one instrument is explained by the other and is lower than would have been expected. It remains unclear though, whether the lower results found for some aspects of the inventories in this research are due to problems with the instruments or related to issues with the sample that have been previously mentioned. The relatively young mean age of the sample, combined with the lack of experience in mental skills and in their sport in general could have influenced the findings in this research study. A follow-up replication is recommended with a more mature sample in a South African context.

The discriminant validity of the instruments was assessed by comparing total scores of the two mental toughness instruments (PPI-A & SMTQ) with the total scores of the ABQ. The current study found negative correlations between the mental toughness instruments and the ABQ ( $r = -.28$  with the PPI-A and  $r = -.16$  with the SMTQ). The subscales of the mental toughness instruments were also found to be negatively correlated with those of the ABQ ( $r = -.16$  to  $r = -.38$  with the PPI-A and  $r = -.09$  to  $-.17$  with the SMTQ). These findings are very similar to those of Gucciardi and Gordon (2009) and reinforce the link between mental toughness and burnout.

The ABQ was found to be psychometrically sound in the present study and compared well with results found in the literature, whereas the PPI-A and the SMTQ produced results, with the same sample, that compared less well with results from the literature. While the PPI-A and the SMTQ displayed some promising psychometric properties in the current study, researchers should apply these mental toughness inventories with circumspection, taking into account questions raised regarding dimensionality, item formulation and variation in sample characteristics (e.g., age and sporting code); until more research can be conducted using these inventories with larger and more varied samples and the understanding of the mental toughness construct improves.

## References

- Asamoah, B. (2013). *The role of mental toughness, psychological skills and team cohesion in soccer performance*. (Unpublished Master's Thesis). Stellenbosch University, Stellenbosch, South Africa.
- Black, J. M., & Smith, A. L. (2007). An examination of Coakley's perspectives on identity, control, and burnout among adolescent athletes. *International Journal of Sport Psychology, 38*, 417-436.
- Black, T. R. (1999). *Doing quantitative research in the social sciences: An integrated approach to research design, measurement and statistics*. London: Sage.
- Clough, P., Earle, K., & Sewell, D. (2002). Mental toughness: The concept and its measurement. In I. Cockerill (Ed.), *Solutions in sport psychology* (pp. 32-43). Cornwall: Thomson.
- Connaughton, D., & Hanton, S. (2009). Mental toughness in sport: Conceptual and practical issues. In D. Mellalieu, & S. Hanton (Eds.), *Advances in applied sport psychology: A review* (pp. 317-346). Cornwall: Routledge.
- Cresswell, S. L., & Eklund, R. C. (2004). The athlete burnout syndrome: possible early signs. *Journal of Science and Medicine in Sport, 7*(4), 481-487.
- Cresswell, S. L., & Eklund, R. C. (2005a). Changes in athlete burnout and motivation over a 12-week league tournament. *Medicine and Science in Sports and Exercise, 37*(11), 1957-1966.

- Cresswell, S. L., & Eklund, R. C. (2005b). Motivation and burnout among top amateur rugby players. *Medicine and Science in Sports and Exercise*, 37(3), 469-477.
- Cresswell, S. L., & Eklund, R. C. (2006). The convergent and discriminant validity of burnout measures in sport: A multi-trait/multi-method analysis. *Journal of Sports Sciences*, 24(2), 209-220. doi:10.1080/02640410500131431
- Crust, L. (2007). Mental toughness in sports: A review. *International Journal of Sport and Exercise Psychology*, 5, 270-290.
- Crust, L. (2008). A review and conceptual re-examination of mental toughness: Implications for future researchers. *Personality and Individual Differences*, 45(7), 576-583. doi:10.1016/j.paid.2008.07.005
- Crust, L., & Swann, C. (2011). Comparing two measures of mental toughness. *Personality and Individual Differences*, 50, 217-221. doi:10.1016/j.paid.2010.09.032
- Diamantopoulos, A., & Schlegelmilch, B. B. (1997). *Taking the fear out of data analysis: A step-by-step approach*. London: Dryden Press.
- DiSanti, J. S. (2015). *Congruency between expectations of high school coach and athlete off-season activities: Is sport diversification a realistic option?* (Unpublished Masters Thesis). Miami University, Oxford, OH.
- Dubuc-Charbonneau, N., Durand-Bush, N., & Forneris, T. (2014). Exploring levels of student-athlete burnout at two Canadian universities. *Canadian Journal of Higher Education*, 44(2), 135-151.

- Fletcher, D. (2005). Mental toughness and human performance: Definitional, conceptual and theoretical issues. *Journal of Sports Sciences*, 23, 1246-1247.
- Fourie, S., & Potgieter, J. R. (2001). The nature of mental toughness in sport. *South African Journal for Research in Sport, Physical Education and Recreation*, 23(2), 63-72.
- Gerber, M., Brand, S., Feldmeth, A. K., Lang, C., Elliot, C., Holsboer-Trachsler, E., & Pühse, U. (2013). Adolescents with high mental toughness adapt better to perceived stress: A longitudinal study with Swiss vocational students. *Personality and Individual Differences*, 54(7), 808-814. doi:10.1016/j.paid.2012.12.003
- Golby, J., & Sheard, M. (2004). Mental toughness and hardiness at different levels of rugby league. *Personality and Individual Differences*, 37(5), 933-942.  
doi:10.1016/j.paid.2003.10.015
- Golby, J., Sheard, M., & van Wersch, A. (2007). Evaluating the factor structure of the Psychological Performance Inventory (PPI). *Perceptual and Motor Skills*, 105(1), 309-325. doi:10.2466/pms.105.1.309-325
- Grobbelaar, H., Malan, D., Steyn, B., & Ellis, S. (2010). Factors affecting the recovery-stress, burnout and mood state scores of elite student rugby players. *South African Journal for Research in Sport, Physical Education, and Recreation*, 32(2), 41-55. doi: 10.4314/sajrs.v32i2.59296
- Gucciardi, D. F. (2012). Measuring mental toughness in sport: A psychometric examination of the Psychological Performance Inventory-A and its predecessor. *Journal of Personality Assessment*, 94(4), 393-403. doi:10.1080/00223891.2012.660292

- Gucciardi, D. F., & Gordon, S. (2009). Development and preliminary validation of the Cricket Mental Toughness Inventory (CMTI). *Journal of Sport Sciences*, 27(12), 1293-1310. doi:10.1080/02640410903242306
- Gucciardi, D. F., Gordon, S., & Dimmock, J. (2008). Towards an understanding of mental toughness in Australian football. *Journal of Applied Sport Psychology*, 20(3), 261-281. doi:10.1080/10413200801998556
- Gucciardi, D. F., Mallett, C., Hanrahan, S., & Gordon, S. (2011). Measuring mental toughness in sport: Current stats and future directions. In D. F. Gucciardi, & S. Gordon (Eds.), *Mental toughness in sport: Developments in research and theory* (pp. 108-132). London: Routledge.
- Hodge, K., Lonsdale, C., & Ng, J. Y. Y. (2008). Burnout in elite rugby: Relationships with basic psychological needs fulfilment. *Journal of Sport Sciences*, 26(8), 835-844.
- Jones, G., Hanton, S., & Connaughton, D. (2002). What is this thing called mental toughness? An investigation of elite sport performers. *Journal of Applied Sport Psychology*, 14, 205-218. doi:10.1080/10413200290103509
- Lemyre, P. N., Treasure, D. C., & Roberts, G. C. (2006). Influence of variability in motivation and affect on elite athlete burnout susceptibility. *Journal of Sport & Exercise Psychology*, 28, 32-48.
- Loehr, J. E. (1986). *Mental toughness training for sports: Achieving athletic excellence*. Lexington, Massachusetts: The Stephen Greene Press.

- Lonsdale, C., Hodge, K., & Jackson, S. A. (2007). Athlete engagement: II. Development and initial validation of the Athlete Engagement Questionnaire. *International Journal of Sport Psychology*, 38(4), 471-492.
- Lonsdale, C., Hodge, K., & Rose, E. (2006). Pixels vs. paper: Comparing online and traditional survey methods in sport psychology. *Journal of Sport and Exercise Psychology*, 28, 100-108.
- Lonsdale, C., Hodge, K., & Rose, E. (2009). Athlete burnout in elite sport: a self-determination perspective. *Journal of Sports Sciences*, 27(8), 785-795.  
doi:10.1080/02640410902929366
- Maddi, S. R. (1994). The hardiness enhancing lifestyle program (HELP) for improving physical, mental, and social wellness. In C. Hopper (Ed.), *Wellness lecture series* (). Oakland: University of California/HealthNet.
- Maddi, S. R. (2002). The story of hardiness: Twenty years of theorizing, research, and practice. *Consulting Psychology Journal*, 54, 173-185.
- Masum, R. (2014). A mixed method analysis of mental toughness in elite and sub-elite male and female tennis players in Pakistan. *Advances in Social Sciences Research Journal*, 1(6), 110-122.
- Middleton, S. C., Marsh, H. W., Martin, A. J., Richards, G. E., & Perry, C. (2005). Developing a test for mental toughness: The mental toughness inventory (MTI). *Australian Association for Research in Education. Conference*, Parramatta.

- Middleton, S. C., Marsh, H. W., Martin, A. J., Richards, G. E., Savis, J., Perry, C., & Brown, R. (2004). The Psychological Performance Inventory: Is the mental toughness test tough enough? *International Journal of Sport Psychology*, 35(2), 91-108.
- Murphy, S. M., & Tammen, V. (1998). In search of psychological skills. In J. L. Duda (Ed.), *Advances in sport and exercise psychology measurement*. (pp. 195-209). Morgantown, WV: Fitness Information Technology.
- Newland, A., Newton, M., Finch, L. M., Harbke, C. R., & Podlog, L. (2013). Moderating variables in the relationship between mental toughness and performance in basketball. *Journal of Sport and Health Sciences*, 2, 184-192. doi:10.1016/j.jshs.2012.09.002
- Nicholls, A. R., Polman, R. C. J., Morley, D., & Taylor, N. (2009). Coping and coping effectiveness in relation to a competitive sport event: pubertal status, chronological age, and gender among adolescent athletes. *Journal of Sport and Exercise Psychology*, 31(3), 299-317.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York, NY: McGraw-Hill.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.
- Plettenberg-Lenhausen, L. (2013). *Performance correlates of mental toughness among female thai boxers*. (Unpublished Doctoral dissertation). Virginia Polytechnic Institute and State University, Blacksburg, VA.
- Raedeke, T. D., & Smith, A. L. (2001). Development and preliminary validation of an athlete burnout measure. *Journal of Sport and Exercise Psychology*, 23, 281-306.

- Raedeke, T. D., & Smith, A. L. (2009). *The athlete burnout questionnaire manual*.
- Sheard, M., Golby, J., & van Wersch, A. (2009). Progress toward construct validation of the Sports Mental Toughness Questionnaire (SMTQ). *European Journal of Psychological Assessment*, 25(3), 186-193. doi:10.1027/1015-5759.25.3.186
- Steele, G. I., & Edwards, D. J. A. (2008). Development and Validation of the Xhosa Translations of the Beck Inventories: 2. Item Analysis, Internal Consistency and Factor Analysis. *Journal of Psychology in Africa*, 18(2), 217-226.
- Tibbert, S. (2013). *Mental toughness and overtraining behaviours*. (Unpublished Doctoral thesis). Victoria University, Australia.
- Wieser, R., & Thiel, H. (2014). A survey of “mental hardiness” and “mental toughness” in professional male football players. *Chiropractic & Manual Therapies*, 22(17), 1-6. doi:10.1186/2045-709X-22-17

## **CHAPTER 4: MENTAL TOUGHNESS IN CRICKET: DEMOGRAPHIC CHARACTERISTICS OF SOUTH AFRICAN CRICKETER PLAYERS ON THE SMTQ AND THE PPI-A**

This manuscript has been prepared according to the editorial guidelines of the *Journal of Applied Sport Psychology*.

Tables and figures have been placed in text.

### **Abstract**

The current paper investigated the demographic differences of an online administration of the Sports Mental Toughness Questionnaire (SMTQ) and the Psychological Performance Inventory-Alternative (PPI-A), with the purpose of contributing to the development of norms within a population of South African cricketers. Respondents consisted of 637 South African cricketers (n = 567 males and n = 70 females) for the SMTQ and, of these, 284 cricketers (n = 240 males and n = 44 females) also completed the PPI-A who accessed the website created for this research and responded to the online questions. The current research found that there were no significant differences between male and female respondents on the total scores or on the subscales for both the SMTQ and the PPI-A. Results of age and sex comparisons on SMTQ and PPI-A scores were inconclusive. No significant differences were found between male and female respondents, nor between the various Age categories. While ethnicity was found to display significant differences on total mental toughness and all three subscale scores for the SMTQ, the nature of these differences are inconclusive. Competitive level proved to be the only demographic variable in which a clear distinction between the subgroups was evident in terms of scores on the SMTQ and the PPI-A, for which those respondents who had represented their country scored the highest means on the total score and on each of the subscales.

## **Context**

Increasing attention is being dedicated to mental toughness research and, with the improved understanding of the construct, assessment methods are being developed and need to be validated and investigated for use in different contexts. This article investigates the demographic differences between online administrations of the Sports Mental Toughness Questionnaire (Sheard, Golby, & van Wersch, 2009) and the Psychological Performance Inventory-Alternative (Golby, Sheard, & van Wersch, 2007), with the purpose of contributing to the development of norms within a population of South African cricketers in the future. This will assist researchers and practitioners in making reliable and valid assessments of cricketers of all ages and developing directed mental toughness programmes that may be most beneficial. It will also contribute to the long-term validation of the instruments. The present research builds on research conducted on these two mental toughness inventories in Article 2, which examined the psychometric properties of paper-and-pencil versions of these inventories in a sample of cricketers from the Eastern Cape, in South Africa. The sample consisted mostly of younger participants, with a mean age of 16.62 and playing mostly at school and club levels.

