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THE RELATIONSHIP BETWEEN MENTAL SKILLS AND LEVEL OF CRICKET PARTICIPATION

by

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MAGISTER ARTIUM

(HUMAN MOVEMENT SCIENCES)

in the Faculty of Humanities,

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DECLARATIONS

I, Julius Jooste, herewith declare that the language (set to UK English) of this research report has been edited by Mrs. Eileen Pearse, freelance editor and translator, employed at Unisa Language Services from 1982 to 2011, member of the Professional Editors' Group and of ZaLang.

I, Julius Jooste, also hereby declare that this research for the degree, Magister Artium (Human Movement Sciences) at the University of Pretoria, has not previously been submitted by me for the degree at this or any other university, that it is my own work in design and execution, and that all materials from published sources contained herein have been duly acknowledged.

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Julius Jooste

Researcher

_____

Date

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Mom, Ami and Jamila, you are the rays that light up my life. This is for you.

Thanks to the Almighty.

Julius Jooste

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"What does he of cricket know if cricket's all he knows" C.L.R James

SUMMARY

Title: The relationship between mental skills and level of cricket participation

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Research findings have supported a relationship between psychological characteristics and optimal performance states, indicating that elite and successful sports participants are more motivated, committed, self-confident, focused and able to peak under pressure compared to non-elite and less successful participants. The reason for this is that a human being's biomechanical and physiological harmonisation of movement is mediated by various aspects of psychological involvement. The psychological components of physical-skills execution in sport can be enhanced by the corrective application of mental-skills training. Personalised mental-skills training enables participants to understand their cognitions in order to allow a degree of *flow* in the coordination and execution of task-related skills through the various mood states of participation. A participant's ability to control the mental and emotional aspects associated with competition not only facilitates task performance but also serves as a psychological keystone of self-belief and wellbeing.

Sports psychology has recently directed its focus to identifying psychological skills relevant to different types of individual and team sports for the purpose of providing on-the-field psychological support. Investigations in South Africa, addressing the psychological constructs conducive to performance in cricket are limited, at both the professional and the amateur levels of competition. At this stage, there are no documented findings available in which the

relationship between mental skills and skilled performance in cricket is addressed. Therefore, research questions for this study are formulated as:

- *"Are there significant differences in the psychological background information on cricket players from different levels of cricket competition?"*
- *"Is there a significant relationship between mental skills and the level of cricket player participation?"*
- *"Is there a significant relationship between mental skills and the specialised roles played in cricket?"*
- *"Is there is a significant relationship between mental skills and batting order in cricket?"*

The study was approached from a quantitative (descriptive) perspective since it was the perceptions and mental skills relative to cricket players' levels of participation that were assessed. A questionnaire assessing the general perspectives on psychology of respondents, and three other standardised psychometric measures (Competitive Anxiety Inventory-2 [Martens *et al.,* 1990]; The Athletic Coping Skills Inventory-28 [Smith *et al*., 1995], and Bull's Mental Skills Questionnaire [Bull *et al*., 1996]) with Cronbach's alpha coefficient ranging between 0.79 and 0.90, were used as research instruments. These Likert-type scale questionnaires were administered to 127 cricket players (30.7% Junior Academy; 53.6% Premier League/Senior Academy and 15.7% Senior Provincial players) to explore their general psychological background information and the mental skills differences between three progressive levels of cricket participation established and recognised by the Northerns Cricket Union (NCU) in the Pretoria Gauteng region of South Africa. Other aims were to investigate the relationship between mental skills and the different tasks (e.g. batting, bowling, wicket keeping) performed in cricket and as well as to investigate the relationship between mental skills and batting order.

Overall results obtained from the respondents' general psychological background information revealed that cricket players, regardless of level of participation, have insufficient exposure to, training in and knowledge of the psychological aspects associated with cricket performance. It is evident from the results that cricket players spent limited time on psychological-skills training

and that they exercise only the physiological and skills-related aspects of the game. One-way analysis of variance (one-way Anova) indicated that there were no statistically significant differences between the three levels of participating respondents in terms of their performance in the various mental-skills and coping-skills subscales. Analysis of the Competitive State Anxiety Inventory-2 subscales indicated no statistically significant differences in the cognitive and somatic anxiety scores between the three levels of participation. However, a statistically significant difference was found in terms of self-confidence in the senior provincial players whose scores were higher on this construct than those of the other two levels of cricket participants.

A comparison of the performance of the various specialised roles in cricket on the mental skills questionnaire indicated that the all-rounders had significantly higher imagery ability and motivation scores than batsmen and bowlers. The various specialised roles showed a very similar outcome on the cognitive, somatic and state self-confidence levels. A significant difference in batting order was revealed in top-order batsmen scoring the highest on motivation and lower-order batsmen scoring the highest on coachability. No other mental-skills difference existed between the different groups of batting order.

The conclusion was that, in essence, there are no mental-skills differences between cricket players from various levels of participation in the one-day cricket format. A definite psychological-skills profile did come to the fore, indicating that successful cricket participants, regardless of what level of competition they compete in, express high proficiencies in motivation, self-confidence, coachability, imagery ability, concentration ability and peaking under pressure.

The study concludes with recommendations for expanding knowledge on the direction and intensity of mental skills in contributing to cricket performance. A more holistic view on the psychological differences between successful and less successful cricket participants at the same level of participation is recommended as well as a comparison between the mental skills of one-day and multiple-day cricket players. Sports psychologists and cricket coaches are also

encouraged to collate their experience and expertise in developing and implementing individualised psychological-skills-training (PST) programmes to satisfy the players' psychological needs when dealing with the performance demands of the game.

Implications for further investigations are listed since there were several aspects that did not fall within the aims of this investigation.

Key words: cricket, level of participation, mental skills

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OPSOMMING

Titel: Die verwantskap tussen psigologiese vaardighede en vlak van krieket deelname

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Navorsingsbevindings staaf die verwantskap tussen psigologiese kenmerke en optimale prestasievlakke, en dui op ’n groter mate van motivering, toewyding, selfvertroue en fokus by elite- en suksesvolle sportdeelnemers wat, in teenstelling met niegekeurde en onsuksesvolle sportlui, in staat is om hul beste prestasie onder druk te lewer. Die verklaring hiervoor is dat verskeie psigologiese fasette ’n rol in die biomeganiese en fisiologiese harmonisering van menslike beweging speel. Die psigologiese komponente van die uitvoering van fisieke vaardighede in sport kan deur die regstellende toepassing van denkvaardigheidsopleiding bevorder word. Individuele denkvaardigheidsopleiding maak dit vir die deelnemer moontlik om sy of haar kognitiewe prosesse te begryp en sodoende ’n mate van *vloei* in die koördinasie en uitvoering van taakverwante vaardighede in verskillende gemoedstoestande tydens sportdeelname te bewerkstellig. ’n Deelnemer se vermoë om beheer uit te oefen oor die verstands- en gevoelsaspekte wat met kompetisie gepaardgaan, bevorder nie slegs taakverrigting nie, maar dien ook as psigologiese hoeksteen vir selfagting en welstand.

Die soeklig in sportsielkunde is onlangs gerig op die identifisering van psigologiese vaardighede wat op verskillende individuele en spansportsoorte betrekking het met die oog op die voorsiening van sielkundige ondersteuning op die sportveld. In Suid-Afrika is uiters beperkte

navorsing gedoen op die gebied van psigologiese konstrukte wat bevorderlik is vir prestasie in krieket, wat kompetisie op sowel professionele as amateurvlak betref. Geen gedokumenteerde bevindings is tans beskikbaar wat die verwantskap tussen psigologiese vaardighede en vaardigheid in die beoefening van krieket aandui nie. Gevolglik word die navorsingsvrae in die onderhawige studie soos volg geformuleer:

- *"Is daar n beduidende verskil tussen die psigologiese agtergrond inligting van krieketspelers van verskeie vlakke van krieket competitisie?"*
- *"Is daar n besonderde verwantskap tussen psigologiese vaardighede en die prestasievlak van krieketspelers?"*
- *"Is daar n besonderde verwantskap tussen psigologiese vaardighede en die gespesialiseerde rolle teenwoordig in krieket?"*
- *"Is daar n besonderde verwantskap tussen psigologiese vaardighede en kolfrangorde in krieket?"*

Die assessering van krieketspelers se persepsies en psigologiese vaardighede met betrekking tot hul prestasievlakke is in hierdie studie vanuit 'n kwantitatiewe gesigshoek benader. Benewens drie gestandaardiseerde psigometriese meetinstrumente (Competitive Anxiety Inventory-2 (Martens *et al.,* 1990); Athletic Coping Skills Inventory-28 (Smith *et al*., 1995), en Bull's Mental Skills Questionnaire (Bull *et al*., 1996) (Cronbach se alfakoëffisiënt het tussen 0.79 en 0.90 gelê) en 'n vraelys vir die evaluering van die algemene psigologiese perspektiewe van die respondente is in hierdie studie ingespan. Hierdie vraelyste wat 'n ooreenkoms met die Likertskaal toon, is aan 127 krieketspelers toegedien (30.7% van die respondente was lede van die Junior Akademie, 53.6% van die Premierliga/Senior Akademie en 15.7% van die Senior Provinsiale spelers). Die doel met die vraelyste was om die algemene psigologies agtergrond kennis van die deelnemers vastestel en ook watter psigologiese verskille voorkom tussen deelnemers op die drie vlakke van deelname aan krieket soos vasgestel deur die Noordelike Krieketunie (NKU) wat in Pretoria, Gauteng, in Suid-Afrika gesetel is. Ander oogmerkke was om die verwanskap tussen psigologiese vaardighede en die verskillende fasette van krieket

(byvoorbeeld, om te kolf of te boul en om paaltjiewagter te wees) te ondersoek en ook die verwantskap tussen psigologiese vaardighede en plekke op die kolflys.

Uit die psigologiese agtergrondsinligting van die respondente blyk dit dat krieketspelers oor die algemeen, ongeag hul vlak van deelname, te kort skiet aan blootstelling, opleiding en kennis ten opsigte van die psigologiese aspekte verbonde aan krieketprestasie. Die resultate van die opname dui daarop dat krieketspelers weinig of geen tyd aan opleiding in psigologiese vaardighede bestee nie en slegs die fisiologiese vaardighede van die spel inoefen. Eenrigting-variansieontleding en VARO-ontleding het ook geen statisties beduidende verskille tussen deelnemers op die drie verskillende prestasievlakke getoon wat hul prestasie op die subskale vir verstands- en behartigingsvaardighede betref nie. ’n Ontleding van die angs-inventaris vir die kompeterende toestand het geen verskille in die tellings vir kognitiewe en somatiese angs by respondente op die drie vlakke van deelname getoon nie. Hierteenoor is ’n statisties beduidende verskil wel ten opsigte van selfvertroue gevind in dié sin dat senior spelers beter in hierdie konstruk presteer het as krieketspelers op die ander twee vlakke.

’n Vergelyking van die prestasie van die respondente in die opname met betrekking tot verskillende gespesialiseerde rolle in krieket toon dat veelsydige spelers oor beduidend meer verbeeldingskrag en motivering as kolwers en boulers beskik. Wat die verskillende gespesialiseerde rolle betref, het die respondente baie eenders gevaar in die items wat kognitiewe en somatiese vlakke asook selfvertroue meet. ’n Beduidende verskil het egter uit die kolflys geblyk in dié opsig dat kolwers boaan die lys die hoogste tellings vir motivering behaal het en diegene onderaan die kolflys die hoogste tellings vir afrigbaarheid. Geen ander verskille ten opsigte van psigologiese vaardighede is tussen deelnemers op verskillende plekke op die kolflys bespeur nie.

Die gevolgtrekking word gemaak dat daar nie n verskil is tussen die psigologiese vaardighede en die deel name vlakke van krieketspelers in eendaagse krieketwedstryde beskou kan word nie. ’n Duidelike profiel van psigologiese vaardighede het wel na vore gekom wat by suksesvolle krieketspelers, ongeag die vlak waarop hulle meeding, spreek van ’n hoë mate van motivering,

selfvertroue, afrigbaarheid, die vermoë om te konsentreer, denkbeeldige nabootsing, en besonder goed onder druk te presteer.

Die studie word afgesluit met aanbevelings vir die uitbreiding van kennis oor die rigting en intensiteit van psigologiese vaardighede en die bydrae daarvan tot prestasie in krieket. ’n Meer holistiese perspektief op die psigologiese verskille tussen suksesvolle en minder suksesvolle deelnemers aan krieketspel word aanbeveel, asook ’n vergelyking tussen die psigologiese vaardighede van spelers in eendaagse en meerdaagse krieketbyeenkomste. Daar word ook aanbeveel dat sportsielkundiges en krieketafrigters hul kragte saamsnoer om programme vir geïndividualiseerde psigologiese vaardigheidsopleiding daar te stel om sodoende in die psigologiese behoeftes van spelers ten opsigte van die hantering van prestasiedruk in die spel te voorsien.

’n Lys van die implikasies van verdere navorsing word gegee, aangesien etlike fasette nie binne die bestek van hierdie studie geval het nie.

Sleutelwoorde: krieket, vlak van deelname, psigologiese vaardighede

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CHAPTER ONE

ORIENTATION, PROBLEM STATEMENT, AIMS AND RESEARCH METHODOLOGY

1.1 ORIENTATION

Elite athletes are consistently confronted with obstacles in their pursuit of optimising their own potential and achieving sporting excellence. It appears that today's highly competitive sporting world is well known for its unpredictable nature because the gap between athletes' physical skills – as well as the margin of victory – seems to be narrowing. Gucciardi (2010) argues that the pursuit of excellence in sport encompasses four significant components, namely physical, technical, tactical and mental skills. However, at the elite level of participation, the participants' physical, technical and tactical skills are often in an even contest with one another which results in athletes with greater mental skills prevailing more consistently than those athletes who are lacking these skills (Calder, 2007). The element that fluctuates most in competitive situations is that of optimal mental states. Lack of mental skills on the day of competition inhibits an athlete's ability to achieve optimal levels of performance regardless of the quality of the physical elements involved (Wang, 2010). Olympic gold medallists from the 1984 Los Angeles Olympics have reported that they had the same technical and physical skills honed to perfection years prior to becoming world champions. It was only when they learned the skill of absolute mental focus in important competitions that they were able to realise their dreams of reaching the highest pinnacle of all performances (Orlick & Partington, 1988). Based on the existing evidence of a strong link between mental skills and optimal sport performance, a need arises for further understanding of the mental components associated with high-level sports performance.

Research into applied sports psychology has viewed the psychological elements associated with successful athletic performance as a leading priority, especially the focus on identifying the mental links to optimal performance (Mahoney, Gabriel, & Perkins, 1987; Orlick, 1992; Talbot-Honeck & Orlick, 1998). Knowledge of this aspect still needs to be broadened as there is a lack of evidence on specific psychological elements relating to the theoretical significance of best possible experience and performance states in sport (Jackson, Thomas, Marsh & Smethurst, 2001).

The present study examines the relationship between mental skills and cricket-related aspects such as level of participation, specialised role, and batting order. Mental skills will be highlighted as contributing to those cricketers who emerge as talented and who have progressed to high levels of excellence and participation. Assessment of the relationships between mental skills and level of performance serves the purpose of furthering the development of the application of psychological behavioural intervention programmes in cricket practices in an attempt to identify talent and optimise both the professional development and the performance of cricket players.

The highest quality of sport performance is often referred to as a peak performance state. Such an experience of functioning allows an athlete to put it all together both physically and mentally (Krane & Williams, 2010). Associated with a peak performance state is a condition known as *flow*. Csikszentmihalyi (1997a) describes *flow* as an optimal psychological state that is characterised by pure happiness and metaphorically accounts for the sense of effortless actions felt when experiencing the best moments in one's life. The following nine dimensions are conducive to a total state of *flow*: first, a balance exists between perceived challenges and the skills of the participant. Second, there is a merging of action and awareness. Third, the participant has clear goals. Fourth, the participant receives unambiguous feedback. Fifth, the participant is totally focused on the task at hand and (sixth) has a sense of control. Seventh, the participant is not self-self-conscious and (eighth) often loses track of time. Lastly the participant experiences high levels of intrinsic satisfaction from the activity (Csikszentmihalyi, 1997b). These elements represent the essential features of peak performance. The flow state is not easily

attainable, since it involves a certain level of mental skills (Jackson *et al.,* 2001). Mental skills are actions or procedures athletes employ to cope with major event pressure, control anxiety, refocusing attention and mental plan usage before and during competition. It involves skills such as positive self-talk, energy activation and modulation, and the managing of stress to maintain positive personal characteristics (Von Guenthner, Hammermeister, Burton & Keller, 2010).

Orlick (1992) constructed a model displaying the psychology of human excellence. He concluded that, to a certain extent, performers who became the best in the world in their different pursuits all had similar mental skills and perspectives. Critical mental components that have continually surfaced as the quintessence of excellence in the pursuit of the highest quality of personal performance included much self-belief and commitment to the sport. These two components are described as combining to form the core of excellence that is steered by other supporting skills such as mental readiness, positive expectations, full focus, ability to eliminate distraction and a constructive evaluation of games situations. It is the latter combination of factors that guides human excellence in virtually all domains (Orlick, 1992).

Mental skills in competition have proved to be instrumental in effective sport participation and performance. The literature reveals that mental readiness is a noteworthy factor determining final Olympic performance placement (Orlick, 1992). It is also noted that mental skills are the foremost prerequisites for peak performance in professional and collegiate golfers (Cohn, 1991). Mental skills are also key antecedents of performance excellence in internationally renowned classical musicians (Talbot-Honeck & Orlick, 1998) and the maintenance of expert performance in kick boxers (Devonport, 2006). MacNamara, Button and Collins (2010) propose that psychological factors play a fundamental role in establishing the development capacity of an individual and also facilitate the translation of potential into talent. These researchers noted that mental skills and other psychological characteristics of developing excellence such as motivation, commitment, coping under pressure, self-belief, imagery, game awareness and vision of what it takes to succeed, are necessary for both the acquisition and the manifestation of expertise.

The cricket skills of bowling, batting and fielding require a substantial mental effort. Chopra (2009) explains that the psychological state of a cricketer could change in a short spell of play from being highly confident to a state of utter diffidence. This distinguishes skilled players from the less skilled, not so much due to raw talent but, relatively, to work ethic, and a focused state of mind. Owens (2008) also concedes that in cricket successful bowlers and batsmen are the ones who can apply the correct type of attentional focus to the task at hand allowing them to harmonise the emotional, physical and mental strands of the situation. In other words it is the cricket player's ability to concentrate on task-relevant cues and adapt attentional focus to the ever-changing game context and to continuously employ effective personal coping resources.

Pressure to perform can affect a cricketer at any stage in the game. Findings have indicated that the negative interpretation of stress was significantly related to endangerment of the cricketer's personal performance goals (Holt, 2003). Therefore, the main objective of coaches and team selectors' remains the ever-difficult task of identifying which bowlers, batsmen and fieldsmen will perform consistently under pressure. Despite the fact that coaches know that cricket is also strongly founded in the mind, limited or no time is spent on mental skills and aspects that are required to reach and maintain maximum performance (Cooper & Goodenough, 2007). Bob Woolmer, along with Noakes and Moffet (2008) in their biography *Art and Science of Cricket,* expressed the opinion that cricket participation at professional level is 90 per cent cognitively played and 10 per cent with raw talent. Yet it appears that 100 per cent of players spend the majority of their time practising the physiological components of performance that, according to Woolmer *et al.* (2008) above, comprise the minority of high-level cricket participation. Far too many players fail to reach their true playing potential because they do not spend enough time on the mental side of their game (Ross, 2009). Humara (2002) argues that many coaches are exceptionally skilled at evaluating and identifying athlete's physical attributes relating to success but often lack the ability to identify and develop the associated psychological attributes. They emphasise the point that well-developed psychological skills, in conjunction with physical attributes, are associated with a high level of mastery (Spieler, Czech, Joyner & Munkasy, 2007). Whereas talented cricket players who struggle with the psychological aspects of competition often just tend to remain players with potential and

never really actualise their abilities into progressive levels of performance, there is evidence that the psychological skills associated with successful sport performance can be adequately learned and improved through regular, proper instruction and practice (Lesyk, 1998; Lesyk & Sanchez, 2001).

This study intends to explore the sports psychological background of cricket players and document the mental factors that are related to three distinct levels of cricket participation, specialised role, and batting order in cricket. If, indeed, potentially talented cricketers can be determined by a specific psychological skills profile, it could serve as an impetus to increase the implementation of behaviour modification programmes to identify and optimise cricket playing potential.

1.2 PROBLEM STATEMENT

There has been considerable speculation by cricket enthusiasts about how the human mind affects cricketers' performance, for example: if a batsman is good enough to get to thirty or forty regularly, then he should be good enough to get to a hundred or more – yet so few do. Why does a bowler who bowls a good line and length, struggle to get it right after he has been hit to the boundary; or why do good fielders drop catches that they have caught a hundred times in practice (Ross, 2009). Woolmer *et al.* (2008) contend that the psychological factors involved in cricket are determinants of success and also explain why some of the most gifted players in the history of the game produce so many inconsistent performances or, conversely, explain the consistency of other much less technically gifted ones. The 2011 Cricket World Cup winning coach and former South African cricketer, Gary Kirsten reports, "It was only in my 101st test match, batting under possibly the most stressful conditions that I had encountered, that I was able to understand my emotions while batting, and do something about them. If only I knew then what I know now, I may have performed so much better earlier in my career" (Narayanan, 2007, p. 1). According to Kirsten, the tools (mental skills) that teach cricket players to manage their emotions present a greatly neglected part of the game. Regrettably for Kirsten, it took years of experiential trial and error to master these tools and, it was only when he

learned the skills of self-awareness, and how to manage and process his emotions effectively, that he began to perform consistently according to his true potential. Like Kirsten, many athletes know that 'getting into the zone' is the key to producing peak performance experiences, but what they do not know is how to get into the zone consciously and intentionally at a time they choose to (Hall, 2007). Talent alone does not make a champion. Personal characteristics and mental qualities at elite-level sport participation provide the means that distinguish greatness from mediocrity (Calder, 2007). Kirsten maintains that many talented cricketers who are not familiar with the cognitive states associated with optimal performances might be prevented from realising their true cricket-playing potential or they may simply experience it at a greatly delayed stage in their careers by learning from tedious trial-and-error experiences (Cooper & Goodenough, 2007).

A problem rising from the above is that psychological-skills training and the important role it plays in facilitating performance in the different roles being played in cricket is a greatly neglected part of the game. Without the necessary mental skills individual batsmen, bowlers or fielders could struggle to actualise their fullest playing potential or even continue effective participation in this sport. The literature and related evidence on optimal cognitive states allowing cricketers to perform are limited in South Africa. As a consequence the researcher felt a need to investigate cricket from a psychological perspective to learn about the game and learn from those who excel at it to provide some insight into the many potentially good cricketers who do not know how to be consistent performers like the few cricketers they admire the most. Psychological skills assessment and individualised intervention programmes could facilitate talent identification and optimisation of cricket-playing potential, leading to more effective and consistent performance states at high levels of cricket participation.

The following research questions are therefore formulated:

- *Are there significant differences in the **psychological background information** on cricket players from different levels of cricket competition?*

- *Is there a significant relationship between **mental skills and level of cricket-player participation**?*
- *Is there a significant relationship between **mental skills and the specialised roles played in cricket**?*
- *Is there is a significant relationship between **mental skills and batting order in cricket**?*

1.3 THE AIMS OF THE STUDY

The aims of the study are to do the following:

1. Explore cricket participants' psychological background information with regard to their general perceptions of the importance of psychology in cricket, their knowledge and exposure to psychological-skills training and their time spent on psychological-skills training in cricket.
2. Determine and compare the mental skills of cricket players from three progressive levels of competition.
3. Explore the relationship between mental skills and the different roles played in cricket (batsman, bowler, all-rounder and wicketkeeper).
4. Explore the relationship between mental skills and batting order in cricket.

1.4 CLARIFICATION OF TERMINOLOGY

This section contains brief definitions of concepts and terms that are interchangeably used in this investigation and that are rather peculiar or that have metaphoric descriptions of sport, cricket and the field of sports psychology.

1.4.1 **Sport:** Sport is referred to as "activities involving powers and skills, competition, strategy, and/or chance that are engaged in for the enjoyment, satisfaction, and/or personal gain (such as income) of the participant and/or others (e.g. spectators).

Included are organised and recreational sports, as well as sport as entertainment" (Wann, 1997, p. 10). The most general descriptions of sport as given on p. 15 suggest that sport is the voluntary display of physical skills and efforts in a competitive activity that is guided by an external source (umpire or referee) in a formal and organised manner. Some people engage in these competitive activities for the pure enjoyment and satisfaction of doing it or for personal gain (fame or fortune). Sport can be played by competitive athletes in a formal manner in the presence of onlookers or by less serious athletes in their leisure time. Then it is more recreational and less competitive in nature, for example hunting, jogging or hiking.

1.4.2 **Athlete:** The term *athlete* used in the text of this investigation is not limited to track and field participants. It includes participants from various other sports such as tennis, soccer, rugby, gymnastics, cricket, et cetera. As a means of facilitating the reading of the text in this investigation the term *he* is used as a neutral term that replaces he or she. This is not intended to discriminate against the female gender and does also not mean that all participants/athletes referred to are male persons.

1.4.3 **Cricket player/cricketer:** In this investigation *cricketer* is referred to as a male participating in the sport of cricket, who intends to execute cricket-related skills such as fielding, bowling and batting to a higher level of performance attainment.

1.4.4 **Flow:** According to Jackson (2000, p. 140), the term *flow* in psychology refers to "an optimal psychological state in which complete absorption in the task at hand leads to a number of positive experiential qualities". *Flow* is an almost effortless yet highly focused state of consciousness where everything is optimal (Csikszentmihalyi, 1997b). In a state of *flow* the mind and body are in harmony and this leads to enhanced functioning and performance. The *state of flow* can also be associated with terms such as peak experience, creativity and happiness (Csikszentmihalyi, 1997b).

1.4.5 **Mental skills:** In the context of this investigation, mental skills also called psychological skills. They refer to an athlete's cognitive abilities and efforts used during participation in

sport for the purpose of increasing inner satisfaction and enhanced physical performance standards. Like the physical skills involved in sport, mental skills such as maintaining and focusing of concentration, regulation of arousal, positive imagery and self-talk, anxiety and worry management and the maintenance of motivation need to be systematically practised. These psychological factors tend to be unstable and account primarily for the day-to-day performance fluctuations in sport (Weinberg & Gould, 2011).

1.4.6 **Psychological-skills training (PST):** Refers to 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" (Weinberg & Gould, 2011, p. 248). This training involves methods and techniques from mainstream psychology that involve behaviour modification, cognitive theory and therapy, attentional control, goal setting, progressive muscle relaxation and systematic desensitisation.

1.5 RESEARCH METHODOLOGY SUMMARY

A detailed discussion of the research methodology applied in this investigation is presented in chapter4 pp. 114 - 131.

Only a summary of the methodological framework is presented at this stage. The main purpose of this study was to identify the psychological skills associated with three progressive levels of cricket participation ranging from amateur to professional level. This is an essentially non-experimental and descriptive investigation that draws upon quantitative data. Psychometric measuring instruments were used to evaluate cricketers' coping resources, state and trait anxiety, and mental skills associated with their level of cricket participation.

Participants included 127 A-side male cricketers representing cricket participation at three different levels in the 2010/2011 cricket season. This group of players consisted of U/19 junior academy players (N = 39); premier club league/senior academy players (N = 68); and first-class

senior provincial players (N = 20). A non-probability *quasi*-sampling technique was used in selecting junior academies, clubs/senior academies and senior provincial teams. The starting point for exclusive subject selection in this study was threefold: (a) A-side male cricket participants from several levels of competitive cricket participation; (b) established levels of cricket participation recognised by the Northerns Cricket Union (NCU); (c) only academies, clubs and first-class senior provincial teams registered with the NCU.

Ethical approval was granted by the author's institutional ethics committee before coaches and team managers of cricket teams were approached. A meeting was set up where the procedures and purpose of the study were communicated to the players and coaching staff. Confidentiality of results was emphasised and participants were made aware that they were under no obligation to participate. After informed consent forms were obtained, evaluation took place at a prearranged time convenient to the team, nearing an upcoming match.

In this investigation, a survey approach (questionnaire) was used as research instrumentation. The questionnaires were constructed using predominantly ordered force-choice Likert-type scale possibilities with a matrix-type design that consisted of statements on the left and responses on the right.

The questionnaires in **the first section** consisted of demographic information (Appendix B, p. 208) including age, level of participation, specialised role in team and perceived level of confidence. General psychological perspectives (Appendix C, p. 210) were also gathered and these revealed the cricketers' mental skills background knowledge, interpretation, perceived importance, preferences and relevance to their cricket successes.

The questionnaires in **Section two** of contained self-reported psychological skills that were measured using the following standardised psychometric instruments:

- The Athletic Coping Skills Inventory-28 (ACSI-28) (Smith, Schutz, Smoll & Ptacek, 1995) (Appendix D, p. 213)

- Bull's Mental Skills Questionnaire (Bull, Albison & Shambrook, 1996) (Appendix E, p. 216)
- Competitive State Anxiety Inventory-2 (CSAI-2) (Martens, Vealey, Burton, Bump & Smith, 1990) (Appendix F, p. 219)

The questionnaires were completed during a single session lasting approximately twenty-five minutes. Data were thereafter processed and statistically analysed using the IBM SPSS Statistical analysis package.

1.6 LIMITATIONS OF THE STUDY

Thomas, Nelson, and Silverman (2005, p. 58) define a limitation as a "possible shortcoming or influence that either cannot be controlled or is the result of the delimitations imposed by the investigator". All research investigations have limitations. The following limitations have been acknowledged in this investigation:

- The study is limited to only 1st-XV-team-side cricket players participating in the Gauteng region of Southern Africa.
- Wicketkeepers were underrepresented in the study's sample and were excluded from any analysis.
- Female cricket players' perceptions of psychology and mental skill scores were not included in this study.
- The length and administration time of the questionnaires could have depleted some respondent's concentration and their ability to anticipate and comprehend all questions correctly. Fewer questionnaires and shorter administration time may have provided more accurate responses.

1.7 OUTLINE OF THE STUDY

Chapter 1 starts with an introduction to the study. It explains the orientation to the investigation, the problem to be examined; it also gives a clarification of terminology, a summary of the research methodology used and limitations to the investigation. **Chapter 2** discusses the nature of sport with reference to its early history, values, motives for participation and need to attain higher levels of performance in competition. More specifically it focuses on cricket by providing a detailed discussion of the nature and performance aspects of cricket participation. **Chapter 3** reviews the literature on the link between mental skills and performance excellence in high-level sports participation. It also explores the constructs of mental toughness in cricket and seeks to identify the effect mental skills have on the quality of cricket performance. **Chapter 4** presents a detailed framework of the research methodology used in this investigation. It elaborates on the empirical research design used and the process by which data were measured. It also provides justification for the various statistical procedures utilised in this investigation. **Chapter 5** will present the data and as well as a discussion of the results, while **chapter 6** concludes the thesis and sets certain recommendations for future research.

1.8 CONCLUSION

This chapter provides a contextual perspective on the study by presenting an orientation to the topic, identification and description of the problem, along with stating the aims of this investigation. It also clarifies related terminology and provides a research methodology summary with anticipated limitations. The next chapter focuses on the nature of cricket as a sporting code.

CHAPTER TWO

A THEORETICAL FRAME OF REFERENCE OF CRICKET AS A SPORTING CODE

2.1 INTRODUCTION

Sport is a timeless activity that has been enjoyed and encouraged by humankind since ancient times. Sport and physical activities such as games and various forms of play have been inevitably linked with people living in social groups (Beashel & Taylor, 1996). These authors believe that humans have used sport as a means of increasing their mastery of nature in interacting with their environment which, over the centuries, evolved into formal recreational activities as they are known today.

Over the last century aspects of formal play and recreation have been seen to become international, highly commercialised, instantly available and universally accessible (Pyke & Davis, 2010). The prevalence of high performance and professionalism in sport justifies its popularity amongst fans all over the world as some eagerly follow the exploits of professional teams and athletes by means of available mass media. In modern times, sport and performance are of great national importance and, while sporting heroes are easily created, they are also indifferently discarded by the media. In recent times elite athletes have demanded high salaries and lucrative sponsorships since they are consistently required to perform in front of large crowds and television audiences, making them an integral part of the entertainment industry (Pyke & Davis, 2010).

South Africans are passionate about sport and acts of true sporting patriotism are likely to be found in nearly every household. The sunny South African climate makes sport a favourite pastime for millions. During the apartheid policy era, South Africa's inability to separate sport

from politics led to a 21-year period of isolation from international sport in the years 1970 to 1991 (Taliep, 2009). Since South Africa's readmission to the international scene in 1992, great sporting successes have been achieved. The three major sports that are intensely followed by South Africans are the games of cricket, rugby and soccer. Soccer is immensely popular with South Africa's black majority, giving rise to the yearly improvement in local competition and emerging talent. Cricket and rugby, being the second and third most followed sports, are consistently fielding teams that put up world-beating class performances against arch foes such as New Zealand, Australia and England (SouthAfricaWeb, 2009). South Africa is also home to world-class sporting facilities that have successfully hosted some of the world's biggest sporting events. Cricket evokes interest around the world and, with the adapted shorter formats of the game, it continues to grow in popularity. Woolmer *et al.* (2008) are of opinion that the reason why so many people find the game irresistible, is because of the wide spectrum of variables and ever-changing conditions to which the players must adapt in a contest. These authors also attribute its popularity to the compelling mixture of a team sport and a one-on-one contest (batsman vs. bowler), that make it so special. Cricket is regarded as the conventional English game that was pioneered by British traders, settlers, administrators and the British Army throughout the British Empire in the early 1700s (Mani, 2009). Over the centuries it has evolved as a global sport and, due to the influx of modern technology, its popularity has increased tremendously. Cricket arrived on the South African shores in the first half of the 19th century and has developed into the establishing of purposeful cricketing communities among the civil population throughout the provinces of South Africa (Allen, 2008).

The game of cricket was controlled by the International Cricket Conference (ICC) established in 1907, in recent times better known as the International Cricket Council (ICC). Back then, representatives from England, Australia and South Africa laid down the rules for cricket and guided its participation, finances and promotion (Gupta, 2004).

In cricket, a team's performance has become a symbol of national pride that has prompted team selection processes to be carried out with absolute accuracy and diligence (Rama Lyer & Sharda, 2008). Performance measures have been incorporated to ease this process by grading

players on their batting and bowling performances. The ICC has its own ranking system in which players and countries are numerically placed, based on a point system that measures various factors in cricket. This tracking of team success makes it imperative to have a well-balanced side that can bowl, field and bat. To create a complementary balance between batting, fielding and bowling expertise, provinces (franchises), national selectors and coaches must have programmes in place to identify and develop talented cricketers from an early age. A well-established route recognised and implemented by Cricket South Africa (CSA) has proved that successful cricketers develop through years of performance at junior, club and provincial levels. In general it is those players who demonstrate potential at sub-national levels who are vaulted into international-level cricket (Subramanian & Ramesh, 2009).

This chapter highlights sport in South African society with an in-depth emphasis on cricket as one of the major sporting codes in South Africa. It explains the different formats of cricket, along with the structures, origins, development and aspects related to performance. The literature from diverse outputs in the field of cricket is reviewed to form good judgment on how cricket has evolved in South Africa and other parts of the world. A more detailed perspective on the contributing role of mental skills in the quest to achieve optimal performance states will be discussed in chapter 3, pp. 55-113.

2.2 SPORT DEFINED

The root of the word 'sport' is derived from the Old French term *desporter* which means to 'divert oneself-in a light, frolicsome manner' (Tomc, 2008). The early meaning of sport is also very closely related to the Old English terms of *plegian* meaning to 'play' and 'gamen' meaning 'amusement' such as pleasure or satisfaction in both participation or as spectator (Renson, 2009).

As a result of sport's relation to the concepts of 'play', 'compete', and 'amusement', many different definitions have arisen. For example, Eitzen and Sage (1986, p. 16) define sport as "competitive activity that is guided by established rules". Pike (1996) defines sport as a voluntary physical activity that demands complex physical skills and physical exertion in a

competitive environment determined by formal and organised conditions such as rules being enforced by umpires and referees. These definitions can be assumed to refer to dedicated athletes competing at established levels, but what about the less dedicated athlete or less competitive athlete or the so-called 'weekend athlete' who, for example, plays a round of golf with a group of friends or engages in recreational activities such as fishing, hunting and jogging?

It is evident that the higher the level of sport participation the more lucrative the rewards involved for participating, to wit the value of sponsorships and prize money awarded to teams and individual athletes. Based on these reasons a more inclusive perspective needs to be considered when defining sport. Wann (1997, p. 15) provides a definition that encompasses all that is part of sport by claiming that sport includes "activities involving powers and skills, competition, strategy, and/or chance, that are engaged in for the enjoyment, satisfaction, and/or personal gain (such as income) of the participant and/or others (e.g. spectators). Included are organized and recreational sports, as well as sports as entertainment".

Based on these different perspectives on sport, it can be said that sport is a voluntary, playful and competitive display of physical skills governed by rules and regulations for either the amusement or the extrinsic gain of the participant in the presence of spectators who also find it entertaining and rewarding – or both.

2.3 HISTORICAL PERSPECTIVE ON SPORT

The most famous origin of sport could certainly be traced back to the Olympic Games in Ancient Greece that are estimated to have taken place during the years 776 BC to 393 AD. This tradition that lasted for over a millennium ended when the Roman Emperor Theodosius banned all pre-Christian cults (pagan religions that regarded sports as religious ceremonies) to establish Christianity as the official religion of state (Jori, 2005). According to Lennartz and Wassong (2005), there are different theories explaining the origin of the Ancient Olympic Games. Some theories claim that the Games were invented by Pelops who defeated Oinomoas, King of Pisa, in a chariot race. Another theory claims the Games were founded by Heracles (Hercules) after he defeated G king of the Greek city-state Elis. The poems of the ancient Greek, Homer, found in

the first extensive sports report called the Iliad, show that the Greeks conducted athletic contests in the form of religious and cultural festivals held in honour of Zeus in the city of Olympia (Parachin, 2008).

One could argue that the developed institutions of the ancient Greek sporting culture were in most senses consistent with 'modern' sport as we know it today (Hubbard, 2008). The relationship between the historical context and the more recent form of sport has been particularly demonstrated by Guttmann's (1978) model and by Dunning and Sheard (1979). Guttmann (1978) developed his model by defining a few fundamental characteristics of sport that have emerged with the transition from the primitive to the modern era:

- Secularism in the sense that modern sport is more like Roman sport with the emphasis on show and spectacle instead of *quasi*-religious ceremonies held by the Greeks.