The SMTQ (Sheard et al., 2009) is a 14-item mental toughness assessment tool that consists of three subscales, Confidence (6 items), Constancy (4 items), and Control (4 items), in addition to a global mental toughness score. The Confidence subscale assesses self-belief in being able to achieve one's own goals and perform better than opponents. The Constancy subscale measures determination, concentration, an unyielding attitude and taking personal responsibility. The Control subscales measures the ability to control emotions, achieve desired outcomes and the belief that one is personally influential (Crust & Swann, 2011). Sheard et al. (2009, p. 191) claimed that "the SMTQ is the only psychometrically acceptable mental toughness instrument that includes a measure of emotional and negative energy control, a characteristic routinely identified in the mental toughness literature", which led them to argue

that the SMTQ improves on a particular weakness of the PPI-A. The items of the SMTQ are assessed on a four-point Likert scale (“Not at all true”, “A little true”, “Mostly true”, and “Very true”), with overall scores ranging from 14-56; The Confidence subscale ranges from 6-24, the Constancy subscale from 4-16, and the Control subscale from 4-16. Internal consistencies of the subscales have been found to be acceptable for the Confidence subscale ( $\alpha = .80$ ), the Constancy subscale ( $\alpha = .74$ ), and the Control subscale ( $\alpha = .71$ ) in Study one (Sheard et al., 2009) and for the Confidence subscale ( $\alpha = .79$ ), the Constancy subscale ( $\alpha = .76$ ), and the Control subscale ( $\alpha = .72$ ) in Study two conducted by Sheard et al. (2009). Study one focused on a sample of 633 performers, aged 16 to 63 (427 males, 206 females;  $M_{\text{age}} = 21.5$  years;  $SD = 5.48$ ), while Study two consisted of 509 athletes, 18 to 48 years old (351 males, 158 females;  $M_{\text{age}} = 20.2$ ;  $SD = 3.35$ ). The internal consistency coefficients found in a sample of cricketers from the Eastern Cape in South Africa in Article 2 for the overall SMTQ was  $\alpha = .68$ , and for each of each of the subscales of the SMTQ Cronbach’s Alpha coefficients were reported as  $\alpha = .71$  for the Confidence subscale,  $\alpha = .48$  for the Constancy subscale, and  $\alpha = .43$  for the Control subscale. Asamoah (2013) conducted research with 263 male South African soccer players between the ages of 17 and 32 during a tertiary education soccer competition and found internal consistency coefficients of  $\alpha = .42$  for overall mental toughness,  $\alpha = .67$  for the Confidence subscale,  $\alpha = .50$  for the Constancy subscale, and  $\alpha = .41$  for the Control subscale.

Research on the SMTQ, investigating differences between various demographic groupings such as age, sex, and competitive level, has generally produced more consistent results than similar research into mental toughness differences using a variety of other mental toughness measurement instruments (Cowden & Meyer-Weitz, 2016; Crust, 2009; Crust & Keegan, 2010; Crust & Swann, 2011; Crust et al., 2014; Gerber, Brand et al., 2013; Gerber, Kalak et al., 2013; Newland, Newton, Finch, Harbke, & Podlog, 2013). Significant age differences have been found with mental toughness generally increasing with age (Cowden &

Meyer-Weitz, 2016; Marchant et al., 2009; Newland et al., 2013; Nicholls, Polman, Morley, & Taylor, 2009; Sheard, 2009). Males have generally been found to score higher on the SMTQ (Beck, 2012; Crust, 2009; Crust & Keegan, 2010; Crust & Swann, 2011; Crust et al., 2014; Gerber et al., 2013; Gerber et al., 2013; Nicholls et al., 2009; Sheard et al., 2009) and Cowden and Meyer-Weitz (2016) suggest socialisation and perceptual and cognitive differences affecting selected mental toughness components as possible reasons for these findings. Cowden and Meyer-Weitz (2016) conducted research on the SMTQ with 365 South African competitive tennis players, which included 191 males and 174 females ( $M_{age} = 28.80$  years;  $SD = 13.68$ ) and they found no significant sex or competitive level differences on the SMTQ. Other researchers have found that national and international competitors generally score higher on the SMTQ than those at lower levels like regional, semi-skilled, novice, and sub-elite (Biglari, Sanatkaran, Bahari, & Montazeri, 2015; Golby & Meggs, 2011; Meggs, Ditzfeld, & Golby, 2014; Sheard et al., 2009).

Beck (2012) conducted research on the SMTQ with 272 college level athletes from a variety of sporting codes and found a significant difference when examining ethnicity, in that Black athletes scored higher on the SMTQ total scores than White athletes. Cowden and Meyer-Weitz (2016) initially found the opposite, but when they controlled for age in the analysis (because of a significant difference between the mean ages of Black and White participants), they found that age was a significant predictor but that ethnicity did not contribute to the predictability of mental toughness beyond that of age. Sheard et al. (2009) reported the following means and standard deviations for the SMTQ subscales for various groups as displayed in Table 1.

Table 1

*SMTQ means and standard deviations (Sheard et al., 2009)*

Factor	Confidence		Constancy		Control		Total mental toughness	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Competitive standard								
International ( <i>n</i> = 79)	18.22	2.82	13.97	1.95	11.34	2.60	43.53	5.57
National ( <i>n</i> = 150)	17.49	3.70	13.79	1.95	10.77	2.62	42.06	6.08
County/provincial ( <i>n</i> = 479)	16.48	3.17	12.73	2.15	10.77	2.24	39.99	5.45
Club/regional ( <i>n</i> = 434)	15.27	3.00	12.69	2.18	10.80	2.20	38.76	5.35
Gender								
Male ( <i>n</i> = 778)	17.03	3.12	12.92	2.27	10.92	2.32	40.88	5.67
Female ( <i>n</i> = 364)	14.65	3.05	12.99	1.95	10.61	2.25	38.25	5.29
Age group								
16–18 years ( <i>n</i> = 272)	15.81	3.56	12.90	2.23	10.71	2.29	39.43	5.88
19–20 years ( <i>n</i> = 505)	16.06	3.16	12.85	2.06	10.86	2.28	39.77	5.32
21–24 years ( <i>n</i> = 231)	16.59	3.00	12.87	2.20	10.51	2.29	39.98	5.85
25 + years ( <i>n</i> = 134)	17.50	3.36	13.49	2.35	11.44	2.36	42.43	5.77

*Note.* Data from combined samples (*N* = 1142).

Cowden and Meyer-Weitz (2016) found the following means and standard deviations for the SMTQ subscales for various groups as displayed in Table 2.

Table 2

*Descriptive statistics for the SMTQ across independent variables (Cowden & Meyer-Weitz, 2016)*

Variable	Total MT			Confidence			Constancy			Control		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Sex	358	41.18	4.74	351	18.22	2.25	351	12.89	1.74	351	10.42	2.29
Male	189	41.58	5.05	188	18.32	2.31	188	12.89	1.85	188	10.62	2.45
Female	169	40.73	4.33	163	18.10	2.18	163	12.88	1.61	163	10.19	2.07
Age	358	41.18	4.74	351	18.22	2.25	351	12.89	1.74	351	10.42	2.29
18–29 years (young)	260	40.62	4.61	253	18.04	2.24	253	12.70	1.76	253	10.15	2.21
30–48 years (middle)	55	42.84	5.28	53	18.77	2.34	53	13.45	1.66	53	11.08	2.42
49 years and older (older)	43	42.42	4.15	41	18.53	2.08	41	13.27	1.56	41	11.18	2.33
Length of tennis participation	358	41.18	4.74	351	18.22	2.25	351	12.89	1.74	351	10.42	2.29
5–15 years	241	40.39	4.57	234	17.97	2.27	234	12.69	1.77	234	10.02	2.15
16–25 years	50	42.30	4.79	48	18.65	2.14	48	13.04	1.66	48	11.06	2.30
26–35 years	33	43.91	5.20	33	18.97	2.31	33	13.76	1.79	33	11.18	2.23
36 or more years	34	42.47	3.89	36	18.56	2.01	36	13.17	1.34	36	11.44	2.59
Participation type	358	41.18	4.74	351	18.22	2.25	351	12.89	1.74	351	10.42	2.29
County club	62	42.40	4.96	60	18.52	2.20	60	13.38	1.78	60	11.15	2.32
Local county tournaments	24	40.33	4.94	23	18.04	2.36	23	12.78	1.59	23	9.96	2.20
National tournaments	80	41.50	4.79	79	18.25	2.35	79	12.86	1.70	79	10.52	2.17
International tournaments	34	41.53	4.08	35	18.49	2.01	35	12.77	1.46	35	10.66	2.61
University team/league	158	40.59	4.66	154	18.05	2.26	154	12.75	1.82	154	10.10	2.22
Ethnicity	332	41.21	4.78	325	18.28	2.25	325	12.92	1.75	325	10.43	2.31
Black	80	40.29	4.33	76	17.99	2.02	76	12.87	1.72	76	9.83	2.02
White	252	41.50	4.88	249	18.30	2.31	249	12.94	1.76	249	10.61	2.37

*Note:* *n* = number of participants; *M* = mean; *SD* = standard deviation.

The PPI-A (Golby et al., 2007) is a 14-item, shortened version of the Performance Profile Inventory (Loehr, 1986), that was found to possess adequate psychometric properties, with acceptable reliability and convergent and discriminant validity (Golby et al., 2007). The scale assesses a global mental toughness score, constituted by four subscale scores, namely, Determination (3 items), Self-belief (4 items), Positive cognition (4 items), and Visualization (3 items). The Determination subscale refers to the “athlete’s resolve and sense of commitment and dedication to playing and practising their sport” (Golby et al., 2007, p. 317), while the Self-belief subscale “describes the athletes’ confidence and the use of positive affirmations” (p. 317). The Positive Cognition subscale is inclusive of “self-regulatory feelings such as thought control, energy, and enjoyment” (p. 317), and the Visualization subscale provides a measurement of the “athletes’ use of positive visualization skills in training and competition” (p. 317). The items of the PPI-A are each assessed on a five-point Likert scale (“Almost Always”, “Often”, “Sometimes”, “Seldom”, and “Almost Never”), with overall scores ranging from 14 – 70; the Determination subscale from 3-15, the Self-belief subscale from 4-20, the Positive Control subscale from 4-20, and the Visualization subscale from 3-15. Golby et al. (2007) reported the following internal consistency coefficients for each of the subscales of the PPI-A:  $\alpha = .72$  for Determination,  $\alpha = .84$  for Self-belief,  $\alpha = .75$  for Positive Cognition, and  $\alpha = .78$  for Visualization. The internal consistency coefficients found Article 2 for the overall PPI-A was  $\alpha = .75$ , and for each of each of the subscales of the PPI-A, Cronbach’s Alpha coefficients were also found to be lower than those in the literature with  $\alpha = .58$  for the Determination subscale,  $\alpha = .56$  for the Self-belief subscale,  $\alpha = .50$  for the Positive Cognition subscale, and  $\alpha = .50$  for Visualization subscale.

Research on the PPI-A investigating differences between various demographic groupings has been limited, although published research findings have been similar to research findings on the SMTQ (Golby & Meggs, 2011; Masum, 2014; Newland et al., 2013; Sheard, 2009).

Masum (2014) conducted research with a sample of tennis players from Pakistan and found higher total PPI-A scores for elite players ( $M = 56.86$ ,  $SD = 4.58$ ) than for sub-elite players ( $M = 48.59$ ,  $SD = 6.51$ ;  $t = 7.86$ ,  $p < .001$ ,  $df = 113$ ). Golby and Meggs (2011) also found national and international level players to have significantly higher mental toughness scores on the SMTQ for overall mental toughness and for all four of the subscales. Sheard (2009, p. 218) conducted research on the PPI-A with 49 male rugby league footballers (18 to 26 years of age;  $M_{age} = 21.7$ ,  $SD = 2.3$ ) at the elite university student level, representing Australia ( $n = 25$ ) or Great Britain ( $n = 24$ ) and reported the following means and standard deviations for the PPI-A displayed in Table 3.

Table 3

*Means and standard deviations of PPI-A subscales*

Scale	Teams			
	Australia ( $n = 25$ )		Great Britain ( $n = 24$ )	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
PPI-A				
Determination	13.56	0.96	13.08	1.14
Self-belief	16.32	2.66	17.67	1.52
Positive Cognition	17.48	0.59	15.83	1.01
Visualization	12.60	1.68	10.25	1.68
Total Mental Toughness	59.96	3.92	56.83	3.14

When comparing scores on the PPI-A for sex differences, Masum (2014) found the male group ( $M = 55.50$ ,  $SD = 4.64$ ) to have higher total mental toughness scores than the female group ( $M = 47.82$ ,  $SD = 7.79$ ). Newland et al. (2013) also found significantly higher mental toughness scores for males in a sample of tertiary level basketball players, with total mental toughness for the sample at 54.87 and a mean of 56.28 for the males and 53.46 for the females.

The current research focused on investigating the SMTQ and the PPI-A in a sample of South African cricketers according to age, sex, ethnicity, and competitive level. Examining the differences between these groups and between the two inventories will assist researchers and

practitioners better understand these psychometric assessment tools and, in the future, to develop norms for these tools in South African samples.

## Method

### Participants

Respondents consisted of 637 South African cricketers (n = 567 males and n = 70 females) who accessed the website created for this research and responded to the online questions. It appears that many respondents completed the first questionnaire (SMTQ; N = 637) and then chose not to carry on with the second questionnaire (PPI-A; N = 284). Table 4 presents the sample sizes, means, and standard deviations for demographic subgroups of the total sample.

Table 4

*Sample sizes, means and standard deviations of subgroups in the study*

Variable	Age		
	n (%)	M	SD
<b>Sex</b>	637	26.70	7.91
<b>Male</b>	567 (89%)	26.46	7.91
<b>Female</b>	70 (11%)	28.66	7.64
<b>Level of participation</b>	637	26.70	7.91
<b>Country</b>	33 (5.18%)	25.70	12.17
<b>Provincial</b>	214 (33.60%)	25.35	7.52
<b>Club</b>	216 (33.91%)	29.23	8.09
<b>School</b>	92 (14.44%)	23.30	6.37
<b>Social</b>	82 (12.87%)	27.76	5.27
<b>Ethnicity</b>	623	26.79	7.92
<b>Black</b>	132 (21.19%)	27.30	4.97
<b>White</b>	351 (56.34%)	25.19	8.13
<b>Coloured</b>	58 (9.31%)	30.86	7.19
<b>Asian</b>	82 (13.16%)	29.95	9.29

## **Administration**

Ethical clearance for this research was obtained from the relevant institution (Ref: 2015\_RPSC\_011) and a website was constructed to administer an online survey, consisting of a landing page explaining the research and ethical aspects, a series of demographic and general questions and the two mental toughness questionnaires. The explanation of the research project stressed the voluntary nature of participation, that the research was for South Africans, that confidentiality and anonymity would be ensured, and that anyone under the age of 18 years who wished to participate had to have parental approval before continuing with the research. The URL for the website was e-mailed to a wide range of people and institutions, requesting participation and assistance in advertising as widely as possible in South Africa. While the majority of responses to the request for participation by institutions were negative, there were limited positive responses from individuals who completed the survey. The response rate improved greatly after permission was granted by the research ethics committee of a large distance education institution to forward an e-mail with the URL to all of their registered students. The time frame that the data collection website was accessible was eight months and the final number of respondents was 637 (n = 567 males and n = 70 females) cricketers. These 637 completed the SMTQ and 284 of these (n = 240 males and n = 44 females) carried on and completed the PPI-A. It is not possible to estimate the response rate because the URL was sent to many people and organisations, who were asked to further distribute the URL. The response rate based only on the number of people the URL was sent to was less than 1%.