- Equality of opportunity to compete as well as in the conditions of competition to allow woman, minorities and lower-class persons all an equal chance to achieve in sport.

- Specialisation to ensure professionalism in sport enabling elite athletes to practise their primary sport or specialised position almost exclusively.

- Rationalised bureaucratic organisation that ensures the development of standardised rules in sport.

- Quantification and record keeping form a part aspect of modern sport; this approximates to precision to provide a certain standard of excellence.

- Record keeping is directly linked to quantification; it serves as a goal that helps athletes strive for continued development.

Contributing to these perspectives on the transition of sport through the various ages, Dunning and Sheard's (1979) model includes some structural elements of modern sport which are more

relevant to the origins of British sport and in line with the properties of contemporary sporting codes such as:

- specific and formal organisation which is institutionally differentiated at regional, national and international levels
- formal and elaborate written rules that are worked out pragmatically and legitimated by rational bureaucratic means
- emphasis on skill, as opposed to physical force
- the test of identity in relation to a specific skill or set of skills
- being nationally and internationally superimposed on local contests
- an emergence of elite players and teams; this creates the chance to establish national and international reputations
- high role differentiation among players, for example specialisation around kicking or bowling or scrumming

2.4 MOTIVES FOR SPORT PARTICIPATION

According to Mihalich (1982), philosophical accounts describe sport as not only one of the greatest prospects for achieving human excellence but also the most general social milieu for developing treasured values, courage, sincerity, a sense of freedom, discipline and collective effort. Mihalich (1982) goes on to say that the continued global fascination with sport over the past centuries can be ascribed to the nature of the unique sporting experience that both establishes character in human beings and develops virtuous human qualities that contribute to our sense of social community.

People have various motives for engaging in structured sport-related activities. Whitehead (1993) reveals that children take part in sport primarily to have fun or seek excitement, improve

their skills, be affiliated with a group, be recognised, be successful, and get fit. A study by Seippel (2006) on varying gender groups, age categories and social class populations, identified seven most general meanings/reasons for people's involvement in a voluntary sport activity. The most prevalent reason found for active participation in sport was the fun and enjoyment associated with the activity, followed by other contributing reasons such as keeping fit and enjoying mental recreation. Next, sport was chosen for its 'sociability', followed by competition/achievements and the 'expressive' nature of sport. The least important of the seven reasons for being active in sport was to obtain a more desirable body and appearance.

The literature on traditional and contemporary motivational forces that inspire athletic participation, rigorous physical efforts and team play, suggests that people participate in sport for complex psychologically inspired reasons such as "to find meaning and purpose in life, positively contribute to an organized social milieu, advancement and self actualization and express the essence of oneself through an accessible and inspiring medium" (Leidl, 2009, p. 156). In simple terms one can say that sport offers people a sense of meaning and purpose in life that is sometimes difficult to find anywhere else. Social cognitive motivational theories vindicate the notion that individuals' level of participation, motivation and their need to achieve will all depend on their achievement goals (ego and task orientation) (Duda, 1992), their extrinsic/intrinsic gratification (Vallerand, 2001), their attributions (Weiner, 1986) and need for self-actualisation (Maslow, 1970).

2.4.1 The need to achieve in sport (achievement motivation)

Adler (1924) proposes that a basic motive of the human race is the striving for superiority. He believes that the drive that propels individuals to achieve grows out of their need to compensate for their deficiencies and their feelings of inferiority through their continuing efforts to maintain control of their environment. Shields and Bredemeier (2009) contend that the ultimate value of striving to achieve goals that are beyond the self is found in the happiness such striving brings to the participant and others when these extraordinary goals are met. The nature of sport is based on achievement regardless of whether one considers competition as

important or not. Therefore, the link between what a person wishes to achieve and sporting success is inseparable. Achievement motivation strives to explain an individual's behaviour intensity (trying hard), persistence (continuing to try hard), choice of action possibilities and performance outcomes (Clews & Gross, 1995). Achievement motivation could thus be defined as "the tendency to strive for success, persist in the face of failure, and experience pride in accomplishments" (Weinberg & Gould, 2011, p. 63).

Many psychologists view the drive to achieve success as a natural behavioural predisposition, but others are of the opinion that the need to achieve is acquired by experiences (Jarvis, 1999). Regardless of all the theoretical perspectives on achievement behaviour, one of the most in-depth perspectives today comes from McClelland and Atkinson (McClelland, Atkinson, Clark & Lowell, 1953) who proposed a mathematical model that explains why some individuals are more motivated to achieve than others. The model posits that achievement motivation is a personality trait the strength of which is determined by two opposing motives. One is the motive to achieve success (Ms) and the other the motive to avoid failure (Maf). The motive to be successful is the capacity to experience fulfilment or pride in accomplishment, while the motive to avoid failure is the capacity to experience infamy or degradation in failure (McClelland *et al.,* 1953). If a person's desire to succeed far outweighs his or her fear of failure then he or she is believed to be high in achievement motivation. This can be reflected in the following equation:

Achievement-motivation (n-Ach) = desire to succeed (Ms) – fear of failure (Maf) (McClelland *et al.,* 1953)

The McClelland-Atkinson theory acknowledges that achievement-oriented behaviour is a product of both the personal qualities (parental upbringing, personal traits) of the participant and the nature of the achievement situation (probability of success/failure, incentive value, significance and difficulty of the task). Winterbottom (1958) contends that mothers who express high expectations of their children, warmly reward successes with physical acts of expression and who encourage and reward independence are more likely to develop high needs to achieve

in their children than fathers who raise their children using a dictatorial parenting style. High achievers express lofty motives to be successful and fairly low levels of motivation to avoid failure. Athletes high in achievement motivation are attracted to achievement situations in sport, have the desire to excel, and are not overly concerned about failing. On the contrary, low achievers express low motivation to achieve and show strong motives to avoid failure. They find achievement situations threatening and respond to challenges with high levels of anxiety. Low achievers are also overly concerned about failing and feel that their self-worth depends on their achievements (Potgieter, 2003). Hart and Albarracin (2009) testify that another distinction between individuals with low and high motives to achieve is that individuals with chronically low-achievement motivation are driven by enjoyable goals and inhibit achievement goals, whereas those high in achievement motivation are motivated to chase an achievement goal and inhibit a fun goal.

The nature of the achievement situation proposes that the incentive value of success is determined by both the difficulty of the task and the significance of the task to the performer. For example, if the probability of achieving success in a match is low in the case of a difficult task or when facing a challenging competitor, then the value of gaining success will increase. High achievers derive the most incentive from participating in tasks that provide them a 50-50 chance of succeeding. If the achievement-oriented athlete experiences early success from non-challenging tasks, his motivation to continue achievement tendencies could be negatively affected. Low achievers, in contrast, do not seek out challenges where there is only a 50 per cent chance of winning; they will rather opt for easy tasks where success is guaranteed because, for them, losing to an evenly matched opponent might highlight their experience of shame and humiliation (Weinberg & Gould, 2011).

The need to achieve has been extensively researched with the aim of revealing the extent to which the level of achievement-oriented behaviour relates to performance attainment in sport participation. De Bruin, Rikers and Schmidt (2007) discovered that high levels of achievement motivation in elite chess players contribute to their willingness to commit themselves to the investment of high-level training (deliberate practice), which is key to reaching exceptional

levels of chess performance. It was also revealed that levels of achievement behaviour are indicative of players who will persist in chess and those who will eventually drop out. Consistent with these findings was the additional that young tennis players who have reached international level competition had significantly higher levels of achievement motivation than tennis players who have not reached that level of performance (Unierzyski, 2003).

The general consensus based on the need achievement theory is that individuals' level of achievement behaviour is indicative of their level of commitment to pursuing success, their task preference and also the time spent in purposeful training. One must also acknowledge that a high level of achievement motivation is an intrinsic source of motivation that cannot always be related to all successful performances in sport. Other factors such as lucrative extrinsic rewards should also be considered, as in the case of a performer who continues sport participation with great intensity and persistence for the fame and fortune associated with it. Regardless of this and other theories on motivational behaviour, the need achievement theory does, however, provide a general framework for all contemporary achievement motivation explanations in sport.

2.4.2 Values of sport

Values can be defined as things which one believes to be important in one's life. They are those goals and actions that one perceives to be preferable when competing (Lee, 1993). Values can be separated into either things which one strives to achieve (terminal) or ways in which one behaves (instrumental) that are personally or interpersonally (socially) related. Sport is valued by society for various reasons. Not only does it provide a means to fame and fortune, constituting an acceptable outlet for aggression, but it also promotes emotional wellbeing (Steptoe & Butler, 1996) and a number of physiological and health-related benefits (Fahey, Insel & Roth, 2004). Due to the fact that most sport participation is an activity between humans, it provides valuable opportunities for social interaction. Botha and Potgieter (1991) claim that sport participation allows the participant to relax socially, to establish new relationships, to

learn self-control, to identify with a group, to be a leader or a follower and to compare abilities with others.

For society the significance of sport is believed to extend beyond the points mentioned above. Pike (1996) contends that the value of sport permeates all levels of society from the family to the government. She explains that sport can provide families with a collective focus, causing a household to participate in group activities or attend each other's activities which become part of the functioning family schedule. Sport also forms an integral part of schools' physical education systems and the extended school curricula in an attempt to holistically (physically, psychologically and socially-emotionally) develop the child by means of competitive team games throughout the key stages. The similarity between sport and pedagogy is highly relevant since it constitutes an essential part of society. According to Botha and Potgieter (1991), rhythm, harmony, form, balance, flow, gracefulness and style are common components of both sport and pedagogy.

Sport forms a big part of the economy in terms of large amounts of revenue that are generated from media coverage of events, ticket sales and also the creation of job opportunities in the leisure industry (Pike, 1996). The influence politics has on sport has also been visible in the extent to which the government regulates the nature of sport through its policies. One such example is the sporting boycotts against South Africa during the apartheid years and the inclusion of the quota system. There is also a strong relationship between national identity and sport performance. It is evident that the success of sports teams in international competitions reflects the success of the country (Pike, 1996).

2.5 COMPETITION: A PROLIFERATION OF SPORTS PERFORMANCE

Shields (2001) states that the word 'competition' is derived from the Latin term *petere*, meaning *to strive* or to *seek*, that is combined with the prefix, *'com-*, meaning *with*. He explains that the original connotation of 'competition' is thus a process in which one strives with someone instead of against someone, in order to bring out the best in each other by posing a worthy challenge along the way. Cooray (1995) describes competition in greater depth, claiming that

the dynamics of competition encompasses three concepts: (1) the existence of a multiplicity of powers and forces; (2) the existence of a goal; and (3) the striving towards that goal. He expands on this by saying that competition evolves around the existence of targets that require the maintenance of standards such as efficiency, hard work, innovation, integrity and relevance.

Humankind is constantly in competition with something or someone (Shields & Bredemeier, 2009). Competition forms part of one's daily existence. For example, competition is experienced at home, on the job, in the classroom, on the playing field as well as featuring prominently in politics and markets. The reality of competing against something seems to be inevitable no matter what the context. Humans have developed an overwhelming need to strive towards areas in their life where they are competent – driven by this daily competition. Commenting on this, Shields and Bredemeier (2009, p. 2) pointed to the strong association humans have with the compelling power of competition:

"Competition is in our veins, fibre in our muscles and wind at our backs. Competition can provide food for the soul, energy for the body, an incentive for the mind. From competition springs desire, from desire springs passion, and from passion can spring a yearning for excellence."

It is evident from the above that competition acts as a source of productivity that propels a person to find prosperity in life. Sport is basically the first introduction to formal competition that people encounter. According to Mellen (2008), sport lives by comparison. He explains that the essence of sport is to put one's ability and skills on the line in competition with another. Competition is, therefore, a critical part of sport.

There is a belief that competition can contribute positively to the development of better personal and interpersonal skills and talents. Chen (2008), for example, postulates that competition offers teens an opportunity to interact with fellow peers, and authorities, while simultaneously helping them to understand their own abilities and talents. The physical and mental activities associated with sports competition also guide participants, especially teens, to experience work ethic, the imperativeness of perseverance and determination. Mango (2009)

adds more specifically that competition can develop a good sense of setting of goals, helps to establish desire and inner will, fosters coping skills, emphasises the importance of discipline and builds character and integrity. Shields and Bredemeier (2009, p. 2) add to the above by stating that "competition is a gateway to growth, a pathway to pride, and an expressway towards excellence". However, these benefits do not counteract all the negative things that can and do occur in competitive sport. The noted problem with competition is that it often evokes negative tendencies among participants. The 'winning at all costs' attitude seems to get the better of most participants and its prominence is seen in almost every aspect of sport competition. In games like cricket, sledging and disrespect are common during matches. This destructive nature of competitors is referred to as 'decompetition'.

Shields (2001) distinguishes between *true competition* and *decompetition* by explaining that decompetition is competition that has dissolved into something that is antagonistic to the *striving with* concept in original competition. In competition the aim is to bring out the best in the other, whereas decompetition entails the striving against the other that, in most cases, is motivated by the process of rivalry. According to Shields and Bredemeier (2009), the strong need to seek victory and avoid failure with the focus being on outcome goals is a pathway to decompetition. The intense fear of being socially evaluated as weak and incompetent is a key characteristic of decompetition. The authors go on to explain that fear causes a fight-or-flight response in the participant causing him to either fight the opponent with dishonest and deceitful means, or to flee the game in the form of surrender (diminished effort and giving up easily). In this case neither the fight nor the flight response is effective in competition and the consequences abruptly affect the participant's self-confidence and motivation. Kohn (1992) argues from a psychological perspective that competition also leads to heightened anxiety and lowered self-esteem that cause the participants to focus their minds exclusively on external evaluation, and performance-based standards of personal worth. Decompetition is, therefore, the total opposite of competition and could be assumed to be the reason why so many like Kohn share negative sentiments regarding competitive sport.

In conclusion, the only thing competition and decompetition have in common is the external, structural arrangement of mutual goal attainment, the participants' orientation to the rules. The opponents, officials and process are in complete opposition to one another (Shields, 2001). The wrong approach to competition could be destructive to the participants' future participation and successes, and they should, therefore, view a contest as an opportunity to strive for excellence. Shields and Bredemeier (2009) suggest that contest that is neither distorted by decompetition nor overused, will encourage athletes' wellbeing and facilitate their enjoyable pursuits of performance excellence. In cricket there are many measures that can serve as goal attainment to enhance one's own reference standards such as bowling average, strike rate, and so on. These can all be used as references to ensure a healthy orientation to competition. Sometimes the sport and level of competition require one not to strive with another but against another. Cricket at high levels is all about performing and, as in other professional sport, there is little room for failure or errors. Errors could easily cost you your place in the team or determine a championship title. Skills such as batting, bowling and fielding are assumed to be influenced by the decompetitive nature associated at high-level cricket participation such as the negative remarks of opponents intended to break another's psychological momentum or to devalue outcome goals or to evoke the intense fear of failure. This investigation aims to identify the psychological components that facilitate performance excellence in the various roles within cricket. Key mental qualities could be paramount in preventing the performance distortion caused by the decompetitive nature associated with high-level cricket participation.

2.6 THE NATURE OF CRICKET

2.6.1 Introduction

South Africa is a sport-loving nation with a passionate following of a large variety of sport. According to Sport and Recreation in South Africa (SouthAfricaWeb, 2009), a 2004 survey to identify the most popular sporting codes indicated that 78 per cent of the adults in South Africa expressed most interest in soccer; 47 per cent expressed interest in rugby; 39% in cricket; 25 per cent in wrestling; 22 percent athletics; 22 per cent tennis; 18 per cent boxing; 12 percent

motorsport; 12 per cent golf and 11 per cent netball. (Participants in the survey were allowed to choose one and/or more sports as they preferred.) This survey's results testify that sport in South Africa is divided into three main groups. The major sports of popularity are: rugby, cricket and soccer (football). Most children are introduced to these sports as early as at primary school level.

Cricket is of British origin and was strongly influenced by the British occupation of South Africa's former British colonies. Since South Africa's readmission to international sport in 1992, cricket teams have won numerous coveted tournament titles. South Africa's national team is one of the elite teams in world cricket, is ranked amongst the best in limited-overs cricket (50-overs matches) and remains amongst the top tier of teams in test cricket (five-day games) (Morgan, 2010). South Africa's national team is called the Proteas (which is the national flower of South Africa) and competes regularly against other cricket-playing nations such as India, Australia, England, New Zealand and Pakistan. South African cricket has been managed mostly by different national bodies that came into existence mainly on ethnic lines until the formation of the United Cricket Board of South Africa in 1991 with the rise of the new democratic government (CricketSouthAfrica, 2011). Today the controlling body for amateur and professional men's and women's' cricket is called Cricket South Africa. According to Doley (2009), cricket with its Twenty20 version, one-day internationals and test matches is the second after soccer as the most popular sport in the world. Doley (2009) adds that the ICC World Cup is the second largest single sporting event in the world, drawing an estimated cumulative television audience of five billion.

2.6.2 The stages of development of South African cricketers

According to Pyke and Davis (2010), the success on the international stage within any cricketing country is channelled down from the highest level of the sport to youth and junior players. In South Africa many aspiring young cricketers dream of becoming a Protea player. Like all sport, a successful cricket career requires not only talent but also much time, hard work, dedication, qualified coaching, modern training facilities and many opportunities. Based on the successes of

certain players (such as JP Duminy, Makhaya Ntini, Mark Boucher and Hashim Amla) Cricket South Africa (CSA) has established a staged development plan for potential players to become international representatives (Protea players) (CricketSouthAfrica, 2011). The four stages listed by CSA as the cricket development pipeline ranging from Bakers Mini Cricket to the Proteas are as follows:

2.6.2.1 Bakers Mini Cricket

The first official step is the cricket introductory Bakers Mini Cricket development programme introduced to children between the ages of five and 11. Here children (boys and girls) enjoy the aspects of batting, fielding and bowling in a fun, semistructured manner. According to CSA, two million children across all backgrounds have been through this programme in the last twenty five-years (CricketSouthAfrica, 2011).

2.6.2.2 Schools Cricket

Schools cricket, also known as hardball cricket, consists of age groups from under 10 through to u/19. At this stage, cricket starts to become more structured and rule covered, with the main focus being on skills development. Players of these ages do have the opportunity to represent their schools and provinces in elite youth inter-provincial tournaments such as the Standard Bank U13 week, Cricket South Africa U/15 week, U/17 National week or the prestigious Coca-Cola Khaya Majola U/19 week. Junior cricket academies established in cluster areas of some provinces enable serious young cricketers to develop their skills and compete further against other regional academies or junior clubs beyond the normal school cricket competition. This is considered the second step in the pipeline and will give the young cricketers a good taste of provincial colours (CricketSouthAfrica, 2011).

2.6.2.3 After-school: club/university

The next step is at senior club or university level. The country's top universities compete annually in a week called the Universities Sports South Africa Week (USSA). The USSA consists of an A-week which is made up of the top 16 university teams and a B-week which consists of the

lower-performing university teams. At the end of the week, a USSA XI squad is announced and these players sometimes compete internationally.

A national U/19 talent search is also carried out each year to identify talent amongst the pool of U18s. An U/19 talent squad is selected in each region and these squads are then required to go through an intensive skills learning and conditioning programme that later offers some players the opportunity to attend a talent squad camp at the High Performance Centre at the University of Pretoria. Here the players are carefully monitored by talent scouts who report to Cricket South Africa on players' skills and progress. Twenty-four players are then selected as the South Africa U19 squad, also known as the Junior Proteas, who compete in the biannual ICC U/19s Cricket World Cup against other top cricket-playing countries. Players who leave school and do not engage in further studies at universities can join cricket clubs and be selected for amateur provincial teams that play official first-class cricket, which could also catch the eyes of provincial and national selectors (CricketSouthAfrica, 2011).

The Women Proteas follow a path somewhat different but it also entails the Bakers Mini Cricket festival, then regional U/17 schools competition and the U/19 National Schools week, followed by a Women's Provincial league after school, which provides a platform for ladies to contend for national colours.

2.6.2.4 Senior provincial/national

The Standard Bank National Cricket Academy is the last preparatory phase for introducing players to the highest level of cricket participation in South Africa (the Proteas). This academy sends out a special invitation to players to attend a five-month-long intensive training programme to perfect the players' skills and also teach them to handle other aspects associated with cricket participation at national level. This High Performance Programme is a specialist programme that nominates the country's top players to attend training camps under a skills specialist. This programme is believed to be a vital stream between franchise cricket and national-level cricket (CricketSouthAfrica, 2011).

These four steps have proved to develop and deliver some of South Africa's best cricketers. There are various cricket academies, clubs and provincial teams that are structured under each of the region's franchises to ensure proper talent identification and development of players of all ages with the aim of streamlining players towards higher levels of cricket participation. Faf du Plessis (Nashua Titans) and Paul Harris (Bizhub Highveld Lions) are of the opinion that the current existing cricket structures in South Africa are creating enough opportunities for cricketers to play at the highest level. Their concern is that not enough cricketers are aware of the pipeline for getting to the top and that many school-leavers fail to realise that club cricket provides the main platform to showcase their talent if they want to get to the top (Titans, 2010).

2.6.3 General cricket-playing conditions

Cricket is an outdoor game between two sides played with bats, a ball and stumps. A side (team) consists of eleven players who are purposefully selected to fulfil specific roles in the team. Usually there are four main bowlers, four batsmen, two all-rounders (players who both bat and bowl) and one wicketkeeper. A coin tossed prior to the game by the captain of each side decides which team has the option of batting first or second. The first team bats its *innings*, followed by the second team batting its innings and whoever scores the most runs wins the match (ICCPlayingHandbook., 2009/2010).

Cricket is played on a large oval-shaped grass field with a boundary marking the outer border of the cricket field. In the middle of the field is a rectangular area called the *pitch* with three wooden stumps situated at each end (Beaudoin, 2003). The pitch is about twenty metres long and three metres wide. Three creases are marked on the pitch: the bowling crease in line with the stumps, the popping crease 1.21 metres in front of it, and the return crease at each end of the bowling crease. Play focuses on the wickets (three vertical stumps connected on top by two horizontal pieces called bails). The most common means of getting a batsman out is to dislodge the bails from the stumps. Tucker (2009) points out that, in cricket, two batsmen need to be in at the same time – each in front of a wicket. They continue batting until one is out. He is then

replaced by a new batsman to establish a new partnership. So the innings continues until ten of the eleven batsmen are dismissed, because cricket needs two batsmen. The eleventh batsman cannot bat alone. The batsman being bowled at can hit the ball in any direction.

In cricket each batsman stands at one end of the pitch. The batsman facing the approaching bowler's delivery is referred to as the striker, and the batsman not facing the approaching delivery is referred to as the non-striker. There are many different strokes (shots) a batsman can play in cricket and it is usually the skilled batsman who incorporates the most appropriate stroke for the different types of bowling deliveries. The batsman who is on strike is required to hit the ball into the outfield or across the boundary to score runs. As the fieldsmen fielders are chasing the ball to get it back to the bowler or wicketkeeper, the two batsmen run across to their opposite wickets to make runs. Every time they cross each other and reach the opposite end of the pitch, one run is scored. The further away the ball is from their wickets, the more time they have to cross each other to score runs. The batsmen must be careful when changing sides because they might get run out when their wickets are broken by one of the fielders, that is if they are caught *out of ground* (a line that demarcates the batting crease) (Tucker, 2009). The batsmen are required to run with their bats when they change sides because the bat is considered part of the batsman. Only the tip of the bat needs to be grounded over the line that demarcates the pitch and not the whole body of the batsman. Thus the batsman can use the length of the bat to his advantage to ensure that he is *safe*, in close-call situations, for example, when batsmen decide to run and the fielder reacts more quickly than they anticipated. If a hit ball travels against or over the boundary line on the outer field, four runs are scored automatically and the batsmen do not need to change places to score runs. If, however, the batsman hits a fly ball directly over the boundary markers, six runs are automatically awarded to the batsman. These shots are known as *fours* and *sixes* respectively, and also *boundaries* (ICCPlayingHandbook., 2009/2010).

2.6.4 Cricket competition formats in South Africa

Cricket has many facets and complexities that are sometimes extremely difficult for an outsider to grasp. New aspects of the game are probably still being learned by experienced players every day. The game of cricket takes up different types or formats with unique variables that are associated with each of them. Mascarenhas (2009) stipulates what is common to all formats of cricket:

- All cricket games are played on the same-sized oval ground with no adjustments.
- The length and width of the pitch does not change.
- The players and field equipment such as the stumps, bails, bats, gloves, pads and other safety gear remain the same.

There are, however, external differences that make each form of cricket unique, such as:

- Clothing for Test-match Cricket is all white, whereas One-day, 50-over and Twenty20 Cricket are coloured, usually in line with the relevant nation's flag or national colours.
- Test-match Cricket is played with a red ball, One-day Cricket is played with a white ball and Twenty20 games are played with red or white balls.
- Test matches last five days and are always played during daylight hours. One-day matches are played in one day and are also called day-night matches that usually start mid-afternoon and continue into the night, made possible by bright artificial lights.
- The ideal number of overs bowled in a test match is more or less ninety overs per day, fifty overs for a One-day game and twenty overs for a Twenty20 game.
- Breaks during the game also differ for the different formats of the game. In Test-match Cricket each of the five days is split into four sessions lasting around ninety minutes each. One-day matches consist of two sessions with a lunch break after session one (after 50-overs or when the first team loses all its wickets) and a short drinks break is also taken after twenty-five overs in the first and second

sessions. A Twenty20 match is also split into two sessions with a short break at the end of the first twenty overs bowled by the fielding team, or when the batting team is dismissed (Mascarenhas, 2009).

2.6.4.1 Multiple-day cricket

Multiple-day cricket, also known as first-class cricket, is played over four days during which each side also gets two innings to bat/bowl. This used to be one of the more popular types of cricket played on a more regular basis. **Batting** in multiple-day cricket is much more conservative in nature compared to limited-over matches. It is believed that no other form of the game tests an individual's technique and mind as thoroughly as multiple-day cricket (Woolmer *et al.,* 2008). Regardless of what order one is batting, the key for every batsman is to play each ball on its merit and to remain calm, think, and act with focus, precision and speed. In four-day cricket the middle-order batsmen like the opening batsmen are also expected to grind out marathon innings. Therefore, middle-order batsmen in multiple-day cricket should not be any less skilled than the opening batsmen as they face the same or equivalent quality bowlers. The legendary Greame Pollock's approach to scoring runs in multiple-day cricket is that every bowler regardless of how good they are will deliver at least four to five loose balls in an hour. These should be taken advantage of and sent to the boundary, scoring the batsman at least 12 to 16 runs an hour. In addition to these, a batsman could score a realistic 20 runs in singles per hour. If a batsman can keep going on like this for two sessions, he could easily be on his way to scoring a century (Woolmer *et al.,* 2008). Multiple-day cricket requires **bowlers** to bowl batsmen out and prevent strong partnerships from being established.

The multiple-day cricket series played in South Africa is called the Super-Sport Series and it is viewed as the breeding ground for Cricket South Africa's future test team talent (CricketSouthAfrica, 2011). The Super Sport Series, initially known as the Castle Cup that existed from 1992/93 to 1995/96, is a premier first-class competition, consisting of six franchises each playing home and away matches against each other. The six franchises consist of the Sunfoil Dolphins (Kwazulu-Natal); the Nashua Cape Cobras (Western Cape); the Chevrolet Warriors

(Eastern Cape); the Bizhub Highveld Lions (Gauteng), the Nashua Titans (Northern Gauteng) and the Chevrolet Knights (Free State).

2.6.4.2 Limited-overs cricket: One-day cricket; Twenty20 cricket

Limited-overs cricket is the short form of cricket. **One-day matches** are limited to 50 overs (40 or 45 depending on the league) per side and were introduced at the request of the public to view a shorter version of cricket where the result could be seen in one day (Vaughan, 2007). In limited-overs cricket, such as in a one-day match, the **batsmen** are compelled to break down the phases of an innings into three separate tactical blocks. Woolmer *et al.* (2008) suggest the **first 15 overs** are crucial to a batting team for setting a target based on the opposition's bowling attack. There is usually never a better time to score boundaries than in this first part of the innings as the field is restricted and the ball is hard. The hard ball brings a good opportunity for the **bowlers** to get some lateral movement on their deliveries and, contrary to expectations, this makes it dangerous for the batsmen to execute their strokes. Therefore it is extremely important for batting teams to not try and score runs too quickly at the expense of losing their wickets – or to waste opportunities to make runs presented by the field restrictions, in an attempt to conserve wickets. Although the **bowling** team's primary objective is not always to bowl the opposition out, the bowlers' still require the skills to restrict the batsmen from scoring. The **overs 16 to 40** are referred to as the middle overs and are characterised by a session where it is necessary to compile the majority of runs. The middle section of the innings might not be as intriguing as the first fifteen and appear a bit dull and predictable, but it still requires batsmen to maintain mature innovation, level-headedness and focus (Woolmer *et al.,* 2008). To prevent this perceived relatively dull period during the middle overs of the innings, Powerplays were introduced. **Overs 41 to 50** are often referred to as 'the slog'. These last 60 balls often tempt batsmen to lose their focus and make them start swinging at every ball in their half of the pitch. The idea is to seek boundaries during these closing overs but, being bowled out before completing the allotted overs, is not the ideal. For elite cricket teams anything under 8 or 10 runs per over in this session is deemed to be failure yet, for schoolboy cricket, it is satisfying.

The Cricket South Africa One-day Cup formerly known as MTN40 is South Africa's primary limited-overs competition which is the equivalent of One-day international matches but is played on a 40-over basis instead of the traditional 50-overs format. It also features the six franchises competing against each other with the inclusion of Zimbabwe for the 2007/08 season. The six franchises play a double round of 10 'home' and 'away' matches, leaving the four best teams to qualify for the semifinals in which team No.1 plays team No.4 and team No.2 plays team No.3, leaving the winners of each semifinal competing against one another in the final. This tournament is also more spectator friendly consisting of day/night games on Wednesdays and Fridays that allow fans to finish work and still attend matches, or is also scheduled for a day match on Sundays (CricketSouthAfrica, 2011).

Twenty20 cricket: This format is the latest format of the game that was originally introduced in 2003. Each team is limited to one 20-overs innings. This short three-hour version of the game requires batsmen to play more positive shots to make as many runs as possible which, in return, makes it an exciting spectacle to watch.

The Standard Bank Pro20 is South Africa's twenty-over-a-side series that was first introduced in 2003/04 and it has been a fan favourite ever since. The franchises each have three home games and two away games followed by two home games and three away games the following season. Thus the tournament consists of five league matches followed by a semifinal and final. The two finalist teams automatically qualify to represent South Africa in the Champions League which is a joint global tournament between Cricket South Africa, the Board of Control for Cricket in India and Cricket Australia (CricketSouthAfrica, 2011).

In limited-overs cricket, a team can win the match by runs or by wickets. If the team batting second surpasses the score of the team batting first, the victory is achieved by the number of wickets still remaining. For example, if four wickets were down when the score was surpassed, the winning margin will be six wickets. If the team batting second cannot surpass the total achieved by the team batting first, the victory is achieved by runs. For example, if team 1 bats

first and scores 200 runs, and team 2 bats second and can only score 180 runs, team 1 would have won by 20 runs.

Regardless of the differences between cricket formats, they all share the same aims. Test-match cricket often ends with no result whereas One-day and Twenty20 cricket are guaranteed of a result in a much shorter time frame, which is possibly one of the reasons why these are preferred by spectators. Since the focus of this study will be on One-day (limited-overs) cricket, a detailed description of one-day cricket is given in order to assist understanding of the tradition and performance measures of this format in cricket.

2.6.5 The technical and tactical skills of cricketers

In One-day cricket, a match can produce various performance measures especially for individual brilliance that can lead to a team's success. These measures include the runs a batsman scores or the number of wickets a bowler scores or catches by a fielder and they depend on a combination of factors, such as the quality of the pitch, atmospheric conditions, the abilities of the bowler, the match situation and the role of the player (Totterdell, 1999). Cricketers can also make incomplete and multiple-performance contributions (batting, bowling and fielding) during sessions of play. This implies that, for a measure of performance for a session of play by a team, a number of match scores would have to be combined and transformed in some way. For this reason the next part of this chapter will discuss the different skills involved in a cricket match and their measures of performance.

2.6.5.1 Batting

A batsman's main purpose is to hit the ball and score runs while at the same time protecting his wicket. In a conversation on 12th September 2009 E Laubscher confirmed that not all strokes are aimed with the purpose of scoring runs; some strokes are more 'defensive' to protect the batsman's wicket, especially if a good ball is bowled. In *defensive* strokes the batsman only blocks the ball and there is no need for the batsmen to change sides or score runs. A batsman gets to bat until he is out. If a hit ball is caught on the fly, the batsman is out. Besides being

caught out or being bowled out (his wicket is struck by the bowler), he can be run out (his wicket is struck by the ball while he is out of his crease), stumped out (he steps out of the crease while trying to strike the ball and the wicketkeeper or fielder breaks the wicket with the ball), bowled leg before wicket – also known as LBW (part of his body stops a delivery from hitting the stumps), and hits the wicket (he dislodges the bails himself). A batsman can also be called out for obstructing the field, for handling the ball or for hitting the ball twice (Gibbs, 2004). A batsman can be timed out if he does not step onto the field of play within two minutes of the previous dismissal. What must also be mentioned with regard to the above and the dismissal of a batsman is that, even when the batsman is cleanly bowled out (his wickets are broken by a bowling delivery), the umpire will not give that batsman out until one of the opposite team members *appeals* (a cricket term, like the shouting of the phrase "How's that?") the 'out'. In other words, someone on the fielding team has to ask an umpire "Is he out?" before the umpire lifts his finger signalling the dismissal of the batsman (ICCPlayingHandbook., 2009/2010)

Batting requires motor and psychological skills to select the most accurate shot from a selection of strokes against bowlers who manipulate the bowling deliveries into fast, spin, seam and swinging actions (Stretch, Bartlett & Davids, 2000). Customarily a batsman's ability is measured and indicated by means of his average (Lemmer, 2004). A batting average is calculated as the sum of all scores divided by the number of times the batsman was out. Initially there can be large fluctuations but these tend to stabilise to a more constant value as the number or batting innings increases. Lemmer (2004) maintains that to assess the batsman's overall performance the average alone does not reflect performance well enough and skills like consistency (variation of scores) and strike rate (average number of runs scored per hundred balls faced) also need to be incorporated into the measure of performance, especially into limited-overs cricket because of the time dimension imposed on it. The advent and growing importance of limited-overs (ODI) cricket has placed a unique emphasis on measuring batting performance. Instead of just crediting the batter on runs scored, runs scored per ball faced have become the essential measure of success in shorter versions of cricket such as one-day cricket (Barr & Kantor, 2004).

To comprehend the performance aspect of cricket batting, one must carefully consider the 'how' and 'why' of batting. Woolmer *et al.* (2008) suggested the following five basic principles of batting in cricket that will give all batsmen the best possible chance of succeeding at the highest level.

1. **Watch the ball:** the projectile speeds in cricket have indicated that the temporal constraints on batsmen are severe. For instance, Land and McLeod (2000) found that, with a fast bowler, the ball takes about 600m/s to reach the batsman and even an expert batsman needs about 200m/s to adjust his stroke based on novel visual information. The first possible clues of a bowling delivery can be picked up by careful observation. If a batsman fails to analyse the pre-delivery clues, it can delay or even hamper his decision-making process. Each batsman has a personal preference for when and how to 'zoom' in on the bowler's run-up approach but it remains vital for the batsman to be watching the ball as it leaves the bowler's hand. The batsman must look for the shine, the position of the seam, and the releasing actions of the fingers. Once the ball is released, parts of the trajectory are visually tracked and relevant information such as the speed, swerve and spin have to be identified to predict where and when the ball is going to pitch (Stretch *et al.,* 2000). According to Land and McLeod (2000), a batsman only views the trajectory of the ball for little more than half a second after it is released, then the batsman's eye makes a predictive saccade to the place where he expects the ball to bounce and then follows its trajectory for 100 to 200 m/s after the bounce. This judgment of the vertical position of the ball and its time of arrival will determine the quality of bat-to-ball contact.

2. **Keep your head still:** a motionless head preceding the batting action allows the eyes to focus on the flight and land of the ball. It is believed that the batsman's perceptual ability consists of a lightning-swift and involuntary jump from the bowler's hand to where the batsman's brain estimates the ball will pitch (Woolmer *et al.,* 2008). In other words, the batsman's judgment must be essentially predictive and he is required to

select an appropriate trajectory for his bat, based on his interpretation of the first two-thirds of the ball's flight (Land & McLeod, 2000).

3. **Judge length accurately; line will change with swing and spin:** playing a defensive back-foot shot to a ball of good length or half volley can cause a batsman to rush his shot, leading to a good chance of missing the ball or being bowled leg before wicket (LBW). By moving forward to a short ball or a bouncer that is aimed at the batsman's chest will limit the batsman to playing a forward shot, causing the ball to hit the glove or body and leading to either a catch or an injury.

4. **Allow your hands to lead your body and feet into the correct position:** good footwork results in good balance, but it is not only the feet that are required to move; the whole body should be in good synchronisation with the feet. Woolmer *et al.* (2008) emphasise that, when the batsman is playing forward, the head, front shoulder and foot should move together, either in line with the ball when defending, or next to the ball when attacking. Batting is considered a sideways game that is played along parallel lines and the bat should meet the ball in the same line along which it travels.

5. **Select the correct shot:** it is believed that, for every type of bowling delivery in cricket, there is a correct shot. This means the larger the array of shots the batsman can play, the better off he would be, but a batsman needs to discipline himself and learn to pick his shots based on the demands of the conditions and circumstances of the game (Woolmer *et al.*, 2008).

Subsequently, much research has been conducted, attempting to explain the factors that contribute to successful batting. Penrose and Roach (1995) emphasised the importance of advance cue utilisation during batting. Expert batters were more able than novices to detect and analyse movement differences in the advance stages of ball flight, allowing them to be more accurate in the prediction of delivery length. It was also found that first-grade batsmen produced a faster and more accurate stroke selection than lower-grade batsmen (Abernethy & Russell, 1984). This can be supported by an earlier study by Abernethy (1981) that points out

that the foot movements of skilled batters were completed before the point of ball-bat contact. It can, therefore, be assumed that, given the restrictive time constraints on batsmen playing at elite levels of performance, it would be the skilled batsmen who are more capable of buying time for effective decision making and shot preparation by taking advantage of the finest information given by the bowler's movement.