After completion of each of the two mental toughness questionnaires (first the SMTQ then the PPI-A), the respondents were shown a page with their scores for the particular questionnaire, along with a brief description of the meaning of the scores. It was stressed that the scores were merely an indication based on their responses at that given point in time and

that mental toughness could be learned. Respondents were encouraged to contact the researcher at a provided e-mail address if they needed any further information, were experiencing any problems, or if they wanted assistance or feedback from the researcher or a referral to a counsellor with sport psychology training. There were 26 (4% of the 637 cricketers sampled) cricket related e-mails received in response to the invitation. Seven made positive comments about believing in mental skills, of which two made further enquiries. One person asked for the ethical clearance letter and the rest of the e-mails were from people who were struggling to enter the competition and/or informing the researcher of a sporting code that was not included in the list on offer.

A prize draw with a number of prizes was offered as an incentive for people to respond to the survey. Sponsorship of prizes for a lucky draw for those respondents who completed the entire survey (i.e., both mental toughness questionnaires) included a two-night stay at the 5-star *Kariega* Game Reserve in the Eastern Cape, a full senior cricket kit with wheelie bag donated by *Fearnley* South Africa, a cricket bat donated by *Bellingham & Smith* from the Eastern Cape, and a series of smaller prizes provide by the researcher (cricket balls, batting gloves, and a R500 book voucher). Upon completion of the survey, respondents were prompted to access a link that would lead them to a separate page on which they could enter their contact details for inclusion in the prize draw. This information was stored in a separate database with no link to the database containing respondents' answers to questions in the survey. This meant that there was no way for the researcher to link any names to respondents' answers, which was explained in the cover letter on the landing page of the website for the survey.

### **Data analysis**

Cronbach's Alpha ( $\alpha$ ) coefficients were calculated for the total scores of the inventories and for the subscales as they are useful for interpreting the average correlation among all the items

along with the number of items (Steele & Edwards, 2008). The  $\alpha$  assesses internal consistency and can range from 0 (no internal consistency) to 1 (maximum internal consistency) and the general recommendation is that scales have an  $\alpha$  of .50 to .70 for early stages of research and .80 or above for basic research tools (Nunnally, 1978).

The means and standard deviations were calculated and are reported for the SMTQ and the PPI-A and their respective subscales. In addition, the means and standard deviations were calculated for different demographic groups in order to begin the process of establishing South African norms for the SMTQ and the PPI-A. The groups investigated in the current research are Sex, Age, Ethnicity, and Competitive level. The Age variable was transformed from an interval/ratio variable into a categorical variable with the categories following those of Cowden and Meyer-Weitz (2016) which, in turn, were based on Sacco's (2013) contemporary conceptualisation of Erikson and Erikson's (1997) stages of human development (namely, young adulthood: 18–29 years; middle adulthood: 30–48 years, and older adulthood: 49 years and older). An additional category of “Child: Under 18” was included in the present study to accommodate the obtained sample. Differences between subgroups of the demographic variables for the total mental toughness scores and scores on the subscales for both inventories were calculated using parametric and non-parametric statistics.

## **Results and Discussion**

### **Sports Mental Toughness Questionnaire (SMTQ)**

The  $\alpha$  coefficient for the overall SMTQ was .78, indicating a moderate to high level of internal consistency and is higher than the .68 found in Article 2 using a paper-and-pencil version with a younger group of cricketers from the Eastern Cape. The average inter-item correlation was .20 (item-total correlation ranging from .27 - .54), with a mean of 42.95 and  $SD = 5.51$ , very comparable to the mean of 40.66 and  $SD = 5.11$  found in Article 2. It was noted in Article 2

that, considering the maximum obtainable score for the scale is 56 (with a minimum score of 14), the cricket players scored themselves reasonably highly on mental toughness characteristics (range = 27-52). The present findings are similar with a range of 22 to 55, suggesting once again that these South African cricketers rated themselves reasonably highly in terms of mental toughness characteristics. Cowden and Meyer-Weitz (2016) found similar results in a sample of 358 South African competitive tennis players, in which they obtained a mean of 41.18 and  $SD = 4.74$ . The  $\alpha$  coefficients for the subscales in the current study were  $\alpha = .72$  for the Confidence subscale,  $\alpha = .56$  for the Constancy subscale, and  $\alpha = .55$  for the Control subscale. The alpha coefficient found for the Confidence subscale was slightly lower than the .80 found by Sheard et al. (2009), while Constancy and Control were considerably lower than those found by Sheard et al. (2009), which were .74 (Constancy), and .71 (Control). The results found are comparable with those found in Article 2 which were .71 (Constancy), and .48 (Constancy) and .43 (Control).

Table 5 presents the means and standard deviations obtained for total scores on the SMTQ for the variables Sex, Age, Ethnicity, and Competitive level. No significant differences were found between male and female respondents, nor between the various Age categories. These results vary somewhat from those found in the literature that report males having significantly higher mental toughness scores. Cowden and Meyer-Weitz (2016) also found no significant differences in a South African sample of competitive tennis players while they did find a significant difference for age and total mental toughness scores on the SMTQ. A significant difference was found for Ethnicity and Competitive level when compared with SMTQ total scores. Respondents who selected the Coloured and White categories rated themselves significantly higher than those respondents who selected the Asian and Black categories and Country and Provincial were both significantly higher than Social and School. The sample sizes, means, and standard deviations found by Cowden and Meyer-Weitz (2016)

are included in Table 5 in parentheses next to corresponding values found in the current research. This is useful to compare the results of the two studies conducted on South African samples. Non-parametric tests results are reported in the Tables in this paper for both SMTQ and PPI-A results because the data are measured on ordinal scales, in addition to not meeting the assumptions of both normality and homogeneity of variance in numerous cases. The parametric versions of the tests were conducted in each instance and all supported the findings of the non-parametric test results. In this research the Mann Whitney U and Kruskal–Wallis H test results are reported.

Table 5

*Means and SD for Sex, Age, Ethnicity and Competitive level for the SMTQ*

<b>SMTQ Total Scores (14-56)</b>	<b>N (*)</b>	<b>M (*)</b>	<b>SD (*)</b>
<b>Sex (<math>U = 19438, p = .78</math>)</b>	<b>637 (358)</b>	<b>42.95 (41.18)</b>	<b>5.51 (4.74)</b>
Male	567 (189)	42.97 (41.58)	5.52 (5.05)
Female	70 (169)	42.86 (40.73)	5.43 (4.33)
<b>Age** (<math>H (3, N=637) = 1.98, p = .58</math>)</b>	<b>637 (358)</b>	<b>42.95 (41.18)</b>	<b>5.72 (4.74)</b>
Under 18 (Child)	50	43.00	3.94
18-29 (Young)	392 (260)	43.04 (40.62)	5.74 (4.61)
30-48 (Middle)	182 (55)	42.66 (42.84)	5.47 (5.28)
49+ (Older)	13 (43)	44.39 (42.42)	4.35 (4.15)
<b>Ethnicity (<math>H (3, n=623) = 40.49, p = .00</math>)<sup>+</sup></b>	<b>623 (332)</b>	<b>42.98 (41.21)</b>	<b>5.70 (4.78)</b>
Black	132 (80)	41.56 (40.29)	4.72 (4.33)
Coloured	58 (18)	45.04	5.69
White	351 (252)	43.77 (41.50)	5.11 (4.88)
Asian	82 (9)	40.42	6.93
<b>Competitive level (<math>H (4, n=637) = 24.09, p = .00</math>)<sup>+</sup></b>	<b>637</b>	<b>42.95</b>	<b>5.51</b>
Country	33	45.73	5.78
Provincial	214	43.91	5.59
Club	216	42.89	5.45
Social	82	41.51	5.16
School	92	41.17	4.86

\* Values from Cowden & Meyer-Weitz (2016)

\*\*Age ranges – Cowden & Meyer-Weitz (2016) & Sacco (2013)

<sup>+</sup> Significant result

Table 6 presents the means and standard deviations for the total mental toughness scores on the SMTQ along with those of the subscales for the variables Sex, Age, Ethnicity, and Competitive level. No significant differences were found between male and female respondents on any of subscales of the SMTQ nor on the total mental toughness score. While no significant differences were found for age on total mental toughness for the SMTQ, significant differences

were found for age on the Constancy and Control subscales using multiple comparisons of mean ranks. The Child category was significantly higher than the Young ( $p < .001$ ) and Middle age group ( $p < .001$ ) categories on the Constancy subscale and the Young category was significantly higher than the Middle ( $p = .02$ ) category on the Control subscale. The lack of significant difference for the Older group is likely due to the small sample size as Table 6 shows the Older group having the highest mean of the Age subgroups. The significantly higher mean for the Child group contradicts the literature on Age and SMTQ scores, although it does raise the question whether the younger group is accurately representing their scores on mental toughness. Given the general tendency for South African cricketers to rate themselves highly on mental toughness, identified in this research project, this contributes to the question of whether South African cricketers possess high enough awareness and knowledge of the mental component of their game.

When comparing Ethnicity and the SMTQ, significant differences were found on total mental toughness scores ( $H(3, N=623) = 40.49, p < .001$ ) and on each of the subscales. Specifically, multiple comparisons of mean ranks revealed significant differences on the Confidence subscale in which the Coloured ( $p < .001$ ) and White ( $p = .04$ ) categories were significantly higher than the Asian category. The Coloured category was significantly higher than the Black category ( $p = .02$ ) on the Confidence subscale and the Constancy subscale ( $p = .03$ ). This particular pattern was repeated for the Constancy subscale, the Control subscale, and SMTQ total mental toughness scales. In addition, the White category was significantly higher than the Black category for the Control ( $p < .001$ ) and SMTQ total mental toughness ( $p < .001$ ) subscales. These results need to be considered in the context of the question raised in Article 2, and in the current paper, about the levels of knowledge and awareness that South African cricketers possess and demonstrate with regard to mental toughness and, in fact, mental skills relating to cricket. Whether these are real differences in mental toughness or merely differences

based on understanding and interpretation, which may be closely linked to socialisation, need to be examined more closely.

Significant differences were found for SMTQ total mental toughness and for all three subscales when analysed for Competitive level. Multiple comparisons of mean ranks revealed significant differences on the Confidence subscale between Social and Provincial ( $p = .01$ ) and Country ( $p = .045$ ) levels, in which the latter two were found to have higher scores than those in the Social category. While there was a significant difference on the Constancy subscale ( $H(4, N=637) = 15.65, p < .001$ ), the multiple comparison of mean ranks did not reveal significant differences between the sub categories of the Competitive level variable compared with the Constancy subscale. Significant differences were found on the Control subscale of the SMTQ in which Country was found to be significantly higher than Social ( $p < .001$ ), Club ( $p < .001$ ), School ( $p < .001$ ), and Provincial ( $p < .001$ ) categories of the Competitive level variable. Provincial was also found to be significantly higher than School ( $p = .04$ ). When comparing the total scores on the SMTQ with Competitive level, Country was found to be significantly higher than Social ( $p = .02$ ) and School ( $p < .001$ ), and Provincial was found to be significantly higher than Social ( $p = .045$ ) and School ( $p < .001$ ). The means reported for each sample category for SMTQ mental toughness total scores and for the subscales were generally higher than those reported by Cowden and Meyer-Weitz (2016) for competitive tennis players. Future research might consider investigation of mental toughness in team versus individual sport players. It bears noting that the participation levels of the competitive tennis players were generally higher than the levels of cricketers in the sample for the current research.

Table 6

*Means and SD for SMTQ for Sex, Age, Ethnicity, and Competitive level for the SMTQ and subscales*

SMTQ Total Scores (14-56)	Confidence		Constancy		Control		Total MT	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<b>Sex (N = 637)</b>	<b>19.34</b>	<b>2.78</b>	<b>13.68</b>	<b>1.91</b>	<b>9.94</b>	<b>2.47</b>	<b>42.95</b>	<b>5.51</b>
Male (n = 240)	19.32	2.82	13.67	1.92	9.97	2.47	42.97	5.52
Female (n = 44)	19.46	2.52	13.74	1.76	9.66	2.46	42.86	5.43
<b>Age** (N = 637)</b>	<b>19.34</b>	<b>2.78</b>	<b>13.68</b>	<b>1.91</b>	<b>9.94</b>	<b>2.47</b>	<b>42.95</b>	<b>5.51</b>
Under 18 (Child)(n=50)	18.64	2.23	14.64	1.56	9.72	1.73	43.00	3.94
18-29 (Young)(n=392)	19.34	2.87	13.54	1.99	10.16	2.40	43.04	5.74
30-48 (Middle)(n=182)	19.48	2.78	13.64	1.74	9.54	2.72	42.66	5.47
49+ (Older)(n=13)	19.92	1.32	14.77	1.48	9.69	2.72	44.38	4.35
<b>Ethnicity (N=623)</b>	<b>19.32</b>	<b>2.78</b>	<b>13.69</b>	<b>1.91</b>	<b>9.97</b>	<b>2.47</b>	<b>42.42</b>	<b>6.93</b>
Black (n=132)	19.11	2.45	13.46	1.85	9.00	2.38	41.56	4.72
Coloured (n=58)	20.17	2.83	14.28	1.59	10.59	2.79	45.04	5.69
White (n=351)	19.54	2.54	13.86	1.79	10.38	2.32	43.77	5.11
Asian (n=82)	18.10	3.76	12.95	2.44	9.37	2.50	40.42	6.93
<b>Competitive level (N = 637)</b>	<b>19.34</b>	<b>2.78</b>	<b>13.68</b>	<b>1.91</b>	<b>9.94</b>	<b>2.47</b>	<b>42.95</b>	<b>5.51</b>
Country (n = 33)	20.03	3.04	14.12	2.34	11.58	1.87	45.73	5.78
Provincial (n = 214)	19.79	2.47	13.97	1.76	10.15	2.56	43.91	5.59
Club (n = 216)	19.42	2.86	13.59	1.70	9.88	2.52	42.89	5.45
Social (n = 82)	18.54	2.79	13.37	2.07	9.61	2.18	41.51	5.16
School (n = 92)	18.59	2.92	13.30	2.23	9.28	2.30	41.17	4.86

\*\*Age ranges – Cowden & Meyer-Weitz (2016) & Sacco (2013)

The results in the current research show a general trend of higher mean scores for the SMTQ for the total scores and the scores on the subscales than found in the literature. Sheard et al. (2009) found  $M = 38.25$  for females and  $M = 40.88$  for males and Cowden and Meyer-Weitz (2016) found  $M = 40.73$  for females and  $M = 41.58$  for males. In the current research, the reported means for females was 42.86 and for males it was 42.97; higher than would be expected for these samples. When considering that the majority of the literature cited involved higher level competitors, as opposed to a large component of club, social and school level competitors in the current research, one needs to query why these South Africa cricketers are reporting higher means than samples in the literature. Are these cricketers more mentally tough than other sports people around the world or is there another reason for the high scores.