Furthermore, Renshaw and Fairweather (2000) investigated the perceptual discrimination ability in three distinct standards of cricket batsmen, using a visual occlusion technique. They found that more expert batsmen (such as those playing at national level) were better at discerning the different wrist spin deliveries (googly, flipper, leg spin and top spin) than the less experienced batsmen (playing at regional and club levels).

Another factor that has been reported as contributing to batting success is handedness (left or right hand dominance). Cricket is considered one sport in which left-handers enjoy an advantage over bowlers because of their limited frequency in the general population. Many coaches believe a useful strategy to implement in the batting line-up is to have a combination of left-handed and right-handed batsmen batting at the same time. This will require the bowlers to continually readjust the line that they bowl. In this context, the research by Brooks, Bussiére, Jennions and Hunt (2003) analysed the batting records of the 2003 Cricket World Cup held in South Africa to determine if left-handed batsmen perform better than right-handed batsmen. They found that left-handed batsmen are indeed more successful than right-handers. The frequency of left-handers in the top three places in the batting order out of 177 players was 47 per cent and there is proof that team performances correlate positively with the percentage of innings by left-handed batsmen, for example, the winning team had the most left-handers in its batting line-up, peaking at 50.5 per cent (Brooks *et al.,* 2003). These authors suggest that this indicates that batting success is maximised when teams have nearly the same number of left-handers and right-handers in their batting line-up. This advantage could be because left-handers enjoy a negative frequency-dependent advantage that does not accommodate the majority of the bowlers in cricket. Another reason could also be that left-handers have better visual and

motor skill performance than right-handers due to their larger motor cortices (right hemispheric brain regions) (Schlaug, 2001).

Regardless of the effects that **advance cue utilisation**, **discrimination ability** and **handedness** have on batting performance, cricket, however, also involves intermittent physical activity. Noakes and Durant (2000) did a review of the physiological requirements in cricket and also reflected on the need for superior genetic physical endowment to achieve success in modern cricket. In their study it was estimated that, in measuring the peak physical activity of a batsman who has batted for 100 runs, along with other batsmen who also scored 100 runs by means of each scoring 50 singles, 20 twos, 10 threes and 20 fours, the results showed that each of them would cover 3.2km in an activity time of 8 minutes, meaning that the average running speed for each batsman is 24 km/h with at least 110 declarations. Petersen, Pyne, Dawson, Portus, and Kellet (2009) also claim that if a batsman can successfully bat an entire one-day innings, he would cover more or less 8.7km. It is apparent that significant demands are placed on batsmen in one-day cricket. To achieve one's highest level of performance, one must pay as much attention to the fitness aspects of batting, bowling and fielding as one would to perfecting these skills. Woolmer *et al.* (2008, p. 527) declare that "test cricketers of the future would have to be as fit as world-class triathlon athletes if they are to play their best and reduce their risk of serious injury".

There are different roles in a cricket team, some players are considered specialist batsmen, some are bowlers who are not that skilled with the bat and others can be all-rounders who are good at bowling and batting (Laubscher, 2009). The less skilled batsmen will bat with a strategy different from that of the skilled batsmen. They might play more defensive shots that will allow a quick single to put the more acclaimed batter on the striker's end. The skilled batsmen (usually the **first-order batsmen**) should be able to play excellent defensive shots and cope with shorter more aggressive deliveries. The **middle-order batsmen** should also be able to play a large variety of shots including those for playing spinners (Laubscher, 2009). These roles in a batting line could change according to the demands of the situation, and the game strategy sometimes requires these changes. Field placings are set according to each bowler's preference

with the aim of controlling the batsman's shot selection. This can cause the batsman to become frustrated and play a rash shot, ending in his dismissal. Captains and bowlers should study the batsmen in this type minute detail to exploit their weaknesses when batting and also consider the conditions of the pitch and the ball to use against the batsman either to prevent him from fulfilling his role or to force him into playing undesirable shots.

The success of a batsman is largely dependent on the principles outlined above. These principles and techniques take years to master; some even say seven to ten years of hard consistent practice is required to go from a conscious thinking batting stage to the desired reactive automatic stage (Woolmer *et al.,* 2008). However, only half the battle is won by a batsman's good technique. While a batsman is in the process of accurately judging his shot selection in an attempt to put an innings together, other qualities such as mental strength, focus, strategy, knowledge of the pitch and conditions, team skills and so forth will also become vital determinants of batting success.

2.6.5.2 Bowling

Bowlers are not allowed to throw the ball. This means the bowling action requires a straight elbow throughout the movement, creating a wide circular arc with the arm. Bowlers are only allowed to bowl overarm, which means that the arm is not allowed below the horizontal. When bowling, it is allowed, even preferred for the ball to bounce off the ground before it reaches the batsman. Bowlers usually take a running start before releasing the ball. A fast bowler's run-up consists of a longer length and a flat-out sprint, whereas a spin bowler's run-up entails a few short strides. The bowler aims at the stumps behind the batsman. A wicketkeeper waits for the ball to pass behind the stumps, while nine other fielders are strategically placed around the cricket ground. The main goal of the bowler is to bowl the ball in such a way as to try to hit the batsman's wicket or cause the batsman to play the ball directly into the hands of one of the fielders. Six deliveries from one end to the other end constitute an *over*. After each over a different bowler starts another over, bowling from the opposite side of the pitch. When this is

done, a different bowler or even the bowler before last, delivers six balls from the opposite side. Whoever bowls is usually strategically selected by the captain (Tucker, 2009).

A bowler can bowl a *no ball* if the arm action, flight or bounce of the ball, or foot landing is illegal. A *wide ball* is called by the umpire if he feels the bowler's ball is bowled too wide for the batsman to play a reachable shot. In cases of these illegal balls, the batting team is rewarded one run, and the illegal ball is not counted as part of the over. The penalty runs awarded for illegal balls are not tallied next to the name of the batsman who faces them but rather tallied on a separate column on the scoring sheet and called *extras*. A *bye* in cricket is awarded to the batting team if the bowler bowls the ball past the striker, past the wickets and past the wicketkeeper without the striker touching the ball. If the ball is far enough into the outfield, the two batsmen can decide to run. If the ball travels to the boundary, four runs are awarded as extras to the batting team. A *leg-bye* is exactly the same as the above, except the ball bounces off the batsman's body. In one-day (limited-over) cricket each side bats one innings and the number of overs is restricted. Typically in a one-day international match the number of overs per innings is restricted to fifty. There must be at least five bowlers in each team with a maximum of ten overs granted to each bowler (ICCPlayingHandbook., 2009/2010).

There are two ways for an innings to end: when the agreed number of overs (50, 40 or 20, depending on competition) have been played or when 10 of the batting team's wickets are lost. An innings can end prematurely if the team batting second exceeds the run total of the team batting first (Beaudoin, 2003). There are no substitutions in cricket, except in cases of serious injury. The same eleven players are required to bat and field for the entire game. When a bowler is not bowling, he is fielding. In most of the cases the best bowlers are not good batsmen, so they bat at the bottom of the batting order (Laubscher, 2009). If they are as skilled with the bat as with the ball, they are referred to as *all-rounders*. Because individual batsmen get only one chance to bat in an innings, much pressure is put on them to perform, especially the first-order batsmen. They are put in the first order because they are regarded as the best batsmen on whom the team relies to score a high number of runs. Usually these batsmen start off batting very conservatively and slowly progress to batting more aggressively as the number

of overs becomes depleted. There is much tension in the air at a one-day cricket match especially if the second team batting is chasing a required run rate to beat the number of runs scored by the first team (Beaudoin, 2003).

To determine a bowler's performance accurately, three criteria must be considered. The first is bowling average which is the same as the batting average except, in this case, one is interested in the runs conceded per wicket (Avg = Runs/Wickets). The bowlers strive to keep the runs conceded per wicket as low as possible, thus aiming for a lower average. Consider the following example proposed by Lemmer (2002): if bowler A conceded 40 runs and took 1 wicket in a 3-over bowling spell, and bowler B also conceded 40 runs and took 1 wicket in an 8-over bowling spell, both of these bowlers scored a bowling average of 40 (which is considered not so good). Who would one rather have in the team? Bowler A is much more 'expensive' by conceding 13.33 runs per over compared to bowler B who only concedes 5 runs per over. Thus in a limited-overs game, bowler B is more effective than bowler A. According to this, it is evident that, since bowling average alone does not accurately predict the success of bowlers, it is necessary to include the two other statistics used to assess bowing performance called *economy rate* and *strike rate*.

The second criterion is *economy rate* which refers to the total number of runs conceded by the bowler divided by the number of overs bowled (E = Runs/Overs). The economy rate does not mention anything about the number of wickets taken; it only indicates the number of runs scored off the bowler. Criterion three is *strike rate* which is the total number of balls bowled, divided by the number of wickets taken (S = Balls bowled/Wickets). If a bowler does not take many wickets but is tough to score runs off, then that bowler is considered to be effective. In the past, there have been several attempts and suggestions to establish more sensible measures in cricket to rate and predict bowlers' performances for the purpose of team selection, for example, the use of neural networks in predicting performance (Subramanian & Ramesh, 2009) and the calculation of the combined bowling rate (CBR= 3/[1/Average + 1/Economy + 1/Strike rate]) (Lemmer, 2002) which both proved to be valuable.

A bowler is usually classified according to the pace, swing and spin of the ball. The type of delivery is defined by the amount of effort the bowler puts into the action, and the variation in wrist and finger movements (Woolmer *et al.,* 2008). Slow bowlers are usually spin bowlers in cricket who use the spin of the ball in unorthodox ways to trick and deceive the batsmen into playing the shot too early, too late or to the wrong line and length. Spin bowling can be classified as either finger spin (using wrist followed by finger motion to import spin to the ball around a horizontal axis) or wrist spin (using fingers followed by wrist motion to import spin to the ball). Finger spin includes deliveries such as left-arm orthodox or right-hand off spin and wrist spin deliveries include leg spinners such as a googly, flipper, legbreak or, when bowled with the left arm, a chinaman (Woolmer *et al.,* 2008). A fast bowler is required to whip his arm over very quickly as he delivers the ball. Speed is one of the fundamental assets that determine the success of fast bowlers. According to Bartlett, Stockill, Elliot, and Burnett (1996), faster ball release speed reduces the time available for the batsman to anticipate the ball accurately, resulting in increasing demands on the effect or mechanisms responsible for correct shot execution. Whether one is a seam bowler (medium, medium fast, fast) or a spinner (wrist, finger) the basic aspects of the bowling action are the same. Woolmer *et al.* (2008) explain that the bowling action is built on three foundations:

- momentum that moves the bowler to the point of delivery
- balance that allows the bowler to be in control of his or her bowling action
- timing which is responsible for controlling the finer aspects of releasing the ball such as line, length and flight

A bowler's bowling action consists of five distinct movements. These movements provide the foundation upon which a bowler's skills are developed. Woolmer *et al.* (2008) break down the five movements that describe the basic bowling action into the following:

- **The run-up and jump into the beginning of the gather:** the run-up commences when the bowler starts to walk or jog over his marker towards the bowling crease by gradually increasing his speed, and ends with a leap into the air at the

start of the pre-delivery stride. Bartlett *et al.* (1996) claim that bowlers have different preferences for run-up length and that there is no universal agreement as to the optimal length a run-up should be. A suggested ideal run-up length for fast bowlers is between 15m and 30m (Woolmer *et al.,* 2008), with the emphasis on a balanced and rhythmical running technique (Elliott & Foster, 1985).

- **The set-up:** the run-up is separated from the delivery stride by a pre-delivery stride. The pre-delivery stride for a right-handed bowler begins with a jump off the left foot and is completed as the bowler lands on the right or back foot (Bartlett *et al.,* 1996).
- **The unfold:** this can also be seen as the *unwind* movement towards the target as the bowler's arm and opposite front foot come down, the bowler's head follows through the over-the-top wheel movement with the eyes fixed on the target.
- **The delivery:** Elliott *et al.* (1986) postulate that the length of individual bowlers' delivery stride depends on their physique and their approaching speed into the delivery stride, but a delivery stride of approximately 75 to 85 per cent of the bowler's standing height is deemed sufficient.
- **The follow through:** the body completes its 'circle', allowing its momentum to move the more relaxed body down the pitch. The bowler should not try and work against his momentum by trying to stop himself as this can cause an injury.

From start to finish, the bowling action should be an uninterrupted, smooth, flowing action. If certain principles of efficient body movement patterns are not present, bowlers could not only perform inefficiently but possibly never reach their full potential or, in the long term, risk serious injury (Ferreira, 2009).

Based on years of coaching experience, observations and in-depth investigations, Woolmer *et al.* (2008) have identified the following six vital attributes associated with fast-bowling performance:

- **Suppleness:** all great fast bowlers have shown that they are extremely supple. Woolmer *et al.* (2008) claim that SA' s former fast bowler, Alan Donald, was so flexible that he could sit with the back of his knees flat on the ground, and reach 23cm beyond his toes.
- **Height:** most famous fast bowlers stand at 1.95 metres. Stockill and Bartlett (1993) and Pyne, Duthie, Saunders, Petersen, and Portus (2006) have reported that longer limb length is positively associated with higher ball release speed in senior and international bowlers. A recent study on fifty-two elite Australian fast bowlers (26 male and 26 female), however, indicated that the mean height for male bowlers was 1.88±0.05m, which is significantly taller than other cricket positions playing on the same level, but the mean height for female bowlers of 1.71±0.05m is not significantly different from that of the rest of the team members (Stuelcken, Pyne & Sinclair, 2007).
- **Athleticism/fitness:** fast bowlers had the lowest work-to-recovery ratio and the highest number of sprints in all game formats (Petersen *et al.,* 2009). Findings show that, in a one-day match, fast bowlers perform 18±5 sprints per hour, cover 13.4km, and have 35 percent less recovery time between high-intensity efforts than other positions on the field (Petersen *et al.,* 2009). Woolmer *et al.* (2008, p. 218) mentioned that "during the 1997/98 season the two South African opening pair bowlers Alan Donald and Shaun Pollock covered a distance equivalent to three marathons, just in their run-ups".
- **Low body fat**: Woolmer *et al.* (2008) stress the importance of a fast bowler being as lean as possible to reduce the incidence of injury by lessening the stress on the body and front leg during the delivery. Portus, Sinclair, Burke, Moore, and Farhart (2000) postulate that an overall larger and leaner body composition is also related to faster ball release speed in first-grade fast bowlers. The findings of Pyne *et al.* (2006) are consistent with these findings, indicating that younger bowlers who mature faster and possess higher relative

muscle mass than bowlers of the same chronological age are more likely to produce faster peak bowling speeds.

- **Youth:** Woolmer *et al.* (2008) are of the opinion that fast bowlers have a very short shelf life compared to spin bowlers. The authors suggest that, at the age of 30, the bowling performance of a fast bowler might follow a downward spiral and, if still bowling well at 33, then they regard the bowler as very fortunate. The authors also mention that bowlers such as Glen McGrath, Richard Hadlee and Imran Khan who extended their bowling careers into their thirties all had to compromise some aspects of their fast bowling that eventually made them less dangerous.
- **Work ethic and determination:** in order to succeed as a thoroughbred fast bowler, one must persevere in the face of adversity and be willing to work harder than anyone else on the cricket field (Petersen *et al.,* 2009).

The literature on bowlers' performance is sparse but, based on the above, one can affirm that ball-release speed, which is essential for fast bowlers, is influenced by a variety of anthropometric, morphological and kinematic factors. Shoulder-wrist length and total-arm length are highly correlated with ball-release speed (Glazier, Paradis, & Cooper, 2000) as well as longer-limb length and higher-approach speeds (Stockill & Bartlett, 1993). Furthermore, it is evident that professional and more successful bowlers exhibited larger and leaner bodies with more powerful strength characteristics (Portus *et al.,* 2000). Regarding these findings, whereas the advent of morphology and professionalism in relation to fast bowlers can generate significant pressure on upcoming bowlers to fit the physiological profile, it can also be a good standard of reference to modify and adapt individualised training programmes to alter some physiological characteristics with a view to preventing injuries and improving bowling speed.

The basics of bowling set the foundation for every type of delivery, whether it be a ball with pace, a seamer or a deceptive spinner. The shorter versions of cricket have deemed accuracy, Yorker deliveries and even medium-pace bowlers as essential (Portus *et al.,* 2000). In high-scoring contexts such as limited-overs cricket and more so in 20-overs cricket, much pressure is

placed on bowlers to find good length and prevent batsmen from getting under the ball. High stress situations such as these could easily disrupt the rhythm and technique of a bowler – which signals the importance of great strength of character.

2.6.5.3 Fielding

The fieldsmen's positions on the field depend on the type of bowler, for example, the field placing for a spin bowler will look very different to the field placing of a speed bowler. Each bowler knows what line and length he is going to ball and sets up his fielders accordingly.

A Powerplay in cricket refers to fielding restrictions that apply to the bowling team. Such a restriction stipulates that a predetermined number of fielders are required inside the inner fielding circle for a set number of overs. Under the Powerplay rule, fielding restrictions apply for the first 10 overs, plus two blocks of five overs in later stages of the game called 'Powerplay Fives' (ICCPlayingHandbook., 2009/2010). It was recently finalised in October 2008 that the batting side will decide when one of the remaining two blocks occur, and the fielding side will decide when to start the other Powerplay. With the first Powerplay, no more than two fielders are allowed to be positioned outside the 30-yard (27.4m) circle. (This is increased to three for the second and third Powerplay blocks.) At least two fielders need to be in close catching positions within the first 10 overs.

It is evident from the above discussion on the technical and tactical aspects of cricketers that performance in cricket relies on the proper functioning of the sum of all the different roles at any one time in a cricket match. Consequently, many players are selected as specialist batsmen, bowlers, wicketkeepers or fielders. Although some players are selected on the basis of their all-round abilities, a healthy balance between these roles is still recommended to ensure team success (Woolmer *et al.,* 2008).

With the emergence of limited-over cricket, the need for excellence from every player prompted even the fast bowlers to begin improving their ground fielding and catching. The likes of Mark Waugh, Herschelle Gibs, Roger Harper and Mark Taylor will be remembered for being

gifted fielders who could deceptively surprise the batsmen and change a game around in seconds. Jonty Rhodes became an international star with his diving run-out of Inzamam-ul-Haq from Pakistan in the 1992 World Cup. South Africa set the bar for a new fielding revolution with the likes of Jonty Rhodes who demonstrated great athleticism, intensity and a staggering level of anticipation in the field (Woolmer *et al.,* 2008). Recent times have demanded cricketers to be as skilled in their fielding as in their bowling or batting. The revolution in cricket has transformed players into a renewed kind of all-rounder in the game. Woolmer *et al.* (2008) list the following common traits shared by some of the best ground fielders of all time:

- They keep low.
- They are very quick across the field.
- They have a powerful throw in.
- They have extraordinary good catching ability.
- They act attackingly instead of defensively.

One of the mantras known to every cricketer in the world is 'catches win matches'. Dropping a catch in a match has so often been seen to lead to devastating results, sometimes enabling batsmen to go on to score personal batting records. According to Woolmer *et al.* (2008), the prerequisites for being a good fielder include:

- excellent reflexes
- having a good eye
- safe hands, a lot of anticipation and alertness
- and a still head

Wicket keeping in cricket is one of the most crictical roles on the field. It is often noticed that the keeper not only works harder than any one else on the field, but also acts as the cheerleader, nursemaid and is the right hand of the captain. The keeper must constantly be prepared to field or catch every delivery being bowled to the batsman, while at the same time analysing the bowler's front arm if so required to diagnose a fault in the action – not to mention the need to interpret the batsman's response, and set an example to the other fielders.

Woolmer *et al.* (2008, p. 344) postulate that the ideal wicket-keeper "is agile, focused and skilled enough to catch a ball even when a heavy bat is flashing in front of his face". They also contend that the wicketkeeper must be mentally tough, brave and possess a high degree of stamina. Consistent with the above sentiments, Canaway (2006) explains that the reason why a wicketkeeper must be mentally tough is because he is the only fielder in a team who requires such absolute focus. Like successful batsmen, the wicketkeepers are required to switch their attentional focus on and off between deliveries and overs to avoid becoming mentally worn out because it is impossible to concentrate fully for such long periods. High levels of fitness and flexibility are also paramount to wicketkeepers since they are required to squat effectively and dive hundreds of times around the wickets in a single innings. Some of these requirements were advocated in an interview with one of the most highly skilled wicketkeepers of world cricket, Sri Lanka's Prasanna Jayawardene, when he shared his thoughts on the need for powerful sideways movement during wicket keeping:

"I try to stay low, to rise with the ball. I move on the balls of my feet. If you move on the toes it can upset your rhythm. I also try to just watch the ball, purely the ball. From the hand, where it pitches, what it does off the pitch. You have to forget about the batsman in front of you. It's tough" (Alter, 2009, p. 1).

It is evident from the above that a wicketkeeper needs quick feet and much calculated anticipation. As regards anticipation, Jayawardene continues to comment that wicket keeping is all about being 'late and fast', implying that one must patiently and closely observe the line and length of the ball as it is important never to go for the ball early and, when it is near, one needs to be extremely quick about collecting it, especially down the leg side.

To add to the above, Morgan (2009) summarises the essence of a successful wicketkeeper as follows:

Key requirements:

- quick feet
- good hands

- fighting qualities
- understanding of the game, being a good communicator and motivator
- high fitness levels
- great anticipation
- being brave
- confidence

A wicketkeeper is primarily required to do the following:

- Assess conditions quickly.
- Build a relationship with and have knowledge of his bowlers.
- Assist his captain (if he's not that) with angles and information on bowlers.
- Act as a key motivator of the team during fielding effort.
- Maintain discipline of fielders and always set the standard for fielding effort.
- Infuriate the opposition; be a thorn in their flesh.

A few decades ago it was easy to appoint the wicketkeeper in the team; it simply was the player with the safest and fastest catching abilities. In recent times, especially in Limited Overs Cricket, the renewed focus is on the inclusion of all-rounders in the team. These days it is vital for an international wicketkeeper to bat and be able to lead a high strike rate if the team is in trouble. According to Woolmer *et al.* (2008), the modern keeper playing at international level must have an average of at least 30 in Test Cricket and have the strength and ability to find the boundary regularly in the closing overs of limited cricket matches.

It is evident from the above that fielding and catching are skills that demand as much attention as the batting and bowling aspects associated with team performance in cricket. In essence, the successful fieldsman and wicketkeeper must be fit, patient and have an extroadinary ability to focus for sustained periods of time.

2.6.6 Basic psychological attributes of cricketers

Cricketers distinguish themselves from the rest by certain defining qualities. Pyke and Davis (2010) contend that good cricketers must possess a fine blend of technical skill, fitness and psychological attributes to enable them to fulfil specific roles in the game, for example, a good **batsman** must have good eye-hand coordination. The ability to anticipate correctly the release, flight and trajectory of the ball is often a significant predictor of batting success. Batsmen must also be able to concentrate for long spells of play because they are continuously required to broaden or narrow down their attention to the essentials of the tasks in play. **Bowlers,** on the other hand, must be able to replicate accurately their run-up through each delivery and try to minimise critical cues as much as possible to maximise uncertainty in the batsmen. A bowler's ability to disguise or create deception with his or her bowling action, delays the batsman's decision-making process, making it difficult him to score runs. **Wicketkeepers** should be quick and agile with an extraordinary ability to 'pick' the bowler's delivery accurately. The same goes for the other **fielders** who must concentrate on the ball and the batsman's attacking strokes. It might happen that a fielder does not receive the ball for hours in the game then suddenly has to catch or field a fast-approaching ball. Even though many of the above qualities are inherited, they can be nurtured and improved by adequate mental and physical training (Pyke & Davis, 2010).

2.7 CONCLUSION

This chapter elaborated on the meaning of sport and explained the reasons why people value and engage themselves in sports activities. It was noted that sport in all its forms provides humans an opportunity to demonstrate their competence in life and from this a passion and a yearning for success could easily be inspired.

More specifically this chapter focused on cricket in South Africa by providing a detailed discussion of the nature and aspects of performance in cricket. A cricket team's success is largely dependent on the skills and performances of various individual roles within the team.

Cricket players are selected on the merit of their batting, bowling, fielding or all-round abilities. Usually they are branded for being specialist batsmen, bowlers, all-rounders or wicketkeepers. Thus far the literature has indicated that being a successful cricketer demands significant levels of fitness, technique, skills, and physiological and psychological abilities. The important role cognition plays in cricket success was repeatedly highlighted by statements in the literature referring to key characteristics such as the "need for correct and accurate anticipation" to be a successful batsman, or the need for "mental strength and a strong character" to be a successful bowler or even a "high standard of mental toughness" required for wicket keeping.

The primary purpose of this investigation is to elaborate on the psychological characteristics associated with cricket performance. To comprehend fully the psychology behind cricket performance, the next chapter attempts to provide insight into the basic meaning of peak performance in sport and also determine the most inclusive psychological antecedents of peak performance. A detailed discussion will first address a framework for the mental skills that facilitate elite athlete performance in various sport activities, after which the literature on the psychology of cricket will be systematically reviewed to identify specific psychological qualities that contribute to cricket players' success. The most prominent qualities will then be highlighted and discussed from a conceptual and theoretical frame of reference in varying contexts such as male versus female or open versus closed skill or individual versus team sport, to make it generally more comprehensive.

CHAPTER THREE

MENTAL SKILLS AND ATTRIBUTES OF ELITE SPORT PARTICIPANTS: A LITERATURE REVIEW

3.1 INTRODUCTION

Athletes across the world are continuously striving for elite levels of performance. However, at elite levels of participation, the margin of victory is narrowing because the gap between athletes' physical abilities is certainly becoming less distinguishable (Wang, 2010). It is worth noting that, as sports-related skills are continuously practised, the measure of marked improvement declines significantly at higher levels of participation, compared to the initial acquisition stages – thus, the higher the skills level, the more pivotal the role of mental aspects becomes (Williams & Krane, 1998). As a result, more intense physical training will not assure the athlete the desired performance improvements. This indicates that further improvement in performance needs to come from psychological intervention. Since sport is currently driven by performance outcomes, it is crucial to increase knowledge and understanding of the mental components associated with elite sport performance.

Research into sport became fascinated with the notion of studying the mental attributes of sports participants in the early1980s. Such studies included the psychological characteristics of an ideal performance state (Loehr, 1983), and the assessment of psychological skills relevant to exceptional athletic performance in a sample of elite, pre-elite and non-elite collegiate athletes (Mahoney *et al.,* 1987). Subsequently elite athletes became the focus of investigation in the form of Orlick and Partington's (1988) study on the mental links to excellence amongst successful and less successful Olympic athletes. Soon after this, more specific individual and team sports fell into the scope of study, such as the investigation of the psychological characteristics of professional golfers (Cohn, 1991), Olympic wrestlers (Gould, Jackson, &

Eklund, 1992), national-hockey league players (Barbour, 1994), professional baseball players (Smith & Christensen, 1995), rugby players (Andrew, Grobbelaar & Potgieter, 2007) and world-class athletes who have reached the top of their sport (MacNamara *et al.,* 2010).

In an attempt to increase the understanding of the mental attributes of elite athletes, this investigation's major aim is to identify the mental skills of cricket players and to determine whether mental skills are accurate predictors of level of cricket participation and performance. Three progressive levels of cricket participation ranging from amateur to professional have been identified. These established levels of participation are recognised by Cricket South Africa (CricketSouthAfrica, 2011) and a sample of respondents was drawn from each category. A detailed investigation of the mental skills of cricket players could serve the purpose of furthering the application of psychological behaviour modification programmes at an early stage (amateur level) of participation in an attempt to identify talent and optimise the potential of young cricketers.

3.2 IN PURSUIT OF EXCELLENCE: DEFINING PEAK PERFORMANCE IN SPORT

A major goal in sport for coaches, athletes and sports psychologists is to help athletes realise their talents in their pursuit of achieving athletic success. Jackson and Roberts (1992) concede that one of the most desired positive performance states athletes strive for in sport is the experience of peak performance. Psychological variables that assist athletes to experience peak performance states continue to provoke the interest of many researchers in the field of applied sports psychology.

Peak performance is defined as "behaviour that exceeds one's predictable level of functioning, representing superior use of potential in any human endeavor" (Privette, 1981, p. 57). The distinguishing characteristics of this state, according to Privette (1981) include dimensions of total absorption in the activity leading to a clear sense of focus on both the task at hand and one's inner state. Behaviour is elicited in a spontaneous and unrestrained manner causing an optimal expression of talent and ability by the performer. Jackson and Roberts (1992, p. 156) describe peak performance as a "state of superior functioning that characterizes optimal sport

performances, resulting in personal bests and outstanding achievements". Pertinent to the perception of peak performance is Csikszentmihalyi's (1997a) *state of flow*. Csikszentmihalyi (1997b) explains the *flow state* as a highly focused state of consciousness in which people experience moments of effortless action that stand out as the best in their lives. This is referred to as an intrinsically enjoyable state that occurs as a result of the person knowing what needs to be done in an activity where the demands of the tasks equal the participant's competences. In the *flow state* the participant becomes totally immersed in the activity and is free of all distractions and negative thoughts, providing a sense of spiritual and magical control over the surrounding environment. Williams and Krane (1998) asserted that one may be in flow and not necessarily experience peak performance, but flow is usually associated with peak performance. Thus flow is rather a precursor to or psychological process underlying a peak performance state. Supporting the above assumption, Jackson and Roberts (1992) investigated the possible psychological dynamics of peak performance in 1st division college athletes and found that athletes experienced high levels of flow during their best performances. Previous studies on peak performance (Loehr, 1983; Ravizza, 1984) also suggest that a state of flow might be necessary for the perception of peak performance.

The intuitive conclusion drawn from both the above phenomena (flow and peak performance) suggests a more productive state that is characterised by spontaneity, complete focus of concentration, control and freedom from worry. Flow, however, refers more to an inner experience of satisfaction, whereas peak performance refers to an optimal functioning state.

It is documented that, to achieve states of flow, an optimal level of mental state is required (Csikszentmihalyi, 1997a). More specifically, the mental state of an athlete is dependent on psychological factors which are thought to be the most closely related to flow experiences (Jackson *et al.,* 2001). A detailed investigation of the psychological attributes describing this superior state is the key to understanding the mental state that athletes aim to achieve (Cohn, 1991). Jackson and Roberts (1992) concluded that psychological factors such as self-confidence, positive mental attitude, motivation to perform, activation control and plans prior to and during competition have all been regarded as antecedents of flow for elite athletes.

3.3 PSYCHOLOGICAL CHARACTERISTICS OF ELITE ATHLETES

Since the1980s, the field of sports psychology has grown tremendously in identifying the psychological constructs associated with peak performance (Mahoney *et al.,* 1987; Orlick & Partington, 1988; Gould *et al.,* 1992; Smith & Christensen, 1995; Gould, Guinan, Greenleaf, Medbery, & Petersen, 1999). These authors discovered that mental skills and related aspects are antecedents of elite levels of participation in sport. The majority of factors appear to be universal across all the various sports, with a few exceptional skills associated with some, such as illustrated in the Table 1, pp. 59-61.

TABLE 1: FRAMEWORK FOR THE MENTAL FACTORS ASSOCIATED WITH ELITE SPORTS PARTICIPANTS

Investigator	Nature of study	Participants	Mental skills
Mahoney *et al.*, 1987	Quantitative measures, 51-item questionnaire	Elite athletes (N=126) (world championship placing)	Anxiety control Ability to concentrate High self-confidence Mental Imagery Focus on own performance Motivation to achieve
Orlick & Partington, 1988	Interview guide and questionnaire with quantitative & explanatory comments	Canadian Olympic athletes (N=235)	Commitment to pursuing excellence Quality training involving: Daily goal setting Simulation training Imagery Pre-competition focus plan Competition-focused plan Post-competition evaluation Distraction control
Cohn, 1991	Qualitative study with open-ended interview	Professional & collegiate golfers (N=19)	Temporary phenomenon Narrow focus of attention Automatic performance Immersed in the present Feeling of control Self-confidence Absence of fear Relaxed state Sense of fun or enjoyment

Gould *et al.*, 1992	Qualitative study with extended interviews	Olympic wrestlers (N=20)	Best-match mental states: Optimal arousal states Heightened effort & commitment Mental preparation Preparation routines Tactical strategy focus Motivational strategies
Barbour, 1994	Semistructured NHL Interview guide & mental aspects of professional hockey questionnaire	National hockey league players (N=37)	Fun & enjoyment Full focus Distraction control Mental readiness Constructive evaluation Positive images Commitment, goals & self-belief
Smith & Christensen, 1995	Psychological skills questionnaire	Minor-league baseball players (N=104)	High levels of concentration Ability to cope with adversity High self-confidence High levels of achievement motivation
Talbot-Honeck & Orlick, 1998	Interview guide	Elite classical musicians	Commitment Non-materialistic goals Strong sense of self Perspective on excellence Positive thinking Feelings of control Enjoyment Concentration & focus Spontaneity & creativity Flexibility

Gould *et al.*, 1999	Qualitative study	U.S. Olympic teams from Atlanta (N=8)	Successful teams engaged in: Extensive mental preparation, and are Highly focused Highly committed
Durand-Bush & Salmela, 2002	In-depth, open-ended semistructured interview	Two time Olympic gold medallists (N=10)	Imagery & visualisation Self-talk to remain focused & motivated Goal setting Self-reflection & evaluation
Devonport, 2006	Semistructured interview	High performance kick boxers (N=3)	Effective use of self-talk Relaxation Heightened concentration Regulation of arousal Goal setting Coping skills Imagery High self-efficacy High motivation & mental toughness
Andrew *et al.*, 2007	Sport psychological skills questionnaire	Elite u/19 Rugby union players (N=120)	Top-ranked players shown more: Average psychological skills Self-confidence Personal coping resources Coping with adversity Activation control
MacNamara *et al.*, 2010	Semistructured interview design	World-class athletes (N=7)	Competitiveness Commitment Vision of steps to success Imagery Improving weaknesses Coping under pressure Game awareness Self-belief

Table 1, pp. 59-61, indicates that a significant number of studies relating to the mental aspects of elite sports participants have been performed over recent decades. To put it in the context of this investigation, an in-depth discussion of each of these studies will follow to reflect on the various approaches most applicable to obtaining an understanding of the mental skills of elite athletes – skills associated with their peak performance experiences. This will provide valuable insight into and understanding of the purpose of this study.

Mahoney *et al.* (1987) conducted a quantitative study of the psychological skills that were pertinent to extraordinary athletic performance in a sample of 713 male and female collegiate athletes representing 23 sports. A 51-item questionnaire was administered to the sample of athletes comprising 126 elite competitors, 141 pre-elite athletes, and 446 non-elite collegiate athletes. In this study the elite athletes were identified as athletes who were placed fourth or above at a national championship such as the Olympics or relevant world championships. Pre-elite athletes were identified as those who had attended special training camps or junior national competitions at the time of the investigation. The non-elite athletes were classified as above-average participants belonging to university athletic teams. The researchers found a significant difference among the athlete subsamples, revealing a cluster of five psychological skills namely: concentration, anxiety management, self-confidence, mental preparation and motivation as having potential importance in skills-level differentiation. Sixteen internationally known sport psychologists were also invited to fill out the 51-item questionnaire in an attempt to depict how an ideal athlete would respond. Interestingly enough, the results showed that the psychologists' ideal athlete psychological profile nearly paralleled those of the elite athletes.

Orlick and Partington (1988) performed a large two-stage study involving an interview and a questionnaire survey sample in an attempt to assess Olympic athletes' mental readiness for the Olympics. The study included 235 Canadian Olympic athletes who participated in the 1984 Los Angeles Olympics. Seventy-five athletes were individually interviewed using an **athlete interview guide** and another 160 athletes completed an **athlete readiness form**, the design of which was based on the data that were obtained from the interview sample. The researchers were able to elicit certain success elements for virtually all the best performers (Olympic

medallists and world champions) in all sports. It was discovered that the best performers trained with the highest degree of quality by mentally preparing themselves on the evening before, the morning of, and on the way to training. These best performers had clearly-established goals for each interval leading up to and during the competition. They also had highly developed imagery skills that enabled them to perfect skills, make technical corrections and visualise themselves succeeding in competition. Reports showed that the most successful athletes were highly effective at engaging in simulation training. They simulated their routines, training runs and competition strategies in practice sessions as if they were in competition. In addition, these athletes had developed systematic procedures to prepare themselves mentally for competition. These included a pre-competition plan, a focus plan for competition, a constructive post-competition evaluation plan and distraction control procedures. This study also states that many of these highly successful athletes believed that they possessed the same measure of technical and physical skills four years prior to becoming world champions, but their best performances came when they learned the above-mentioned mental skills that helped them to focus during important competitions (Orlick & Partington, 1988).

The investigations mentioned above greatly expanded the understanding of the link between peak performances and mental attributes of elite athletes. Research continued to extend the knowledge in this area through the study of top performers in diverse sporting disciplines. One such study was conducted by Cohn (1991) who attempted to establish whether specific psychological qualities do exist in the peak performance states of golfers. Ten professional and nine collegiate golfers (ages 19-38) participated in semistructured open-ended interviews that required them to elaborate on the mental aspects associated with their peak performances. An inductive content analysis of the interview transcripts enabled the researcher to separate the respondents' statements into major categories. The psychological categories associated with peak performance that emerged from the interviews were the same for at least 80 per cent of the subjects. It emerged that the most frequently reported descriptions of peak performance in golf were: it was a temporary phenomenon; golfers had a narrow focus of attention during performance; their performance was automatic and effortless; they were completely absorbed in the present; they experienced a feeling of control; had a high level of self-confidence; felt an

absence of fear; were mentally and physically relaxed when performing; and experienced inner joy and fun because of circumstances of the situation that were associated with feelings of mastery and goal achievement.

Consistent with other research on Olympic athletes (Orlick & Partington, 1988; Gould *et al.,* 1999; Durand-Bush & Salmela, 2002) Gould *et al.* (1992) identified similar mental attributes in best performances among Olympic wrestlers. This study involved extensive interviews with 20 wrestlers who participated in the 1988 U.S. Olympics. The subjects were required to probe their mental preparation strategies, precompetitive cognition and affect relating to their all-time best match, worst Olympic match, and most crucial Olympic match performances. Prominent differences were found between the wrestlers' best and worst match experiences, revealing that, prior to best match performances, wrestlers described having an optimal mental state that was characterised by positive expectations, optimal arousal states, and high levels of commitment. They also actively engaged in mental preparation strategies that consisted of match preparation routines, a tactical strategy focus and other strategies that enhanced motivation. Another important finding in this study supports the contentions of Orlick and Partington (1988) revealing that, according to their study, Olympic medallists consistently adhered to systematic pre-performance routines throughout the Olympics, and non-medallists deviated from and neglected their pre-performance routines. In this study by Gould *et al.* (1992) wrestlers characterise their worst match performance as the one where they did not utilise their mental preparation routines consistently.

Expanding on the knowledge gained on the connection between mental skills and the subjective experiences of successful Olympic athletes, Devonport (2006) discovered that similar mental skills are linked with expert performances in elite kick boxers. This researcher conducted a qualitative investigation with three high-performance kick boxers to discuss their views on the psychological factors contributing to success in kick boxing. The three main psychological attributes that were regarded as prerequisites for success by all the fighters were: high self-efficacy, high levels of motivation and mental toughness. Other mental skills that were perceived to be associated with success included: relaxation, effective use of self-talk,

heightened concentration, self-regulation of arousal, setting of goals, coping with being hit, and imagery.

Orlick (1997, paragraph 1) contends that "human excellence in virtually all domains is guided by mental factors". He explains that, after many years of observations, individual interviews and wide-ranging two-way exchanges with world class performers, seven critical components of personal success kept on surfacing as the essence of excellence. These components included commitment, belief, full focus, positive images, mental readiness, distraction control, and constructive evaluation. These components often operate interdependently and are closely linked to form a model of the psychology of human excellence or 'Wheel of Excellence' that serves as a functional framework to guide the pursuit of human excellence (Orlick, 1992).

FIGURE 1: ORLICK'S (1997) WHEEL OF EXCELLENCE

Orlick (1997) explains that the two major elements that allow individuals to be the best they can possibly be in their performance pursuit are **commitment** and **belief**. These two elements form the core of human excellence and serve as the overall orientation or perspective towards excellence. The remaining five elements of excellence are the spokes in the wheel referred to as mental skills that facilitate and channel commitment and belief into a stream of effective actions that ensure the performance wheel will function efficiently. The elements in Orlick's model of excellence apply to planning sport settings in such a way that focus allows the

participant to concentrate on the right things at the right time (task-relevant cues) to create opportunities of excellence. Mental readiness allows the participant to enter competitions in the right frame of mind. Distraction control helps the participant to identify ineffective performance states and guide the athlete back on track. The element of constructive evaluation ensures that lessons are learned along the way, allowing participants to adjust their behaviour. These seven elements empower participants to open the door to new realities in their performance pursuit.

Barbour (1994) applied Orlick's (1992) model of excellence as a functional basis for investigating the mental skills of national hockey league players. The interview analysis indeed revealed that NHL players demonstrated all seven elements of Orlick's *Model of Human Excellence.* An additional mental skill of fun and enjoyment was also listed as a key element in both the hockey players' development and their professional careers. The players regarded the fun element and the ability to enjoy playing hockey as an important mental skill that contributed to their overall development and longevity in the sport. Commitment, the core mental skill of the Human Excellence Model, was also continuously mentioned in the players' interviews. Commitment was seen as the most important mental factor in hockey and it was even more enhanced when the players had clearly established goals. Therefore, when applying Orlick's model, we can assume that the commitment-goals link serves the overall orientation towards excellence in national hockey participation.

Talbot-Honeck and Orlick (1998) also applied Orlick's (1992) model of excellence as a framework for studying the essence of excellence in elite classical musicians. They conducted open-ended interviews using the Musician Interview Guide adapted from Orlick and Partington's Athlete Interview Guide (1988). Analyses revealed that elite musicians described the essence of excellence as emerging from mental aspects such as: a deep commitment to music, non-materialistic goals, a strong sense of self, a positive perspective on excellence, striving for challenging opportunities, positive thinking, feelings of being in control, feelings of enjoyment, and high levels of concentration. Creativity and spontaneity (referring to musicians' visualisation, imagination and/or musical interpretation), along with flexibility, were deemed by

musicians to be the leading prerequisites for performance excellence. It is evident that the basic elements proposed in Orlick's Wheel of Excellence (1992) are significant not only to the performance in gross motor tasks such as sport but also to fine arts activities like classical music.

Based on the above research findings, it can be hypothesised that psychological skills are important determinants of peak performance at elite levels of sports participation. However, the above-mentioned research findings lack objective and experimental evidence to support the link between psychological skills and peak performance. A considerable emphasis has been placed on identifying psychological attributes to educate sport consultants, coaches and athletes about acknowledging and applying these relevant skills in order to aid performance enhancement interventions. This is why the need to develop a psychometrically sound measure of sport-related psychological constructs has evolved.

Smith *et al.* (1995) developed the Athletic Coping Skills Inventory-28 (ACSI-28) which emerged as one of the best measures of the factors deemed crucial for success in sport performance. The ACSI-28 is a multidimensional measure of sport-specific psychological skills that Smith and Christensen (1995) utilised to identify the psychological skills as predictors of performance and survival in professional baseball players. The findings showed that the more successful players with a higher chance of survival in the sport scored higher on the psychological-skills constructs than the less successful professional minor-league players. More specifically, the results indicated that psychological skills provide a more accurate predictor of pitching performance than physical skills. In batting, both the psychological skills and the physical skills accurately predicted performance two and three years on in the players' careers. The ACSI-28 has proved to be a very effective measure of sports-related psychological skills and is frequently utilised as a contemporary measure in the study of applied sports psychology. Another example of a study using the ACSI-28 to assess psychological skills was conducted by Andrew *et al.* (2007). The investigators compared sixty top-ranked and sixty lower-ranked U/19 rugby union players in an attempt to identify sports-psychological-skills levels and psychosocial factors associated with different participation levels. It was discovered that the top-ranked players showed significantly higher scores of self-confidence ($d \geq 0.4$), personal coping resources, coping with adversity,

average psychological skills and activation control scores than the lower-ranked players. According to these findings, psychological skills levels can help to both distinguish between players of different participation levels and predictively determine the longevity of participants' careers.

Despite the valuable research findings generated on the psychological attributes of elite athletes and peak performance states, more investigation was clearly needed to understand the development and maintenance of expertise in sport. Only a few researches have considered the psychological factors associated with the overall career development of outstanding athletes and their maintenance of performance in sport. However, Durand-Bush and Salmela (2002) have provided insight into this area by investigating athletes' perceptions of factors that contributed to their development and maintenance of expert athletic performance. The researchers conducted in-depth, open-ended and semistructured interviews with a sample of ten athletes who have won at least two gold medals at separate Olympic Games and/or world championships. Three of the respondents were team-sport athletes (i.e. ice hockey) and seven were individual sport athletes (i.e., speed skating, wrestling, track, freestyle skiing, synchronised swimming, bobsledding, and swimming). The results of this investigation indicated that the athletes had progressed through four different stages throughout their careers: sampling years, specialising years, investment years and maintenance years. The stage that was deemed most important in the development of performance in the selected sport of choice was the investment years. The investment years were characterised by a period that the athletes singled out for direct focus on the sport in which they eventually became world champions. The maintenance years were the stage during which the athletes won their gold medals and experienced the pinnacle of their sport. The psychological factors that were considered to have played an important role during the investment years were self-confidence, motivation and competitiveness. The athletes also engaged in elaborate cognitive processes such as imagery, relaxation and self-talk to facilitate optimal states of performance. In the maintenance years, personal characteristics mentioned by the elite-level athletes were high levels of self-confidence and motivation. The psychological factors most often associated with this stage were visualisation, self-talk, and short-term and long-term goal setting. Nearly all athletes reported

that self-talk and visualisation were the most effective strategies for dealing with unwarranted pressures and demands associated with elite-level competition.

Further input on the importance of mental skills in the development of excellence comes from MacNamara *et al.* (2010, p. 52) who are of the opinion that "given the complexity of the talent development process, it seems likely that a range of psychological factors underpin an athlete's ability to translate potential into top-class performance". MacNamara *et al.* (2010) conducted semistructured interviews with seven world-class athletes who had competed at the top of their sport for between four and thirteen years in attempt to identify the psychological characteristics with potential for developing excellence. They revealed that psychological skills such as competitiveness, commitment, vision of steps necessary to succeed, imagery, working on weaknesses, coping under pressure, game awareness and self-belief contributed to the performers' development into successful world-class performers in sport.

It is evident from the consistency of the literature retrieved over the past three decades that some optimal combination of mental states is linked with superior levels of performance. Across the array of studies, it seems that, in competitive sport in general regardless of how it is measured, elite and successful athletes pertinently felt that the following psychological attributes contributed largely to their sports successes:

- total commitment
- high self-confidence and an optimistic attitude
- clearly-defined goals and a strong performance focus
- good attention-focusing and refocusing skills
- control of arousal and anxiety
- imagery practice
- good developed concentration strategies and skills
- mental readiness
- constructive evaluation of performance

Successful and world-class athletes have demonstrated relatively higher levels of mental-skills scores and mental-skills usage prior to best competition performances. Psychological factors were also perceived to be important in the development and maintenance of expert athletic performance and serve as a good predictor of level of participation and longevity of career success. The mental states reported to be associated with poor performances include acting in a way that is contrary to normal performance routines, lack of concentration and having self-doubts that evoke negative thoughts based on past experiences or about the possible outcomes of the task.

Orlick's model of human excellence served as a good holistic theory on the mental skills required to excel in a variety of sports. This theory has provided a coherent starting point for engaging in further examination of the mental skills of elite performers.

As reflected by Barbour (1994) and Talbot-Honeck and Orlick (1998), the comprehensive nature of Orlick's theory on human excellence was justified by highlighting the seven elements of Orlick's model in other research findings on mental attributes associated with expert performances. Table 2, p. 71, is an extended illustration of Barbour's (1994) integration of the seven elements of human excellence regarding related research findings on elite athletes' mental skills.

TABLE 2: AN INTERGRATION OF ORLICK'S (1992) SEVEN ELEMENTS OF HUMAN EXCELLENCE AND MENTAL SKILLS ASSOCIATED WITH ELITE ATHLETES

ORLICK (1992)							
	COMMITMENT	**BELIEF**	**FULL FOCUS**	**POSITIVE IMAGES**	**MENTAL READINESS**	**DISTRACTION CONTROL**	**CONSTRUCTIVE EVALUATION**
Mahoney *et al.* (1987)	Motivation	Self-confidence	Concentration		Mental preparation	Anxiety management	
Orlick & Partington (1988)	Total commitment		Competition focus plan	Imagery training	Pre-competition mental preparation plan	Distraction control plan	Post-competition evaluation
Cohn (1991)		Self-confidence	Narrow focus of attention			Feeling of being in control; immersed in present	
Gould *et al.* (1992)	Commitment	Confident, Positive expectations	Tactical strategy focus		Mental preparation plans		
Smith & Christensen (1995)	Achievement motivation	Self-confidence	High levels of concentration				Can cope with adversity.
Talbot-Honeck & Orlick (1998)	Commitment	Strong sense of self	Refined performance focus	Perspective on excellence; positive thinking		Feelings of control	
Gould *et al.* (1999)	Highly committed		Highly focused		Mental preparation		
Durand-Bush & Salmela (2002)	Motivation	Self-confidence	Can remain focused.	Imagery & visualization		Uses self-talk to cope.	Self-reflection & evaluation
Devonport (2006)	High motivation	Self-efficacy	Heightened concentration	Imagery		Coping skills	
Andrew *et al.* (2007)		Self-confidence				Activation control; coping resources	
MacNamara *et al.* (2010)	Commitment	Self-belief	Game awareness	Imagery & vision of steps to success	Competitiveness	Coping under pressure	Improving weaknesses

3.4 PSYCHOLOGICAL ATTRIBUTES OF CRICKET PLAYERS

Reviews of the literature on the mental aspects associated with successful cricket performance are fairly limited. There are, however, a number of studies that provide valuable guidance and insight for the purpose of this investigation. The following literature review applied a variety of conventional approaches most relevant to gaining an understanding of the mental skills of elite cricket players, such as a personal philosophy by a world-renowned mental skills specialist on cricket, quantitative data on the psychological attributes of elite cricketers, experts' confessions on working with professional male and female cricket players, effects of mental skills intervention programmes, interviews and self-report techniques with elite cricketers, and cricket biographies. Investigations into the psychological dimensions of cricketers tend to be clinical in nature because cricket is a sport that is prone to shifts in psychological momentum (Bull, 1995).

Also worth noticing was that psychological factors surface as crucial determinants of success in all formats of the game (Woolmer *et al.,* 2008; Thelwell & Maynard, 2003; Gordon, 1990). This could be a major reason why so many uniquely talented cricket players struggle with inconsistent game performances.

One of the most prominent and respected mental coaches in world cricket, Dr. Sandy Gordon, contends that his three years spent with the male Western Australian State Cricket Team taught him that "more skilled and experienced players tend to report using more approximations of a variety of mental skills, are more aware of both mental and physical reactions to negative and positive circumstances during competition, and are internals" (Gordon, 1990, p. 391). He goes on to say that elite cricketers are also more accurately aware of the mental skills associated with successful performances. Findings based on the normative data gathered by Gordon, serving as a member of the specialist coaching panel over the cricket seasons of 1987 to 1990, revealed that part-time professional cricketers listed the following skills in priority order as the most important mental requirements in cricket:

- self-regulation skills
- concentration/attention

- arousal control
- visualisation
- confidence and consistency
- pre-game, during-game and post-game activities

The main reasons for acknowledging these skills were that most cricketers' struggle to maintain appropriate levels of concentration during stressful game situations. Batsmen, more than fielders or bowlers, reported a lapse in concentration that seemed to affect their performances. Another major problem that hampered the players' performance was the inability to handle pressure or control arousal levels. Worry and rumination about future consequences also prevailed as a recurring problem among the players (Gordon, 1990).

Slogrove, Potgieter and Foxcroft (2002) studied the cognitions, feelings and behaviours of three potentially elite top-order cricket batsmen in an attempt to compile a questionnaire that evaluates and assesses the mental processes associated with cricket batting. Based on a summary of nine in-depth thought-sampling interviews with three case study participants, Slogrove *et al.* (2002) were able to construct a Mental Processes during Batting in Cricket questionnaire that contained forty confirmed statements reflecting cognitions, affect and behaviours relating to batting in cricket. The questionnaire was completed by 110 cricketers from 10 top South African university cricket teams that included four national players, 19 provincial A-players, 22 provincial B-players, and 16 provincial U/24 players. The five most strongly reported experiences while batting in limited-overs matches by the university cricketers were: the playing of each delivery on its merit, feeling a sudden rush of nervousness when prompted to bat, expecting to be perfect in their batting, using a specific pre-delivery routine/self-talk before facing their first delivery in an innings, and an over-analysis of their batting when in bad form (Slogrove *et al.,* 2002). Even though the statement of 'feeling a sudden rush of nervousness before having to bat' does not reveal whether nervousness (anxiety) was positively or negatively interpreted by the cricketers, the results could still be assumed to lend support to other research suggesting that, actually, pre-game anxiety is experienced in a more facilitative manner by elite cricketers (Jones, Hanton & Swain, 1994). Using a pre-game routine or directed self-talk confirms the reflections made in a cricket-specific consultancy programme (Bull, 1995). It is also consistent with the view of

Weissensteiner, Abernethy & Farrow (2009) that this is an important skill used in mentally directing attention/concentration and building self-confidence prior and during important competitions.

Thelwell and Maynard (2002) investigated the concept of repeatable good performance (RGP) in professional cricket players. The main purpose of this investigation was to examine whether there was consensus among players about the most important antecedents of good consistent cricket performances. The study included a triangulation of methods performed on different participants within the same population of professional cricketers. More specifically, the first method used inductive content analysis to identify the cricketers' perceptions of what constitutes repeatable good performance and to recall the antecedents required for repeatable good cricket performances. The authors' interpretation of RGP ('repeatable good performance') was noted as a series of good performances that are slightly different to the concepts of relatively rare heightened performance states such as the individualised optimal performance state (Hanin, 2000), peak performance (Privette, 1981) or state of flow (Csikszentmihalyi, 1997a). They felt that it appears to be unrealistic to achieve an optimal performance state, peak experience or flow state in every single competition and, therefore, thought it would be more appropriate to incorporate a term that describes consistent good performances. The second method in Thelwell and Maynard's (2002) study utilised the repertory grid technique to confirm the antecedents cited from the first method, but also to identify professional cricketers' perceptions of the differing components of excellent and average performance states. Method three by the same authors used a cultural consensus analysis that required participants to rank the antecedents of RGP in order of importance. The results yielded from all three study methods confirmed the appropriateness of using the phenomenon called 'repeatable good performance' in the field of sports psychology, specifically in cricket. The need for total self-confidence was ranked the highest prerequisite for repeatable good performance by the batsmen and second highest by bowlers, behind being highly motivated. Furthermore, the core elements of repeatable good cricket performance that were highly ranked by both batsmen and bowlers from all three studies were:

- the need for total self-confidence

- optimal arousal levels
- motivation and focus by means of self-talk
- total mental preparation that included pre-match routines, goal setting, and imagery

The consistent findings on three occasions using varying methodologies that also resemble the important mental skills in professional cricket listed by Gordon (1990), recommend that sports psychology consultants and coaches consider these results in establishing more appropriate mental skills intervention programmes for cricket players.

In an attempt to understand the necessary factors and skills that both facilitate and constrain the development of expertise in cricket batting, Weissensteiner *et al.* (2009) conducted semistructured interviews with 14 expert cricket batsmen, coaches and administrators to probe their perceptions of batting in cricket. The findings supported the notion that batting expertise in cricket is inherently multi-factorial. Therefore, a grounded theory was generated from the data that encapsulated a complex array of interacting skills components and critical factors such as socio-developmental factors, psychological skills, visual perceptual (anticipatory) and technical (motor) skills. Those factors that that emerged as contributory psychological factors, included the skills of self-regulation and preparatory routines to achieve optimal concentration and attentional control. A strong self-belief and confidence were also considered important, along with mental toughness, resilience and an intense work ethic.

Thelwell and Maynard (2003) examined the efficacy of a mental skills intervention package in an attempt to improve both consistency (RGP) and level of performance in sixteen semi-professional male cricketers who represented an English Cricket Board (ECB) league across two seasons. An additional aim of the study was to determine more sensitive indicators of performance. The participants were assigned to experimental and control groups that were monitored subjectively (criteria developed by qualified English Cricket Board coaches) and objectively (match statistics) across the two seasons. Prior to the second season, each participant in the experimental group followed a twelve-week mental skills intervention programme conducted by accredited sports psychologists on a once-a-week basis that lasted approximately one hour. The mental skills package consisted of goal setting, activation

regulation, self-talk, mental imagery and concentration. The experimenter occupied the members of the control group with tasks not considered relevant to the dependent variable in the same frequency as the experimental group. Activities for the control group included team building or fielding activities in an effort to avoid any kind of experimental bias. The group data revealed that the cricket-specific mental skills intervention package consisting of goal setting, self-talk, imagery, concentration, and activation regulation strategies was beneficial in enhancing both the subjective performance consistency and actual performance of cricketers. However, no improvement in RGP from the objective data could be reported. Although the present investigation demonstrates the positive correlation between mental skills training and subjective enhanced performance measures, it still does not determine the nature of the relationship between psychological skills intervention and cricket performance accomplishment. However, the present study does offer cricket coaches insight into not only adopting objective measures when evaluating cricket performance but also including some forms of subjective measures in the operationalisation of cricket players' performance.

An important and valuable source of information about the mental attributes of professional cricket players emerges from sports psychology consultants who have been actively involved with national cricket teams. These consultants can provide valuable insight into the important mental skills required for professional cricket players. One such example is Bull's (1995) report on a five-year sports psychology consultancy programme with the England Women's Cricket team between 1988 and 1993.

Bull (1995) believed that his sports psychology services, along with the implementation of a fundamental mental skills training programme consisting of relaxation training, imagery, attention control, goal setting and positive thinking, were instrumental in achieving the team's ultimate goal of winning the World Cup. In testimony to this, a player from Bull's (1995, p. 13) investigation commented, "I am convinced that we would not have won the World Cup without the sport psychology support". Prior to Bull's (1995) services, the Woman's Cricket Association had received neither application of sports psychology nor any sports-related scientific support from neighbouring universities. This could possibly be the

reason for their not contesting as World Cup winners for 20 years prior to their success in 1993. Bull's (1995) five-year service was delivered and divided into four distinct phases:

- Phase 1: introduction and education (2 years)
- Phase 2: competition preparation and thinking (2 years)
- Phase 3: preliminary World Cup preparation (1 year)
- Phase 4: final World Cup preparation (2 months).

More specifically, the preliminary and final World Cup preparation consisted of developing and maintaining self-confidence and a positive mind-set by focusing on previous excellent performances with the aid of imagery and self-talk. Two months prior to the world tournament all players received a World Cup handbook that covered various aspects of the tournament. A few of these aspects covered areas such as attitude, mental preparation for competition and team spirit. The attitude section emphasised the importance of daily goal setting, a pre-competition routine and a plan for possible distractions. The mental preparation section advised the players about how to incorporate effective sports-related thought processes prior to, during and after matches. This involved the implementation of positive self-affirmations, verbal, visual and physical triggers to direct concentration, constructive performance evaluation and goal setting for future matches. Even though a causal relationship or link between a World Cup victory and the mental skills intervention programme cannot be established, there is however room for the contention that, along with the other factors such as technical coaching, effective management, fitness testing and the natural ability of cricketers, a sports psychology consultancy programme can contribute to the success of the team.

Totterdell (1999) reports that mood is another factor that can affect cricket performance. In Totterdell's (1999) investigation, the mood and performances of thirty-three male professional county cricketers from three English County Championship teams and one Second XI Championship team were studied for the duration of one championship match. Each player was given a pocket computer to complete a series of bipolar and unipolar rating scales before the commencement of play, during the lunch interval and after the match. A pooled time-series analysis method was used to test the association between players' moods and their subjective performances. The results revealed that players' performances

were related to their happiness, energy, enthusiasm, focus and confidence during the match. However, even though the majority of players performed better when they were less tense, there were a few who performed better when they were more tense. The fact that professional cricketers' performances were influenced by their moods could also lead to the assumption that the players' moods could be influenced by their performances. Therefore, it is likely that a bidirectional relationship between mood and performance exists (Totterdell, 1999). This study recommends that cricket coaches and players could benefit from incorporating the development of mood-control skills into regular training schedules.

Totterdell and Leach (2001) attempted to promote the understanding of mood regulation and performance by setting out to investigate whether professional cricketers' performances were related to their expectation of improving an unpleasant mood. Two studies were performed, one of which used a sample (N = 46) of professional cricketers to assess the relationship between their negative mood-regulation scores (NMR) and performance over the course of a cricket season. Study two examined the NMR and performance relationship in greater detail by focusing on the association between NMR and less unpleasant mood with better batting performance by 19 participants from study one during one cricket match. The results from study one indicated that the cricketers' NMR scores significantly correlated with their batting averages for the season. Other constructs such as age, general wellbeing and the ability to reflect on and adapt their objectives (reflexivity) showed no significant correlation with performance. Study two revealed that players with higher NMR scores rated themselves as happy while batting, showed smaller negative changes in their happy mood, and performed better in their batting during the match. These findings suggest that players who have greater belief that they can positively regulate unpleasant moods with the use of NMR strategies may have a competitive advantage.

Also reporting on the contributing role happiness plays in cricket performance were Stanimirovic and Lloyd (2010) who conducted a three-year (2007-2009) consecutive investigation into how psychological factors contribute to team performance in a sample (N = 290) of male cricketers competing in the Cricket Australia under 19 National Championships. The participants completed the Raven's Standard Progressive Matrices

(RSPM) and the Emotional Quotient Inventory (EQ-i) to assist the researchers to examine whether general mental ability (GMA) and trait emotional intelligence (EI) contributed to overall team performances. Regression analyses indicated that happiness significantly contributed to the total number of points scored by a team. However, no significant relationship existed between teams' GMA scores and number of points scored in the tournaments. Findings based on the above research show that pleasant mood associations and happiness facilitate cricket performance. Based on the findings of the present investigation, we assume that those cricketers who are self-motivating because they feel satisfied with their lives, have a better chance of performing than those cricketers who are less satisfied (happy) with their lives.

The intuitive conclusion drawn from the above research findings is that the nature of cricket performance does not rest solely upon the obvious tactical and physical abilities of cricketers. Even the most physically trained and highly skilled cricketers find it difficult to achieve reoccurring high-performance results. The more revealing the results of the contributing role mental factors play in achieving high-level cricket performance, the better the objective incorporation of intervention programmes in player development and performance attainment. Another factor that is positively associated with the sports performance of cricket teams is emotional intelligence. Crombie, Lombard and Noakes (2009) investigated the relationship between a team's emotional intelligence (Team EI) and sports performance in six cricket teams participating in the South African Domestic Super Sport Series Four-Day cricket competition. The performances and team EI of the six professional cricket franchises (formerly provincial teams) were measured across two consecutive seasons. The Mayer-Salovey-Caruso Emotional Intelligence Test V2.0 (MSCEIT) was administered to the participants at their pre-competition training camps for each respective year to derive teams' Total EI scores as well as both individual players' Total EI scores and individual players' EI Branch scores. The results of this investigation yielded a significant relationship between the emotional intelligence scores of the teams and their performance measured in terms of log standings. The investigators suggest that the reasons for this EI and performance relationship could be threefold. Firstly, it is assumed that teams with higher emotional intelligence scores perform better because they are likely to possess greater mental capacity/skills to maintain emotional control in pressure situations that in the

end facilitated cricket performance. Secondly, players with higher EI scores tend to comprehend the deleterious effects of negative emotions on their performance states and can, therefore, accordingly apply emotional regulation techniques to prevent unwanted emotions. Thirdly, teams higher in EI can potentially better manage the negative emotional impact cricketing controversy has on their match performances (Crombie *et al.,* 2009). The present investigation suggests that the inclusion of emotional intelligence education in the coaching and training of sports participants could be beneficial in the quest to improve sports performance.

The most striking finding from the array of studies of and testimonies from elite cricketers, sports psychology consultants and sports researchers on the psychological attributes associated with successful cricket performance was the extent to which they all had similar perspectives on mental skills. The skills reported as most essential for elite cricket participation and repeatable good performances were self-regulation skills, ability to direct concentration and attention accurately, management of arousal, visualisation skills, self-confidence and pre-game, during-game and postgame activities (Gordon, 1990; Bull, 1995; Thelwell & Maynard, 2003). Positive mood states such as happiness were also associated with enhanced cricket performances (Totterdell, 1999; Totterdell & Leach, 2001; Stanimirovic & Lloyd, 2010) as well as emotional intelligence scores (Crombie *et al.,* 2009). Not only were these skills associated with elite cricketers; they also played a pivotal interacting role in nurturing expertise in cricket batting (Weissensteiner *et al.,* 2009). To support the relevance of structuring a psychological component in players' training regimes, a cricket-specific mental skills training programme containing goal setting, activation regulation, self-talk, mental imagery and concentration has indicated a facilitating effect on both the consistency and level of cricket performance (Thelwell & Maynard, 2003). Sports psychology consultants also documented that less experienced cricketers tend to focus more on enhancing the physical and technical components of their cricket participation, which is considered a recipe for number of training sessions as opposed to the more skilled cricketers who focused more on training that entailed shorter and smarter training sessions consisting of mental training (Gordon, 1990).

3.4.1 Mental toughness and cricket performance

An important mental skill that has evolved as a new area of research is mental toughness (Weinberg & Gould, 2011). Qualitative investigations of elite sports performers have proposed numerous characterisations of mental toughness such as the ability to cope with stress and adversity (Goldberg, 1998); the ability to overcome failures (Woods, Hocton, & Desmond, 1995); having a steadfast self-belief in one's ability to achieve; having an insatiable desire and internalised motive to succeed; the ability to perform under pressure; the ability to remain fully focused on the task at hand (Jones, Hanton, & Connaughton, 2002); and mental resilience (Bull, Shambrook, James, & Brooks, 2005). However, recent scientific research defines mental toughness as "the quality which determines in large part how people deal effectively with challenge, stressors, and pressure, irrespective of prevailing circumstances" (Clough, & Strycharczyk, 2012, p. 1). Mental toughness, taken as whole is depicted as a product of four pillars:

- **Challenge:** perceiving treats as an opportunity to grow and develop oneself
- **Confidence:** having a strong sense of self-belief
- **Control:** the capacity to think and feel that one has control over one's destiny;
- **Commitment:** the tendency to stick to tasks and take an active role (Clough, & Strycharczyk, 2012)

It appears that almost every sought-after positive psychological characteristic associated with sporting success is labelled as mental toughness. Weinberg & Gould (2011) agree with the latter by arguing that the importance of psychological-skills training with the intent to develop and improve mental skills is accentuated in the highly valued attribute of mental toughness. Mental skills in essence refer to an athlete's cognitive abilities and efforts that are used to increase inner satisfaction and enhance physical performance (Weinberg, & Gould, 2011). It can, therefore, be reasoned that mental toughness is an acquired psychological quality that results from the presence of well-developed mental skills.

Mental toughness in cricket players is a critical element of contemporary top-level cricket participation (Bull *et al.,* 2005). In an attempt to provide a framework for understanding mental toughness within cricket, Bull *et al.* (2005) interviewed 12 England national cricket

players who were deemed to be the mentally toughest performers in the years between 1980 and 1990. Analysis of the focused interview transcripts identified 733 separate quotes that were further categorised into general themes to provide a mental toughness framework that has been used to disseminate the responses of these mentally tough cricketers. The general dimensions and global themes noted as important antecedents in the complex development, characteristics, and attributes of mental toughness within English cricket were:

- developmental factors (such as parental influence and childhood background)
- personal responsibility (entailing themes of self-reflection, independence, and high levels of competitiveness)
- dedication and commitment (surviving early setbacks, the need to achieve success, never-say-die mind-set, and go-the-extra-mile mind-set)
- belief (resilient confidence, overcoming self-doubts, feeding off physical condition, maintaining self-focus)
- coping with pressure (thriving on competition, willingness to take risks, good decision making, the keeping of perspectives and honest self-appraisal)

Contributing to the above findings, Gucciardi and Gordon (2009) identified five overarching categories that were regarded by current and former cricketers (N = 16) as key components of a mentally tough cricketer:

- **Affective intelligence**: the ability to regulate one's emotions and moods in any circumstances
- **Desire to achieve:** insatiable desire and commitment to improve one's performance levels and achieve success consistently
- **Resilience:** the ability to bounce back from adverse and pressure situations
- **Attention control:** the ability to manage one's attention and focus over extended periods of play
- **Self-belief:** an unshakeable self-belief in one's physical ability to perform

It is interesting that the general dimensions and global themes of mental toughness in cricket identified by Bull *et al.* (2005) and Gucciardi and Gordon (2009) can readily be compared to the previously-mentioned definition and pillars of mental toughness proposed

by Clough and Strycharczyk (2012). Self-belief, the desire to achieve success, maintenance of focus and coping with pressure seem to be key antecedents in the above studies. This suggests that, regardless of the slight differences in mental toughness in cricket and other specific sports, a general framework can be developed – irrespective of the sport. The above-mentioned frameworks in cricket could provide a strong reference point for providing insight into and understanding of the development of mental toughness in cricket. The role of the sports psychologist or mental coach in cricket is emphasised here because the need to teach and develop the mental skills linked with mental toughness is considered a key ingredient of performance in cricket.

The objective of this investigation is to assess and evaluate the mental attributes of successful cricketers with the aim of providing the means of implementing psychological-skills intervention in the daily training environment of cricketers so that they can excel at top-level competition.

3.4.2 Key mental skills noted as important antecedents of cricket performance

The literature reviewed in this chapter gathered from quantitative data methods, cricket biographies, personal philosophies and confidences of mental skills specialists and experts in the game of cricket, has revealed that cricket performance and the nurturing of talent and expertise in the sport is to a large extent dependable on the effective application of mental skills (Bull, 1995; Gordon, 1990; Stanimirovic & Lloyd, 2010; Thelwell & Maynard, 2002; Weissensteiner *et al.,* 2009). The most striking themes and global dimensions from the array of studies on the psychological attributes associated with cricket performance disclosed that self-confidence, imagery and visualisation goals, coping skills, and concentration are the mental skills most frequently used in high-level cricket participation and performance. To advance understanding of the purpose of this investigation, it is necessary to elaborate on these essential mental skills to consolidate what role they play in sport in general.

3.4.2.1 Self-confidence in sport: A conceptual and theoretical framework

Vealey (1986, p. 222) defines sport-specific self-confidence as “the belief or degree of certainty individuals possess about their ability to be successful in sport”. Vealey (1986) was

the first to develop a conceptual model of sport-specific self-confidence (sport confidence) that contained measures for SC-trait (Trait sport confidence), SC-state (State sport confidence) and competitive orientation (tendency to strive toward achieving a specified goal) among sports participants. Initially this model served as a relevant framework and inventory to operationalise confidence in competitive sport. Vealy (2001) adapted her views on sport confidence, describing it as a social cognitive construct that can be either more trait dominant or more state dominant, depending on the participant's appraisal of the situation. The latest integrative model of sport confidence predicts that the development and manifestation of confidence in athletes is affected by the specific organisational culture (e.g. standard of competition, motivational climate, and the expected goals and structures of the sport) as well as demographic (gender, race) and personality characteristics (e.g. goal orientation, optimism). This implies that a participant's level of confidence today can be different to last week, yesterday or tomorrow, it all depends on the participant's temporal frame of reference and interpretation of the forces associated with the particular competition.

It is widely asserted that self-confidence is one of the most critical psychological characteristics associated with successes in sport (Hays, Thomas, Maynard, & Bawden, 2009; Woodman & Hardy, 2003). Fascination with self-confidence is fuelled by the dramatic facilitative influence it has on athletes' affect, behaviour and cognitions in sport. Weinberg and Gould (2011) give a more detailed description of the associated benefits of self-confidence in sport:

- **Confidence arouses positive emotions:** high confidence allows one to view competition anxiety more positively, which enables one to act calmly and collectedly in when under pressure or allows one to be assertive when the situation requires.
- **Confidence facilitates concentration:** when one is high in confidence, one is less concerned about negative social evaluation and less worried about the actual performance states. In essence, athletes high in confidence apply more efficient coping strategies and more productive attentional focus to task relevant cues.

- **Confidence affects goals:** instead of setting vague and easily attainable goals, confident athletes are more likely to set challenging goals which they strive to attain in an attempt to actualise their true potential.
- **Confidence enhances effort:** confidence strongly correlates with the amount of effort and perseverance athletes display in pursuit of their goals.
- **Affects game strategies:** the confident athlete is more focused on achieving success in competition and trying to make bold and decisive movements, whereas the less confident athlete is more focused on not failing and trying to avoid making mistakes.
- **Affects psychological momentum:** confident athletes tend to get even more motivated in adverse conditions by displaying an increase in determination and a never-give-up attitude.
- **Enhances performance:** even though a strong correlation exists between confidence and sport performance, it is still necessary to consider the factors affecting this relationship, such as the organisational culture, personality characteristics, demographic characteristics, affect and cognitions of the participant.

A more situation-specific form of self-confidence is called self-efficacy. Like Weinberg and Gould (2011), the researcher of this investigation will use these terms interchangeably to explain the athletes' belief in their abilities to perform in sport-related environments.

Self-efficacy is defined as "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (Bandura, 1994, p. 71). In other words, self-efficacy is the extent to which a person believes or trusts his or her own ability to perform a particular task successfully. Bandura (1994) refers to these beliefs as key determinants of how people behave, think and feel. Self-efficacy enhances personal accomplishment and wellbeing in ways similar to the previously noted benefits of self-confidence. Even though self-efficacy begins to form from a variety of childhood experiences, it continues to evolve throughout a person's life as he or she is confronted with new experiences and understanding. However, Bandura (1997) contends

that people's beliefs about their personal efficacy can be developed by four main sources of influence:

- **Mastery experiences**: challenging tasks that require effort and perseverance strengthen our sense of self-efficacy.
- **Social modelling**: witnessing other people similar to oneself succeed in a task raises the observers' belief that they are also capable of mastering comparable tasks.
- **Social persuasion**: verbal encouragement and persuasion from significant others can decrease self-doubt and mobilise greater effort at achieving one's goal.
- **Minimising stress and depression; improving physiological and emotional states**: the negative interpretation of physiological and emotional cues in stressful situations might lower individual athletes' self-efficacy and cause them to doubt their competence. On the contrary, if athletes view an increased heartbeat as a sign of readiness for competition it might lead to enhanced levels of self-efficacy.

3.4.2.1.1 Self-confidence and sports performance

Research into sports psychology has consistently discovered that high levels of self-confidence are positively correlated with successful athletic performances (Hays *et al.,* 2009; Woodman & Hardy, 2003). Research into the role of self-confidence is still evolving as this remains a complex concept that is dependent on a variety of factors including social-cultural, gender and sports status.

Hays *et al.* (2009) demonstrated a positive correlation between high sports confidence and successful sporting performance in fourteen world-class athletes. An analysis of the participants' responses to open-ended semistructured interviews revealed that high sports confidence was strongly associated with effective cognitions (e.g. focus on task, self, outcome), positive affect (e.g. enjoyment, being relaxed/calm) and effective behaviours (e.g. confident body language, committed to decision/movements, and increased efforts). In contrast, low sports confidence was strongly associated with faulty cognitions (e.g. focus on 'wrong things', doubt and uncertainty), negative affect (e.g. being nervous, unhappy,

frustrated and angry), and ineffective behaviours (e.g. lack of effort, noncommittal to decisions and being unsociable). A quote derived from one of the interview responses reflecting on an occasion where confidence was low, reads as follows: "I was a lot more negative than I would normally be, I was a lot more distracted by other athletes and what they were doing" (Hays *et al.,* 2009, p. 1189).

In support to the above findings, Woodman and Hardy (2003) noted that the factors responsible for debilitating athletes' confidence appeared to be directly related to the sources from which they derive their confidence, namely poor performances, poor preparation, poor coaching, illness or injury and a lack of mental and physical preparation. However, gender also had an influence on athletes' levels of confidence, for example, in comparison to male athletes, female athletes seemed to be more susceptible to external confidence-reducing factors such as the lack of coach's support or presence at competitions. Females were also less confident later in their careers, compared to when they started their respective sports. The role of gender in the self-confidence-performance relationship was also noted in a meta-analysis that revealed that self-confidence was significantly higher for male athletes than for female athletes (Woodman & Hardy, 2003). Furthermore, it was revealed that self-confidence was significantly related to competitive sports performance for higher-standard athletes than for lower-standard athletes.