#### **Psychological Performance Inventory-Alternative (PPI-A)**

The  $\alpha$  coefficient for the overall PPI-A was .86, indicating a high level of internal consistency. This compares favourably with previous research on the PPI-A which found  $\alpha$  ranging from .81 – .85 (Golby et al., 2007; Masum, 2014; Newland et al., 2013) and is higher than the  $\alpha = .75$  found in Article 2 in a sample of cricketers from the Eastern Cape in South Africa. The average inter-item correlation was .31, with the item-total correlations ranging from .26 - .66. The maximum obtainable score for the PPI-A is 70 (with a minimum of 14) and the scores in the present study ranged from 39 – 70, with  $M = 57.94$  and  $SD = 7.45$ , indicating a relatively high mean score based on participants' self-rating. Newland et al. (2013) found  $M = 54.87$  ( $SD = 6.33$ ) amongst high level college basketball players, while Masum (2014) found  $M = 56.86$  ( $SD = 4.58$ ) among elite and  $M = 48.59$  ( $SD = 6.51$ ) among sub-elite tennis players. Sheard (2009) found  $M = 59.96$  ( $SD = 3.92$ ) for elite Australian rugby player and  $M = 56.83$  ( $SD = 3.14$ ) among elite Great Britain rugby players. This suggests that the South African sample of cricketers self-rated their mental toughness scores at high levels, given that 95% of the sample

in the current research are sub-elite players. Relatively low  $\alpha$  coefficients were found for the subscales at  $\alpha = .52$  for Determination,  $\alpha = .69$  for Self-Belief,  $\alpha = .70$  for Positive Cognition, and  $\alpha = .54$  for Visualization. These results are comparable to those found in Article 2 in the sample of South African cricketers but lower than other research conducted with the PPI-A.

The means and standard deviations found in the present research for Sex, Age, Ethnicity, and Competitive level in comparison to the total mental toughness scores of the PPI-A can be found in Table 7. The table includes the results of the tests of differences which show there were no significant differences between male and female respondents, between Age groups, nor between Competitive level groups and total scores on the PPI-A. Finding no significant difference between male and female respondents is in line with the finding in the current research for the SMTQ but not with other research into the PPI-A, in which males were found to score higher than the females in those studies (Masum, 2014; Newland et al., 2013). The finding in the current research that revealed no significant difference between competitive level and total mental toughness scores on the PPI-A is contrary to findings in previous research that found significantly higher levels of total mental toughness among higher level competitors (Golby & Meggs, 2011; Masum, 2014). A significant difference was found on the Ethnicity variable in which the Coloured group was found to have significantly higher mean scores than the White group, a difference that could be explained by the different sub-sample sizes.

Table 7

*Means and SD for Sex, Age, Ethnicity and Competitive level for total scores on the PPI-A*

<b>PPI-A Total Scores (14-70)</b>	<b>N</b>	<b>M</b>	<b>SD</b>
<b>Sex (<math>U = 4734, p = .28</math>)</b>	<b>284</b>	<b>57.94</b>	<b>7.45</b>
Male	240	57.76	7.42
Female	44	58.96	7.63
<b>Age** (<math>H(3, N=284) = 4.70, p = .20</math>)</b>	<b>284</b>	<b>57.94</b>	<b>7.45</b>
Under 18 (Child)	26	55.39	7.13
18-29 (Young)	172	57.87	7.65
30-48 (Middle)	78	58.69	7.22
49+ (Older)	8	60.50	4.87
<b>Ethnicity (<math>H(3, N=272) = 8.30, p = .04</math>)<sup>+</sup></b>	<b>272</b>	<b>58.15</b>	<b>7.39</b>
Black	62	57.39	8.54
Coloured	34	61.47	5.76
White	138	57.78	6.73
Asian	38	57.74	8.43
<b>Competitive level (<math>H(4, n=284) = 6.36, p = .17</math>)</b>	<b>284</b>	<b>57.94</b>	<b>7.14</b>
Country	6	64.67	3.14
Provincial	102	57.92	7.14
Club	108	57.54	7.05
Social	34	58.18	8.26
School	34	57.88	8.97

\*\*Age ranges – Cowden & Meyer-Weitz (2016) & Sacco (2013)

<sup>+</sup> Significant result

Table 8 presents the means and standard deviations for the total mental toughness scores on the PPI-A along with those of the subscales for the variables Sex, Age, Ethnicity, and Competitive level. While no significant differences were found for age on total mental toughness for the PPI-A, multiple comparisons of mean ranks revealed significant differences

for age on the Determination ( $H(3, N=284) = 9.04, p = .03$ ) and the Visualization ( $H(3, N=284) = 9.79, p = .02$ ) subscales. However, the only significant difference between sub groups of the Age variable identified by the multiple comparisons of mean ranks was between the Young and Middle age groups on the Visualization subscale ( $p = .03$ ) in which the Middle group scored higher than the Young group.

The comparison of Ethnicity and the PPI-A revealed a significant difference on total scores, as identified in Table 7, and multiple comparisons of mean ranks identified significant differences on the Positive Cognition ( $H(3, N=272) = 14.06, p = .00$ ) and Visualization ( $H(3, N=272) = 9.25, p = .03$ ) subscales. Specifically, significant differences were found between the Coloured and White groups ( $p = .03$ ) on total scores of the PPI-A, in which the Coloured group had a significantly higher mean score than the White group. Significant differences on Positive Cognition were found where the Asian group obtained significantly higher means than the Black group ( $p = .01$ ) and the White group ( $p = .03$ ). The multiple comparisons of mean ranks on the Visualization subscale indicated the Coloured group obtaining significantly higher means than the White group ( $p = .03$ ).

Multiple comparisons of mean ranks comparing the Competitive level variable with total scores and subscales of the PPI-A revealed significant differences on Determination ( $H(4, N=284) = 11.89, p = .02$ ), in which the Country level was significantly higher than Social ( $p = .03$ ), Club ( $p = .01$ ), School ( $p = .04$ ), and Provincial ( $p = .03$ ) levels. In all cases, the respondents who had represented their country obtained significantly higher mean scores on Determination than the other groups.

Table 8

*Means and SD for Sex, Age, Ethnicity and Competitive level for total scores on the PPI-A and subscales*

PPI-A Total Scores (14-70)	Determination		Self-belief		Positive Cognition		Visualization		Total MT	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<b>Sex (N = 284)</b>	12.60	2.12	16.79	2.42	16.70	2.45	11.85	2.22	<b>57.94</b>	<b>7.45</b>
Male (n = 240)	12.54	2.05	16.72	2.48	16.69	2.44	11.81	2.21	57.76	7.42
Female (n = 44)	12.91	2.51	17.18	2.02	16.77	2.50	12.10	2.30	58.96	7.63
<b>Age** (N = 284)</b>	12.60	2.12	16.79	2.42	16.70	2.45	11.85	2.22	57.94	7.45
Under 18 (Child)(n=26)	11.62	2.17	16.23	2.44	15.85	2.62	11.69	1.93	55.39	7.13
18-29 (Young)(n=172)	12.80	2.04	16.72	2.47	16.76	2.48	11.59	2.26	57.87	7.65
30-48 (Middle)(n=78)	12.59	2.20	16.97	2.36	16.74	2.37	12.39	2.22	58.69	7.22
49+ (Older)(n=8)	11.50	2.20	18.25	1.17	18.00	1.31	12.75	1.58	60.50	4.87
<b>Ethnicity (N = 272)</b>	<b>12.65</b>	<b>2.13</b>	<b>16.88</b>	<b>2.37</b>	<b>16.74</b>	<b>2.45</b>	<b>11.88</b>	<b>2.23</b>	<b>58.15</b>	<b>7.39</b>
Black (n = 62)	12.36	2.50	16.61	2.72	16.23	2.41	12.19	2.31	57.39	8.54
Coloured (n = 34)	13.41	1.52	17.94	1.83	17.53	1.91	12.59	2.85	61.47	5.76
White (n = 138)	12.74	2.03	16.80	2.13	16.55	2.40	11.70	2.00	57.78	6.73
Asian (n = 38)	12.11	2.10	16.68	2.83	17.58	2.80	11.37	2.68	57.74	8.43
<b>Competitive level (N = 284)</b>	<b>12.60</b>	<b>2.12</b>	<b>16.79</b>	<b>2.42</b>	<b>16.70</b>	<b>2.45</b>	<b>11.85</b>	<b>2.22</b>	<b>57.94</b>	<b>7.45</b>
Country (n = 6)	15.00	0.00	17.67	1.03	18.00	1.55	14.00	0.89	64.67	3.14
Provincial (n = 102)	12.69	2.15	16.65	2.49	16.75	2.49	11.84	1.99	57.92	7.14
Club (n = 108)	12.37	2.10	16.85	2.17	16.59	2.34	11.72	2.33	57.54	7.05
Social (n = 34)	12.59	2.20	17.18	2.61	16.82	2.56	11.59	2.12	58.18	8.26
School (n = 34)	12.65	2.03	16.47	2.92	16.59	2.70	12.18	2.63	57.88	8.97

\*\*Age ranges – Cowden & Meyer-Weitz (2016) & Sacco (2013)

Similar to the findings on the SMTQ, the means for the PPI-A and for the subscales were found to be generally higher than those found in the limited published research on the PPI-A for similar groupings. Newland et al. (2013) found  $M = 53.46$  for females and  $M = 56.28$  for males and Masum (2014) found  $M = 47.82$  for females and  $M = 55.5$  for males. In the current research, the reported means for females was 57.76 and for males it was 58.96; higher than would be expected for these samples, suggesting that respondents in the current research overestimated their ability in terms of responding to the ratings of their mental toughness attributes as measured by the PPI-A.

## **Conclusion**

This research aimed to examine internal consistency and the differences of demographics grouping on the total scores and subscale scores of the SMTQ ( $N = 637$ ) and the PPI-A ( $N = 284$ ). Both inventories displayed acceptable levels of internal consistency for the overall mental toughness scores that compare well with those found in the literature, but the internal consistencies found for the subscales were considerably lower than those found in the literature (Golby et al., 2007; Masum, 2014; Newland et al., 2013), with the exception of Gucciardi (2012) and the results found in Article 2, where low internal consistencies for the subscales were found in both. The  $\alpha$  coefficients found in the current study for the Constancy ( $\alpha = .56$ ) and Control ( $\alpha = .55$ ) subscales of the SMTQ were also low, similar to what was found in Article 2 with the cricketers from the Eastern Cape ( $\alpha = .50$  and  $\alpha = .41$ ), but still considerably lower than the  $\alpha = .71 - .74$  found by Sheard et al. (2009). Similar results were evident with the PPI-A where relatively low  $\alpha$  coefficients were found for the subscales at  $\alpha = .52$  for Determination,  $\alpha = .69$  for Self-Belief,  $\alpha = .70$  for Positive Cognition, and  $\alpha = .54$  for Visualization. These results are comparable to those found by Steele (Article 2) in the sample of South African cricketers but lower than other research conducted with the PPI-A. For

example, Golby et al. (2007) found the following internal consistency results for the four subscales: Determination ( $\alpha = .72$ ), Self-belief ( $\alpha = .84$ ), Positive Cognition ( $\alpha = .75$ ), and Visualization ( $\alpha = .78$ ). This further reinforces the suggestions that there may be problems with items on the PPI-A (which is drawn from the PPI) that were constructed based on anecdotal evidence to capture components of mental toughness. The results also raise questions about potential problems with the SMTQ's items that need to be investigated further because the sample size for the current study is large. More research needs to be conducted on the SMTQ and the PPI-A with a variety of sports and especially in South Africa, considered in conjunction with levels of understanding of psychological skills.

The examination of demographic variables on the total scores and subscales of the SMTQ and the PPI-A produced valuable data that can be used in similar research with these inventories around the world and especially in South Africa. The current research, along with the welcomed and very much needed research published by Cowden and Meyer-Weitz (2016), contributes to the understanding and body of knowledge around these assessment tools in a South African context. The results are somewhat incongruous with results found in the literature outside of South Africa that made use of these two assessment tools. The current research found that there were no significant differences between male and female respondents on the total scores or on the subscales for both the SMTQ and the PPI-A. This is comparable to the results found by Cowden and Meyer-Weitz (2016) in a sample of South African competitive tennis players using the SMTQ but contradictory to results found in other research in which males were found to have significantly higher scores on both the SMTQ (Beck, 2012; Crust & Keegan, 2010; Crust et al., 2014; Gerber et al., 2013; Gerber et al., 2013; Golby et al., 2007; Nicholls et al., 2009) and on the PPI-A (Masum, 2014; Newland et al., 2013).

When examining the differences for age on both of the mental toughness inventories, no significant difference was found on total mental toughness scores. The analysis on the

SMTQ did reveal significant differences on the Constancy and Control subscales in which the Child group scored significantly higher than the Young and Middle groups on Constancy and the Young group scored significantly higher than the Middle group on Control. This differs substantially from the results found in the literature which suggests older groups score higher on the SMTQ than younger groups (Cowden & Meyer-Weitz, 2016; Sheard et al., 2009). In the current research, the Older group scored the highest mean score on total mental toughness and on the Confidence subscale, while the Child group scored the highest mean score on the Constancy subscale and the Young group scored highest on the Control subscale. This result reinforces the assertion that many of the cricketers are self-reporting their levels of mental toughness at high levels and may be indicative of a lack of knowledge, understanding and self-awareness when it comes to the mental components related to cricket. The comparison of Age and the PPI-A revealed significant differences on the Determination and Visualization subscales. The Young group produced the highest mean score on the Determination subscale and the Older group the highest mean score on the Visualization subscale, which again raises concerns about younger participants attributing high levels of mental toughness to themselves. Further research needs to be conducted to establish if the young South African cricketers do indeed possess higher levels of mental toughness or, as is more likely, if there is another explanation for these results. It may be useful to pursue a methodological avenue that would make use of mixed designs where qualitative, descriptive and inferential information could be reflected against each other.

Ethnicity was found to display significant differences on total mental toughness and all three subscale scores for the SMTQ. The Coloured group displayed higher mean scores for total mental toughness, Confidence, Constancy, and Control. This subgroup was followed by the White group for total mental toughness and the three subscales and there were no significant differences between the Black and White groups, with the exception of the Control subscale

where the White group obtained higher mean scores. Ethnicity was found to display significant differences on the total mental toughness scores of the PPI-A and on the Positive Cognition and Visualization subscales. In a similar manner to the SMTQ, the Coloured group scored higher means on the total mental toughness score and on the Determination, Self-Belief, and Visualization subscales. The Asian group scored the highest mean on the Positive Cognition subscale. While the variable of ethnicity has been compared in limited other research (Beck, 2012; Cowden & Meyer-Weitz, 2016) inconclusive results have been found, as is also evident in the current research. This author contends differences in mental toughness based on ethnic characteristics is not a useful avenue of exploration due to the discrepancies and that mental toughness differences have more to do with learned aspects. To this end, more viable options may relate to extra-personal and environmental aspects such as socio-economic status, family support, available resources, and support from coaches to name a few. A concerning factor here is the inflated reporting of mean scores evident in the current paper and those in Article 2.