In a study utilising measures of State self-confidence, State sport-confidence and Trait sport-confidence for varsity athletes between team sport and individual sport, it was found that team-sport participants showed significantly higher levels in all three variables of self-confidence compared to individual-sport participants (Zeng, 2003). These lowered levels of self-confidence in individual sport could probably be due to a greater opportunity for individual efforts to be negatively identified with failure.

Based on the above literature, it is evident that self-confidence is a key component in achieving sport success. Self-confidence can be divided into dimensions where it is more trait-like or state-like in nature. Irrespective of where it originates from, both dimensions promote a facilitating effect on athletes' mood, concentration, effort and persistence in achieving success. Sport confidence like self-efficacy is also dependent on the extent to which performance is generated from individual efforts or a combined team effort.

Investigative studies claim that gender has a significant effect on levels of sport-confidence and that higher-standard athletes attach more value to the effect self-confidence has on their sporting successes.

3.4.2.2 Imagery in sport: A conceptual and theoretical framework

A psychological skill that is often misunderstood or misapplied in sports training and competition is mental imagery. However, much evidence implies that, if understood correctly, the power of imagery could serve athletes' in mysterious perhaps magical ways (Driskell, Copper & Moran, 1994; Weinberg & Gould, 2011). The reason for this is probably because it allows the participant to establish the correct blueprint for success. Miller (2000) explains that effective visualisation (imagery) causes the brain to send electrical messages to the involved muscles in the same sequence as it does in the actual physical performance of that action. Therefore, the neuromuscular pathways to the relevant muscles involved in a physical action could be strengthened by the application of effective imagery strategies.

Visualisation or imagery is considered to be one of the most essential mental skills required to master the mind game in sport (Murphy, 2005). Imagery is defined as "an experience similar to a sensory experience (seeing, feeling, hearing), but arising in the absence of the usual external stimuli" (Martens, 1987, p. 78). Potgieter (2003) defines imagery as the mental rehearsal of real-life situations in an attempt to create or recreate a desired experience in the mind. These definitions clarify the point that imagery is a process that entails the cognitive activation of bodily senses in an attempt to simulate referents that relate to a specific external environment. In other words, it is the viewing of a performance action or skill execution in the mind's eye. Weinberg and Gould (2011) contend that the major purpose for athletes to engage in imagery training is to picture previous successful experiences or new events to prepare themselves mentally for competition. They also claim that it serves the purpose of mediating a participant's behaviour both cognitively and motivationally towards either general or specific behavioural roles. Murphy (2005) adds that imagery could also be used by the participant to gain confidence and direct attention focus in order to learn new skills, thus enhancing injury rehabilitation, and to gain emotional control and find personal meaning in the world.

When athletes engage in imagery it can be done from either an internal or an external perspective. 'Internal imagery' refers to the imaginary process in which individual athletes look on from their own vantage point, feeling themselves performing the skill. For instance, a bowler in cricket will feel the weight of the cricket ball between his fingers, and also spot the batsman and the area where he intends the ball to go to as he executes his run-up in his mind. External imagery takes place when the athlete sees himself or herself performing a skill from an outside perspective, similar to an outside observer sitting in the stands – almost as if one is watching a recording of oneself performing a specific action. There has been much debate regarding the effectiveness of these imagery perspectives, but the literature has indicated that internal imagery is more effective because, compared to external imagery, it evokes more subliminal neuromuscular activity in the muscles involved in the imagined activity (Hale *et al.,* 1998; Hale, 1994; Harris & Robinson, 1986).

Weinberg and Gould (2011) suggest that nearly anyone can learn to use imagery but that the effectiveness of the participant's imagery is determined by a few factors. The following factors were noted as determining the extent of the performance-enhancing effect of imagery:

- **Nature of the task:** it is believed that imagery has more performance-enhancing effects on tasks that involve higher functional cognitive processes such as tasks involving perception and decision-making activities.
- **Skills level of the performer**: even tough imagery is beneficial for the performances of both novices and experienced athletes, experienced athletes are said to contribute greater performance-enhancing effects from imagery training than novices do.
- **Imaging ability:** imaging ability is the quality of an individual's imagery experience (Gregg, Hall & Nederhof, 2005). The quality of imagery is predominantly dependant on the participant's ability to control images and to see these images in clear and vivid form.
- **Coupling imagery with physical practice:** imagery could be an effective substitute for physical practice if the participant is injured or over-trained, but the combination of imagery and physical practice is better than doing either of these alone.

3.4.2.2.1. Imagery and sports performance

Over the years, imagery use has been positively linked to sports and exercise performances. Ramsey, Cumming and Edwards (2008) investigated the conceptualisation of imagery direction and its subsequent effect on golf putting performance in novice and experienced golfers (N = 75). The findings demonstrated that persuasive debilitative imagery had a significantly adverse effect on the golfers' ability to sink putts. Facilitative imagery on the other hand greatly improved the golfers' ability to sink more golf balls than those in the suppressive imagery group. This evidence highlights the impact imagery has on putting performance as well as the importance of the directional content in applying imagery to sports performance purposes. Coaches and athletes can take note of the facilitative effect of imagery and also refrain from including any persuasive debilitative imagery in their imagery regimes, except if the purpose of their imagery is to cope with negative or adverse situations in which they plan to gain emotional control (Ramsey *et al.,* 2008).

Findings contributing to the above have also revealed that novice hockey players (N = 27) receiving both stimulus proposition and stimulus response imagery scripts, performed significantly better in hockey penalty flicks than players receiving no imagery scripts at all (Holmes, Whitemore, Collins & Devonport, 2001). More specifically, this study found that a group of hockey players receiving both stimulus response and proposition-laden imagery scripts performed better ($p < .05$) than those players receiving stimulus proposition-only scripts. This provides clear support for the bio-informational theory suggesting that the incorporation of autonomic and physiological responses into the imagery manipulations strengthens and enhances the effectiveness of the motor programme. What stood out from the reported stimulus responses from the subjects was that not one single response matched the responses from the other participants. This indicates that stimulus response imagery scripts should be individualised for each participant engaging in imagery, in order to maximise its potential performance-enhancing benefits.

Holmes and Collins (2001) developed the PETTLEP model of imagery in response to some researchers' criticising the lack of theoretical and empirically based evidence of the actual performance-enhancing effects of imagery implementation in sports practices. The PETTLEP model of imagery suggests critical practical components that should be involved in the

implementation of motor-based imagery interventions, namely: **Physical** (the athlete's replication of the actual physiological responses in the sporting situation); **Environmental** (during visualisation of the performance, the environment should be as similar as possible to the actual performance environment); **Task** (imagined task needs to match the actual task closely); **Timing** (imagined performance actions should be done at the correct pace); **Learning** (imagery content should be congruent with the phase of the participant's learning); **Emotion** (the participant must try and experience all the emotions involved in the performance situation); and **Perspective** (imagery from an internal perspective is preferable to imagery from an external perspective). The main goal of research on the PETTLEP model is to advocate and provide sound evidence that the concept of 'functional equivalence' explains the performance-enhancing effect of imagery use.

The performance-enhancing effect of the practical components (functional equivalence) of the PETTLEP model was compared to more traditional imagery methods in two separate investigative studies involving varsity hockey players (N = 48) and junior gymnasts (N = 40) aged between 7 and 14 (Smith, Wright, Allsopp & Westhead, 2007). The hockey participants were randomly assigned to one of four groups: a sport-specific imagery group (imagery involving players wearing their hockey uniforms while standing on the hockey pitch), a clothing imagery group (imagery group performed imagery at home in a standing position wearing their hockey uniforms), a traditional imagery group (imagery performed at home wearing everyday clothing), and a control group (group reading hockey literature for the same length of time as other groups spent on imagery). The sport-specific imagery intervention was based on the same concepts of the PETTLEP model, considering the emphasis on competition-relevant imagery environment (hockey pitch) and the use of hockey clothing. The investigators found that all forms of imagery were effective in enhancing hockey players' penalty flick performances. However, the sport-specific imagery group involving the physical and environmental components of the PETTLEP- based imagery model proved to be convincingly more effective than the modest improvements generated by the more traditional imagery interventions. Clearly this indicates that the incorporation of functional equivalence in imagery environment and uniform has a more facilitative effect on the hockey players' performances. The possible reason for this is that, being in the physical environment where competition takes place and being dressed in match uniforms, allows

the participant access to clearer and more vivid memories of the event, which enhances the effectiveness of the imagery process.

The investigation by Smith *et al*. (2007) of the junior gymnasts revealed that in the four randomly assigned groups (physical practice group, PETTLEP group, stimulus imagery group, and control group) the PETTLEP group proved to have the largest performance-enhancing effect and appeared to be more than double those of the stimulus group and control group. It was also noted that the PETTLEP imagery group had the same enhancing effect on performance as the physical practice group. It can therefore be assumed that, with regard to this study, the PETTLEP-imagery appears to be as effective as physical practice in enhancing gymnastic performances. The combination of imagery and physical practice was not tested in this study but the combination of PETTLEP imagery with physical practice could be expected to provide an even more positive effect in gymnastics than engaging in either one of these alone.

These above results provide sufficient support for the effectiveness of functional equivalence (PETTLEP-model) imagery in different participant populations (novice and experienced) as well as the nature of sports activities (hockey and gymnastics).

The above research findings have indicated the effectiveness of imagery for sports psychology intervention. They have also demonstrated that the inclusion of functional equivalence-enhancing methods in imagery intervention can lead to greater performance improvements than traditional imagery practices. Imagery is a skill that can be learned and effectively mastered by athletes ranging from beginners to elite-level participants to facilitate sports performances by means of enhancing self-confidence, gaining emotional control, helping with attention strategies, learning new skills as well as helping with injury rehabilitation.

3.4.2.3. Coping skills in sport: A conceptual and theoretical framework

A topic of interest in sports psychology is not so much whether an athlete is going to choke at some stage during their professional career, but rather whether the athlete will be able to cope when they do choke. Choking forms a big part of every sport and it has been observed

that it is the champions who usually set themselves apart from the other less successful participants by having more effective ways of coping with the stress and adversity associated with sports competition. Various opinions have evolved to describe the skill of coping or the processing of stress, however, a view on coping that is widely accepted in psychology and sports psychology is the transactional-process perspective (Lazarus & Folkman, 1984). The transactional-process perspective defines coping as "a process of constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands or conflicts appraised as taxing or exceeding one's resources" (Lazarus & Folkman, 1984, p. 141). This perspective underscores the point that coping is considered as a sequence of steps involving both behavioural and cognitive efforts to manage stress. According to Madden (1995), the individual differences in athletes' knowledge, experience, skills, cognitive style or mental outlook will determine the way they will cope with the many situations arising from sport. He also claims that coping strategies can be learnt and acquired the same way as other sport-specific skills.

The coping process starts with the participants' appraisal of the situation and the associated demands being placed on them. If individuals evaluate the personal significance of the situation and decide that their goals are at stake, an internal emotional response is activated, causing perceptions of threat or harm. Lazarus and Folkman (1984) refer to this as primary appraisal. Secondary appraisal, on the contrary, is the cognitive underpinning of coping that focuses on how the stressful individuals' environment can be controlled. Researchers into coping are of the opinion that there are virtually hundreds of specific coping behaviours that participants could exhibit in dealing with stressful sports situations but, to increase the functional knowledge of coping, these theorists and researchers on coping have tried to derive broader categories of coping behaviour. The two coping categories that are most commonly known are problem-focused and emotion-focused coping (Hardy, Jones, & Gould, 1996). Problem-focused coping is the resolution of the problem that directly affects the involved participant's behaviour. It includes specific behaviours such as goal setting, time management skills, information gathering, problem solving and adhering to an injury rehabilitation programme (Hardy *et al.,* 1996). Emotion-focused coping involves the reappraisal or emotional regulation of the problem that causes stress to the participant. It includes behaviours such as relaxation, meditation and cognitive

efforts to turn attention away from the problem. In addition to the above two forms of coping categorisations, other coping categories have been proposed. Madden (1995) for example also suggests avoidance or detachment coping in which the participant physically, behaviourally and mentally disengages from a potentially stressful situation. Hardy *et al.* (1996) believe that this form of avoidance coping is more effective for short-term stress than for long-term stress because, in long-term stress situations, the consequences would not dissipate by themselves nor do they allow the participant to feel like an active agent in dealing with stress. An investigation assessing the coping responses and strategies of international adolescent golfers revealed that, during the most stressful times of golf tournaments, these golfers apply problem-focused coping strategies more frequently than emotion-focused or avoidance coping strategies (Nicholls, Holt, Polman & James, 2005). This finding is consistent with that of Crocker and Isaak (1997) who, in an earlier study, reflected young swimmers' preferences for active coping strategies. An exploration by Holt and Hogg (2002) of the coping strategies of an international female soccer team participating in a six-week preparation camp for the 1999 World Cup Final revealed that, in response to stressors, players used numerous coping strategies that are considered as important for performance. The four major coping categories of the soccer players included: reappraisal (consisting of self-talk, problem solving and past successes), use of social resources (encouragement from team mates, support from family and significant others), performance behaviours (good warm-up, on-field task communication) and blocking (blocking of coaches' negative communication styles and other irrelevant stimuli). More specifically, the majority of the players' coping energies were found to be directed more at managing concerns created by the team environment (e.g. perceptions of the coaches) and subculture than at managing the psychological demands associated with the World Cup Final. This indicates that team-sport participants counter stressors by applying a range of coping responses (such as efficient pre-game team warm-up/start to the game, on-field communication and identifying coaches' perceptions) that are generally directed at dealing with performance behaviours. Holt (2003) conducted a case study in an attempt to identify coping in professional cricket which, although it is also considered a team sport, is one where there is much emphasis on the individualised role and responsibility of the players. Findings indicated that the subjects used qualitatively different coping strategies to deal with different situational appraisals. When the subjects anticipated threat, they responded with proactive coping strategies to

build self-confidence and maintain concentration. To boost their confidence, they used self-talk ("I might talk myself up a bit more."), mental rehearsal ("remembering and playing back what I've done in the past . . ."') and recalled previous successful performances. In an attempt to maintain concentration during the game, the respondents developed a concentration routine that they activated before each and every bowling delivery. In addition to the above-mentioned proactive strategies, the respondents also deployed two reactive skills when they perceived poor personal performance levels. These included resilience that helped them cope with mistakes ("If you bowl a bad ball you can get away with it really.") and extensive self-talk after bowling badly ("You know that's not good enough; you've got to start doing this."). The respondents moreover possessed a set of general coping behaviours that they used in all competitive situations. These involved the learning of their opponents' strengths and weaknesses, evaluating new opponents and understanding environmental conditions.

Given that coping is a process that needs to be evaluated for psychological intervention purposes with the aim of enhancing optimal performance, various measures have been developed. The first major attempt to assess an individual's coping was the development of the Ways of Coping Checklist (WCC) by Folkman and Lazarus (1980). The WCC is a situation-specific measure that assesses an individual's efforts to cope with a particular stressful event. The WCC's shortcoming in considering the role an individual's personality traits play in the coping situation led Carver, Weintraub, and Scheier (1989) to develop an instrument called the COPE, that measures coping dispositions that are assumed to stay stable across time and situations.

A more contemporary multidimensional measure of sport-specific coping is the Athletic Coping Skills Inventory-28 (ACSI-28) (Smith *et al.,* 1995). The ACSI-28 yields a total personal coping resource score as well as seven sport-specific subscales. Smith and Christensen (1995) defined these subscales as follows, as they apply to the sport of baseball:

- **Peaking under pressure:** player is challenged rather than threatened by pressure situations and performs well under pressure; a clutch performer.

- **Freedom from worry:** player does not put pressure on self by worrying about performing poorly or making mistakes; does not worry about what others will think if he or she performs poorly.

- **Coping with adversity:** player remains positive and enthusiastic when things are going badly. The athlete has the ability to remain calm and controlled and is able to bounce back from mistakes and setbacks quickly.

- **Concentration:** player is not easily distracted; able to focus on the task at hand in both practice and game situations, even when adverse or unexpected situations occur.

- **Goal setting and mental preparation:** player sets and works toward specific performance goals; plans and mentally prepares self for games and clearly has a 'game plan' for pitching, hitting, playing hitters, base running, and so on.

- **Confidence and achievement motivation:** player is confident and positively motivated; consistently gives 100 per cent during practice and games and works hard to improve skills.

- **Coachability:** player is open to and learns from instruction; accepts constructive criticism without taking it personally or becoming upset.

Research reveals that the scale shows strong psychometric properties even though it also considers global psychological skills such as concentration, motivation and mental preparation. The ACSI-28 has been used in a number of studies. Andrew *et al.* (2007) revealed that the ability to cope in rugby featured significantly in determining the level of rugby participation. They discovered that top-ranked U/19 South African rugby union players had better personal coping resources scores ($d = 0.48$) and were more able to cope with adversity ($d = 0.44$) than the lower-ranked players. Consistent with these findings, Kruger, Potgieter, Malan, and Steyn (2010) also found that South African Super 12 rugby players had significantly higher ($p < 0.05$) personal coping resources scores than players playing at senior-club level.

3.4.2.4. Concentration and attention control in sport: A conceptual and theoretical framework

With the increasing interest in studying the cognitions of sports participants, it was soon discovered that attention is widely regarded as a crucial resource in sports performance (Devonport, 2006; Mahoney *et al.,* 1987; Talbot-Honeck & Orlick, 1998). So often athletes say "I was completely in the zone" or "If I just didn't lose my concentration towards the dying seconds of the game I would've won" or "Just focus on what we have practiced [sic] and everything would be fine" (Murphy, 2005, p. 114). Phrases like these make their way into all sports competitions and, therefore, provide a strong impetus for coaches, athletes and sports psychologists to seek an understanding of the importance of task-relevant cues in sports performance.

A classic and often cited definition by James (1890, p. 403) describes attention as "the taking possession by the mind, in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought. Focalization, concentration of consciousness is the essence. It implies withdrawal from some things in order to deal effectively with others". A more contemporary view defines attention as "cognitive resources, mental effort, or concentration devoted to a cognitive process" (Galotti, 2008, p. 616). It is evident from the above that attention involves the active focus and concentration of mental effort on tasks that are associated with the performance environment. The terms *concentration*, *attention* and *focus* will be used interchangeably in this text to refer to participants' direction of mental efforts and its effect on sports participation and performance.

Posner and Boies (1971) provided a clear path for furthering studies on attention by claiming that attention involves three facets namely **alertness**, **selectivity** and **capacity**. They explained that an initial requirement for focusing concentration on the task at hand is a state of alertness or optimal readiness to respond to relevant stimuli. This means that an optimal level of arousal is necessary for achieving a state of focus. Unduly high levels of arousal will negatively affect attention by causing it to narrow down in capacity as the performer considers a systematic reduction in the range of cues at the time of executing a skill (Weinberg & Gould, 2011). Low arousal levels on the contrary may cause the performer to

become bored, tired or disinterested, which leads to a weakened or absence of response to relevant stimuli. Selectivity of attention is required to avoid the participant's becoming bombarded with all the external and internal information present at a particular moment. The participant is, therefore, required to identify selectively important aspects (foreground) relating to performing the task at hand and to ignore the other aspects that are irrelevant (background) to the situation. The aspect of *capacity* refers to the fact that an individual's ability to process large volumes of information simultaneously is limited. Weinberg and Gould (2011) argue that because each one has a limited attention capacity it is beneficial for individuals to change their type of information processing from a control to an automatic state. This automatic processing state refers to the mental processing of a skill without conscious thought. This prompts the need to over-learn a skill in order for it to become a spontaneous reaction that does not require much thought. In other words, the more a specific skill is exercised the more automatic the skill becomes, leaving a greater capacity of attention to focus on other aspects of the game.

Another great contributor to the research done on attention is Robert M. Nideffer (1987). Nideffer (1987) contends that a person's focus of concentration is forever shifting along two independent bi-polar dimensions: width and direction. The 'width' of attention stretches along a continuum ranging from 'broad' (being aware of much of the environmental cues simultaneously) to narrow (the focusing on one or two task-relevant cues). Opposite this dimension is one's direction or target of attentional focus (namely internal or external). The internal/external dimension of attention refers to whether a person is focusing on their own thoughts and feelings (internal focus) or attending to their external environment and events (external focus). These two above-mentioned dimensions of concentration interact with each other creating four distinct types of attentional styles (Nideffer, 1976). These are shown in Figure 2 on the next page.

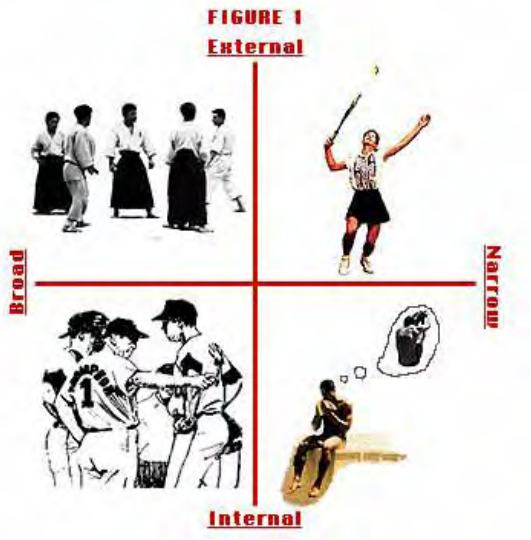

FIGURE 2: THE DIMENSIONS OF ATTENTIONAL FOCUS THAT RESULT IN FOUR DIFFERENT ATTENTIONAL STYLES (Nideffer, 2002).

Nideffer (1987) explains that in sport a broad external focus allows the participant to analyse the external environment consciously in order to automatically and/or instinctively react to multiple environmental cues (e.g. a golfer considering the wind and distance of pin before making a club selection). A broad internal focus of concentration would be necessary when a participant is required to integrate and compare many different pieces of information from existing internal schemes stored in the long-term memory (e.g. when formulating a 'game plan' for a forthcoming match). A narrow internal focus of concentration would be used when the participant is systematically rehearsing information relating to performing a specific skill (e.g. when mentally visualising a putt or controlling and monitoring your own internal state). The participant uses a narrow external focus of concentration when physically performing a task and focusing exclusively on one or two external cues (e.g. taking a penalty kick at goal or performing a putt in golf). According to Nideffer (1976), effective performances in different sports skills require different types of attention foci. If an inappropriate attentional focus is applied to a sports situation, it might inhibit the participant's performance. Potgieter (2003) reflects on this by using a golfer as example in his writings. He claims, when a golfer has an important putt to sink, the most appropriate attention style would be a *narrow-external focus* (focusing on the distance of the hole and the slope of the green exclusively). If the golfer allows his concentration to be distracted by background noises such as spectators (*broad-external focus*) or inappropriate thoughts and physiological responses (*narrow-internal focus*), he may encounter performance problems

due to the fact that he is not completely absorbed in the performance demands of the situation.

3.4.2.4.1. Concentration and sports performance

Numerous studies have been conducted to assess the relationship between attentional style and sports performance. Summers, Miller and Ford (1991) found that attentional flexibility was a key element in skilled basketball performance. Orlick and Partington's (1988) study on successful and less successful Olympic athletes also revealed that concentration was a central component of performance. That study indicated that attentional control was an important discriminating factor that separated the more successful from the less successful athletes competing at the Olympic Games. Consistent with these findings, a study (Nideffer, Bond, Cei & Manili, 1999) evaluating the attentional styles of 239 elite athletes (171 male and 68 females) from a variety of open and closed skills sports who have won at least one Olympic medal or world championship revealed that multiple-medal winners were more capable of narrowing their focus of concentration to attend to detail and perfect their skills than single-medal winners. The multiple-medal winners' ability to narrow down their focus to detail in highly competitive conditions undoubtedly contributed to their repeated success. Nideffer *et al.* (1999) also identified gender differences by revealing that on average males scored 10 percentage points higher than female athletes on the scales that measured analytic skills (broad internal focus). Males also measured slightly higher (3.3%) on the external awareness (broad external focus) scale.

It is evident that attentional focus and the ability to shift attention according to the demands of the situation are paramount for obtaining high levels of performance. The ability to maintain the correct focus of attention while being resilient to all present distractions seems to be essential to performing optimally. Perry (2005) postulates that there are common distractions present in sports that often interfere with or divert participants' attention away from a functional focus. These distractions can be either internal such as one's own thoughts, fears and worry or external, such as environmental noise, gamesmanship, visual distractions, weather and playing conditions. Perry (2005) continues by pointing out that often one's internal distractions (worry and fear) are caused by the incorrect appraisal of external distractions that cause one to doubt one's preparedness for competition. In the

worst cases, these could contribute to the phenomenon of choking. In sports just as in physical skills, the ability to focus concentration on performance-relevant cues can be effectively learned and improved. Weinberg and Gould (2011) recommend the following ways to enhance concentration:

- **Simulation training in practice:** all factors that represent potential distraction to the participant and negatively affect their performance should be included in practice sessions.

- **Self-talk and cue words:** short and simple instructional, emotional or motivational cue words can be used during competition to trigger the desired response.

- **Nonjudgmental thinking:** instead of judging the worth of one's performance and appraising it as good or bad, it is better to look at one's actions from a nonjudgmental point of view.

- **Establishing routines:** pre-performance routines are believed to prepare athletes mentally for the upcoming competition by helping them to transfer their attention from task-irrelevant thoughts to task-relevant thoughts.

- **The development of competition plans:** pre-competition and competition plans help athletes prepare for different circumstances that facilitate their attentional focus on the processes necessary to perform.

- **The practice of eye control:** identify task-relevant cues in training and apply similar focus in competitions.

- **Over-learning skills:** over-learning helps to make the performance skill automatic, which enables athletes to free up their attention to concentrate on other aspects related to the performance environment.

The views expressed above indicate that, for someone to perform optimally in sports, a certain type of attentional focus must be constantly applied to the cues associated with the

performance demands of the situation. Evidently there are many ways to enhance athletes' ability to identify task-relevant cues and adapt their focus of attention accordingly. To do this, irrelevant internal and external distractions in competition must be correctly identified and purposefully eliminated. The concept of over-learning a skill has proved to be an effective tool for managing attention resources since it frees up attention capacity, allowing the participant to concentrate on other aspects of the performance situation. One learns from Nideffer's (2002) contributions to understanding attention that there are times in sport when it is necessary for athletes to manage their attentional focus by learning to switch their levels of concentration on and off. Many investigations have revealed that world-class athletes deem the ability to apply correct concentration strategies effectively to be a prerequisite for achieving success. The intuitive conclusion drawn from the above writings is that sports participants who are more flexible and accurate about adapting their focus of concentration according to performance demands are more likely to experience success in their sport.

3.5 ANXIETY IN SPORT

In the field of sports psychology it is often postulated that one of the most important psychological factors to influence sports performance is anxiety (Raglin & Hanin, 2000). The contextual discussions in this chapter on mental skills (3.4.2) often referred to the fact that various mental skills serve the purpose of combating unwanted stress in performance situations. The relevance of stress in cricket was highlighted by Gordon (1990) who revealed that a major problem hampering cricket players' performance was their inability to deal with stress or to control arousal levels. And Holt (2003) contended that the negative interpretation of stress in cricket is significantly related to the endangerment of the players' personal performance goals. In an interview with Shaun Pollock, Cooper and Goodenough (2007) were informed that managing stress in cricket is a major obstacle to the players because of the visibility and measures attached to an individual's performance.

To advance understanding of the effects of stress, arousal and anxiety on sports performance, it is necessary to take an in-depth look at the conceptualisation and theoretical framework provided for these terms.

3.5.1 A conceptual and theoretical framework

Although the terms *arousal*, *stress* and *anxiety* are being used interchangeably by many people in sport, academics point out that there are discernible differences that set these terms apart. Arousal is defined as a "general physiological and psychological activation, varying on a continuum from deep sleep to extreme excitement" (Weinberg & Gould, 2011, p. 78). Arousal could also be described as the energising of the mind and body to a point of extreme alertness (Potgieter, 2003). A person can be aroused by either a pleasant or an unpleasant event. Stress refers to a variety of adverse emotional states such as anxiety, depression, and anger which arise from a cognitive perception that one does not have the necessary skills or tools to cope with the demands of a particular situation (Balague, 2005). Anxiety, like stress, is the negative appraisal of a stimulus that evokes some form of physical, psychological or interpersonal threat. More specifically, Weinberg and Gould (2011) define anxiety as a debilitating emotional state in which feelings of apprehension, nervousness and worry are associated with heightened physiological activation or arousal. Anxiety is, therefore, the cognitive dimension of arousal (Potgieter, 2003). This indicates that anxiety will not be present without the occurrence of arousal. Due to the association between arousal and anxiety, the researcher of this study will use these two terms interchangeably in the following context to facilitate the reader's understanding of the theoretical discussion that follows.

Spielberger (1966) contends that anxiety in its natural form can be separated into either a trait or a state. He refers to trait anxiety as a behavioural disposition that is inclined to appraise objective non-dangerous physical or psychologically circumstances as threatening and reacts accordingly with high levels of state anxiety. In other words, trait-anxious individuals tend to have a behavioural predisposition that responds to objectively non-threatening situations with disproportionate levels of state anxiety. State anxiety, however, is a situation-specific negative appraisal of arousal or activation of the autonomic system that is characterised by feelings of fear and tension. Weinberg and Gould (2011, p. 78) describe state anxiety as a "temporary, ever changing emotional state of subjective, consciously perceived feelings of apprehension and tension, associated with activation of the autonomic nervous system".

Some of the main causes of anxiety in sport are its uncertain nature, manifesting in things like taking a victory-deciding penalty in the dying seconds of the game or competing against an equally tough competitor. Potgieter (2003) asserts that a myriad other factors such as fear of physical danger, fear of disruption of daily habits and fear of negative social evaluation as a result of failure are the most potent causes of anxiety in sport. High levels of anxiety are usually accompanied by a combination of physiological, cognitive and behavioural manifestations. Balague (2005) provides a list of the symptoms of anxiety. Some of the physiological symptoms include:

- palpitations, accelerated heart rate
- trembling or shaking
- feeling of chocking
- increased muscle tension
- paresthesia
- restlessness, feeling keyed up or on the edge
- nausea or abdominal distress

Some of the cognitive symptoms include:

- uncontrollable worry, apprehensive expectation about activities
- concentration difficulties
- difficulty making decisions

Some of the behavioural and emotional symptoms include:

- irritability
- emotional outbursts such as crying and anger
- withdrawal, isolation
- rumination
- shifting of activity, difficulty staying on a plan or course of action

The above-mentioned manifestations can be experienced at varying intensities prior to and during competition and will be particularly disruptive to sports performance.

Usually prior to competition, the anxious athlete is likely to worry about the things that can go wrong and that are elicited by thoughts of previous poor performances or perceived threats. According to Balague (2005), the movement pattern, the timing, the reaction time and decision-making style of the anxious athlete are different from their habitual, low anxiety movement patterns. This was evidenced in an investigation that recorded the hampering effects of increased anxiety on the spatial-temporal changes in movement patterns (behaviour) of wall climbers (Pijpers, Oudejans, Holsheimer & Bakker, 2003). Pijpers *et al.* (2003) discovered that high levels of anxiety in wall climbers resulted in an increased geometric index of entropy and also longer climbing times. Nicholls, Polman and Levy (2010) also reveal that high somatic and cognitive anxiety experienced prior to competition has a negative effect on athletes' levels of coping self-efficacy.

3.5.2 The effects of anxiety on sports performance

A potential explanation for the debilitating effect anxiety has on sports performance is the **processing efficiency theory** (Eysenck & Calvo, 1992). The processing efficiency theory proposes that participants react to cognitive anxiety by means of worrying. Worrying depletes the participant's cognitive resources and hampers the athlete's ability to focus on task-relevant cues. Worrying also signals the criticality of the event to the participant, causing the participant to invest too much thought and effort in the skill, which inadvertently affects the performer's attentional focus. In other words, this type of worry depletes the participant's capacity for working memory which is needed for the effective production of a performance skill. Another explanation of the decrease in performance caused by anxiety is the **conscious processing hypothesis** (Masters, 1992). This theory claims that anxious performers try to cope with their fear of failure by investing additional cognitive and physiological effort in their actions, using explicit knowledge in an attempt to gain conscious control. According to Deikman (1996), this laborious, higher-order processing transfers task control away from automatic processing and leads to the *'deautomatization'* of the skill, which could cause a sudden drop in skilled performance. Masters (1992) confirmed the conscious processing hypothesis by revealing that golf players' putting performances were less affected by anxiety if they had learned their putting skill implicitly (without knowledge of rules) rather than explicitly (with knowledge of the rules). The golfers

with a fair measure of explicit knowledge of how to putt, tended to incorporate it in their skill execution, trying to maintain conscious control in stressful match conditions, which resulted in a decrease in their performance due to a disruption of their automaticity. A similar study done by Mullen and Hardy (2000) also supports the conscious processing hypothesis by reporting that golfers' putting performances in high anxiety conditions were less impaired when they had to generate random letters every second of their putting action in an attempt to prevent themselves from making use of explicit putting knowledge. The suppressing of the application of explicit rules could possibly have maintained the golfers' state of automatic processing for longer periods, thus enabling them to show less of a decline in performance during stressful situations than the explicit control group.

Despite the common belief that anxiety is detrimental to athletic performance, numerous theoretical assumptions have postulated that anxiety may sometimes facilitate sports performance. **The drive theory** (Hull, 1943; Spence, 1958) claims a positive linear relationship between arousal and performance, suggesting that the higher the participant's arousal, the better his or her performance will be. The drive theory indicates that performance is a function of drive and habit strength (Performance = drive x habit strength). 'Drive' here represents physiological arousal and 'habit strength' refers to the dominance of either the correct or incorrect response. None of this means that athletes and coaches need 'psyching up' before competitions; it just indicates that when the dominant response is correct (e.g. when it's a simple skill or the skill is well learned) then high levels of arousal can lead to improved performance. In the case of an incorrect response (e.g. a complex skill or a skill that is not fully mastered yet), high levels of arousal could be detrimental to the participant's performance. Therefore, a positive relation between arousal and performance might exist only to a certain extent in simple tasks involving strength, speed and endurance. Due to the nature of the above assumption, it is evident that the drive theory could not be fully supported in sport.

The **inverted-U hypothesis** (Yerkes & Dodson, 1908) states that an intermediate level of arousal brings on an optimal level of performance. Both very high and very low levels of arousal will result in impaired performance, meaning that a performer who is under-aroused because he or she is playing against a much weaker opponent is unlikely to exert great effort

or perseverance because performance is expected to be low. In the case of a must-win situation where there are high levels of arousal, the athlete might become distracted by thoughts of negative consequences or fear of failure that increases muscle tension that impairs the rhythm and mechanics of the action movement (Balague, 2005). The inverted-U hypothesis also suggests that an optimal level of arousal varies according to the nature of the task and the ability of the athlete. Potgieter's (2003) response to the latter is that high levels of arousal will bring on optimal performance in gross motor activities that involve strength, speed and endurance, whereas low levels of arousal are more facilitative for complex fine motor activities. The ability of the athlete plays a role in the sense that the beginner usually performs poorly under increased arousal, whereas the elite participant may perform well under such conditions, regardless of the nature of the task. Many people condemn the Inverted-U hypothesis by pointing out that it does not leave room for any other outcomes to explain poor performance except for saying that, if a participant did not perform well, it would be because of inadequate levels of arousal (either too high or too low). Some also say that the arousal-performance relationship is much more complex than suggested by the hypothesis (Jones, 1990). The inverted-U hypothesis also suggests a gradual decrease in performance if the level of arousal is not adequate. However, it fails to explain the sudden drop in athletes' performances when competing in high-pressure situations. As a result of these limitations, the popularity of the inverted-U hypothesis remains questionable.

Hanin (1989) constructed an alternative view on optimal performance states that he calls the **individualised zones of optimal functioning (IZOF)**. The IZOF proposes that athletes reach their optimal performance states at different times in a competition, depending on their emotions. If the athlete's pre-competition anxiety falls outside his or her predetermined zone of optimal functioning, then performance would not be ideal. Hanin's (1989) IZOF theory serves as an ideographic model that identifies a variety of emotional states associated with optimal performance. Athletes would therefore have to understand what emotions are helpful and unhelpful to their performance and try to reinstate those helpful emotions in game situations. The IZOF is thus an effective tool for helping athletes and their coaches to understand and establish emotional readiness. The main limitation of

the IZOF model is that, being too descriptive, it fails to explain why some emotions are helpful in certain participants and other emotions not.

Another view on the arousal-performance relationship is Hardy's (1990) **catastrophe model**. The catastrophe model claims that performance depends on the complex interaction between arousal and cognitive anxiety. This theory predicates that under normal circumstances physiological arousal is related to performance in an inverted-U manner, but if cognitive anxiety increases beyond a threshold, past the point of optimal arousal, then a sudden decline (catastrophe) in performance is expected. The sudden drop in performance is usually more dramatic if cognitive anxiety is combined with high levels of physiological arousal.

Kerr's (1989) **reversal theory** contends that a participant's interpretation of his arousal level will determine what effect arousal will have on performance. Kerr (1989) suggests that participants will interpret arousal as exciting, anxious, boring or relaxing. One participant can interpret high arousal as either a pleasant excitement (eustress) or as an unpleasant anxiety (distress). Another participant might see low arousal as boring or relaxing. These four different emotions will determine what effect arousal will have on performance. It could happen that an athlete's interpretation of his arousal can change in the course of competition. These alternative shifts in emotions (interpretations) are called *reversals*.

The levels and manifestations of pre-competition and competition anxiety are believed to be different for each athlete. The literature reveals that successful athletes and those who have been participating for extended periods of time (matured in the sport) interpret their anxiety to be more facilitative to peak performance than do less successful and novice athletes who interpret their anxiety as debilitating (Humara, 2002). Findings also show that individual sports participants (track and field) report significantly higher levels of somatic anxiety and lower self-confidence than team-sport (basketball) participants (Kirby & Liu, 1999). Martin and Hall (1997) confirmed this hypothesis by revealing that figure skaters experience greater somatic and cognitive anxiety prior to individual competitions than prior to a team competition. The need to develop individualised interventions to regulate arousal and anxiety in sport was further indicated in an investigation revealing that, on the CSAI-2 measure, female participants recorded higher somatic anxiety and lower self-confidence

than male participants (Thuot, Kavouras & Kenefick, 1998). In addition, Thuot *et al.* (1998) discovered that adolescents recorded higher levels of cognitive and somatic anxiety with decreased self-confidence as the ability of their opponents increased.