Competitive level proved to be the only demographic variable in which a clearer distinction between the subgroups was evident in terms of scores on the SMTQ and the PPI-A, for which those respondents who had represented their country scored the highest means on the total score and on each of the subscales. Significant differences were found for total scores on the SMTQ and on all three of its subscales, with the Country and Provincial groups self-reporting higher mean scores. Even with the Country group achieving the highest mean score on all subscales, there were still some results that need further investigation, as the Country group and Provincial group achieved significantly higher scores than only the Social and School subgroups and not for all comparisons. The Country group produced significantly higher scores than the Social and School groups on the Confidence and Control subscales, but no significant differences were found between subgroups on the Constancy subscale. The PPI-A displayed no significant difference for Competitive level on the total scores but did produce

a significant difference on the Determination subscale in which the Country subgroup was significantly higher than all the other subgroups.

Overall, more research is needed on these two mental toughness assessment tools in sport throughout the world and especially in South Africa. The current research raises questions about the discriminative power of both the SMTQ and the PPI-A amongst South African cricketers. This may be due to problems with the conceptual clarification and understanding of mental toughness, the construction of the assessment tools, or issues relating to the sample. Specific research is needed amongst South African cricketers, and sports people in general, to establish their knowledge, understanding, and self-awareness in terms of the mental component of their games. This may well result in more education being required about mental toughness and mental skills in sport amongst South African coaches and administrators.

## **References**

- Asamoah, B. (2013). *The role of mental toughness, psychological skills and team cohesion in soccer performance*. (Unpublished Master's Thesis). Stellenbosch University, Stellenbosch, South Africa.
- Beck, N. M. (2012). *Mental toughness: An analysis of sex, race, and mood*. (Unpublished Master's Thesis). University of North Texas, Texas, USA.
- Biglari, S., Sanatkaran, A., Bahari, S. M., & Montazeri, M. (2015). The comparison of team and individual male athletes, mental toughness at different levels of skills. *International Journal of Basic Sciences and Applied Research*, 4(2), 127-132.

- Cowden, R. G., & Meyer-Weitz, A. (2016). Mental toughness in South African competitive tennis: Biographical and sport participation differences. *International Journal of Sport and Exercise Psychology, 14*(2), 152-167. doi:10.1080/1612197X.2015.1121509
- Crust, L. (2009). The relationship between mental toughness and affect intensity. *Personality and Individual Differences, 47*(8), 959-963.
- Crust, L., Earle, K., Perry, J., Earle, F., Clough, A., & Clough, P. J. (2014). Mental toughness in higher education: Relationships with achievement and progression in first-year university sports students. *Personality and Individual Differences, 69*, 87-91. doi:10.1016/j.paid.2014.05.016
- Crust, L., & Keegan, R. (2010). Mental toughness and attitudes to risk-taking. *Personality and Individual Differences, 49*(3), 164-168. doi:10.1016/j.paid.2010.03.026
- Crust, L., & Swann, C. (2011). Comparing two measures of mental toughness. *Personality and Individual Differences, 50*, 217-221. doi:10.1016/j.paid.2010.09.032
- Erikson, E. H., & Erikson, J. M. (1997). *The life cycle completed*. New York: W.W. Norton.
- Gerber, M., Brand, S., Feldmeth, A. K., Lang, C., Elliot, C., Holsboer-Trachsler, E., & Pühse, U. (2013). Adolescents with high mental toughness adapt better to perceived stress: A longitudinal study with Swiss vocational students. *Personality and Individual Differences, 54*(7), 808-814. doi:10.1016/j.paid.2012.12.003
- Gerber, M., Kalak, N., Lemola, S., Clough, P. J., Perry, J. L., Pühse, U., . . . Brand, S. (2013). Are adolescents with high mental toughness levels more resilient against stress? *Stress and Health, 29*, 164-171. doi:10.1002/smi.2447

- Golby, J., & Meggs, J. (2011). Exploring the organizational effect of prenatal testosterone upon the sporting brain. *Journal of Sports Science and Medicine, 10*, 445.
- Golby, J., Sheard, M., & van Wersch, A. (2007). Evaluating the factor structure of the Psychological Performance Inventory (PPI). *Perceptual and Motor Skills, 105*(1), 309-325. doi:10.2466/pms.105.1.309-325
- Gucciardi, D. F. (2012). Measuring mental toughness in sport: A psychometric examination of the Psychological Performance Inventory-A and its predecessor. *Journal of Personality Assessment, 94*(4), 393-403. doi:10.1080/00223891.2012.660292
- Loehr, J. E. (1986). *Mental toughness training for sports: Achieving athletic excellence*. Lexington, Massachusetts: The Stephen Greene Press.
- Marchant, D. C., Polman, R. C. J., Clough, P. J., Jackson, J. G., Levy, A. R., & Nicholls, A. R. (2009). Mental toughness: Managerial and age differences. *Journal of Managerial Psychology, 24*(5), 428-437. doi:10.1108/02683940910959753
- Masum, R. (2014). A mixed method analysis of mental toughness in elite and sub-elite male and female tennis players in Pakistan. *Advances in Social Sciences Research Journal, 1*(6), 110-122.
- Meggs, J., Ditzfeld, C., & Golby, J. (2014). Self-concept organisation and mental toughness in sport. *Journal of Sports Sciences, 32*(2), 101-109. doi:10.1080/02640414.2013.812230
- Newland, A., Newton, M., Finch, L. M., Harbke, C. R., & Podlog, L. (2013). Moderating variables in the relationship between mental toughness and performance in basketball. *Journal of Sport and Health Sciences, 2*, 184-192. doi:10.1016/j.jshs.2012.09.002

- Nicholls, A. R., Polman, R. C. J., Morley, D., & Taylor, N. (2009). Coping and coping effectiveness in relation to a competitive sport event: pubertal status, chronological age, and gender among adolescent athletes. *Journal of Sport and Exercise Psychology, 31*(3), 299-317.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York, NY: McGraw-Hill.
- Sacco, R. G. (2013). Re-Envisaging the Eight Developmental Stages of Erik Erikson: The Fibonacci Life-Chart Method (FLCM). *Journal of Educational and Developmental Psychology, 3*(1), 140-146. doi:10.5539/jedp.v3n1p140
- Sheard, M. (2009). A cross-national analysis of mental toughness and hardiness in elite university rugby league teams. *Perceptual and Motor Skills, 109*(1), 213-223. doi:10.2466/PMS.109.1.213-223
- Sheard, M., Golby, J., & van Wersch, A. (2009). Progress toward construct validation of the Sports Mental Toughness Questionnaire (SMTQ). *European Journal of Psychological Assessment, 25*(3), 186-193. doi:10.1027/1015-5759.25.3.186
- Steele, G. I., & Edwards, D. J. A. (2008). Development and Validation of the Xhosa Translations of the Beck Inventories: 2. Item Analysis, Internal Consistency and Factor Analysis. *Journal of Psychology in Africa, 18*(2), 217-226.

## CHAPTER 5: CONCLUSION

The current research project consisted of three studies examining mental toughness among South African cricketers. These included the development and implementation of a mental toughness programme, psychometric assessment of mental toughness inventories, namely the PPI-A and the SMTQ, and the examination of demographic characteristics of South African cricketers scores on the two inventories. Findings suggest that important elements to consider when developing mental toughness programmes are that the programme is age appropriate, programmes for young cricketers should consider implementing group and individual learning and be more structured, and programmes for all ages need to incorporate a focus on personal development. Coaches are exceptionally important in the development of mental toughness and the coach and sport performance professional need to provide an active mentoring structure, focusing on motivational climate and interactions with others. Extra-personal influences need to be considered carefully when developing and implementing mental toughness programmes. Particular extra-personal influences that emerged in the present research were seasonal demands (overload), competition level, social support, motivational climate, and team stability. These extra-personal influences contribute to the development of mental toughness by influencing the programme and environment as well as influencing and assisting to maintain intra-personal aspects such as education, awareness, self-belief, and self-regulation. The diagram in Figure 1 provides a graphic representation of these dynamics that have been identified as important in the current research.

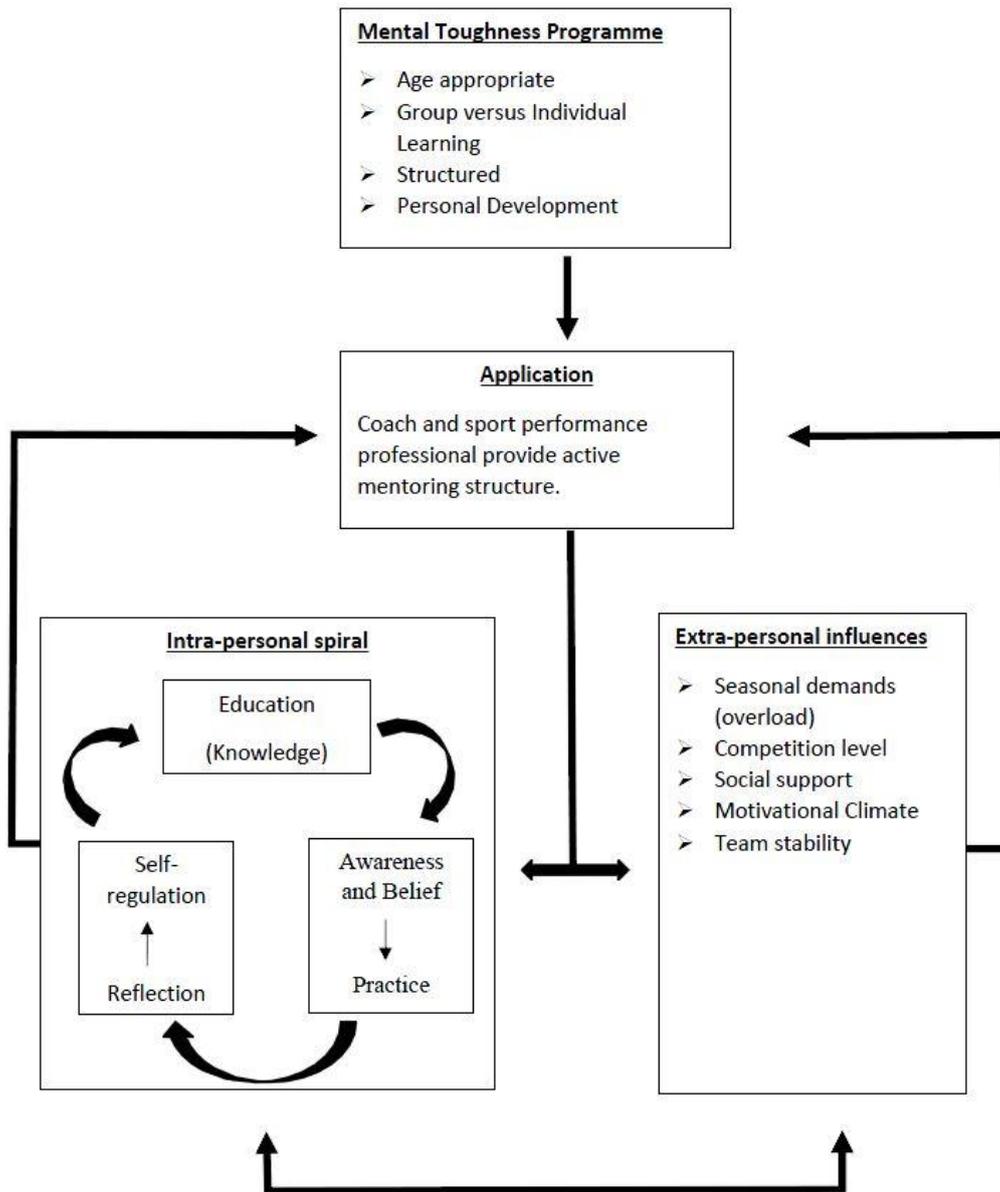


Figure 1. Diagrammatic presentation of convergent findings of the current mental toughness research<sup>4</sup>

### Lack of awareness and overestimation of psychological skills

Convergent findings emanating from the three studies in the present research project suggested that the cricketers appeared to lack awareness about psychological skills as they

<sup>4</sup> Gender and ethnicity did not emerge as significant in the development of mental toughness and its application.

pertain to cricket and they appeared to overestimate their ability in regard to the psychological skills they possess.

In the first study (Article 1), developing and implementing mental toughness programmes for school level cricketers, the participants self-scored with high ratings on the PPI-A, even though they had indicated little, if any, mental toughness or Psychological Skills Training (PST) involvement or knowledge before this project. Initial scores ranged from 48-60 with the post-programme PPI-A scores ranging from 51-65, with the possible score range of 14-70. The school level cricketers rated themselves on average: 77% of the maximum score for determination, 77% of the maximum score for self-belief, 73% of the maximum score for positive cognition, and 63% of the maximum score for visualisation. It is interesting to note that after learning about mental toughness and participating in the programme, some participants decreased scores on some subscales of the PPI-A, with one participant even decreasing scores on all four subscales. This raises the question of how well they understood what they were rating before the programme and the impact the programme had on their knowledge of mental toughness. More research needs to be conducted on self-report measures to investigate how knowledgeable South African cricketers (and sports people in general) are about what they are rating when completing these self-report assessments.

The obtained mean of 55.43 ( $SD = 6.14$ ) for total scores of the PPI-A in Article 2, with mostly school level and amateur cricketers from the Eastern Cape, and  $M = 57.94$  ( $SD = 7.45$ ) in Article 3, with most amateur and club cricketers throughout South Africa, reflects a relatively high mean score ascribed to themselves by participants in this study. In Article 2, the mean age of participants was 16.62 ( $SD = 4.61$ ) and less than six percent of the entire sample indicated that they spend much, if any, time working on mental toughness or PST, with these mostly indicating *focus* as the mental skill they practice. The mean age for participants in Article 3 was 26.70 ( $SD = 7.91$ ). These results raise the question whether the

participants in the study may have overestimated their mental skills ability in general, and mental toughness specifically. Newland et al. (2013) found  $M = 54.87$  ( $SD = 6.33$ ) amongst high level college basketball players, while Masum (2014) found  $M = 56.86$  ( $SD = 4.58$ ) among elite and  $M = 48.59$  ( $SD = 6.51$ ) among sub-elite tennis players. Sheard (2009) found  $M = 59.96$  ( $SD = 3.92$ ) for elite Australian rugby player and  $M = 56.83$  ( $SD = 3.14$ ) among elite Great Britain rugby players. This suggests that the South African sample of cricketers in Articles 2 and 3 self-rated their mental toughness scores at high levels, given that the entire sample in Article 2 and 95% of the sample in Article 3 were sub-elite players.