In summary, anecdotal reports support the notion that anxiety exerts a variety of effects on athletic performance. Anxiety can be either facilitative or debilitative, depending on the participant's interpretation of pre-competition arousal, the nature of the task and the skills level of the performer. Gender and social context of sports competition are also found to be indicators of the level of anxiety in participants. Anxiety-induced performance catastrophes are likely to happen because worry (cognitive anxiety) increases effort which reduces the athlete's attentional resources. Cognitive anxiety can prompt the athletes to make use of explicit knowledge to gain conscious control over the performance action and this actually disrupts the automatic processing of the skill. Theories such as the *drive theory* (Hull, 1943; Spence, 1958), the *inverted U-hypothesis* (Yerkes & Dodson, 1908), Hanin's *individualised zones of optimal functioning* (IZOF) (Hanin, 1989), Kerr's *reversal theory* (Kerr, 1989) and Hardy's *catastrophe model* (Hardy, 1990) all incorporate the concept of individual differences in the arousal-performance relationship of athletes.

3.6 CRITICISM OF PSYCHOLOGICAL-SKILLS TRAINING (PST) APPROACHES

The accumulated empirical evidence listed in this chapter generates the notion that the identification of critical mental skills for the purpose of developing individualised psychological-skills training programmes in sport is of paramount importance to any athlete who wishes to achieve elite levels of performance. Based on the literature gathered, the investigator in this study reasons that insufficient psychological skills prevent many talented athletes from achieving sporting success and that this insufficiency is the primary reason why athletes plateau just below the elite level. Gardner and Moore (2007) oppose this outlook in their claim that it is unreasonable to focus on any one mechanism or variable in determining and predicting human performance. These authors argue that multiple internal and external factors are intricately linked together to either impede or enhance human performance. They proceed to suggest that factors such as **instrumental competencies** (participant's physical/sensorimotor and/or cognitive skills); **environmental stimuli and performance demands** (such as participant's work, competitive, interpersonal, situational,

and organisational circumstances); **dispositional characteristics** (the participant's intrapersonal characteristics such as coping styles and cognitive-affective schemas); and **behavioural self-regulation** (including interacting cognitive, affective, physiological and behavioural processes that form the foundation of achievement behaviour) need to be considered as causes of functional and dysfunctional human performance. Hardy et al. (1996) agree with the latter by asserting that the proper configuration of these factors is required to generate an ideal performance state. This ideal performance state is similar to Csikszentmihalyi's (1997a) *state of flow* and Hanin's (2000) *zone of optimal functioning.* Gardner and Moore (2007, p. 4) reflect on such a state as "an optimal bio-psychosocial state that promotes and sustains automated, task focused, goal directed behaviour" that is a function of the right combination of the cognitive, affective and physiological conditions of a well-learned skill. The main idea of an *ideal performance state* or *flow* or *zone of optimal functioning* state is for a skill to occur in a seemingly effortless and automatic manner. The difference is that Gardner and Moore (2007) formulate a deeper understanding of the occurrence of these states by explaining that an optimal performance state is dependent on three interactive phases such as the **pre-performance phase** (internal and external demands that promote performance-related behaviour); **the performance phase** (involving skills execution and the actual interaction of cognitive, affective, physiological and behavioural processes) and the **post-performance response phase** (the response to performance outcomes following competition). Arising from this model of understanding, Gardner and Moore (2007) believe that an intervention focus such as a psychological-skills training (PST) programme should not be set on performance outcomes *per se*, but rather on the interacting processes that underlie optimal performance states. Their reason for this is that athletes do not function solely in the competitive domain of sports events but also in many other domains affecting life that require attention and intermittent assistance.

For the past thirty odd years the primary psychological approach has emphasised the development of psychological-skills training (PST) programmes (such as goal setting, imagery/mental rehearsal, arousal control, directive self-talk and pre-competition routines) in an attempt to control internal states such as thoughts, emotions and physical sensations for the purpose of creating an ideal performance state (Burton, Naylor & Holliday, 2001; Gordon, 1990; Gould, Damarjian & Greenleaf, 2002; Gregg *et al.,* 2005). However, many

inconsistencies in the scientific literature regarding the efficacy of psychological-skills interventions utilised to enhance performance have been revealed. Moore (2003), along with Gardner and Moore (2006), has provided anecdotal evidence demonstrating that the long-held assumption fundamental to PSTs that the reduction and control of negative thoughts, emotions and bodily state and increased levels of confidence are related to the development of an ideal performance state is, in fact, neither accurate nor is it theoretically and empirically supported. Gardner and Moore (2007) argue that PST approaches fail to integrate advances from other psychology disciplines such as cognitive, clinical and sports sciences into their theoretical models and suggest a more innovative and comprehensive approach to understanding functional and dysfunctional athletic performance. One such model is the Integrative Model of Human Performance (IMHP) which takes into account how interpersonal, intrapersonal, environmental and self-regulatory processes affect the performance and psychosocial functioning of individual performers (Gardner & Moore, 2007). Instead of suppressing negative thoughts and attempting to maintain emotional control and high confidence like general PSTs, the IMHP attempts to experientially accept internal thoughts, feelings and physical sensations associated with competition (whether they are positive or negative) while maintaining attentional focus on the performance task. The IMHP remains attentionally and behaviourally engaged in the performance task, regardless of the self-regulatory processes involved. This external focus or task-focused attention approach has proved to be effective in facilitating functional human performance (Gardner & Moore, 2004; Rapee & Lim, 1992). This is in contrast to the internal control-based approach to performance enhancement (PST procedure) and the possible reason for this effectiveness is that the participant never really becomes preoccupied or overly self-focused and distracted by possible performance consequences and ramifications, but remains goal directed and task oriented.

Psychological-skills training is thus criticised as an approach that is focused too much on self-regulatory processes, which may inadvertently result in excessive cognitive activity and task-irrelevant attentional focus. Further criticism holds that the occurrence of unwanted thoughts during and prior to performance often results in an associated increase in emotional states and physiological arousal that disrupt task-relevant attention and goal-directed behaviour. In response to the above affects, it would be advantageous to

incorporate other psychological approaches to human performance such as the IMHP (Gardner & Moore, 2007) because of its resultant active absorption in the task and not in the self. The present researcher is of the opinion that the PST approach should not be completely discarded as ineffective, but should rather be used as a possible means of enhancing performance in conjunction with other task-oriented approaches.

3.7 CONCLUSION

This chapter reviewed the literature on the mental components associated with achieving peak performance states and experiencing athletic success. More specifically it highlighted the extent to which psychological factors play a part in distinguishing more successful participants from less successful participants at elite levels of sports participation. The facilitative role mental skills play in high level sports participation has been strongly emphasised over the past three decades and today it continues to evoke much interest among researchers, trainers and athletes all over the world. Over the years, mental factors such as self-confidence, commitment, concentration, coping skills, imagery and visualisation goals have emerged as key antecedents to achieving athletic success at the highest level of sports participation (Andrew *et al.,* 2007; Barbour, 1994; Devonport, 2006; Mahoney *et al.,* 1987; Orlick & Partington, 1988). These mental skills have also been shown to contribute towards the adequate development and nurturing of sporting talent (MacNamara *et al.,* 2010).

In the process of investigating the relevance of mental skills to cricket participation and performance, it emerged through various conventional approaches that the application of effective mental strategies and psychological intervention programmes significantly contributed to the attainment of career success and recurring performance states. More specifically, elite participants in the sport reported that the ability to remain determined, focused, confident and in control of pressure situations are key antecedents to performing in high-level competitions. This chapter aimed to increase the understanding of the role mental skills play in elite levels of sports participation, providing sports coaches, players and mental consultants with insight into the need to establish and apply psychological intervention programmes to serve as performance aids to optimising player potential and achieving athletic success.

The next chapter will provide a thorough and detailed framework for the research methodology used in this investigation.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter outlines the research methodology used in this investigation. McMillan and Schumacher (2006) describe research as the systematic process of collecting and logically analysing data for some purpose. They further postulate that methodology, which is also referred to as methods, is the way in which one collects and analyses data. This chapter covers the methodological procedures such as data-collecting techniques, research design, data processing and statistical analysis that the investigator used for implementing the protocols of this study.

The core aim of this investigation is to determine the relationship between mental skills and level of cricket participation. In order to achieve this aim, the researcher made use of a descriptive research approach. According to Thomas *et al.* (2005), the most prevalent descriptive research technique is the survey which, in this study, will include data collection of the subjects' psychological background information and standardised psychometric questionnaires to verify a psychological skills profile for cricket players. All questionnaires used in this study were constructed to include a summative Likert-type scale response format.

The aims of this study were to do the following:

1. Explore cricket participants' psychological background information regarding their general perceptions of the importance of psychology in cricket, their knowledge of and exposure to psychological-skills training and the time spent on their psychological-skills training in cricket.
2. Determine and compare the mental skills of cricket players from three progressive levels of competition.

3. Explore the relationship between mental skills and the different roles played in cricket (batsman, bowler, all-rounder and wicketkeeper).
4. Explore the relationship between mental skills and batting order in cricket.

In order to reach the aims above, the analysis of results had the following objectives:

1. Evaluate the participants' perceptions of the importance of psychology in cricket participation.

2. Determine any difference in knowledge and use of psychological-skills training according to level of participation.

3. Investigate the various levels of cricket participants' perceived ability to be psychologically prepared for competitions.

4. Validate the extent of participants' previous consultations with sports psychologists/mental skills coaches.

5. Explore the need of various levels of participants to learn from psychological skills training.

6. Determine whether statistically significant differences existed between the various levels of participation in terms of the performance on sports-psychological-skills profile tests (Bulls' Mental Skills Questionnaire and the Athletic Coping Skills Inventory (ACSI-28) and the Athletic Competition Self-Evaluation Questionnaire (CSAI-2).

7. Determine whether statistically significant differences existed between the various specialised roles played in cricket in terms of their performance on sports psychological skills profile tests (Bulls' Mental Skills Questionnaire and the ACSI-28) and the Athletic Competition Self-Evaluation Questionnaire (CSAI-2).

8. Determine whether there were statistically significant differences between the various groups of batting orders in terms of their performance on sports-psychological-skills profile tests (Bulls' Mental Skills Questionnaire and the ACSI-28) and the Athletic Competition Self-Evaluation Questionnaire (CSAI-2).

This chapter includes a detailed discussion of the research design, research instruments, sample and sampling procedure, data collection, and the administration of the questionnaires. It also contains justification for the use of specific statistical procedures applied in this study.

4.2 RESEARCH DESIGN

McMillan and Schumacher (2006, p. 22) describe research design as "a general plan on how the research is set up, what happens to the subjects, and what methods of data collection are used". Therefore, the purpose of the research design is to provide an overall blueprint that establishes a path for gathering data to enable the researcher to test the hypothesis accurately. This investigation addresses the need for cricket participants and coaching staff to acknowledge the role mental skills play in the optimisation of cricket-playing potential in elite levels of cricket participation. Evidence of a positive relationship between mental skills and the level of performance in cricket could provide the impetus for an increasing trend on behalf of cricket organisations to establish behaviour modification programmes as part of their player development programmes at the different levels of participation, with the aim of developing first class cricketers.

The underlying design of this research was approached from a quantitative (descriptive) outcome perspective. Thomas *et al.* (2005) explain that quantitative research tends to focus on methods that typically involve precise measurements and a rigid control over variables and statistical analyses. The current study is essentially quantitative since the cricket players' state and trait anxiety, coping abilities and mental skills relative to their experiences and performances in competition have been assessed. The principle of MAXMINCON suggested by McMillan and Schumacher (2006) has been used as a guide for controlling any explanation except the hypothesis for the results of this investigation. The MAXMINCON principle explains that applied quantitative research needs to "maximize systemic or true variance to increase the odds that the real relationship will be discovered; minimize error variance or reduce all the mistakes that could surface in the study to disguise the true relationship, and control extraneous variance or make sure that rival hypotheses are not the real explanations of the relationship" (McMillan & Schumacher, 2006, p. 18).

4.2.1 The population

The population is referred to as "all of the potential subjects for a study, from which a sample is drawn" (Gratton & Jones, 2004, p. 271). It generally encompasses the entire group of all units of analysis from which the researcher desires to draw specific conclusions. The population in this investigation refers to cricket participants hailing from Pretoria in the Northern Gauteng region of South Africa.

4.2.2 Target population

Welman, Kruger and Mitchell (2005) define a target population as the group the researcher attempts to sample. In a survey, such as this study, only a selected subset of the population is used to represent the population as a whole. It is, therefore, important to identify the target population accurately to ensure that the results are meaningful.

The target population for this investigation involved a combined sample (N = 127) of limited-overs male cricket players from three established levels of cricket participation recognised by the Northerns Cricket Union (NCU). They included 1st team (U/19) boys playing at junior cricket academy level (30.7% of sample), men over 18 playing in the Northerns Premier club league and senior cricket academy level (53.6%) and first class cricketers (15.7% of sample) playing at franchise and senior provincial level in the limited-overs format of the 2010/2011 season. A quota sampling technique was used in selecting academies, clubs and provincial teams to recruit these subjects. Quota sampling is explained by McMillan and Schumacher (2006) as a non-probability sampling technique that allows the researcher to select subjects on the basis of characteristics of the population. The basis for subject selection in this study included the following characteristics: (a) A-side male cricket participants from several levels of competitive cricket participation; (b) established levels of cricket participation recognised by the Northern's Cricket Union (NCU) and/or Nashua Titans Franchise; (c) exclusive consideration of academies, clubs and senior provincial teams registered with the NCU.

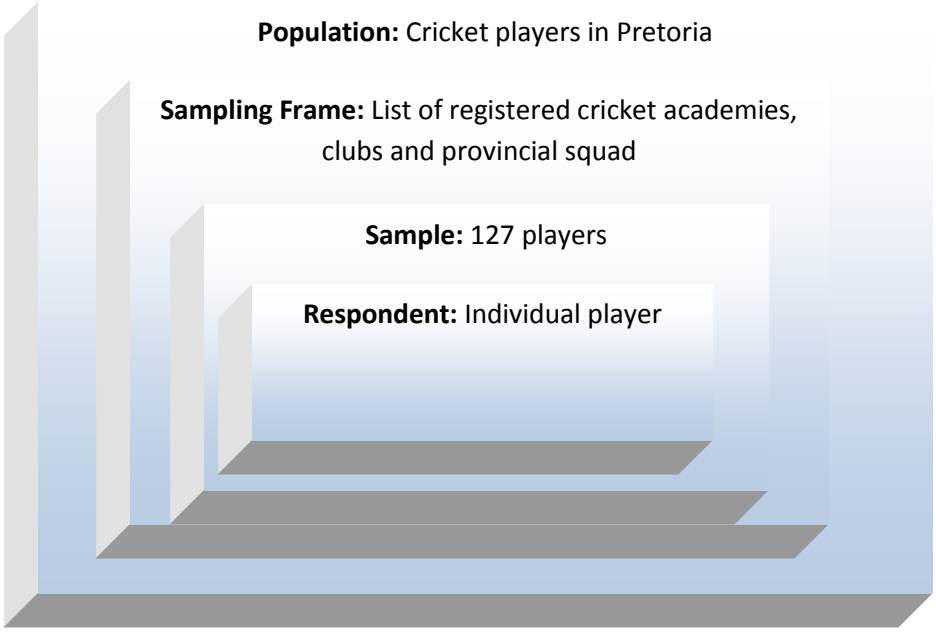

FIGURE 3: ILLUSTRATION OF THE BASIC SAMPLING TERMS (Shaughnessy & Zechmeister, 1997)

4.2.3 Sample frame

After a subset of the population is selected, Shaughnessy and Zechmeister (1997) suggest that a specific list of the members of the population be developed. This list is referred to as the sample frame. The sample frame consists of everyone in the population who fits the pre-determined criteria set by the investigator and actually represents an operational definition of the population (Welman *et al.,* 2005).

The sample frame that was used in this investigation consisted of cricket participants who represented three progressive levels of cricket participation in the limited-overs cricket format: (a) U/19 junior academy players; (b) clubs playing in the Northern's premier cricket league/senior academy players; (c) first-class senior provincial teams recognised by the Northern's Cricket Union (NCU) of South Africa.

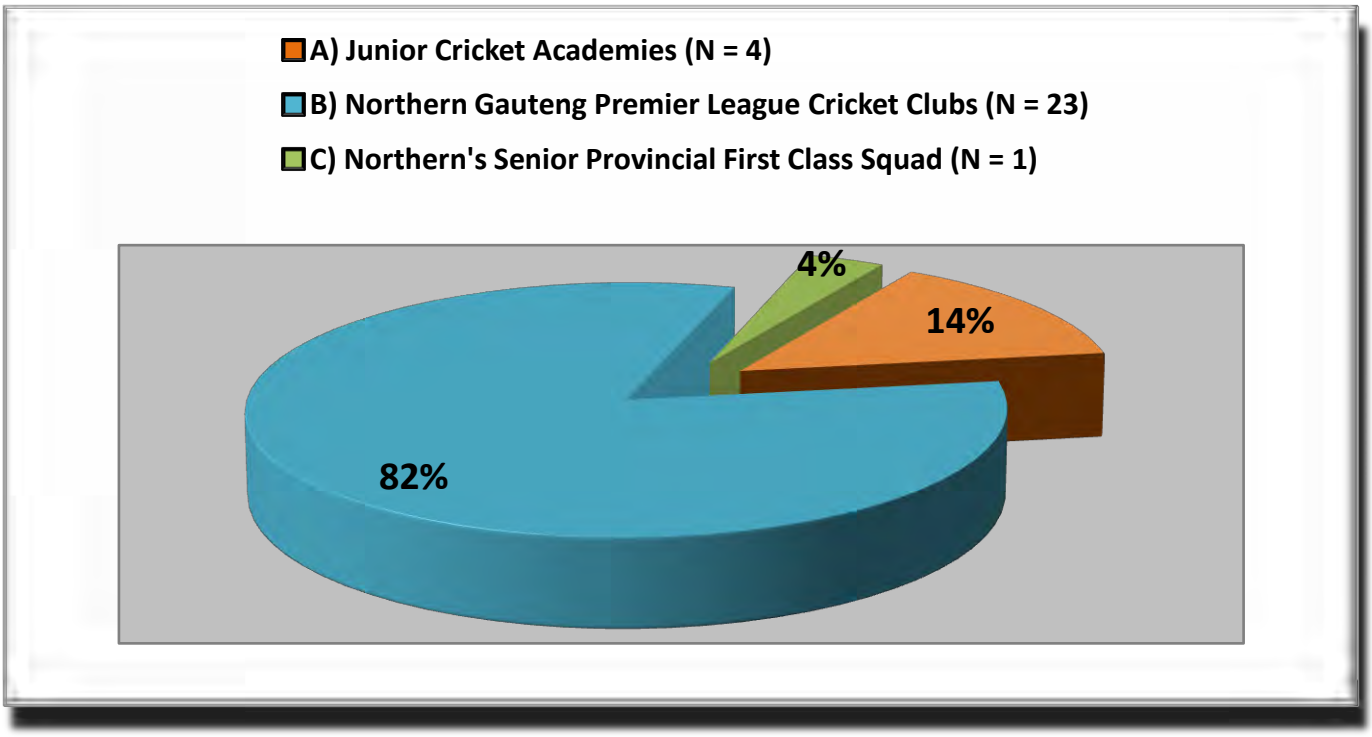

FIGURE 4: CHART INDICATING THE SAMPLE FRAME OF THE TARGET POPULATION.

To date there are four Northern's Cricket Union (NCU) approved youth cricket academies; twenty-three area clubs and one first-class senior provincial squad within the Northern Gauteng (Pretoria) region of South Africa (Titans, 2010).

4.2.4 Research sample

Sampling means making a selection from the sampling frame (a concrete listing of the elements in the population) in order to identify the people or issues to be included in the research (White, 2005). This means that a sample is inclusive and representative of the larger population. In this investigation, the following criteria were used to specify the research sample:

- Youth cricket academies must be registered by the Northerns Cricket Union.
- Amateur cricket clubs must compete in the Northerns premier club league.
- Participants must be the coaches' first choice (A-side) to represent the team in one-day 50-overs (for senior provincial and premier league players) or 40-overs cricket (for junior and U/19 players).

- Players must be active members who represented their teams in the 2010/2011 cricket season.
- Senior provincial cricketers must have represented their franchise in the MTN40 Domestic Championship competitions.

4.2.5 Sampling procedure

A non-probability quota sampling process was used to select participants for this study. The questionnaires were distributed to male cricket players (N = 127) playing one-day cricket at an amateur or professional level. These levels of cricket participation have been categorised by the NCU in the following groups:

- boys participating in youth cricket academy teams/secondary school level
- men playing senior club cricket or who are part of a senior cricket academy
- men playing at senior provincial level

4.2.6 Sampling size and respondents

The sampling size indicates the number of participants in a sample. According to Maree and Pietersen (2007), it is the investigator's responsibility to consider the purpose of the research, the design and the size of the population. White (2005), however, suggests that the larger the population, the smaller the percentage of that population's sample needs to be.

This investigation included a non-random sample of N = 39 U/19 players; N = 68 premier league club and senior academy players; and N = 20 first-class senior provincial players who were active members of the 2010/2011 cricket season playing in the Pretoria, Gauteng region of South Africa.

4.2.7 Data collection

A questionnaire assessing demographic detail and psychological background information was constructed using closed-ended, Likert-type scale response possibilities.

Additional standardised psychometric measures for the purpose of scoring coping skills, mental-skills usage in sport, and anxiety, were included in the study that had a matrix design with statements on the left and anchored responses on the right. In this investigation, cricket players representing three progressive levels of cricket participation were targeted to complete the questionnaires.

Confirmation was received that all the items were clear and understandable and that all respondents were competent in English, serving as either their first or their second preferred language of communication.

4.2.7.1 Research instruments

Survey-based methods such as questionnaires or paper-and-pencil tests are claimed to be the most common techniques for asking questions which are designed in advance to measure variables such as personality, psychological traits and states, attitudes, abilities and achievements (Haag & Holzweg, 2004). Surveys also deal more directly with the nature of individuals' thoughts, opinions, and feelings (Shaughnessy & Zechmeister, 1997).

This investigative study was conducted by means of standardised psychometric pen-and-paper tests used to assess variables known in the field of sports psychology. These tests were thought most appropriate for the aims of the study and were administered with the consent and guidance of the supervisors of this study.

The questionnaires were arranged into two sections:

Section one: Background information on the respondents (Appendixes B & C, pp. 208-210)

Demographics of the respondents (Appendix B, p. 208):

The following aspects were recorded for each respondent:

- Gender
- Level of participation
- Specialised role
- Batting order

- Personal rating of their batting form
- Personal rating of their bowling form
- Personal rating of their self-confidence

General psychological perspectives of the respondents (Appendix C, p. 210):

This section explored the respondents'

- knowledge and use of psychology in cricket
- knowledge and use of psychological-skills training
- perceived ability to be psychologically prepared for competitions
- previous experience with sports psychologists
- expressed need to learn from psychological-skills training

Section two: Psychological-skills profiles of the respondents (Appendix D-F, pp. 213-219)

The following standardised psychometric instruments were used to assess the respondents' mental skills scores:

The Athletic Coping Skills Inventory-28 (ACSI-28) by Smith, Shutz, Smoll, and Ptacek (1995) (Appendix D, p. 213) is a multidimensional measure of the following seven sport-specific psychological skills:

1. Peaking under pressure
2. Freedom from worry
3. Coping with adversity
4. Concentration
5. Goal setting and mental preparation
6. Confidence and achievement motivation
7. Coachability

The scales of this inventory can be summed up to yield a total Personal Coping Resources score, which is assumed to reflect a multifaceted psychological-skills construct (Smith *et al.*, 1995). The ACSI-28 total Personal Coping Resources score (based on the sum of seven

subscales) has high internal consistencies with alphas of 0.84 (N = 594) for males and 0.88 (N = 433) for females, totalling a 0.86 (N = 1027). The subscales in this study are expressed as percentage values, with higher values indicating better skills levels. The test-retest reliability from a sample of male and female college athletes after a period of one week was found to be 0.87 (N = 94) (Smith *et al.,* 1995). The ACSI-28 has been utilised in South Africa (Andrew *et al.,* 2007).

Bull's Mental Skills Questionnaire by Bull, Albison and Shambrook (1996) (Appendix E, p. 216) contains 28 items that assess participants along a six-point Likert scale, ranging from **Strongly agree** to **Strongly disagree**. This instrument measures the following mental skills:

1. Imagery ability (ia)
2. Mental preparation and goal setting (mp)
3. Self-confidence (sc)
4. Anxiety and worry management (awm)
5. Concentration ability (ca)
6. Relaxation ability (ra)
7. Motivation (m)

The Bull's Mental Skills Questionnaire that has been translated into Dutch, revealed generally high Cronbach alpha levels of 0.80, 0.64, 0.62, 0.61, 0.59, 0.72, and 0.72 respectively for the seven subscales in a sample of 219 athletes (Snauwaert, 2001). The subscales in this study are expressed as percentage values, with higher values indicating better skills levels. The Bull's Mental Skills Questionnaire has been utilised within the South African context (Danariah, 2007; Edwards, 2007). Edwards and Steyn, (2011) recently performed an exploratory study of 419 male and female university students in an attempt to establish preliminary norms for South Africa. Results for this population yielded a similar mean score for Imagery to the score from Danariah's (2007) study, while the relaxation ability, motivation, self-confidence, anxiety and worry management scores concurred with Edwards's (2007) and Danariah's investigations.

Competitive State Anxiety Inventory-2 (CSAI-2) by Martens, Vealey, Burton, Bump and Smith (1990) (Appendix F, p. 219) is one of the most prominent available assessments of arousal and anxiety. The CSAI-2 consists of a 27-item measure that is divided into three 9-item subscales that assess:

- cognitive state anxiety
- somatic state anxiety
- state self-confidence

The CSAI-2 assesses participants' feelings before competing along a four-point Likert scale with responses to items ranging from 1 (**Not at all**) to 4 (**Very much so**). Each response has a directional scale that requires the participant to indicate whether these feelings are regarded as being positive or negative in relation to competition. Subscale scoring is exponential, yielding totals ranging from 9 to 36 for each subscale. It requires approximately 5 to 10 minutes to complete. The reliability of the three subscales is high, ranging between 0.79 and 0.90. High Cronbach alphas ranging from 0.79 to 0.83 for cognitive anxiety, from 0.82 to 0.83 for somatic anxiety and from 0.87 to 0.90 for self-confidence were established during assessment construction (Martens *et al.,* 1990). The CSAI-2 has been utilised in South Africa (Andrew, Grobbelaar & Potgieter, 2007; Edwards, 2007; Edwards & Steyn, 2008). See Appendix F, p. 219 for a copy of the CSAI-2.

TABLE 3: THE QUANTITATIVE MEASURMENTS EMPLOYED FOR THIS INVESTIGATION

Measure:	***Instrument:***	***References:***
The Athletic Coping Skills Inventory – 28 (Appendix D)	ACSI-28	Smith *et al.,* (1995)
Bull's Mental Skills Questionnaire (Appendix E)		Bull *et al.,* (1996)
Competitive State Anxiety Inventory – 2 (Appendix F)	CSAI-2	Martens *et al.,* (1990)

The instruments used in section two aim to establish a psychological-skills profile for each category of cricket participants in an attempt to identify a link between level of cricket

participation and psychological attributes. These measures were also used to evaluate the relationship between psychological skills and specialised roles in cricket and batting order.

4.2.7.2 Piloting the questionnaires

Thomas *et al.* (2005, p. 73) state that "every thesis or dissertation proposal should present pilot work that verifies that all instruments and procedures will function as specified". The questionnaires should, therefore, be piloted to a sample of participants that resemble the characteristics of the subjects used in the intended study. This will serve as an adequate opportunity to identify methodological faults that cause the research to lack validity. It is suggested that an appropriate size of the sample should be greater than 20, but having fewer than that is better than having no pilot study at all (McMillan & Schumacher, 2006).

A pilot study was conducted on twenty cricket volunteers (ages 17-28) who are active members of their respective teams. The results of the pilot study yielded an estimate of reliability that provided a sense of confidence in the variability of the answers, which was a promising sign to continue the intended investigation of the proposed relationships. The quality of research is determined by two key concepts: reliability and validity (Gratton & Jones, 2004). To provide a sense of 'truthfulness' the concepts of reliability and validity for this investigation were carefully considered.

4.2.7.3 Reliability

Reliability can be defined as the extent to which a scale reproduces similar findings under the same inter-subjective conditions (Haag, 2004), thus meaning that research results would be consistent if the research were to be repeated with different subjects from the same population.

The present investigation's measuring tools' reliability was considered by its Cronbach's alpha. The Cronbach's alpha is used to indicate the internal reliability (consistency) of an instrument. The closer the Cronbach's alpha coefficient is to one, the stronger the internal consistency of the instrument. If, however, the alpha coefficient is closer to zero then it indicates a poor correlation (Maree & Pietersen, 2007). The following Cronbach's alpha coefficient has been suggested to be generally acceptable for guiding researchers:

- 0.90 = high reliability
- 0.80 = moderate reliability
- 0.70 = low reliability.

TABLE 4: THE INTERNAL RELIABILITY OF THE MEASURING INSTRUMENTS

Measure:	***Cronbach's alpha***	***References:***
The Athletic Coping Skills Inventory – 28 (Appendix D)	0.87	Smith *et al.,* (1995)
Bull's Mental Skills Questionnaire (Appendix E)	0.76	Edwards & Steyn (2011)
Competitive State Anxiety Inventory – 2 (Appendix F)	Ranging from 0.79 to 0.90 for the three subscales	Martens *et al.,* (1990)

4.2.7.4 Validity

Gratton and Jones (2004, p. 288) define validity as "the extent to which measurements actually reflect the phenomena being studied". In other words, a valid instrument measures what it is supposed or described to measure. Validity underlying tests and questionnaires can be categorised into face, criterion, construct and content validity (White, 2005).

- **Face validity:** refers to the extent to which the test or questionnaire appears to measure what it is intended to measure (Maree & Pietersen, 2007). All questionnaires used in this investigation list the concept being measured with scales and items relating to that concept.
- **Criterion validity:** this type of validity is probably the most revealing test to clarify whether an instrument measures what it is supposed to measure. This validity can be determined by comparing the degree of correspondence of one instrument to another instrument with known validity (White, 2005). The measuring instruments employed in this investigation passed a number of

validation studies by administering other relevant measures for the same sample.

- **Construct validity:** focuses on what is being measured. Maree and Pietersen, (2007) report that, for an instrument to be classified as standardised, it should demonstrate good construct validity. In other words, the instrument must address all the necessary latent factors of a concept in order to measure that concept accurately.
- **Content validity:** the content validity of a measuring instrument refers to the extent to which the instrument covers the complete behaviours or content represented by the particular construct being measured (White, 2005). In the case of this study, content validity was determined by selecting reputable measures to assess psychological skills in sport and to pre-test these measures with respondents similar to those of the target population.

4.2.7.5 Administration of questionnaires

After the pilot study, the investigator telephonically arranged a meeting with the coaches and team managers of the various cricket organisations and teams targeted for this study. The purpose and potential benefits of this investigation were explained to the consenting participants and testing dates were set. Participants were provided with an information leaflet (on a University of Pretoria letterhead) explaining the rationale for the investigation as well as the criteria employed to identify the respondents. A letter of consent/assent was attached that informed the participants, as well as their parents when relevant, that voluntary compliance applies and that they are allowed to withdraw from the study at any time. Data will be securely kept, anonymity is ensured and participant information will be presented in a confidential manner. After consent was obtained, data were gathered by means of a once-off group administration of questionnaires per team. The researcher waited while each group of respondents completed the questionnaires. According to Maree and Pietersen (2007), the following are advantages of this method of data collection:

- A large number of respondents can complete the questionnaires in a short space of time.

- Accuracy of the questionnaires can be checked and evaluated by the administrators on the spot of administration.
- This method is easy and cost effective.
- Response rate of participants is optimal.
- The investigator can immediately assist respondents if there are any issues or uncertainty in the questionnaires.

4.3 PERCEPTION SCALES USED IN THE STUDY

A useful way of quantifying affective behaviours in survey research is to include a variety of scales. The forced responses are listed in such a way that the variables to be measured are arranged in numerical scores that are either ordinal, interval, or ratio in nature (Maree & Pietersen, 2007). The most commonly used scales are the Likert-type scale and the semantic differential scale.

This investigation included 4-point, 5-point, and 6-point Likert-type scales ranging from summated responses of 'Not at all' to 'Very much so'; 'Strongly disagree' to 'Strongly agree' and 'Almost never' to 'Almost always' for the CSAI-2, Bull's Mental Skills Questionnaire and the Coping Skills Inventory (ACSI-28) respectively. Respondents usually find Likert-type scales very user friendly. Respondents in this study were instructed to select one response from each question that best describes their thoughts, feelings, or behaviour relating to their experiences in cricket competitions and participation.

4.4 DATA PROCESSING AND STATISTICAL ANALYSIS

Data were analysed by making use of the IBM SPSS Statistical analysis package. The following statistical techniques were used to analyse the data:

Descriptive statistics: "Descriptive statistics is a medium for describing data in manageable forms" (Babbie, 1992, p. 430). Frequency analysis was used to describe the sample in terms of the demographics asked for in the questionnaire. Descriptive statistics were employed in this study to give an indication of mean performance by level of participation, specialised

position and batting order in cricket. These descriptive statistics included the number of participants, minimum and maximum values, mean scores and standard deviations.

Mean score: The mean score is used to describe central tendency. The mean score is computed by adding up all the applicable values and dividing the sum by the number of cases (Trochim, 2006).

Inferential statistics "assists you in drawing conclusions from your observations; typically, that involves drawing conclusions about a population from the study of a sample drawn from it" (Babbie, 1992, p. 430). Inferential statistics were used in this study to determine the differences in cricket players' perceptions of mental skills and their role in cricket. They were also used to determine whether statistically significant differences existed between various levels of cricket participation, specialised roles and batting orders in terms of the participants' sports-psychological-skills profiles and their somatic and cognitive anxiety scores as well as their levels of self-confidence. Due to smaller sample sizes, when dividing the total sample into level of participation, specialised role and batting position, parametric as well as non-parametric statistics were used to analyse the data. The non-parametric statistics were used to confirm the results obtained from the parametric statistics since the normal distribution of data cannot be assumed. The following inferential statistical analysis was performed to do the analysis:

- **Chi-square analysis:** Chi-square tests are used when the researcher has two nominal variables and wants to determine whether these variables are independent of each other. The data are cast in what is commonly referred to as a contingency table (Howell, 1992). This technique gives an indication of whether there is a statistically significant relationship between two variables. Cross-tabulations with chi-square analysis were used in this study to determine whether statistically significant relationships existed between the levels of cricket participation and the participants' perceptions of the importance of mental-skills usage in cricket, their knowledge and use of psychological-skills training, their perceived ability to be psychologically prepared for competitions, their previous experience and consultation with

sports psychologists and lastly, their expressed need to learn from psychological-skills training.

- **One-Way Analysis of Variance – Parametric statistic:** This type of analysis can be defined as follows: "Analysis of variance is used to compare two or more means to see if there are any reliable differences among them" (Tabachnick & Fidell, 1996, p. 37). These analyses were used in this study to determine whether statistically significant differences existed between the levels of participation, and the players' specialised roles and batting positions. As the sample sizes were relatively small and the data were not normally distributed, non-parametric techniques were employed to confirm these results. Non-parametric tests, also known as distribution-free tests, are a class of tests that do not rely on a parameter estimation and/or distribution assumptions (Howell, 1992). The major advantage attributed to these tests is that they do not rely on any seriously restrictive assumptions concerning the shape of the sampled populations and thus accommodate small samples, as in the case of this study. **The non-parametric Kruskal-Wallis One-Way Analysis of Variance** was used to confirm the results obtained by the parametric one-way analysis of variance. "The Kruskal-Wallis one-way analysis of variance is a direct generalization of the Wilcoxon rank-sum test to the case in which we have three or more independent groups. As such, it is the distribution-free analogue of the one-way analysis of variance. It tests the hypothesis that all samples were drawn from identical populations." (Howell, 1992, p. 622.)

4.5 CONCLUSION

This chapter discussed the methodological aspects of this investigation. It also explained the research process, the research design, the methodology used and the data-gathering procedures. Basic sampling terms recommended by Shaughnessy and Zechmeister (1997) were used to confine the target population into an appropriate sample frame. A pilot study using the applied questionnaire provided validity to ensure effective testing procedures and justification of the concepts and processes involved in determining the sample of cricketers'

psychological background information and their levels of mental-skills usage. The next chapter reveals the results of the study with a detailed analysis and interpretation.

CHAPTER FIVE

ANALYSIS AND INTERPRETATION OF RESULTS

5.1 INTRODUCTION

Chapter 3 described how mental skills could cultivate talent potential and facilitate peak athlete performances. A strong case was also made for the fact that successful cricket participation is to a great extent reliant on mental toughness, which encompasses various mental skills such as self-confidence, imagery and visualisation goals, coping skills and concentration. The investigative methodology underlying the results was explained in chapter 4, and this chapter attempts to present and interpret the cricket participants' views on psychological-skills usage in cricket (Appendix C, p. 210) and their responses to the different mental-skills inventories (Appendix D-F, pp. 213-219).

Statistical analysis of data was done by cross-tabulations with chi-square analysis to determine whether statistically significant relationships existed between the levels of cricket participation and the cricket player's perceptions of the psychological-skills usage in cricket. One-way analysis of variance (parametric statistic) was used to determine whether there were statistically significant differences between mental skills and the levels of participation, specialised roles and batting order. The non-parametric Kruskal-Wallis one-way analysis of variance was used to confirm the results obtained by the parametric one-way analysis of variance. Since this investigation made use of a descriptive research design that is exploratory in nature, in order to highlight any possible tendencies, the researcher will also report on findings that prove to be marginally significant.

5.2 ANALYSIS OF RESULTS

5.2.1 Section one: Background information on the respondents (Appendices B & C)

5.2.1.1 Demographics of the respondents (Figures 5-7; Appendix B)

The demographics of the sample are presented in Figures 5 to 7 (pp. 133-134). The sample consisted of 127 cricket players who participated at three progressive levels of cricket competition.

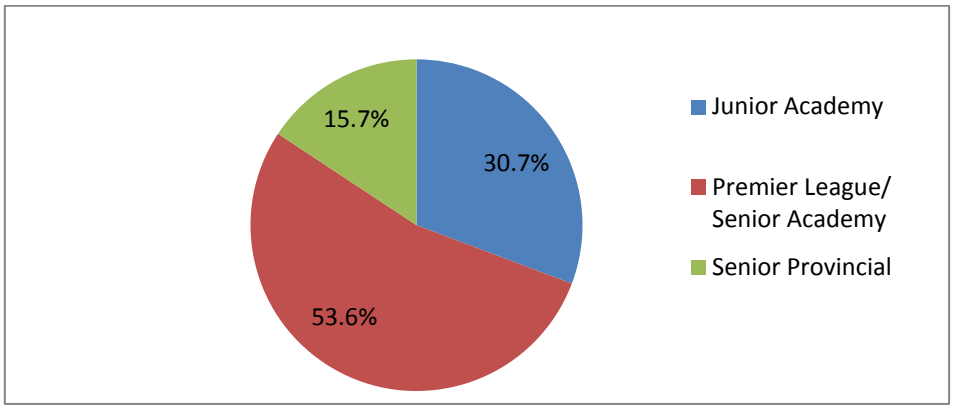

FIGURE 5: LEVEL OF PARTICIPATION IN CRICKET

More than half (53.6%) of the sample participated in cricket at Premier League/senior academy level. A third (30.7%) participated at junior academy level while the remaining 15.7% participated at first-class senior provincial level.

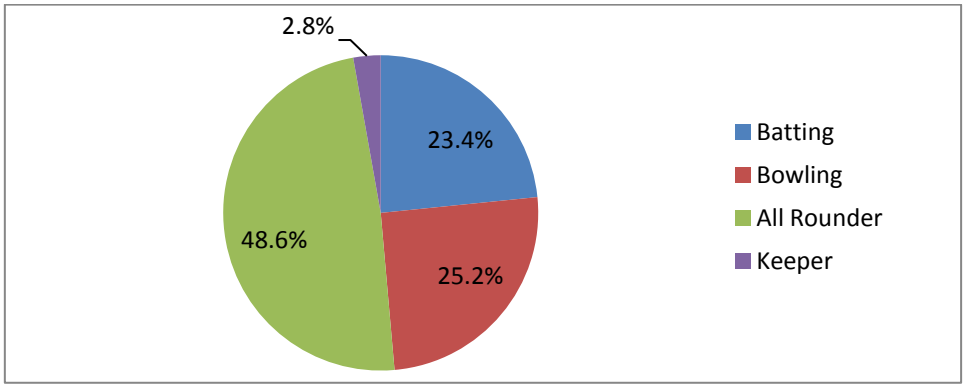

FIGURE 6: DISTRIBUTION OF SPECIALISED ROLES IN CRICKET

The results in Figure 6 indicate that almost half (48.6%) of these respondents were all-rounders, with a quarter being bowlers (25.2%) and batsmen (23.4%) respectively. Only a small percentage (2.8%) of the respondents were wicketkeepers.

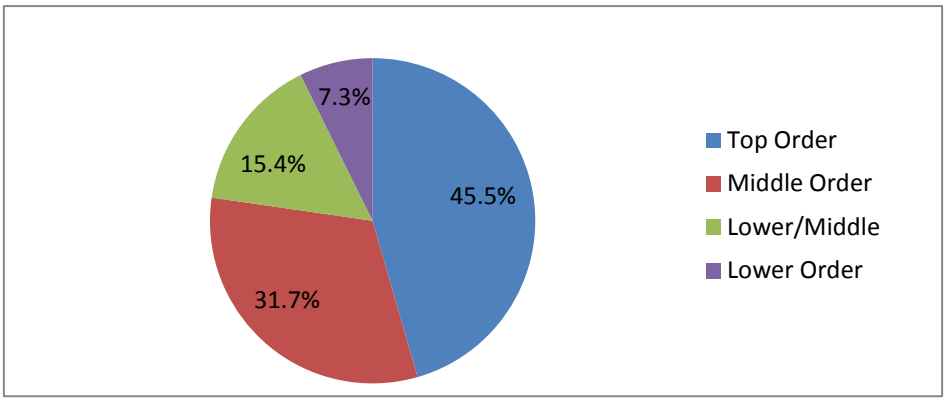

FIGURE 7: DISTRIBUTION OF BATTING ORDER IN CRICKET

Figure 7 illustrates that almost half (45.5%) of the players were top-order batsmen (batting order 1-4), followed by 31.7% middle-order batsmen (order 5-7). Lower-order/middle-order batsmen (order 8-9) were represented by 15.4% of the sample and only 7.3% were lower-order batsmen (order 10-11).

The respondents' self-reported batting form, bowling form and self-confidence are reflected in Tables 5 to 7, pp. 134 to 136. Perceptions in this section were assessed according to the respondents' agreement to the most appropriate 4-point Likert scale response available (Poor, Average, Good, Very good).

TABLE 5: PERCEIVED BATTING FORM

		Frequency	Percent	Valid Percent
Valid	Poor	14	11.0	11.5
	Average	56	44.1	45.9
	Good	52	41	42.6
	Total	122	96.1	100.0
Missing	System	5	3.9	
Total		127	100.0	

The results in Table 5 indicate that almost half (45.9%) of the respondents rated their batting form as average. A large part of the group (42.6%) perceived their batting form to be good. A

small portion of the group (11.5%) rated their batting form as poor. The criteria for rating one's batting is usually determined by one's average (the sum total of runs scored, divided by the number of dismissals) and strike rate (average number of runs scored per hundred balls faced). A good one-day cricket batsman usually has an average that ranges between 35 and 40 runs with an 80+ strike rate. Note that the players' responses to this question were not based on set criteria but on their own interpretation of performance standards that are relevant to their level of participation and their role in their respective teams.

TABLE 6: PERCEIVED BOWLING FORM

		Frequency	Percent	Valid Percent
Valid	Poor	4	3.1	3.9
	Average	45	35.4	43.7
	Good	54	42.5	52.5
	Total	103	81.1	100.0
Missing	System	24	18.9	
Total		127	100.0	

The results in Table 6 indicate that almost half (43.7%) of the respondents rated their bowling form as average. More than half (52.5%) perceived their bowling form to be good. Only 3.9% rated their bowling form poorly. The criteria for rating one's bowling are usually determined by one's average (number of runs conceded per wicket), economy rate (total runs conceded, divided by number of overs bowled) and strike rate (total number of deliveries bowled, divided by the number of wickets taken). A good one-day cricket bowler usually does not concede more than 4 runs per over, with a bowling average of 25 to 30 runs per wicket taken. Note that the players' responses to this question were not based on set criteria but on their own interpretation of performance standards that are relevant to their level of participation and their role in their respective team.

Based on the above results, it is evident that almost half of the respondents rated their foremost cricket performance tasks (bowling and batting) as good. Just below half rated these skills as average. Very few perceived their bowling or batting skills as being poor. Thus the conclusion to be drawn is that nearly half of the respondents are not completely satisfied with their performance.

TABLE 7: PERCEPTIONS OF SELF-CONFIDENCE

		Frequency	Percent	Valid Percent
Valid	Low	2	1.6	1.6
	Average	52	40.9	41.3
	High	72	56.7	57.2
	Total	126	99.2	100.0
Missing	System	1	.8	
Total		127	100.0	

When the respondents were requested to report on their levels of self-confidence (Table 7), 57.2% of the respondents rated their self-confidence as high, followed by 41.3% who rated it average. Only 1.6% rated it low. It is no surprise to see that the majority of cricket players in this study rated their self-confidence as high, since this is demonstrated to be a key psychological characteristic associated with success in cricket (Bull *et al.,* 2005; Gucciardi & Gordon, 2009; Weissensteiner *et al.,* 2009).

5.2.1.2 General psychological perspectives of the respondents (Tables 8-15; Appendix C)

Perceptions regarding the psychological background information were assessed according to the respondents' selection of the most appropriate 4-point Likert scale responses available ('Not at all'; 'Somewhat'; 'Moderately so'; 'Very much so'). As indicated previously, cross-tabulations with chi-square analysis were used to determine whether there were any relationships between the level of participation in cricket competition and respondents' perceptions of psychological-skills usage in this sport. These results are presented in Tables 8 to 15, pp. 137 to 148.

TABLE 8: PERCEPTIONS OF CRICKET PARTICIPATION AS EQUALLY MENTAL AND PHYSICAL RECORDED BY LEVEL OF PARTICIPATION

Crosstab

			Competitive Cricket Participation is as mental as it is physical.					
			0	Not at all	Somewhat	Moderately so	Very much so	Total
Level	Junior Academy	Count	1	1	2	6	28	38
		% within Level	2.6%	2.6%	5.3%	15.8%	73.7%	100.0%
		% within 'Competitive Cricket Participation is as mental as it is physical.'	100.0%	100.0%	28.6%	33.3%	28.3%	30.2%
	Premier League/Senior Academy	Count	0	0	3	9	56	68
		% within Level	.0%	.0%	4.4%	13.2%	82.4%	100.0%
		% within 'Competitive Cricket Participation is as mental as it is physical.'	.0%	.0%	42.9%	50.0%	56.6%	54.0%
	Senior Provincial	Count	0	0	2	3	15	20
		% within Level	.0%	.0%	10.0%	15.0%	75.0%	100.0%
		% within 'Competitive Cricket Participation is as mental as it is physical.'	.0%	.0%	28.6%	16.7%	15.2%	15.9%
Total		Count	1	1	7	18	99	126
		% within Level	.8%	.8%	5.6%	14.3%	78.6%	100.0%
		% within 'Competitive Cricket Participation is as mental as it is physical.'	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 8: Continued: Chi-square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-square	5.900[a]	8	.658
Likelihood Ratio	5.938	8	.654
Linear-by-Linear Association	.751	1	.386
N of Valid Cases	126		

a. 10 cells (66.7%) have expected count less than 5. The minimum expected count is .16.

The results in Table 8 indicate that 73.5% of the junior academy cricket players felt that cricket participation is as mental as it is physical. Most of the premier league/senior academy players agreed with this statement, by a percentage of 82.4%. The senior provincial players scored in between with a 75% of the respondents agreeing to this statement.

The results of the chi-square analysis confirmed that there is no statistically significant relationship between level of participation and this perception.

TABLE 9: PERCEPTIONS OF THE ROLE MENTAL SKILLS PLAY IN CRICKET PARTICIPATION AND PERFORMANCE BY LEVEL OF PARTICIPATION

			I think mental skills play an important role in successful cricket participation and performance.			
			Somewhat	Moderately so	Very much so	Total
Level	Junior Academy	Count	1	3	35	39
		% within Level	2.6%	7.7%	89.7%	100.0%
		% within 'I think mental skills play an important role in successful cricket participation and performance.'	50.0%	20.0%	31.8%	30.7%
	Premier League/Senior Academy	Count	0	11	57	68
		% within Level	.0%	16.2%	83.8%	100.0%
		% within 'I think mental skills play an important role in successful cricket participation and performance.'	.0%	73.3%	51.8%	53.5%
	Senior Provincial	Count	1	1	18	20
		% within Level	5.0%	5.0%	90.0%	100.0%
		% within 'I think mental skills play an important role in successful cricket participation and performance.'	50.0%	6.7%	16.4%	15.7%
Total		Count	2	15	110	127
		% within Level	1.6%	11.8%	86.6%	100.0%
		% within 'I think mental skills play an important role in successful cricket participation and performance.'	100.0%	100.0%	100.0%	100.0%

TABLE 9: Continued: Chi-square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-square	5.378[a]	4	.251
Likelihood Ratio	6.045	4	.196
Linear-by-Linear Association	.079	1	.779
N of Valid Cases	127		

a. 5 cells (55.6%) have expected count less than 5. The minimum expected count is .31.

When the respondents were asked whether they think mental skills play an important role in successful cricket participation and performance, they all agreed to the same extent that mental skills do in fact contribute towards success in cricket. A total of 89.7% of the junior academy players felt that mental skills are very important for cricket success and so did 83,8% of the premier league/senior academy players. The greatest number of agreements to this statement came from senior provincial players, with 90% of the respondents reporting on the contributing role of mental skills.

It is thus evident that, regardless of the level of cricket participation, the majority of respondents felt that mental skills are necessary for performance in cricket (see Table 9, pp. 138-139). The chi-square analysis confirmed that there was no statistically significant relationship between level of participation and agreement with this statement.

TABLE 10: PERCEPTIONS OF THE USE OF PSYCHOLOGICAL-SKILLS TRAINING IN AIDING CRICKET PERFORMANCE BY LEVEL OF PARTICIPATION (Value of psychological skills training)

			I think psychological skills-training is of little use in aiding cricket performance.				
			Not at all	Somewhat	Moderately so	Very much so	Total
Level	Junior Academy	Count	19	7	9	4	39
		% within Level	48.7%	17.9%	23.1%	10.3%	100.0%
		% within 'I think psychological-skills training is of little use in aiding cricket performance.'	27.1%	43.8%	40.9%	21.1%	30.7%
	Premier League/Senior Academy	Count	41	8	7	12	68
		% within Level	60.3%	11.8%	10.3%	17.6%	100.0%
		% within 'I think psychological-skills training is of little use in aiding cricket performance.'	58.6%	50.0%	31.8%	63.2%	53.5%
	Senior Provincial	Count	10	1	6	3	20
		% within Level	50.0%	5.0%	30.0%	15.0%	100.0%
		% within 'I think psychological-skills training is of little use in aiding cricket performance.'	14.3%	6.3%	27.3%	15.8%	15.7%
Total		Count	70	16	22	19	127
		% within Level	55.1%	12.6%	17.3%	15.0%	100.0%
		% within 'I think psychological-skills training is of little use in aiding cricket performance.'	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 10: Continued: Chi-square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-square	8.001[a]	6	.238
Likelihood Ratio	8.157	6	.227
Linear-by-Linear Association	.084	1	.772
N of Valid Cases	127		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is 2.52.

Respondents were more divided in their opinions regarding the use of psychological-skills training in aiding cricket participation and performance. Half of the junior academy and senior provincial players indicated that they did not agree at all that psychological skills training was of little use in aiding cricket performance. Just more than half (60.3%) of the premier league/senior academy players agreed with this. Almost a fifth (23.1%) of the junior academy players and a third (30%) of the senior provincial players felt that this statement was true to a moderate extent compared to 10.3% of the premier league/senior academy players.

The three levels of participation did not differ significantly in their opinion regarding this statement. Chi-square analysis has indicated that there was no statistically significant relationship between the level of participation and their opinion regarding the use of psychological skills training.

This result relates to the responses given in Tables 8 to 9 (pp. 137-139) and, therefore, corroborates the respondents' explicit positive view of psychological skills training as a means towards aiding cricket performance. Table 11 on the next page presents the respondents' general perception of their knowledge of the mental skills relating to effective cricket participation and performance.

TABLE 11: PERCEPTIONS OF THE USE OF PSYCHOLOGICAL-SKILLS TRAINING IN AIDING CRICKET PERFORMANCE BY LEVEL OF PARTICIPATION (Knowledge of mental skills)

			I have sufficient knowledge of mental skills relating to effective cricket participation and performance.				
			Not at all	Somewhat	Moderately so	Very much so	Total
Level	Junior Academy	Count	0	10	21	8	39
		% within Level	.0%	25.6%	53.8%	20.5%	100.0%
		% within' I have sufficient knowledge of mental skills relating to effective cricket participation and performance.'	.0%	31.3%	30.9%	30.8%	30.7%
	Premier League/Senior Academy	Count	0	19	33	16	68
		% within Level	.0%	27.9%	48.5%	23.5%	100.0%
		% within 'I have sufficient knowledge of mental skills relating to effective cricket participation and performance.'	.0%	59.4%	48.5%	61.5%	53.5%
	Senior Provincial	Count	1	3	14	2	20
		% within Level	5.0%	15.0%	70.0%	10.0%	100.0%
		% within 'I have sufficient knowledge of mental skills relating to effective cricket participation and performance.'	100.0%	9.4%	20.6%	7.7%	15.7%
Total		Count	1	32	68	26	127
		% within Level	.8%	25.2%	53.5%	20.5%	100.0%
		% within 'I have sufficient knowledge of mental skills relating to effective cricket participation and performance.'	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 11: Continued: Chi-square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-square	9.095[a]	6	.168
Likelihood Ratio	7.734	6	.258
Linear-by-Linear Association	.176	1	.675
N of Valid Cases	127		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is .16.

The results in Table 11, p. 142 reveal that only half of the junior academy and premier league/senior academy players have a moderate knowledge of the mental skills relating to effective cricket participation and performance. As expected of professional cricket players, more senior provincial players (70%) felt that they have moderate knowledge in this regard.

Even though the majority of senior provincial players have indicated that they had moderate knowledge of the mental skills relating to effective cricket participation, compared to half of the players at the other two levels who felt the same way, there was still no statistically significant relationship between level of participation and knowledge of mental skills.

TABLE 12: TIME SPENT ON PSYCHOLOGICAL-SKILLS TRAINING BY LEVEL OF PARTICIPATION

			I spend a lot of time on a psychological-skills-training programme to help exercise my mind in cricket.				
			Not at all	Somewhat	Moderately so	Very much so	Total
Level	Junior Academy	Count	15	16	8	0	39
		% within Level	38.5%	41.0%	20.5%	.0%	100.0%
		% within 'I spend a lot of time on a psychological-skills-training programme to help exercise my mind in cricket.'	25.0%	34.0%	50.0%	.0%	31.0%
	Premier League/Senior Academy	Count	36	26	4	2	68
		% within Level	52.9%	38.2%	5.9%	2.9%	100.0%
		% within 'I spend a lot of time on a psychological-skills-training programme to help exercise my mind in cricket.'	60.0%	55.3%	25.0%	66.7%	54.0%
	Senior Provincial	Count	9	5	4	1	19
		% within Level	47.4%	26.3%	21.1%	5.3%	100.0%
		% within 'I spend a lot of time on a psychological skills-training programme to help exercise my mind in cricket.'	15.0%	10.6%	25.0%	33.3%	15.1%
Total		Count	60	47	16	3	126
		% within Level	47.6%	37.3%	12.7%	2.4%	100.0%
		% within 'I spend a lot of time on a psychological-skills-training programme to help exercise my mind in cricket.'	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 12: Continued: Chi-square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-square	8.956[a]	6	.176
Likelihood Ratio	9.961	6	.126
Linear-by-Linear Association	.123	1	.726
N of Valid Cases	126		

a. 5 cells (41.7%) have expected count less than 5. The minimum expected count is .45.

Table 12, pp. 143-144 reveals that a greater number (41%) of junior academy players spent some time training in the cognitive aspects of cricket. However, 38.5% indicated that they do not spend any time on psychological-skills training. Furthermore, the majority of premier league/senior academy and senior provincial players indicated that they did not spend time on psychological-skills training or only did so to a small degree. The chi-square analysis confirmed that there was no statistically significant relationship between times spent on psychological-skills training and level of participation.

TABLE 13: PERCEPTIONS OF ABILITY TO BE PSYCHOLOGICALLY PREPARED FOR AN IMPORTANT MATCH

			I know how to psychologically prepare myself for an important match.				
			Not at all	Somewhat	Moderately so	Very much so	Total
Level	Junior Academy	Count	3	8	21	7	39
		% within Level	7.7%	20.5%	53.8%	17.9%	100.0%
		% within 'I know how to psychologically prepare myself for an important match.'	33.3%	20.0%	38.9%	29.2%	30.7%
	Premier League/Senior Academy	Count	5	27	26	10	68
		% within Level	7.4%	39.7%	38.2%	14.7%	100.0%
		% within 'I know how to psychologically prepare myself for an important match.'	55.6%	67.5%	48.1%	41.7%	53.5%
	Senior Provincial	Count	1	5	7	7	20
		% within Level	5.0%	25.0%	35.0%	35.0%	100.0%
		% within' 'I know how to psychologically prepare myself for an important match''	11.1%	12.5%	13.0%	29.2%	15.7%
Total		Count	9	40	54	24	127
		% within Level	7.1%	31.5%	42.5%	18.9%	100.0%
		% within 'I know how to psychologically prepare myself for an important match.'	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 13: Continued: Chi-square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-square	8.498[a]	6	.204
Likelihood Ratio	8.064	6	.233
Linear-by-Linear Association	.090	1	.764
N of Valid Cases	127		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is 1.42.

Question 6 in the Psychological Background Questionnaire (Appendix C, p. 210) prompted the respondents to pick the most appropriate response given to whether they knew how to prepare themselves psychologically for an important match. More than 50% of the respondents felt that they were somewhat or moderately able to prepare themselves psychologically for important matches. This was the case regardless of

their level of participation. Strangely, the majority (53.8%) of the junior academy players indicated that they are moderately able to prepare themselves for an important game, compared to 38.2% of the premier league/senior academy players and 35% of the senior provincial players. Very few felt that they were not able to prepare themselves psychologically. The results of the chi-square analysis confirmed that there was no statistically significant relationship between level of participation and the ability to psychologically prepare for an important competition.

Table 14 reveals the extent to which players consult sports psychologists or mental skills coaches to improve their performance in cricket.

TABLE 14: PREVALENCE OF CONSULTING A SPORTS PSYCHOLOGIST OR MENTAL COACH BY LEVEL OF PARTICIPATION

			I have consulted a sports psychologist/mental skills coach in the past to improve my performance in cricket.				
			Not at all	Somewhat	Moderately so	Very much so	Total
Level	Junior Academy	Count	12	14	5	8	39
		% within Level	30.8%	35.9%	12.8%	20.5%	100.0%
		% within 'I have consulted a sports psychologist/mental skills coach in the past to improve my performance in cricket.'	22.2%	40.0%	26.3%	42.1%	30.7%
	Premier League/Senior Academy	Count	34	16	12	6	68
		% within Level	50.0%	23.5%	17.6%	8.8%	100.0%
		% within 'I have consulted a sports psychologist/mental skills coach in the past to improve my performance in cricket.'	63.0%	45.7%	63.2%	31.6%	53.5%
	Senior Provincial	Count	8	5	2	5	20
		% within Level	40.0%	25.0%	10.0%	25.0%	100.0%
		% within 'I have consulted a sports psychologist/mental skills coach in the past to improve my performance in cricket.''	14.8%	14.3%	10.5%	26.3%	15.7%
Total		Count	54	35	19	19	127
		% within Level	42.5%	27.6%	15.0%	15.0%	100.0%
		% within 'I have consulted a sports psychologist/mental skills coach in the past to improve my performance in cricket.'	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 14: Continued: Chi-square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-square	8.263[a]	6	.219
Likelihood Ratio	8.305	6	.217
Linear-by-Linear Association	.312	1	.576
N of Valid Cases	127		

a. 2 cells (16.7%) have expected count less than 5. The minimum expected count is 2.99.

No statistically significant relationship was found between the level of participation and whether players consulted a sports psychologist or mental skills coach. A third to half of the players indicated that they have not consulted these professionals. A quarter of the junior academy and senior provincial players have consulted these professionals to a greater extent.

It is thus evident from the results that junior academy and senior provincial players are more likely to opt for mental support than cricket players competing at premier league/senior academy level.

TABLE 15: EXPRESSED NEED TO LEARN FROM PSYCHOLOGICAL SKILLS TRAINING BY LEVEL OF PARTICIPATION

Level * I want to learn more about psychological-skills training. Cross-tabulation

			I want to learn more about psychological-skills training.				
			Not at all	Somewhat	Moderately so	Very much so	Total
Level	Junior Academy	Count	0	6	17	15	38
		% within Level	.0%	15.8%	44.7%	39.5%	100.0%
		% within 'I want to learn more about psychological-skills training.'	.0%	31.6%	38.6%	25.4%	30.2%
	Premier League/Senior Academy	Count	4	13	21	30	68
		% within Level	5.9%	19.1%	30.9%	44.1%	100.0%
		% within 'I want to learn more about psychological –'skills training.'	100.0%	68.4%	47.7%	50.8%	54.0%
	Senior Provincial	Count	0	0	6	14	20
		% within Level	.0%	.0%	30.0%	70.0%	100.0%
		% within 'I want to learn more about psychological-skills training.'	.0%	.0%	13.6%	23.7%	15.9%
Total		Count	4	19	44	59	126
		% within Level	3.2%	15.1%	34.9%	46.8%	100.0%
		% within 'I want to learn more about psychological-skills training'	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 15: Continued: Chi-square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-square	11.519[a]	6	.074
Likelihood Ratio	15.654	6	.016
Linear-by-Linear Association	2.406	1	.121
N of Valid Cases	126		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is .63.

The results in Table 15, p. 148 indicate that the majority (70%) of senior provincial players expressed a need to learn more about psychological-skills training, compared to only 44.1% of premier league/senior academy players and 39.5% of junior academy players.

The results of the chi-square analysis indicated that there was a statistically significant relationship between level of participation and the expressed need to learn more about psychological-skills training. This relationship was significant at the 0.10 level of significance (90% confidence interval).

Overall results obtained from the respondents' general psychological background information (Tables 8-15) revealed that the respondents, regardless of level of participation, have insufficient exposure, training and knowledge of the psychological aspects associated with cricket performance. It is apparent that cricket players from all three levels of participation spent inadequate time on psychological-skills training and focus most of their attention on the physiological and skills-related aspects of the game.

Section two of the results reflects the cricket participants' coping skills, mental skills, and anxiety scores in relation to their level of participation, respective role on the field and batting order. As mentioned previously, all the analyses were performed by making use of ANOVA. Kruskall-Wallis Tests were used to confirm the results of the ANOVA tests.

5.2.2 Section two: Psychological-skills profiles of the respondents (Appendices D-F)

Mental skills were assessed by means of standardised psychometric instruments that included 4-point, 5-point, and 6-point Likert-type scales ranging from summated responses of 'Not at all' to 'Very much so'; 'Strongly disagree' to 'Strongly agree' and 'Almost never to 'Almost always' for the CSAI-2, Bull's Mental Skills Questionnaire and the Athletic Coping Skills Inventory respectively.

One-way analysis of variance (parametric statistic) was used to determine whether statistically significant differences existed between mental skills and the levels of participation, specialised roles and batting order. These results are presented in Tables 16 to 24 (pp. 150-163).

5.2.2.1 Performance by level of participation in cricket

a) Coping skills by level of participation (Table 16; Appendix D)

TABLE 16: COPING SKILLS BY LEVEL OF PARTICIPATION (Appendix D, p. 213)

		Mean	Std. Deviation	Minimum	Maximum	p-value
Coping with adversity	Junior Academy/Secondary School Level	64.10	19.51	8.33	100.00	.972
	Premier League Club/Senior Academy Level	63.76	17.63	16.67	100.00	
	Senior Provincial Level	62.92	18.03	25.00	100.00	
	Total	63.59	18.15	8.33	100.00	
Coachability	Junior Academy/Secondary School Level	77.99	15.35	41.67	100.00	.640
	Premier League Club/Senior Academy Level	77.56	18.98	25.00	100.00	
	Senior Provincial Level	73.75	15.12	50.00	100.00	
	Total	76.43	17.25	25.00	100.00	
Concentration	Junior Academy/Secondary School Level	69.01	13.38	33.33	100.00	.177
	Premier League Club/Senior Academy Level	65.64	15.42	25.00	91.67	
	Senior Provincial Level	61.40	15.01	41.67	91.67	
	Total	65.35	14.83	25.00	100.00	
Confidence and motivation	Junior Academy/Secondary School Level	78.07	13.06	41.67	100.00	.137
	Premier League Club/Senior Academy Level	71.79	16.18	16.67	100.00	
	Senior Provincial Level	75.92	18.72	25.00	100.00	
	Total	75.26	15.82	16.67	100.00	

Goal setting and mental preparation	Junior Academy/Secondary School Level	56.83	21.45	.00	83.33	.690
	Premier League Club/Senior Academy Level	53.58	23.66	.00	100.00	
	Senior Provincial Level	57.50	20.75	25.00	100.00	
	Total	55.98	22.43	.00	100.00	
Peaking under pressure	Junior Academy/Secondary School Level	72.64	18.43	33.33	100.00	.145
	Premier League Club/Senior Academy Level	70.70	19.41	33.33	100.00	
	Senior Provincial Level	61.84	24.74	8.33	100.00	
	Total	68.39	20.16	8.33	100.00	
Freedom from worry	Junior Academy/Secondary School Level	49.78	23.61	.00	100.00	.487
	Premier League Club/Senior Academy Level	48.35	22.98	.00	100.00	
	Senior Provincial Level	42.10	24.29	.00	83.33	
	Total	46.75	23.32	.00	100.00	

According to the results in Table 16, pp. 150-151, the three levels of participation performed similarly on coping with adversity, coachability, and goal setting and mental preparation. The coping skills that were most prominently displayed by all respondents were coachability (average = 76.43%), and confidence and motivation (average = 75.26%). The skills that scored the lowest amongst the respondents were goal setting and mental preparation (average = 55.98%), along with freedom from worry (average = 46.75%).

The **senior provincial level** respondents obtained the lowest scores of the group when it came to concentration, peaking under pressure, and freedom from worry. They were, however, the strongest in goal setting and mental preparation, but without any real difference from the other two groups.

The **premier league/senior academy** respondents scored the lowest in terms of confidence and motivation, as well as goal setting and mental preparation. They did not stand out above the other participants in any of the other coping skills.

The **junior academy** respondents scored low on freedom from worry. They did, however, outscore the other respondents in coping with adversity, coachability, concentration, confidence and motivation, and peaking under pressure.

Generally speaking, the junior academy cricket players demonstrated the best total coping-skills score (66.92%) of both the senior provincial (62.21%) and premier league cricket players (64.49%). This is presumably due to the less competitive demands that are placed on cricketers at different levels of participation. It could be that junior academy participants score high on coping skills because the performance demands they face are less daunting than those being experienced at senior club and senior provincial levels.

The results of the Anova analysis indicated that the above differences in scores on the ACSI-28 subscales were not statistically significant. These results were confirmed by the non-parametric Kruskall-Wallis tests.

b) Mental skills by level of participation (Table 17; Appendix E)

TABLE 17: MENTAL SKILLS BY LEVEL OF PARTICIPATION (APPENDIX E, p. 216)

		Mean	Std. Deviation	Minimum	Maximum	p-value
Imagery ability	Junior Academy/Secondary School Level	69.23	14.33	33.33	95.83	.113
	Premier League Club/Senior Academy Level	75.14	13.39	45.83	100.00	
	Senior Provincial Level	69.68	20.10	25.00	100.00	
	Total	71.35	15.02	25.00	100.00	
Mental preparation	Junior Academy/Secondary School Level	65.65	18.04	16.67	100.00	.491
	Premier League Club/Senior Academy Level	66.79	17.21	25.00	100.00	
	Senior Provincial Level	71.27	13.81	45.83	100.00	
	Total	67.90	16.96	16.67	100.00	
Self-confidence	Junior Academy/Secondary School Level	71.60	17.51	29.17	100.00	.835
	Premier League Club/Senior Academy Level	73.29	14.74	41.67	100.00	
	Senior Provincial Level	74.02	19.01	37.50	95.83	
	Total	72.97	16.17	29.17	100.00	
Anxiety and worry management	Junior Academy/Secondary School Level	63.57	17.93	25.00	100.00	.199
	Premier League Club/Senior Academy Level	68.06	18.57	25.00	100.00	
	Senior Provincial Level	59.79	23.11	16.67	91.67	
	Total	63.81	19.27	16.67	100.00	
Concentration ability	Junior Academy/Secondary School Level	69.85	19.14	29.17	100.00	.865
	Premier League Club/Senior Academy Level	71.78	18.52	16.67	100.00	
	Senior Provincial Level	72.08	21.59	33.33	100.00	
	Total	71.24	19.09	16.67	100.00	

Relaxation ability	Junior Academy/Secondary School Level	68.47	16.74	33.33	91.67	.530
	Premier League Club/Senior Academy Level	70.32	16.48	29.17	100.00	
	Senior Provincial Level	65.63	16.76	37.50	91.67	
	Total	68.14	16.55	29.17	100.00	
Motivation	Junior Academy/Secondary School Level	78.18	14.80	33.33	100.00	.774
	Premier League Club/Senior Academy Level	79.91	13.78	37.50	100.00	
	Senior Provincial Level	80.92	19.16	33.33	100.00	
	Total	79.67	14.91	33.33	100.00	

The three levels of participation performed very similarly on the Bulls' Mental Skills subscales (see Table 17, pp. 152-153). The mental skills that were most strongly represented by the respondents were motivation (average = 79.67%), and self-confidence (average = 72.97%). The skills in which the respondents scored the lowest were anxiety and worry management (average = 63.81%), and mental preparation (average = 67.90%).

The **senior provincial level** respondents demonstrated the highest proficiency in motivation, relaxation ability, concentration ability, self-confidence and mental preparation. Regardless of scoring the highest in the majority of the mental skills tested, they did appear to demonstrate the weakest anxiety and worry management scores.

The **premier league/senior academy level** respondents scored more or less the same for all the mental skills tested. They did indicate the strongest imagery ability, and anxiety and worry management scores of all respondents. The lowest score recorded for premier league/senior club respondents was mental preparation, which nevertheless, still outscored the junior academy level respondents.

The **junior academy level respondents** were outscored by the respondents in the other two levels in most of all the mental skills tested. Like respondents in the other two levels, they indicated high scores in motivation, and self-confidence.

One-way analysis of variance indicated that there were no statistically significant differences between the three levels of participation, in terms of their performance on any of the Bulls' subscales. This was confirmed by the non-parametric analysis.

Thus, the conclusion to be drawn is that there is no significant difference between the coping skills or mental skills qualities of junior, senior and provincial cricket players.

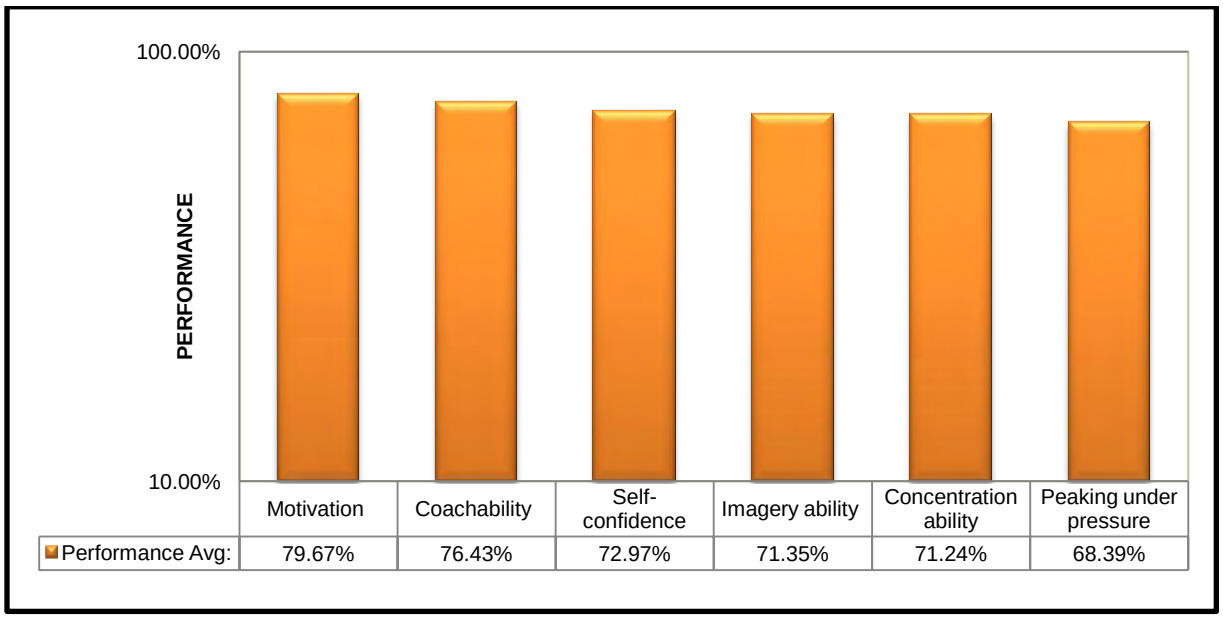

FIGURE 8: REPRESENTATION OF MENTAL SKILLS WITH THE HIGHEST RECORDED SCORES BY ALL PARTICIPANTS

The results in Figure 8 identify the mental skills from both psychometric measures in which the participants from all three levels of competition recorded the highest scores. It is apparent that a mental-skills profile consisting of motivation, coachability, self-confidence, imagery ability, concentration ability, and peaking under pressure is evident in successful cricket participation.

c) Levels of anxiety by level of participation (Table 18; Appendix F)

TABLE 18: LEVELS OF ANXIETY BY LEVEL OF PARTICIPATION (Appendix F, p. 219)

		Mean	Std. Deviation	Minimum	Maximum	p-value
Cognitive anxiety	Junior Academy/Secondary School Level	55.64	15.22	25.00	88.89	.332
	Premier League Club/Senior Academy Level	58.88	13.04	25.00	80.56	
	Senior Provincial Level	61.85	15.12	41.67	88.89	
	Total	58.79	14.08	25.00	88.89	
Somatic anxiety	Junior Academy/Secondary School Level	53.36	15.64	25.00	89.29	.643
	Premier League Club/Senior Academy Level	55.36	13.99	25.00	78.57	
	Senior Provincial Level	57.59	18.11	25.00	85.71	
	Total	55.43	15.06	25.00	89.29	
Self-confidence	Junior Academy/Secondary School Level	72.93	14.91	47.22	97.22	.069*
	Premier League Club/Senior Academy Level	69.58	13.13	36.11	94.44	
	Senior Provincial Level	77.94	10.60	58.33	94.44	
	Total	73.48	13.54	36.11	97.22	

p<0.10*

The results in Table 18 indicate that the various levels of participation performed similarly in terms of cognitive anxiety, and somatic anxiety scores. No statistically significant differences were found. However, there was a statistically significant difference between the three levels in terms of self-confidence ($p < 0.10$).

The **senior provincial level** respondents had higher scores on self-confidence than the premier league/senior academy level respondents. This difference was significant at the 0.10 level of significance. This difference was confirmed by the non-parametric analysis.

The **premier league/senior academy level** respondents scored slightly higher than the junior academy level respondents and slightly lower than the senior provincial level respondents in both cognitive and somatic anxiety. They recorded the lowest self-confidence score compared to the respondents from other levels.

The **junior academy level** respondents on the other hand recorded the lowest levels of cognitive and somatic anxiety. They recorded relatively high levels of self-confidence.

5.2.2.2 Performance by specialised role in cricket

a) Coping skills by specialised role (Table 19; Appendix D)

The fact that only three of the players indicated that they were wicketkeepers, means that this group will be excluded from further analysis due to underrepresentation.