Similar findings are evident for the SMTQ, in which the maximum score for the scale is 56, suggesting the cricket players in the sample from Article 2 again scored themselves at high levels on mental toughness characteristics ( $M = 40.66$ ,  $SD = 5.11$ , range = 27 – 52), which may be partly due to lack of awareness and a naïve comprehension of the construct. In Article 3, with a much larger sample, the cricket players again scored themselves at high levels on mental toughness characteristics ( $M = 42.95$ ,  $SD = 5.51$ , range = 22 – 55). Cowden and Meyer-Weitz (2016) found similar results in a sample of 358 South African competitive tennis players, in which they obtained an overall mean of 41.18 and  $SD = 4.74$ .

The results in the current research show a general trend of higher mean scores for the SMTQ for the total scores and the scores on the subscales than found in the literature. Sheard et al. (2009) found  $M = 38.25$  for females and  $M = 40.88$  for males (mixed elite and sub-elite sample; 80% sub-elite) and Cowden and Meyer-Weitz (2016) found  $M = 40.73$  for females and  $M = 41.58$  for males (mixed elite and sub-elite sample; 67% sub-elite). In Article 3, the reported means for females was 42.86 and for males it was 42.97; higher than would be expected for these samples, considering that the majority of the literature cited involved higher level competitors, as opposed to a large component of club, social and school level competitors in the current research. The query that arises is why these South African

cricketers are reporting higher means than samples in the literature. Are these cricketers more mentally tough than other sports people around the world or is there another reason for the high scores.

The findings suggest that these South African cricketers may have overestimated their levels of mental toughness characteristics, which may further be an indication of a lack of awareness and understanding of psychological skills in sport. Asamoah (2013) conducted research with 263 male soccer players participating in a tertiary institution competition in South Africa and made reference to the “relatively poor psychological skill level of the study population” (p. 106). Training psychological skills involves influencing an intra-personal aspect that is focused on the individual in that it helps an individual improve their performance, with the ultimate goal of PST being self-regulation (Weinberg & Gould, 2015). In order for this to occur, it is important to encourage self-awareness in the participants and the link between self-awareness and self-belief, one of the most important and consistently identified components of mental toughness, is one that has come up repeatedly in the literature (Bull, Shambrook, James, & Brooks, 2005; Gucciardi, Gordon, & Dimmock, 2009b).

Lack of awareness and overestimation of psychological skills could confound measurement in the South African context, especially given the issues around an agreed definition of mental toughness internationally, and issues identified in the current research project about the psychometric properties of the two inventories.

The importance of self-awareness in mentally tough athletes has been established in the literature, and a focus of this programme was to develop in the players a more conscious awareness of the psychological processes occurring in their performance (Bull et al., 2005; Connaughton, Hanton, & Jones, 2007; Gucciardi, Gordon, Dimmock, & Mallett, 2009; Gucciardi, 2009; Gucciardi & Gordon, 2009a; Gucciardi, Gordon, & Dimmock, 2009a; Gucciardi & Gordon, 2009b; Gucciardi et al., 2009b). Creating awareness was an important

part of both programmes and, after one of the exercises early in the programme, a participant commented, *“I’ve heard about this strong power of the mind stuff sir, but I’ve never believed it till then”*, highlighting the awareness that was emerging. This is an important point because many cricketers (and sports people in general) believe that people are born with a skill or mental toughness and one either possesses the ability or not. This perspective resonates with Dweck’s (Blackwell, Trzesniewski, & Dweck, 2007; Dweck, Chiu, & Hong, 1995a; Dweck, Chiu, & Hong, 1995b; 2017; 1988; Levy, Stroessner, & Dweck, 1998; Mangels, Butterfield, Lamb, Good, & Dweck, 2006) entity self-theory (fixed mindset) and this is why it is important to start an intervention by encouraging participants to engage incremental self-theory (growth mindset) orientated, understanding that the brain can grow and create new pathways through neuroplasticity (Chambers, 2010; Demarin, Morovic, & Bene, 2014; Fuchs & Flügge, 2014).

Education programmes about performance and sport psychology are exceptionally important in creating awareness about the use and benefits of PST and mental toughness specifically, and sport psychology in general. There is a need to educate sports people, parents, administrators, and especially coaches and young people about growth mindsets, PST, psychological skills, mental toughness, and how these affect performance. In the studies described in Article 1, the education sessions were, therefore, extra-personal aspects that were internalized to contribute intra-personally to the development of mental toughness. This cyclical process of education, practice, and awareness needs to be sustained after the departure of the researchers, ideally by the coach and the organization, or possibly by employing suitably trained sport psychology professionals. School leaders should consider employing performance psychology professionals who could assist learners with developmentally appropriate programmes and to develop mental toughness. Such assistance would benefit sport, academics, performing arts, and other areas in the lives of learners.

South Africa needs to formalise the role of sport psychology by introducing a category within the Health Professions Council of South Africa for registration as a sport psychologist and government and national sporting bodies should make more use of suitably qualified and accredited individuals. Psychological Skills Training programmes also improve self-regulation and the participants in the projects described in Article 2 reported that the improvements in self-awareness and self-regulation were also noticeable to those involved, identifying that the difference could be seen between those team members attending and not attending the sessions. The benefits of PST extend to a range of areas important in improving performance in and outside of sport. The participants reported that the programme helped improve their decision-making, resilience, ability to take responsibility for their own performance, and consideration for the team. The educational aspect of the programme is important as it creates awareness which allows the person to be open to identifying extra-personal aspects that help or hinder mental toughness. Awareness of the psychological processes one engages in when performing well or poorly improves the ability to self-regulate, which is the ultimate goal of PST (Vago & Silbersweig, 2012; Weinberg & Gould, 2015).

The inclusion of mentor programmes is recommended to assist in developing mental toughness by increasing the players' awareness of the role mental aspects play in their performance and to integrate the mental toughness training with physical training, allowing the players to apply the theory to their own game. The integration of the mental toughness training and physical training is particularly important for the programme to be effective (Williams & Krane, 2014). Developers of such programmes need to consider the age and enthusiasm of participants in the programme and incorporate more structure as well as support from management.

The current research project's results need to be considered in the context of the questions raised Articles 2 and 3 in the current research project about the levels of knowledge and awareness that South African cricketers possess and demonstrate with regard to mental toughness and, in fact, mental skills relating to cricket. These mental toughness differences need to be examined to determine whether these are real differences or differences based on understanding and interpretation, which relate directly to what children learn about sport psychology and mental toughness while growing up. This may also be closely linked to aspects such as characteristics associated with motivational climate (e.g. enjoyment, mastery, autonomy), interactions with individuals (i.e., coaches, parents, friends, family, senior athletes, sport psychologists, team-mates), experiences in and outside sport (all of which relate to external or extra-personal aspects that influence the individual), as well as psychological skills and strategies, and an insatiable desire and internalized motives to succeed (which relate to internal or intra-personal aspects).

### **Developmental/Age related findings**

Participants in the two studies discussed in Article 1 were high school level learners and the major challenges experienced in the programmes emanated from a lack of enthusiasm, participation, structure, and understanding of sport psychology. Poor communication and contracting at the start of both studies to clarify roles and expectations contributed to the lack of participation and structure. The lack of enthusiasm and understanding of sport psychology could be alleviated by educating sports coaches and players on the benefits of mental toughness because the lack of knowledge of the participants in Article 1 contributed to their attitude and lack of enthusiasm towards the programmes.

The participants in Article 1 indicated a preference for group learning during the education phase of the PST components of the mental toughness programmes and it appeared

that this was partly due to their young age and their uncertainty about PST and mental toughness. As players get older, more mature, and become more experienced in mental toughness, they may need more of an individualised approach, tailored to their specific needs.

The findings from the studies in Article 1 suggested that the timing of mental toughness programmes were problematic because many school learners in South Africa (and at this school especially) are required to do one summer sport and one winter sport and do not have an “off-season” as such. Instead, they have a vacation that marks the end of the winter sport season, they start the new term, and then begin the cricket season. The academic year ends in December and the learners have an extended vacation until mid-January, when the cricket season resumes until approximately April. The beginning of a new academic year results in the cricket season effectively being started again because some learners have matriculated, while others are older, which means there is inevitably some movement between age group teams, sometimes resulting in considerable changes to teams.

Both studies considered Article 1 focused on Action Research and making use of PST with the teams and individuals and they also both emphasised the importance of extra-personal factors in the development of mental toughness. The mentor system was designed to assist the players in terms of social support and interaction with others, in which players from both teams were tasked with working together in pairs, with the respective 1<sup>st</sup> XI team member being the mentor to an u15A team member. The second extra-personal aspect drawn from both programmes related to the influence of the coach. The researchers discussed with the coaches before and at the start of the research the importance of the role of the coach in developing mental toughness and both coaches were very supportive of the research and their players’ participating in the mental toughness programme, with both coaches verbalising their interest of and belief in the importance of the mental component of cricket. The relationship between the researcher and coach was discussed as one of collaboration in which both parties

would work together to enhance PST and environmental aspects (which were discussed between both sets of researchers and coaches as encompassing issues around motivational climate and social support). With the exception of the first focus group with each team, in which the coaches were requested not to participate (initiated by the team members and researchers), the coaches were invited to participate in all aspects of the programmes and were provided with information throughout the duration of the programmes. Coaches were both interviewed individually, with the focus on the players in their teams, and results were compared to focus group results. The coaches were also requested to assist in arranging venues at the school and facilitate the scheduling of the sessions based on the availability of the participants as they were mostly under the age of 18. The role of the coach in the development of the players' mental toughness is critical (Connaughton et al., 2008) and the researchers, in their initial interviews with the coaches, began the process of providing them with access to skills to help identify and develop mental toughness after the conclusion of the intervention.

Extra-personal factors were found to be very important in the studies in Article 1. Motivational climate, interactions with individuals, and experiences in and outside sport were found to be instrumental in assisting the development and maintenance of mental toughness. Psychological Skills Training improves mental toughness, which has been reported to have a relationship with motivational issues and motivational climate which, in turn, assist in creating an environment conducive to the development and maintenance of mental toughness. Analysis of the data from the two mental toughness programmes discussed in Article 1 revealed results in line with the findings of Bull et al. (2005) and Connaughton et al. (2008), in that the influence of the coach and social support are important extra-personal characteristics that play a role in the successful implementation of the mental toughness programme. In order to benefit the most from psychological interventions such as this mental

toughness programme, the right attitude needs to be adopted by the players and the coach. A growth mindset and a *winning mind* need to be encouraged and the most effective environment for fostering a positive, strong and resilient mental athlete needs to be developed and cultivated. The winning mind and winning environment are inextricably linked. The coach of the team is integral to this process and contributes the most to the success in creating and sustaining an environment that maintains mental toughness, which contributes to developing a culture of mental toughness.

Research suggests that young children should sample sports instead of specialising in sport from an early age, with authors suggesting that if it occurs, specialisation should start around the end of primary school (approximately 13 years of age) (Baker, Côté, & Abernethy, 2003; Côté, Baker, & Abernethy, 2007; Côté, Baker, & Abernethy, 2003; Côté & Vierimaa, 2014; Foster, Maynard, Butt, & Hays, 2016). Weiss (1991; 2004) highlighted the need to adapt PST philosophy for children (and therefore mental toughness programmes too), suggesting that emphasis should be placed on personal development rather than performance enhancement per se. Content and delivery of PST and mental toughness programmes with youngsters may therefore require holistic consultancy models that draw upon literature from general developmental psychology (Foster et al., 2016). Once children reach specialisation age, more traditional PST approaches may be appropriate, while continual emphasis on development and character development is essential, even into the professional context (Hodge, Henry, & Smith, 2014). In the current research discussed in Article 1, it becomes evident that these high school learners are unable to specialise entirely on a single sport because they are required, at least, to play a summer and winter sport, with some playing more than just the two sports until the end of their school career.

The researchers experienced some difficulty in running the programmes due to the lack of enthusiasm, structure, and support, in particular, from the one coach. These, along

with the timing of the programme lead to participants being unable to focus on the educational and practice requirements of the programme. They would not be prepared for the sessions, other commitments would easily distract them, and they tended to want to be “spoon-fed” rather than taking responsibility for their own development. While it could be argued that the age groups in the studies in Article 1 could have been the reason for this, research with university and semi-professional cricket players in which the current author has been involved suggests these problems are not isolated to school level cricketers (McInerney, 2014). The incorporation of the mentor system was good for those who made active use of it, but in cases where the sessions did not take place or the mentors were not interested, it created expectations for the mentees that were not met, which had a negative impact on enthusiasm. Beginning programmes with education and activities that encourage the adoption of growth mindset thinking may alleviate these issues. Parents and teachers need to be encouraging growth mindset thinking from as young an age as possible when working with children (Blackwell et al., 2007; Dweck et al., 1995a; Dweck et al., 1995b; Dweck, 2007; Dweck, 2017; Levy et al., 1998; Mangels et al., 2006).

Mental toughness programmes with high school cricketers should be implemented in the pre-season and during the cricket season, taking careful precautions not to overload the cricketers with educational information very close to competitive situations that will impact their performance negatively. Players need sufficient time to learn the skills and techniques and then practice them before attempting to implement them in competitive situations. Group learning approaches work well with this level of participants for educational phase activities of PST components in mental toughness programmes, while they need to progress to group and individual activities as players become more familiar with using psychological skills. The ultimate goal will be for players to self-regulate and take responsibility for their own development, although the suggestion from the current research is that younger cricketers

may initially require more structured and prescriptive approaches, progressively introducing more autonomy as they progress to professional levels. Coaches and management need to actively support sport psychology work so that the cricketers will be more willing to commit to the process and all people involved need to be educated on the effectiveness and use of sport psychology and mental toughness.

### **Ethnicity**

Ethnicity will be discussed separately from other demographic variables due to the historic focus of this variable in research and the conclusion reached in the current research questioning how ethnicity is researched in the future. While ethnicity was found to display significant differences on total mental toughness and all three subscale scores for the SMTQ, the nature of these differences are inconclusive, similarly to research findings (Beck, 2012; Cowden & Meyer-Weitz, 2016). Similar results were found for the PPI-A, with ethnicity found to display significant differences on the total mental toughness scores of the PPI-A and on the Positive Cognition and Visualization subscales. No significant differences were found between black and white respondents, except for the Control subscale where the white respondents reported higher mean score than the black respondents. While the variable of ethnicity has been compared in limited other research (Beck, 2012; Cowden & Meyer-Weitz, 2016), inconclusive results have also been found. Beck's (2012) research on the SMTQ found a significant difference when examining ethnicity, in that black athletes scored higher on the SMTQ than white athletes. Cowden and Meyer-Weitz (2016) initially found the opposite, but when they controlled for age in the analysis (because of a significant difference between the mean ages of black and white participants), they found that age was a significant predictor but that ethnicity did not contribute to the predictability of mental toughness beyond that of age. Some of the

differences found on the ethnicity variable could also be explained by the different sub-sample sizes.

The development and implementation of mental toughness in general, and programmes specifically, can benefit from the current research by focusing on educating coaches, sports people, administrators, parents, and especially youth about psychological skills and how they can benefit performance and enjoyment. The suggestion from this research is that differences in mental toughness based on ethnic characteristics is not a useful avenue of exploration due to the discrepancies and that mental toughness differences have more to do with learned aspects. To this end, more viable options may relate to extra-personal and environmental aspects such as socio-economic status, family support, available resources, and support from coaches to name a few. These and cultural differences may be useful exploration points in order to develop ways to impart the theory to different cricketers.

### **Other demographics that hold implications**

The current research found that there were no significant differences between male and female respondents on the total scores or on the subscales for both the SMTQ and the PPI-A. This is comparable to the results found by Cowden and Meyer-Weitz (2016) in a sample of South African competitive tennis players using the SMTQ but contradictory to results found in other research in which males were found to have significantly higher scores on both the SMTQ (Beck, 2012; Crust & Keegan, 2010; Crust et al., 2014; Gerber, Brand et al., 2013; Gerber, Kalak et al., 2013; Golby, Sheard, & van Wersch, 2007; Nicholls, Polman, Morley, & Taylor, 2009) and on the PPI-A (Masum, 2014; Newland et al., 2013).

Results of age and sex on SMTQ and PPI-A scores were inconclusive. No significant differences were found between male and female respondents, nor between the various Age categories. These results vary somewhat from those found in the literature that report males

having significantly higher mental toughness scores. Cowden and Meyer-Weitz (2016) found no significant differences between males and females in a South African sample of competitive tennis players, while they did find a significant difference for age and total mental toughness scores on the SMTQ. A significant difference was found for Competitive level when compared with SMTQ total scores. In the current research, no significant differences were found between male and female respondents on any of subscales of the SMTQ nor on the total mental toughness score. While no significant differences were found for age on total mental toughness for the SMTQ, significant differences were found for age on the Constancy and Control subscales. The significantly higher mean for the Child group contradicts the literature on Age and SMTQ scores, raises the question whether the younger group is accurately representing their scores on mental toughness. Given the general tendency identified in this research project for South African cricketers to rate themselves highly on mental toughness, it raises the question of whether South African cricketers possess high enough awareness and knowledge of the mental component of their game. Significant differences were found for SMTQ total mental toughness and for all three subscales when analysed for Competitive level. The means reported for each sample category for SMTQ total mental toughness scores and for the subscales were generally higher than those reported by Cowden and Meyer-Weitz (2016) for competitive tennis players. There were no significant differences between male and female respondents, between Age groups, nor between Competitive level groups and total scores on the PPI-A. Finding no significant difference between male and female respondents is in line with the finding in the current research for the SMTQ but not with other research into the PPI-A, in which males were found to score higher than the females in those studies (Masum, 2014; Newland et al., 2013). The finding in the current research that revealed no significant difference between competitive level and total mental toughness scores on the PPI-A is contrary to

findings in previous research that found significantly higher levels of total mental toughness among higher level competitors (Golby & Meggs, 2011; Masum, 2014).

When examining the differences for age on both of the mental toughness inventories, no significant difference was found on total mental toughness scores. The analysis on the SMTQ did reveal significant differences on the Constancy and Control subscales in which the Child group scored significantly higher than the Young and Middle groups on Constancy and the Young group scored significantly higher than the Middle group on Control. This differs substantially from the results found in the literature which suggests older groups score higher on the SMTQ than younger groups (Cowden & Meyer-Weitz, 2016; Sheard et al., 2009). In the current research, the Older group scored the highest mean score on total mental toughness and on the Confidence subscale, while the Child group scored the highest mean score on the Constancy subscale and the Young group scored highest on the Control subscale. This result reinforces the assertion that many of the cricketers are self-reporting their levels of mental toughness at high levels and may be indicative of a lack of knowledge, understanding and self-awareness when it comes to the mental components related to cricket. The comparison of Age and the PPI-A revealed significant differences on the Determination and Visualization subscales. The Young group produced the highest mean score on the Determination subscale and the Older group the highest mean score on the Visualization subscale, which again raises concerns about younger participants attributing high levels of mental toughness to themselves. Further research needs to be conducted to establish if the young South African cricketers do indeed possess higher levels of mental toughness or, as is more likely, if there is another explanation for these results. It may be useful to pursue a methodological avenue that would make use of mixed designs where qualitative, descriptive and inferential information could be reflected against each other.

Competitive level proved to be the only demographic variable in which a clearer distinction between the subgroups was evident in terms of scores on the SMTQ and the PPI-A, for which those respondents who had represented their country scored the highest means on the total score and on each of the subscales. Significant differences were found for total scores on the SMTQ and on all three of its subscales, with the Country and Provincial groups self-reporting higher mean scores. Even with the Country group achieving the highest mean score on all subscales, there were still some results that need further investigation, as the Country group and Provincial group achieved significantly higher scores than only the Social and School subgroups and not for all comparisons. The Country group produced significantly higher scores than the Social and School groups on the Confidence and Control subscales, but no significant differences were found between subgroups on the Constancy subscale. The PPI-A displayed no significant difference for Competitive level on the total scores but did produce a significant difference on the Determination subscale in which the Country subgroup was significantly higher than all the other subgroups.

Research on both the SMTQ and the PPI-A investigating differences between various demographic groupings have reported similar findings (Golby & Meggs, 2011; Masum, 2014; Newland et al., 2013; Sheard, 2009). Significant age differences have been found with mental toughness generally increasing with age (Cowden & Meyer-Weitz, 2016; Marchant et al., 2009; Newland et al., 2013; Nicholls et al., 2009; Sheard, 2009). Males have generally been found to score higher on the SMTQ (Beck, 2012; Crust, 2009; Crust & Keegan, 2010; Crust & Swann, 2011; Crust et al., 2014; Gerber et al., 2013; Gerber et al., 2013; Nicholls et al., 2009; Sheard et al., 2009) and Cowden and Meyer-Weitz (2016) suggest socialisation and perceptual and cognitive differences affecting selected mental toughness components as possible reasons for these findings. When comparing scores on the PPI-A for sex differences, Masum (2014) found the male group ( $M = 55.50$ ,  $SD = 4.64$ ) to have higher total mental toughness scores than the

female group ( $M = 47.82$ ,  $SD = 7.79$ ). Newland, Newton et al. (2013) also found significantly higher mental toughness scores for males in a sample of tertiary level basketball players, with total mental toughness for the sample at 54.87 and a mean of 56.28 for the males and 53.46 for the females. In research with 365 competitive South African tennis players, Cowden and Meyer-Weitz (2016) found no significant sex or competitive level differences on the SMTQ. Other researchers have found that national and international competitors generally score higher on the SMTQ than those at lower levels like regional, semi-skilled, novice, and sub-elite (Biglari, Sanatkaran, Bahari, & Montazeri, 2015; Golby & Meggs, 2011; Meggs, Ditzfeld, & Golby, 2014; Sheard et al., 2009). Masum (2014) conducted research with a sample of tennis players from Pakistan and found higher total PPI-A scores for elite players ( $M = 56.86$ ,  $SD = 4.58$ ) than for sub-elite players ( $M = 48.59$ ,  $SD = 6.51$ ). Golby and Meggs (2011) also found national and international level players to have significantly higher mental toughness scores on the SMTQ for overall mental toughness and for all four of the subscales. Future research might consider investigation of mental toughness in team versus individual sport players. It bears noting that the participation levels of the competitive tennis players were generally higher than the levels of cricketers in the sample for the current research.

### **Use of Action Research methodological approach**

Using group settings to address the education phase of PST (Weinberg & Gould, 2015) within the mental toughness programmes reduced the time each player was required to commit to the programme and both the use of Action Research and the mental toughness programme improved the cohesion of the team according to those who attended. An Action Research approach proved to be useful because the research method formed part of the intervention in that the group focus required the researchers and the teams to focus on group processes which assist in developing cohesion. It was, however, important to clarify the role

and timing of the group activities so that the participants were aware of what they were being asked to do and why. This provided the structure that the participants seemed to require and enabled the clarification of the link between group activity and individual work. Players who attended regularly believed it was more beneficial learning about mental toughness and mental skills as a group rather than working through the programme as individuals. Action Research proved useful as it allowed more collaboration between the researchers and participants and the constant action and reflection allowed the researchers to adapt the programme elements to the participants in the very dynamic school environment. The educational sessions (Weinberg & Gould, 2015) were conducted with the groups of players and each session was designed to incorporate one component that constituted the programme that would allow the players to develop an understanding of the concepts under discussion and an awareness of their role in mental toughness and improved performance (Weinberg & Williams, 2006).

The Action Research framework in both studies made use of McLean's (2006) Organizational Development Process (ODP) model of Action Research to guide the process in the development and implementation of the mental toughness programmes. Action Research allowed the researchers to make use of the action and reflection cycle to incorporate theory and practice in a participatory framework that allows the participants to be partners in the process of constructing the research (Reason & Bradbury, 2008). The benefit of this approach is that it allowed for the development of both theory and practice (McNiff & Whitehead, 2006), because the method became part of the intervention. Such processes are aimed at practical outcomes and reflection on these processes provide opportunities to develop new forms of understanding and contribute to the existing knowledge base. This is very useful in sport psychology because the focus is on making positive changes in the lives of participants, while systematically recording and incorporating outcomes over time, in so

doing, constantly contributing to the development of theory. The cyclical process of education, practice, and awareness is an important part of Action Research that begins in the research project and needs to be sustained after the departure of the researchers. Action Research is useful in this regard because the reflective nature and cyclical process of the Action Research cycle empowers participants through participation (Reason & Bradbury, 2008). By incorporating an Action Research approach with mental toughness development, the players would be better equipped to self-regulate and take responsibility for their future mental toughness development to a greater extent.

### **Findings on measurement and the nature thereof**

The current research project assessed the internal validity of the three inventories by making use of Cronbach's Alpha. Convergent validity was assessed by correlating the respondents' scores on the PPI-A and the SMTQ. The scores on these two inventories would then be correlated with the respondents' scores on the ABQ in order to contribute to the discriminant validity assessment of the inventories. The findings reinforce previous findings of research on these two inventories (Golby et al., 2007; Gucciardi, 2012; Middleton, Marsh, Martin, Richards, & Perry, 2005; Sheard et al., 2009).

The PPI-A displayed a moderate-to-strong level of internal consistency for global mental toughness, although the  $\alpha$  coefficients for the subscales were low and ranged from .50 to .58, raising questions about dimensionality. The global mental toughness results compare well with results found by Golby et al. (2007), Masum (2014), and Newland, Newton, Finch, Harbke, and Podlog (2013), while the subscale  $\alpha$  coefficients were considerably lower than those found by Golby et al. (2007) and more comparable, yet lower, than with the results found by Gucciardi (2012), in which the  $\alpha$  coefficients for the subscales ranged from .60 to .69. Gucciardi (2012) found encouraging factorial validity results for the PPI-A but the low

internal consistency results reinforced the concerns of other research, such as Middlton et al. (2004), which suggests that there may be problems with the items that were constructed to capture the components of mental toughness measured in the PPI-A because it was derived from the PPI, which was based on anecdotal evidence and for which no psychometric properties were provided. The SMTQ displayed a moderate global internal validity with  $\alpha = .68$  and the internal consistency of the subscales ranged from .43 to .71, with internal consistency of Constancy and Control notably affected by negatively worded items. Asamoah (2013) found similar results in a South African sample with internal consistency for the subscales ranging from .41 – .67. The subscales of Constancy and Control were also particularly low ( $\alpha = .50$  and .41). In discussing the results in relation to the sample, Asamoah (2013) made reference to the “relatively poor psychological skill level of the study population” (p. 106). The results in the current study and Asamoah (2013) are considerably lower than those found by Sheard et al. (2009), namely  $\alpha$  ranging from .71 – .80.

The correlations between the subscales of the PPI-A ( $r = .22 - .39$ ) were considerably lower than those found by Golby et al. (2007) ( $r = .50 - .63$ ) and very much in line with the subscale correlations found by Gucciardi (2012) ( $r = .19 - .47$ ). These results raise questions about the subscales, suggesting a substantial conceptual difference between the subscales. The correlations for the subscales ( $r = .16 - .53$ ) were comparable to the  $r = .24 - .44$  found by Sheard et al. (2009) and to the  $r = .25$  to .60 found by Plettenberg-Lenhausen (2013).

The Total Burnout Score for the ABQ showed a high degree of internal consistency ( $\alpha = .87$ ) which compares well with the internal consistency range of  $\alpha = .86 - .90$  that Raedeke and Smith (2001) found in their initial research of the ABQ. The internal consistency of the subscales ( $\alpha = .67 - .82$ ) are well within range of the findings in the research literature for internal consistency, which range from  $\alpha = .71 - .91$ . (Cresswell & Eklund, 2006; Raedeke & Smith, 2001). Moderate correlations were found between the subscales of the ABQ ( $r = .43 -$

.56), which once again are within the range of the results presented in the research literature of  $r = .21 - .74$ .

The convergent validity of the PPI-A and the SMTQ was assessed by correlating the total scores of these instruments and revealed a moderate correlation of  $r = .44$ , which is lower than the reported .71 found by Wieser and Thiel (2014). This suggests that only 19% of the variation in the one instrument is explained by the other and is lower than would have been expected. It remains unclear though, whether the lower results found for some aspects of the inventories in this research are due to problems with the instruments or related to issues with the sample that have been previously mentioned. The relatively young mean age of the sample, combined with the lack of experience in mental skills and in their sport in general could have influenced the findings in this research study. A follow-up replication is recommended with a more mature sample in a South African context.

The discriminant validity of the instruments was assessed by comparing total scores of the two mental toughness instruments (PPI-A & SMTQ) with the total scores of the ABQ. The current study found negative correlations between the mental toughness instruments and the ABQ ( $r = -.28$  with the PPI-A and  $r = -.16$  with the SMTQ). The subscales of the mental toughness instruments were also found to be negatively correlated with those of the ABQ ( $r = -.16$  to  $r = -.38$  with the PPI-A and  $r = -.09$  to  $-.17$  with the SMTQ). These findings are very similar to those of Gucciardi and Gordon (2009b) and reinforce the link between mental toughness and burnout.

While the PPI-A and the SMTQ displayed some promising psychometric properties in the current study, researchers should apply these mental toughness inventories with circumspection, taking into account questions regarding dimensionality, item formulation and variation in sample characteristics (e.g., age and sporting code), until more research can be

conducted using these inventories with larger and more varied samples and the understanding of the mental toughness construct improves.

Both mental toughness inventories displayed acceptable levels of internal consistency for the overall mental toughness scores that compare well with those found in the literature, but the internal consistencies found for the subscales were considerably lower than those found in the literature (Golby et al., 2007; Masum, 2014; Newland et al., 2013), with the exception of Gucciardi (2012) and the findings in Article 2, who both found low internal consistencies for the subscales. The  $\alpha$  coefficients found in the current study for the Constancy ( $\alpha = .56$ ) and Control ( $\alpha = .55$ ) subscales of the SMTQ were also low, similar to what was found in Article 2 with the cricketers from the Eastern Cape ( $\alpha = .50$  and  $\alpha = .41$ ), but still considerably lower than the  $\alpha = .71 - .74$  found by Sheard et al. (2009). Similar results were evident with the PPI-A where relatively low  $\alpha$  coefficients were found for the subscales at  $\alpha = .52$  for Determination,  $\alpha = .69$  for Self-Belief,  $\alpha = .70$  for Positive Cognition, and  $\alpha = .54$  for Visualization. These results are comparable to those found in Article 2 in the sample of South African cricketers but lower than other research conducted with the PPI-A. For example, Golby et al. (2007) found the following internal consistency results for the four subscales: Determination ( $\alpha = .72$ ), Self-belief ( $\alpha = .84$ ), Positive Cognition ( $\alpha = .75$ ), and Visualization ( $\alpha = .78$ ). This further reinforces the suggestions that there may be problems with items on the PPI-A (which is drawn from the PPI) that were constructed based on anecdotal evidence to capture components of mental toughness. The results also raise questions about potential problems with the SMTQ's items that need to be investigated further because the sample size for the current study is large. More research needs to be conducted on the SMTQ and the PPI-A with a variety of sports and especially in South Africa, considered in conjunction with levels of understanding of psychological skills.

The current research project employed two different mental toughness inventories (SMTQ and PPI-A) along with the ABQ with a number of different samples. It also focused on developing and implementing mental toughness programmes with young cricketers. The approaches used in this research were beneficial to the investigation of the mental toughness construct because the findings suggest that there is still more work to be done in defining this multi-layered construct and, therefore, in the assessment of mental toughness. The extra-personal influences identified in this research relate to previous research findings and reiterate the need to incorporate them formally into mental toughness development, along with more research to understand how they function in different contexts. Using multiple measures of mental toughness may be useful at this stage in the conceptual development of mental toughness, especially in applied research, as it will assist researchers in accessing the necessary information that will most appropriately benefit participants. The results from the current research provide a useful platform to further investigation into mental toughness in South Africa by providing a rich and varied database composed of different levels of specificity.

## **References**

- Asamoah, B. (2013). *The role of mental toughness, psychological skills and team cohesion in soccer performance*. (Unpublished Master's Thesis). Stellenbosch University, Stellenbosch, South Africa.
- Baker, J., Côté, J., & Abernethy, B. (2003). Sport -specific practice and the development of expert decision-making in team ball sports. *Journal of Applied Sport Psychology*, *15*, 12-25. doi:0.1080/10413200390180035
- Beck, N. M. (2012). *Mental toughness: An analysis of sex, race, and mood*. (Unpublished Master's Thesis). University of North Texas, Texas, USA.

- Biglari, S., Sanatkaran, A., Bahari, S. M., & Montazeri, M. (2015). The comparison of team and individual male athletes, mental toughness at different levels of skills. *International Journal of Basic Sciences and Applied Research*, 4(2), 127-132.
- Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development*, 78(1), 246-263. doi:10.1111/j.1467-8624.2007.00995.x
- Bull, S. J., Shambrook, C. J., James, W., & Brooks, J. E. (2005). Towards an understanding of mental toughness in elite English cricketers. *Journal of Applied Sport Psychology*, 17(3), 209-227. doi:10.1080/10413200591010085
- Chambers, R. A. (2010). Neuroplasticity. In I. P. Stolerman (Ed.), *Encyclopedia of psychopharmacology* (pp. 856-856). Berlin, Heidelberg: Springer Berlin Heidelberg. doi:10.1007/978-3-540-68706-1\_442
- Connaughton, D., Hanton, S., & Jones, G. (2007). A framework of mental toughness in the world's best performers. *The Sport Psychologist*, 21, 243-264.
- Côté, J., Baker, J., & Abernethy, B. (2007). Practice and play in the development of sport expertise. In G. Tenenbaum, & R. C. Eklund (Eds.), *Handbook of sport psychology* (pp. 184-202)
- Côté, J., Baker, J., & Abernethy, B. (2003). From play to practice: A developmental framework for the acquisition of expertise in team sport. In J. Starkes, & K. A. Erickson (Eds.), *Expert performance in sports: Advances in research on sport expertise* (pp. 89-113). Champaign, IL: Human Kinetics.

- Côté, J., & Vierimaa, M. (2014). The developmental model of sport participation: 15 years after its first conceptualization. *Science & Sports, 29*(Supplement), S63-S69.  
doi:10.1016/j.scispo.2014.08.133
- Cowden, R. G., & Meyer-Weitz, A. (2016). Mental toughness in South African competitive tennis: Biographical and sport participation differences. *International Journal of Sport and Exercise Psychology, 14*(2), 152-167. doi:10.1080/1612197X.2015.1121509
- Cresswell, S. L., & Eklund, R. C. (2006). The convergent and discriminant validity of burnout measures in sport: A multi-trait/multi-method analysis. *Journal of Sports Sciences, 24*(2), 209-220. doi:10.1080/02640410500131431
- Crust, L. (2009). The relationship between mental toughness and affect intensity. *Personality and Individual Differences, 47*(8), 959-963.
- Crust, L., Earle, K., Perry, J., Earle, F., Clough, A., & Clough, P. J. (2014). Mental toughness in higher education: Relationships with achievement and progression in first-year university sports students. *Personality and Individual Differences, 69*, 87-91.  
doi:10.1016/j.paid.2014.05.016
- Crust, L., & Keegan, R. (2010). Mental toughness and attitudes to risk-taking. *Personality and Individual Differences, 49*(3), 164-168. doi:10.1016/j.paid.2010.03.026
- Crust, L., & Swann, C. (2011). Comparing two measures of mental toughness. *Personality and Individual Differences, 50*, 217-221. doi:10.1016/j.paid.2010.09.032
- Demarin, V., Morovic, S., & Bene, R. (2014). Neuroplasticity. *Periodicum Biologorum, 116*(2), 209-211.

- Dweck, C. S. (2007). *Mindset: The new psychology of success*. New York, NY: Random House.
- Dweck, C. S. (2017). *Mindset: Changing the way you think to fulfil your potential* (Updated Ed ed.). United Kingdom: Robinson.
- Dweck, C. S., Chiu, C., & Hong, Y. (1995a). Implicit theories and their role in judgments and reactions: A world from two perspectives. *Psychological Inquiry*, 6(4), 267-285.
- Dweck, C. S., Chiu, C., & Hong, Y. (1995b). Implicit theories: Elaboration and extension of the model. *Psychological Inquiry*, 6(4), 322-333. doi:10.1207/s15327965pli0604\_12
- Elliott, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology*, 54, 5-12.
- Foster, D., Maynard, I., Butt, J., & Hays, K. (2016). Delivery of psychological skills training to youngsters. *Journal of Applied Sport Psychology*, 28(1), 62-77.  
doi:10.1080/10413200.2015.1063097
- Fuchs, E., & Flügge, G. (2014). Adult neuroplasticity: More than 40 years of research. *Neural Plasticity*, 2014, 1-10. doi:10.1155/2014/541870
- Gerber, M., Brand, S., Feldmeth, A. K., Lang, C., Elliot, C., Holsboer-Trachsler, E., & Pühse, U. (2013). Adolescents with high mental toughness adapt better to perceived stress: A longitudinal study with Swiss vocational students. *Personality and Individual Differences*, 54(7), 808-814. doi:10.1016/j.paid.2012.12.003

- Gerber, M., Kalak, N., Lemola, S., Clough, P. J., Perry, J. L., Pühse, U., . . . Brand, S. (2013). Are adolescents with high mental toughness levels more resilient against stress? *Stress and Health, 29*, 164-171. doi:10.1002/smi.2447
- Golby, J., & Meggs, J. (2011). Exploring the organizational effect of prenatal testosterone upon the sporting brain. *Journal of Sports Science and Medicine, 10*, 445.
- Golby, J., Sheard, M., & van Wersch, A. (2007). Evaluating the factor structure of the Psychological Performance Inventory (PPI). *Perceptual and Motor Skills, 105*(1), 309-325. doi:10.2466/pms.105.1.309-325
- Gucciardi, D. F. (2009). Do developmental differences in mental toughness exist between specialized and invested Australian footballers? *Personality and Individual Differences, 47*(8), 985-989.
- Gucciardi, D. F. (2012). Measuring mental toughness in sport: A psychometric examination of the Psychological Performance Inventory-A and its predecessor. *Journal of Personality Assessment, 94*(4), 393-403. doi:10.1080/00223891.2012.660292
- Gucciardi, D. F., & Gordon, S. (2009a). Construing the athlete and exerciser: Research and applied perspectives from personal construct psychology. *Journal of Applied Sport Psychology, 21*(1), 17-33.
- Gucciardi, D. F., & Gordon, S. (2009b). Development and preliminary validation of the Cricket Mental Toughness Inventory (CMTI). *Journal of Sport Sciences, 27*(12), 1293-1310. doi:10.1080/02640410903242306

- Gucciardi, D. F., Gordon, S., & Dimmock, J. (2009a). Evaluation of a mental toughness training program for youth-aged Australian footballers: I. A quantitative analysis. *Journal of Applied Sport Psychology, 21*(3), 307-323. doi:10.1080/10413200903026066
- Gucciardi, D. F., Gordon, S., & Dimmock, J. (2009b). Evaluation of a mental toughness training program for youth-aged Australian footballers: II. A qualitative analysis. *Journal of Applied Sport Psychology, 21*(3), 324-339. doi:10.1080/10413200903026074
- Gucciardi, D. F., Gordon, S., Dimmock, J., & Mallett, C. (2009). Understanding the coach's role in the development of mental toughness: Perspectives of elite Australian football coaches. *Journal of Sports Sciences, 27*(13), 1483-1496.  
doi:10.1080/02640410903150475
- Hodge, K., Henry, G., & Smith, W. (2014). A Case Study of Excellence in Elite Sport: Motivational Climate in a World Champion Team. *The Sport Psychologist, 28*(1), 60-74.  
doi:10.1123/tsp.2013-0037
- Levy, S. R., Stroessner, S. J., & Dweck, C. S. (1998). Stereotype formation and endorsement: The role of implicit theories. *Journal of Personality and Social Psychology, 74*(6), 1421-1436. doi:10.1037/0022-3514.74.6.1421
- Mangels, J. A., Butterfield, B., Lamb, J., Good, C., & Dweck, C. S. (2006). Why do beliefs about intelligence influence learning success? A social cognitive neuroscience model. *Social Cognitive and Affective Neuroscience, 1*(2), 75-86. doi:10.1093/scan/nsl013
- Marchant, D. C., Polman, R. C. J., Clough, P. J., Jackson, J. G., Levy, A. R., & Nicholls, A. R. (2009). Mental toughness: Managerial and age differences. *Journal of Managerial Psychology, 24*(5), 428-437. doi:10.1108/02683940910959753

- Masum, R. (2014). A mixed method analysis of mental toughness in elite and sub-elite male and female tennis players in Pakistan. *Advances in Social Sciences Research Journal*, 1(6), 110-122.
- McInerney, M. (2014). *The development and implementation of a mental toughness training programme for cricketers*. (Unpublished MA). Rhodes University, Grahamstown, South Africa.
- McLean, G. N. (2006). *Organization development: Principles, processes, performance*. San Francisco: Berrett-Koehler Publishers.
- McNiff, J., & Whitehead, J. (2006). *All you need to know about action research*. London; Thousand Oaks, Calif.: SAGE.
- Meggs, J., Ditzfeld, C., & Golby, J. (2014). Self-concept organisation and mental toughness in sport. *Journal of Sports Sciences*, 32(2), 101-109.  
doi:10.1080/02640414.2013.812230
- Middleton, S. C., Marsh, H. W., Martin, A. J., Richards, G. E., & Perry, C. (2005). Developing a test for mental toughness: The mental toughness inventory (MTI). *Australian Association for Research in Education. Conference*, Parramatta.
- Middleton, S. C., Marsh, H. W., Martin, A. J., Richards, G. E., Savis, J., Perry, C., & Brown, R. (2004). The Psychological Performance Inventory: Is the mental toughness test tough enough? *International Journal of Sport Psychology*, 35(2), 91-108.
- Newland, A., Newton, M., Finch, L. M., Harbke, C. R., & Podlog, L. (2013). Moderating variables in the relationship between mental toughness and performance in basketball. *Journal of Sport and Health Sciences*, 2, 184-192. doi:10.1016/j.jshs.2012.09.002

- Nicholls, A. R., Polman, R. C. J., Morley, D., & Taylor, N. (2009). Coping and coping effectiveness in relation to a competitive sport event: pubertal status, chronological age, and gender among adolescent athletes. *Journal of Sport and Exercise Psychology, 31*(3), 299-317.
- Plettenberg-Lenhausen, L. (2013). *Performance correlates of mental toughness among female thai boxers*. (Unpublished Doctoral dissertation). Virginia Polytechnic Institute and State University, Blacksburg, VA.
- Raedeke, T. D., & Smith, A. L. (2001). Development and preliminary validation of an athlete burnout measure. *Journal of Sport and Exercise Psychology, 23*, 281-306.
- Reason, P., & Bradbury, H. (2008). *The SAGE handbook of action research: Participative inquiry and practice*. Los Angeles, Calif.; London: SAGE.
- Sheard, M. (2009). A cross-national analysis of mental toughness and hardiness in elite university rugby league teams. *Perceptual and Motor Skills, 109*(1), 213-223.  
doi:10.2466/PMS.109.1.213-223
- Sheard, M., Golby, J., & van Wersch, A. (2009). Progress toward construct validation of the Sports Mental Toughness Questionnaire (SMTQ). *European Journal of Psychological Assessment, 25*(3), 186-193. doi:10.1027/1015-5759.25.3.186
- Vago, D. R., & Silbersweig, D. A. (2012). Self-awareness, self-regulation, and self-transcendence (S-ART): A framework for understanding the neurobiological mechanisms of mindfulness. *Frontiers in Human Neuroscience, 6*(296), 1-30.  
doi:10.3389/fnhum.2012.00296

Weinberg, R. S., & Gould, D. (2015). *Foundations of sport and exercise psychology* (6th ed.). Champaign, IL: Champaign, Ill; Human Kinetics Publishers.

Weiss, M. R. (1991). Psychological skill development in children and adolescents. *The Sport Psychologist*, 5, 335-354.

Weiss, M. R. (2004). *Developmental sport and exercise psychology: A lifespan perspective*. Morgantown, WV: Fitness Information Technology.

Wieser, R., & Thiel, H. (2014). A survey of “mental hardiness” and “mental toughness” in professional male football players. *Chiropractic & Manual Therapies*, 22(17), 1-6.  
doi:10.1186/2045-709X-22-17