TABLE 19: COPING SKILLS BY SPECIALISED ROLE (Appendix D, p. 213)

		Mean	Std. Deviation	Minimum	Maximum	p-value
Coping with adversity	Batting	60.42	15.97	25.00	83.33	.585
	Bowling	65.12	18.35	16.67	100.00	
	All-rounder	64.22	17.42	25.00	100.00	
	Total	63.25	17.27	16.67	100.00	
Coachability	Batting	77.43	12.88	50.00	100.00	.771
	Bowling	78.09	17.78	41.67	100.00	
	All-rounder	75.33	19.00	25.00	100.00	
	Total	76.94	17.30	25.00	100.00	
Concentration	Batting	66.67	12.53	50.00	91.67	.798
	Bowling	65.71	14.40	41.67	91.67	
	All-rounder	68.00	15.46	25.00	100.00	
	Total	67.79	14.43	25.00	100.00	
Confidence and motivation	Batting	68.94	17.85	33.33	100.00	.207
	Bowling	77.33	10.63	50.00	91.67	
	All-rounder	74.67	18.02	16.67	100.00	
	Total	73.64	16.53	16.67	100.00	
Goal setting and mental preparation	Batting	55.43	20.96	8.33	83.33	.541
	Bowling	59.88	25.84	.00	100.00	
	All-rounder	53.92	21.43	.00	100.00	
	Total	56.41	22.50	.00	100.00	
Peaking under pressure	Batting	65.97	15.91	33.33	100.00	.233
	Bowling	67.63	25.53	33.33	100.00	
	All-rounder	73.69	19.18	8.33	100.00	
	Total	69.09	20.43	8.33	100.00	
Freedom from worry	Batting	44.10	21.91	.00	75.00	.364
	Bowling	48.08	22.77	.00	91.67	
	All-rounder	51.96	22.89	.00	100.00	
	Total	48.04	22.64	.00	100.00	

It is clear from Table 19, p. 156 that coachability, and confidence and motivation are the two highest recorded coping skills (76.94% and 73.64% respectively) amongst the various roles played in cricket. The two lowest recorded skills were freedom from worry (48.04%), and goal setting and mental preparation (56.41%).

The **batting positions** seemed to have lower scores in terms of coping with adversity, confidence and motivation, peaking under pressure, and freedom from worry, than the other two positions. The skill which recorded the highest for the batting group was coachability. The batting group reached a total coping-skills score of 62.56%.

Bowlers, on the other hand, demonstrated the highest scores in coping with adversity, coachability, goal setting and mental preparation, and confidence and motivation. The only score in which they recorded the lowest of all the other roles was concentration. The bowlers in the end scored an average total coping-skills score of 65.97%.

All-rounders had the highest scores in terms of concentration, peaking under pressure, and freedom from worry. They recorded the lowest score in goal setting and mental preparation. The all-rounders reached a total coping-skills score of 65.96% which almost equals the coping-skills score of the bowlers.

In the end, none of the above differences between batsmen, bowlers and all-rounders were statistically significant as confirmed by both the parametric and non-parametric analysis of the data.

b) Mental skills by specialised role (Table 20; Appendix E)

TABLE 20: MENTAL SKILLS BY SPECIALISED ROLE (Appendix E, p. 216)

		Mean	Std. Deviation	Minimum	Maximum	p-value
Imagery ability	Batting	69.44	17.01	33.33	100.00	.099*
	Bowling	68.83	15.73	25.00	91.67	
	All-rounder	75.68	13.38	50.00	100.00	
	Total	71.32	15.14	25.00	100.00	
Mental preparation	Batting	65.83	15.36	37.50	100.00	.776
	Bowling	69.10	14.69	29.17	95.83	
	All-rounder	66.91	17.65	16.67	100.00	
	Total	67.27	16.32	16.67	100.00	
Self-confidence	Batting	70.65	13.96	41.67	95.83	.459
	Bowling	73.56	16.37	37.50	100.00	
	All-rounder	75.49	15.58	41.67	100.00	
	Total	73.23	15.41	37.50	100.00	
Anxiety and worry management	Batting	66.15	17.30	37.50	100.00	.994
	Bowling	66.50	15.75	25.00	87.50	
	All-rounder	66.67	21.38	25.00	100.00	
	Total	66.10	18.99	25.00	100.00	
Concentration ability	Batting	69.33	18.67	29.17	100.00	.779
	Bowling	73.00	16.50	37.50	100.00	
	All-rounder	71.24	19.026	16.67	100.00	
	Total	71.20	18.21	16.67	100.00	
Relaxation ability	Batting	64.00	16.31	33.33	87.50	.251
	Bowling	69.87	15.82	33.33	100.00	
	All-rounder	70.42	16.42	29.17	100.00	
	Total	68.10	16.31	29.17	100.00	
Motivation	Batting	77.08	17.07	33.33	100.00	.104
	Bowling	74.36	16.19	33.33	100.00	
	All-rounder	81.86	13.59	37.50	100.00	
	Total	77.76	15.34	33.33	100.00	

*$p<0.10$

A comparison of the performance on the Bull's Mental Skills scores (Table 20) of the various specialised roles in cricket indicated that the various roles performed similarly on the majority of the subscales. The two highest-recorded mental skills for all three roles were self-confidence (73.23%) and motivation (77.76%). The two lowest-scored mental skills were mental preparation (67.27%), and anxiety and worry management (66.10%).

The **batting positions** seemed to have scored lower than the other two positions in mental preparation, self-confidence, concentration ability, and relaxation ability. This difference was, however, not statistically significant.

The **bowlers** turned out to be the strongest in mental preparation, and concentration ability but also at no statistically significant level.

The **all-rounders** had significantly higher imagery ability scores than the other two roles. Anova tests indicated that this difference was significant at a 90% confidence interval ($p < 0.10$). The non-parametric analysis, however, did not confirm that this difference was significant and, due to the relatively small base sizes of the different specialised roles, these results were interpreted with caution. The motivation scores of the all-rounders also seemed to be significantly higher than the bowling positions. Anova analysis indicated that this was not statistically significant, though this difference was considered statistically significant at the 0.10 level of significance, when looking at the results of the non-parametric analysis. Due to the fact that the base sizes are small and normality cannot be assumed, the results of the non-parametric analysis will be accepted. Based on the above tendencies, it can be assumed that all-rounders are somewhat more psychologically skilled cricketers than bowlers or batsmen.

c) Levels of anxiety by specialised role (Table 21; Appendix F)

TABLE 21: LEVELS OF ANXIETY BY SPECIALISED ROLE (Appendix F, p. 219)

		Mean	Std. Deviation	Minimum	Maximum	p-value
Cognitive anxiety	Batting	61.11	14.67	33.33	88.89	.309
	Bowling	56.61	13.57	36.11	88.89	
	All-rounder	55.34	13.64	25.00	80.56	
	Total	57.69	13.90	25.00	88.89	
Somatic anxiety	Batting	55.00	18.29	25.00	89.29	.751
	Bowling	51.71	13.36	28.57	71.43	
	All- rounder	54.10	14.61	25.00	85.71	
	Total	55.60	15.08	25.00	89.29	
Self-confidence	Batting	70.18	13.85	47.22	94.44	.680
	Bowling	73.33	11.05	50.00	94.44	
	All-rounder	73.07	13.93	36.11	97.22	
	Total	72.19	13.09	36.11	97.22	

As can be seen in Table 21 the various specialised roles performed similarly on the subscales of the **CSAI-2**. Statistical analysis of the data confirmed that there were no statistically significant differences between the specialised positions in terms of cognitive anxiety; somatic anxiety and self-confidence.

5.2.2.3 Performance by batting order in cricket

The results of the above analysis are presented in Tables 22 to 24 (pp. 161-164). When the total sample is divided according to batting order, the sample sizes became fairly small, especially for the lower-order batting groups that consisted of only nine players. The results of the parametric analysis will thus be interpreted with caution in favour of the results of the non-parametric analysis, since the normal distribution of data cannot be assumed.

a) Coping skills by batting order (Table 22; Appendix D)

TABLE 22: COPING SKILLS BY BATTING ORDER (Appendix D, p. 213)

		Mean	Std. Deviation	Minimum	Maximum	p-value
Coping with adversity	Top order	64.81	17.63	8.33	100.00	.717
	Middle order	64.32	16.77	33.33	100.00	
	Lower/Middle	64.04	18.01	25.00	91.67	
	Lower order	57.41	22.99	16.67	83.33	
	Total	62.65	17.72	8.33	100.00	
Coachability	Top order	75.16	16.05	41.67	100.00	.047*
	Middle order	77.78	19.34	25.00	100.00	
	Lower/Middle	72.37	15.23	50.00	100.00	
	Lower order	90.74	10.58	66.67	100.00	
	Total	79,01	17.15	25.00	100.00	
Concentration	Top order	66.98	15.86	25.00	100.00	.690
	Middle order	66.03	14.09	41.67	91.67	
	Lower/Middle	62.50	13.18	41.67	83.33	
	Lower order	68.52	16.02	41.67	91.67	
	Total	66.01	14.84	25.00	100.00	
Confidence and motivation	Top order	73.72	16.94	25.00	100.00	.983
	Middle order	75.00	14.56	41.67	100.00	
	Lower/Middle	74.07	17.59	16.67	91.67	
	Lower order	75.00	10.21	58.33	91.67	
	Total	74.44	15.70	16.67	100.00	
Goal setting and mental preparation	Top order	55.35	22.53	.00	91.67	.963
	Middle order	54.91	20.12	8.33	100.00	
	Lower/Middle	53.51	25.81	8.33	100.00	
	Lower order	58.33	27.95	.00	100.00	
	Total	55.52	22.49	.00	100.00	
Peaking under pressure	Top order	69.91	18.77	8.33	100.00	.902
	Middle order	70.09	18.99	33.33	100.00	
	Lower/Middle	70.61	24.27	33.33	100.00	
	Lower order	64.81	26.28	33.33	100.00	
	Total	68.85	20.16	8.33	100.00	
Freedom from worry	Top order	44.14	20.77	.00	100.00	.310
	Middle order	51.50	24.84	.00	100.00	
	Lower/Middle	53.94	23.79	.00	91.67	
	Lower order	49.07	28.09	.00	91.67	
	Total	49.66	23.23	.00	100.00	

$p<0.05^*$

Performance on the subscales of the **ACSI-28**, was mostly the same, regardless of batting order. The two most prominent coping skills in cricket batting were coachability (79%), and confidence and motivation (74.44%). The lowest-recorded skills were goal setting and mental preparation (55.52%), and freedom from worry (49.66%).

The **top order, middle and lower/middle order batsmen** performed the same for all the coping-skills except, in freedom from worry, the top order recorded the lowest score. The total coping skills-score for the top order was 64.29% followed by the lower/middle (64.43%) and middle order batsmen (65.64%).

The **lower-order (10-11)** group had significantly higher coachability scores than the rest of the batting-order groupings. The statistical significance of this difference was confirmed by both the analysis of variance and the Kruskall-Wallis tests at the 0.05 level of significance. The **lower-order group** had the highest total coping-skills score (66.26%) of all batting order groupings.

Further analyses comparing the relationship between batting order and mental skills are displayed in Table 23.

b) Mental skills by batting order (Table 23; Appendix E)

TABLE 23: MENTAL SKILLS BY BATTING ORDER (Appendix E, p. 216)

		Mean	Std. Deviation	Minimum	Maximum	p-value
Imagery ability	Top order	73.56	14.57	45.83	100.00	.404
	Middle order	71.73	14.37	33.33	100.00	
	Lower/Middle	75.26	12.95	45.83	95.83	
	Lower order	65.74	16.11	45.83	91.67	
	Total	71.57	14.41	33.33	100.00	
Mental preparation	Top order	65.72	19.18	16.67	100.00	.721
	Middle order	66.88	14.18	37.50	100.00	
	Lower/Middle	71.06	16.51	29.17	95.83	
	Lower order	68.23	18.49	29.17	91.67	
	Total	67.72	17.09	16.67	100.00	

Self-confidence	Top order	70.44	15.87	29.17	100.00	.388
	Middle order	74.34	16.31	41.67	100.00	
	Lower/Middle	77.55	15.59	50.00	100.00	
	Lower order	71.35	20.10	37.50	95.83	
	Total	73.42	16.27	29.17	100.00	
Anxiety and worry management	Top order	63.27	16.86	29.17	100.00	.646
	Middle order	65.13	22.54	16.67	100.00	
	Lower/Middle	69.44	22.14	25.00	100.00	
	Lower order	68.75	10.20	54.17	83.33	
	Total	66.65	19.30	16.67	100.00	
Concentration ability	Top order	71.74	17.64	33.33	100.00	.739
	Middle order	69.23	21.66	16.67	100.00	
	Lower/Middle	73.68	15.72	41.67	100.00	
	Lower order	76.19	19.50	37.50	100.00	
	Total	72.71	18.74	16.67	100.00	
Relaxation ability	Top order	68.32	16.65	29.17	91.67	.807
	Middle order	68.31	17.48	37.50	100.00	
	Lower/Middle	72.45	17.45	33.33	100.00	
	Lower order	70.37	10.91	50.00	83.33	
	Total	69.86	16.57	29.17	100.00	
Motivation	Top order	78.70	15.73	33.33	100.00	.063*
	Middle order	83.01	12.03	50.00	100.00	
	Lower/Middle	78.29	12.92	58.33	100.00	
	Lower order	68.52	21.46	33.33	91.67	
	Total	77,13	14.98	33.33	100.00	

p<0.10*

In Table 23, pp. 162-163, the various batting orders seemed to have performed similarly. The two mental skills that were most strongly represented by the batting-order groupings in cricket were self-confidence (73.42%), and motivation (77.13%). The lowest recorded mental skills were mental preparation (67.72%), and anxiety and worry management (66.65%).

The **top, middle and lower/middle order** groups recorded similar scores for the various mental skills tested. The **lower/middle order** group did, however, score the highest of all groups in imagery ability, mental preparation, self-confidence, anxiety and worry management, and relaxation ability. The statistical analysis confirmed that there were no statistically significant differences between these three groupings of batting order on any of the mental skills subscales.

The **lower batting (10-11)** order obtained lower scores in terms of imagery ability and motivation. One-way analysis of variance indicated that there was a statistically significant difference between the batting orders in terms of motivation. This difference was significant at the 0.10 level of significance. The **lower order** group had significantly lower motivation scores than the rest of the players.

c) Levels of anxiety by batting order (Table 24; Appendix F)

TABLE 24: LEVELS OF ANXIETY BY BATTING ORDER (Appendix F, p. 219)

		Mean	Std. Deviation	Minimum	Maximum	p-value
Cognitive anxiety	Top order	60.88	13.83	25.00	83.33	.237
	Middle order	56.51	14.33	25.00	88.89	
	Lower/Middle	52.99	13.00	36.11	69.44	
	Lower order	55.56	15.99	36.11	88.89	
	Total	58.49	14.15	25.00	88.89	
Somatic anxiety	Top order	57.43	14.99	25.00	85.71	.256
	Middle order	54.55	16.29	25.00	89.29	
	Lower/Middle	51.43	12.50	28.57	71.43	
	Lower order	48.02	13.73	28.57	67.86	
	Total	52.86	15.09	25.00	89.29	
Self-confidence	Top order	71.47	14.44	41.67	97.22	.690
	Middle order	70.75	13.99	36.11	94.44	
	Lower/Middle	72.55	10.89	50.00	91.67	
	Lower order	77.08	12.04	58.33	94.44	
	Total	72.96	13.53	36.11	97.22	

The performances of the **various batting orders** in terms of cognitive anxiety, somatic anxiety and self-confidence did not differ significantly from one another. The statistical analysis confirmed that there were no statistically significant differences between the batting orders on the subscales of the CSAI-2.

The **top-order group** recorded slightly higher cognitive and somatic anxiety scores than the other batting-order groupings. The **lower-order** group recorded the highest self-confidence of all the batting-order groupings.

5.3 DISCUSSION OF RESULTS

A comprehensive interpretation of the results from the respondents' psychological background information (section one) and psychological-skills profile (section two) will follow, with a view to elucidating the primary aims set for this study (see chapter 1, pp. 1-12).

5.3.1 Respondents' general psychological background information

It was apparent that, regardless of the level of participation, the majority of players indicated that they perceived competition in cricket to be as mental as it is physical. Woolmer *et al.* (2008) support this notion by reasoning that cricket is a game of pressure and that even an eight-year-old batsman or bowler will realise the stresses inherent in the one-on-one element involved in cricket. The assumption can, therefore, be made that the psychological demands associated with cricket are nearly as prevalent at the novice stages of the game as they are at professional level. The majority of respondents in this study indicated that they do think mental skills play an important role in successful cricket participation and performance. This underscores the fact that participants from all three levels of participation acknowledge that, to a certain extent, cricket success is dependent on psychological skills. This echoes the acknowledgement and concessions of the England Women's Cricket Team who, after winning the Women's Cricket World Cup in 1993 following a five-year psychological support programme (Bull, 1995), lauded the contributing role psychological skills play in achieving cricket success.

When the respondents in the current investigation were asked whether they thought psychological skills-training is of little use in aiding cricket performance, half to just more than half indicated that they did not agree at all. Only a fifth to a third of the respondents felt that this statement was moderately so. The three levels of participation did not differ significantly in their opinions regarding this statement. This again corroborates the players' explicit positive regard for psychological-skills training as a means of aiding cricket performance.

Linking up with this, Thelwell and Maynard (2003) have proved that a mental skills training package consisting of goal setting, arousal regulation, self-talk, mental imagery and

concentration, does in fact enhance not only the actual performances of semiprofessional cricketers but also their subjective performance consistency.

Despite the respondents' positive regard for psychological-skills training in cricket, it is of concern to realise that, throughout the levels of participation, the participants in this study had only a moderate knowledge of the mental skills related to cricket success. It is also worth noting that players competing at junior academy level are not far behind the senior provincial players in terms of their understanding of the cognitive processes involved in optimal cricket performance. One would have expected that the higher the level of competition the better players' knowledge of the psychological aspects regarding the sports would be. As reported by Gary Kirsten in Narayanan (2007), it is clear that education and training in cricket-specific psychological skills is a greatly neglected part of the game, especially at senior and provincial levels.

Thus we may assume that the reason why more senior provincial players have demonstrated a moderate knowledge of psychological skills related to cricket success than participants at the other two levels could be because they have had more trial-and-error experiences on their path to provincial level and not because of any special psychological skills education and training at more professional levels of the game.

Another revelation was that the majority of players do not spend time on psychological skills training or, if they do, it is very little, regardless of their level of participation. In other words, the provincial players do not spend any more time on psychological-skills training than senior club and junior cricket players. It is thus assumed that either the players are not introduced to psychological-skills training by their coaching staff and/or that coaching staff or players still regard psychological-skills training with great suspicion and derision. Weinberg and Gould (2011) add to this presumed cause by suggesting that the basic reasons why psychological-skills training is neglected are a lack of knowledge, a belief that psychological skills are innate and cannot be taught, or a perceived lack of time. These reasons are probably also the views of the respondents and their coaching staff but, either way, it is a paradox that the players spend so

little time on psychological-skills training while at the same time acknowledging the importance of mental skills as perquisites for success in cricket.

Based on the above, it is no surprise that more than half of the respondents felt that they were only partly or moderately able to prepare themselves psychologically for important games since, as mentioned previously, the majority do not spend any time training in the psychological aspects of the game. Presumably then, the majority of cricket players in this study rely on their physical skills and techniques to perform in cricket, which they spend all their time practising. Gordon (1990) supports this notion by asserting that younger and less experienced cricket players are more focused on physical fitness and technique training than the experienced and more elite players. He contends that younger and less elite players waste much of their efforts on quantity training instead of quality training which includes aspects of mental training. As a result, Gordon (1990) concludes that the more skilled and experienced players are more capable of incorporating effective and diverse mental skills into game situations.

A deduction arising from the above is that the more time cricket players spend on psychological-skills training the better equipped they will become at preparing mentally for important games and the sooner they are likely to become more skilled.

Furthermore, the majority of senior provincial players expressed a need to increase their knowledge of psychological-skills training, compared to only 44.1% of premier league/senior academy players and 39.5% of junior academy players. Thus it is evident that the higher the level of participation, the greater seems to be the need to learn about psychological-skills training in cricket. Unsurprisingly, those players who play cricket at a professional level demonstrate a greater need to learn about PST than do those players who play it at a nonprofessional or recreational level. In their work, Woolmer *et al.* (2008) explain that a possible reason for this is that, as cricket players become more elite, they face greater stress such as the pressures of touring, the long spells of time away from home, disrupted routines, the need to maintain and establish sound relationships within the squad – all of which are added to the players' existing performance demands. The 'rock star' syndrome where the

players becomes rich and popular overnight is another illustration of an impending threat to performance because it interferes with the high levels of concentration that are demanded by the game.

Findings similar to those above have been documented for other team sports in South Africa. Van den Heever, Grobelaar and Potgieter (2007) revealed that 26.75% of respondents from a sample of South African provincial netball players expressed a great need for sports-psychological-skills training. A supporting investigation into top and lower ranked u/19 South African Rugby Union Players has similarly revealed results indicating that 21.7% of the respondents express a great desire for sports-psychological-skills training (Andrew *et al.,* 2007).

It is consequently evident that there is a lack of implementation of sports-psychological-skills training not only in cricket but also in other major team sports in South Africa. This could be an indication that sports psychology in South Africa is still in its growing phases or that the on-field psychological support is being greatly neglected as part of training principles and strategies. Fourie and Potgieter (2001) affirm the latter by arguing that sports coaches in general lack the experience and expertise to develop and implement SPST programmes.

It is evident from the one-day cricket participants' responses to the questions regarding psychological-skills usage in cricket that there is a demand for greater education on this topic. Many players appear to value the contribution of psychological factors to cricket success but their exposure to these is limited because they are not implemented in training and competition. Some players have indicated that they can prepare themselves psychologically only to a moderate extent and this could be a possible stumbling block that prevents the players from performing according their desires. Nearly half the respondents rated their batting and bowling as good, whereas the other half rated it as average and poor. From the results of the respondents' psychological background information, the lack of knowledge and training in psychological skills pertinent to cricket-related tasks such as bowling or batting might be a possible reason why the above percentages are so high for average performances (batting and bowling).

One could conclude that respondents from all three levels have insufficient exposure, training and knowledge regarding the cognitive aspect of successful cricket participation.

5.3.2 Respondents' psychological-skills profiles in cricket

5.3.2.1 Performance by level of participation in cricket

The analysis of performance on the **Bulls' Mental Skills Questionnaire** indicated that there were no statistically significant differences between the three levels of participation in terms of their performance on any of the Bulls' subscales. The results of the **Athletic Coping Skills Inventory-28 (ACSI-28)** substantiated the results of the Bull's Mental Skills Questionnaire by showing that the three levels of participation also performed similarly on other mental skills such as coping with adversity, coachability, and goal setting and mental preparation. These findings are in conflict with Gordon's (1990) views that more skilled and experienced cricket players use more approximations of a variety of mental skills. It appears from the former that there is no significant difference between the mental skills usage of junior academy, premier league/senior academy and senior provincial cricket players. This could be due to the fact that the sample of participants tested in this investigation consists of A-side participants from each participatory level and that all of them have the psychological potential to participate at a higher level of competition or, that the exposure and training in mental skills is so limited in all three levels of cricket participation, that it actually results in no one level to be more psychologically proficient than the others.

Apart from the findings discussed above, a strong psychological-skills profile for cricket players from all three levels of competition did come to the fore. According to the results yielded from the two above-mentioned mental-skills questionnaires (Tables 16 & 17, pp. 150-152), the indication is that skilled cricket players, regardless of level of participation, scored high in motivation, self-confidence, coachability, imagery ability, concentration ability, and peaking under pressure. To a certain extent, these skills resemble the components listed by Orlick (1992) as the essence of human excellence in general but, more specifically, they correspond to what Gordon (1990) discovered to be the most important mental-skills requirements in cricket when

he evaluated the Western Australian State Cricket team players. These identified mental skills also link up with what Thelwell and Maynard (2002) ascribed as antecedents of repeatable good performance in professional cricket players.

These results indicate that successful cricket participation at amateur level requires the same key psychological attributes as participation at professional level. According to the psychological-skills profile generated from this study, we may conclude that, from a young age, successful cricket players have learned to master various psychological qualities that are necessary to playing competitive cricket at a senior or more professional level. If the sample of this investigation had not been limited to only A-side players, a possible difference in their psychological skills could have been validated.

Analysis of the **CSAI-2** subscales indicated that no statistically significant differences were found in cognitive anxiety and somatic anxiety scores for the participants from the various levels of competition. This implies that all the cricket participants in this study experienced similar degrees of apprehension and tension in game situations as a natural reaction to their autonomic nervous systems activation (Weinberg & Gould, 2011). There was, however, a marginal statistically significant ($p < 0.10$) difference between the senior professional and premier league cricketers in terms of their self-confidence. The senior provincial level participants had higher scores than the premier league/post school level participants. The tendency for higher self-confidence at the more elite level of participation could be substantiated by the arguments of Hays *et al.* (2009) who believe that high levels of self-confidence are positively associated with successful performances, emphasising that senior provincial cricket players have experienced more career success in cricket participation than the premier league and post-school players. Another possible explanation suggested by Woodman and Hardy (2003) as too why senior provincial cricket players scored higher on self-confidence than the other two levels of participation is that self-confidence was more significantly related to competitive sports performance in higher-standard participants than in lower-standard participants. It must, however, be acknowledged that the senior provincial players had higher self-confidence scores while at the same time demonstrating somatic and cognitive anxiety scores similar to those of

the less elite players. This is a classic example of Kerr's (1989) *reversal theory* which states that the players' interpretation of arousal will determine its behavioural effect. This implies that the senior provincial players could have interpreted their arousal and anxiety in a different way which enabled them to display higher levels of self-confidence. Humara's (2002) opinion can, therefore, be taken into consideration. He argues that more mature players interpret their anxiety as more facilitative to peak performance than do novice or less successful participants. The senior provincial participants in this study evidently perceived their arousal and anxiety as more facilitative than the less elite participants, which might also have resulted in their demonstrating higher levels of self-confidence in competition.

5.3.2.2 Performance by specialised role in cricket

A comparison of the performance of the various **specialised roles** on the **Bulls' Mental Skills Questionnaire** indicated that the all-rounders (batsmen and bowlers) had higher imagery ability scores than the other roles ($p < 0.10$). Imagery entails the mental rehearsal of real-life situations (Potgieter, 2003) for the purpose of mediating one's behaviour both cognitively and motivationally towards specific behaviour roles (Weinberg & Gould, 2011). Usually an all-rounder is an equally good batsman and bowler, making him a more skilled player of the game. Given the reasoning that the two skills of batting and bowling in cricket are worlds apart, it might be crucial for an all-rounder to engage in additional imagery training in order to prepare both cognitively and motivationally for both the bowling and batting roles that he takes on in a single game. The skills of batting and bowling are complex and take years of training to master (Woolmer *et al.,* 2008). Gregg *et al.* (2005), along with Weinberg and Gould (2011), claimed that such tasks which involve highly functional cognitive processes derive much more performance-enhancing effect from imagery training than do less cognitively demanding tasks. This probably explains why successful all-rounders develop slightly better imagery abilities than other single-speciality role-players in cricket. The motivation scores of the all-rounders also seemed to be significantly higher ($p < 0.10$) than those of the bowling positions. These results are not at all coincidental. The only assumption that can be made by the researcher is that all-rounders are more motivated because they have more opportunities in a match to contribute to

the team success or to reach their own personal goals compared to exclusively specialised batsmen or bowlers. If an all-rounder experiences a bad day in front of the wickets he can make up for it when he is bowling, whereas the other players cannot. Therefore, he needs high levels of motivation, otherwise poor batting might affect his bowling later on in the game or *vice versa*.

Results of the analysis of the **ACSI-28 sub-scales** showed that the specialised batsmen seemed to have lower scores in terms of coping with adversity, confidence and motivation, and freedom from worry, than the specialised bowlers and all-rounders. All-rounders had the highest scores for peaking under pressure, with bowlers obtaining the highest scores on goal setting/mental preparation. However, none of these differences were statistically significant as confirmed by both the parametric and non-parametric analysis of the data. The results of the above two mental-skills measures indicate that all-rounders are better psychologically equipped to achieve in cricket than specialised batsmen or bowlers. This should be interpreted with caution as there were only marginally significant differences. Possible studies for the future could look at the association between the number of all-rounders and a team's overall performances as well as the comparison between the mental skills of wicketkeepers and those of the rest of the players in cricket.

The various **specialised roles** performed very similarly on the subscale tests of the **CSAI-2.** Statistical analysis of the data confirmed that there were no statistically significant differences between the specialised roles in terms of cognitive anxiety, somatic anxiety and self-confidence.

5.3.2.3 Performance by batting order in cricket

Further analyses focused on the comparison of the batting order and batting-order performance on the Bulls' Mental Skills Questionnaire. When dividing the total sample according to batting order, the sample sizes became fairly small, especially for the lower-order (10-11) batting groups that consisted of only nine players. The results of the parametric analysis will thus be interpreted with caution in favour of the results of the non-parametric analysis, as the normal distribution of data cannot be assumed.

The various **batting orders** seemed to have performed similarly on the subscales of the **Bulls' Mental Skills Questionnaire**. The lower batting (10-11) order obtained lower scores in terms of imagery ability and motivation. One-way analysis of variance indicated that there was a statistically significant difference between the batting orders in terms of motivation ($p < 0.10$). The low-order group had significantly lower motivation scores than the rest of the players. The work of Weissensteiner *et al.* (2009) points out that batting expertise in cricket depends not only on psychological factors but also on interacting skills components and other factors such as socio-developmental, visual-perceptual and technical skills. The psychological factors that do play a supporting role, according to these authors, include self-regulation, attentional control, self-belief and confidence. The results obtained in this investigation revealed that none of the above characteristics featured in determining batting expertise; however, motivation was noted as the only mental skill that separated top-order (1-4) batsmen from lower-order batsmen. It can, therefore, be assumed that better batsmen are likely to be more motivated to achieve.

Performance on the subscales of the **ACSI-28** was mostly the same, regardless of **batting order**. However, the lower-order group had significantly higher coachability scores than the rest of the batting-order groupings ($p < 0.05$). This means that lower-order batsmen are potentially more open and willing to learn from coaches' instruction than top-order (1-4) and middle-order batsmen (5-7). It could be that they are more likely to accept criticism without becoming offended because they realise that they are considered the least skilled batsmen in the team and that they can benefit from any form of critique.

The performances of the various **batting orders** in terms of **cognitive anxiety, somatic anxiety and self-confidence** did not differ significantly from one another. The statistical analysis confirmed that there were no statistically significant differences between the batting orders on the subscales of the **CSAI-2.**

5.4 CONCLUSION

In this chapter a description of the sample of cricketers and their perception of the importance of psychology in cricket was given. Thereafter, an analysis of results was presented and interpreted. From the collective results of the psychological-skills profiles of cricket players from varying levels of competition, it became apparent that there is no significant relationship between mental skills and level of participation in one-day cricket. The Competition Self-Evaluation Questionnaire (CSAI-2) did, however, reveal that all three levels of participants experienced the same degree of cognitive and somatic anxiety but the senior provincial players demonstrated higher self-confidence intensities than the participants at premier club league level. Nor could the various specialised roles in cricket be distinguished by their performance on mental skills scores, but all-rounders did demonstrate significantly higher scores in motivation and imagery ability. The dominance in these mental skills could be the result of the players' ability to master a larger variety of complex skills involved in the game than the bowlers or batsmen alone. The order of batsmen is only significantly differentiated by the psychological characteristics of motivation and coachability, in which high levels of motivation were associated with skilled batting. As argued in the discussion, a possible reason for the lack of discrimination in the three levels of participation may be due to the homogenous nature of the sample. The participants tested in this investigation are A-side participants from each level of participation and it might be that all of them have the psychological potential to participate at a higher level of competition. Another rationalisation, based on the thoughts of Ross (2009), and Woolmer *et al.* (2008), is that training in mental skills has received such limited exposure in the context of all three levels of cricket participation in South Africa, that it has resulted in an equal spread of psychological proficiency amongst the players. This investigation will be concluded in the next chapter with conclusions and recommendations based on the results presented in this chapter.

CHAPTER SIX

CONCLUSIONS, RECOMMENDATIONS AND IMPLICATIONS FOR FURTHER RESEARCH

6.1 INTRODUCTION

The line of reasoning in chapter 1 was that a lack of mental skills on the day of competition could inhibit athletes' performance, regardless of the quality of physical elements involved. From a sports psychological perspective, a number of elite athletes have prevailed and achieved the pinnacle of performance in their sport by using the appropriate mental skills. The incorporation of psychological-skills training programmes into sports-related skills training has been shown to be facilitative not only in achieving optimal performance states, but also in cultivating talent potential. Yet, despite the evidence for the strong link between mental skills and optimal sports performance, it is still uncertain whether mental skills could distinguish or determine the level of performance in the complex mixture of a team or in individual contest sports such as cricket. Research questions for this investigation were consequently formulated as follows:

- *Are there significant differences in the **psychological background information** on cricket players from different levels of cricket competition?*
- *Is there a significant relationship between **mental skills and level of cricket-player participation**?*
- *Is there a significant relationship between **mental skills and the specialised roles played in cricket**?*
- *Is there is a significant relationship between **mental skills and batting order in cricket**?*

A psychological background questionnaire, along with three standardised sports psychometric measuring instruments, was administered to 127 cricket participants from three progressive levels of participation to explore their psychological background information and to measure their levels of mental-skills usage. Since the mental-skills measures used in this investigation have relatively high Cronbach's alphas (refer to chapter 4 for details), the results, conclusions and recommendations should be reliable.

In chapter 1, the aims of the study were to do the following:

1. Explore cricket participants' psychological background information with regard to their general perceptions of the importance of psychology in cricket, their knowledge of and exposure to psychological-skills training and their time spent on psychological-skills training in cricket.
2. Determine and compare the mental skills of cricket players from three progressive levels of competition.
3. Explore the relationship between mental skills and the different roles played in cricket (batsman, bowler, all-rounder and wicketkeeper).
4. Explore the relationship between mental skills and batting order in cricket.

Conclusions and recommendations will subsequently be offered according to the above four aims.

6.2 CONCLUSIONS

The results generated by this investigation have given rise to the following conclusions:

*There are **no significant differences** in the psychological background information on cricket players from different levels of cricket participation (validated in 6.2.1.1, p. 177).*

*There is **no significant relationship** between mental skills and level of cricket player participation (validated in 6.2.2.1, p. 178).*

*There **is a partial relationship** between mental skills and the specialised roles in cricket (validated in 6.2.2.2, p. 178).*

*There is **a partial relationship** between mental skills and batting order in cricket (validated in 6.2.2.3, p. 179).*

The above answers to the research questions formulated in this study are validated by the conclusions below.

6.2.1 Section one: Background information on the respondents

6.2.1.1 General psychological perspectives of the respondents

Results confirmed that there was no significant relationship between level of cricket participation and the perception of the role mental skills play in cricket success. The majority of the participants thought mental skills play an important role in achieving cricket success. The majority also believed that competitive cricket is as mental as it is physical. No significant relationship was found between level of participation and the use of psychological-skills training in aiding participant's cricket performances. The majority of the senior provincial players indicated moderate knowledge and use of mental skills to enhance performance, compared to half the junior academy and premier league/senior academy players. The majority of the participants also indicated that they did not spend any time on psychological-skills training. This could be good grounds for why more than half of the participants' further responses revealed that they were only partly to moderately able to prepare themselves psychologically for important matches.

These findings emphasise the importance and need for psychological-skills training (PST) among cricket players at all levels of competition, but they also highlight the fact that PST is a neglected part of the game. The players, regardless of what level they compete at, do not have sufficient knowledge of the associated psychological factors – hence these participants do not spend time training and nurturing the psychological skills involved in cricket. The obvious conclusion,

therefore, is that there are no significant differences in the psychological background information provided by the participants from the three different levels of participation.

6.2.2 Section two: Psychological-skills profiles of the respondents

6.2.2.1 Performance by level of participation in cricket

There were no statistically significant differences between the three levels of participation in terms of their performances on any of the mental skills questionnaires. A psychological-skills profile for individual successful cricketers was, however, established with an indication that skilled (A-team) cricketers from all three levels of participation scored high on motivation, self-confidence, the ability to peak under pressure, concentration ability, coachability and relaxation constructs of the mental skills questionnaires. These mental skills resemble findings of Gordon (1990) and Thelwell and Maynard (2002) as key antecedents of elite-level cricket performance.

Participants from all three levels of participation experienced the same extent of both somatic and cognitive anxiety, but the senior provincial players did show an indication of higher self-confidence than the premier league/senior academy players on the CSAI-2 measure. Based on the *reversal theory* (Kerr, 1989) and the accounts in supportive literature (Humara, 2002; Woodman & Hardy, 2003), more professional cricket players can be said to experience their levels of anxiety more facilitatively than the less experienced cricket players, which could explain the higher levels of self-confidence in the provincial players. Therefore, the only psychological quality that was associated with level of cricket participation was self-confidence.

6.2.2.2 Performance by specialised role in cricket

All-rounders indicated higher imagery and motivation scores than the other specialised roles of batting and bowling. It is assumed that the reason why all-rounders possess higher levels of motivation is that they have a greater responsibility to contribute towards their team's successes or failures because they are heavily relied on by the team for their batting and bowling prowess in a single competition. A further assumption is that a possible reason why all-rounders demonstrate higher imagery ability is because of the complexity of combining batting

and bowling tasks in a short space of time as in limited-overs cricket. The complex skills of batting and bowling are expected to demand significant reserves of functional cognitive processes. According to Gregg *et al.* (2005) and Weinberg and Gould (2011), the more cognitively demanding a task, the more one can derive a performance-enhancing effect from effective imagery training. Imagery ability can thus be said to be a mental characteristic that facilitates a cricket player's all-round abilities and skills in cricket.

The results reveal that all-rounders have a tendency to be more psychologically skilled as regards their motivation to perform and their visualisation processing of cricket-related tasks. Therefore, there is only a partial relationship between mental skills scores and specialised roles in cricket.

6.2.2.3 Performance by batting order in cricket

A significant difference in terms of batting order could be indicated only by the mental skills of motivation and coachability. Top-order batsmen showed higher levels of achievement motivation than lower-order batsmen whereas lower-order batsmen, on the contrary, demonstrated the highest scores by coachability. An additional revelation was that there was no significant difference in either the remaining mental skills of the different batting orders or their cognitive state anxiety, somatic state anxiety and state self-confidence.

The logical conclusion, therefore, is that the only mental skill that contributes to skilled batting in cricket is the motivation to achieve – hence this finding can be said to show that there is only a partial relationship between mental skills scores and batting order in cricket.

6.3 RECOMMENDATIONS

The following recommendations arise from this investigation:

- Extend knowledge of the role of mental skills in cricket success: successful and less successful cricket participants from the same level of participation should be compared with one another.

- Limited-overs cricket players' cognitive abilities should be compared to those of multiple-day cricket players.

- The effects of individualised psychological-skills training on cricket performance should be investigated to determine their performance-enhancing effects on participants from various levels of participation.

- Due to the small sample of wicketkeepers in the current investigation, it is recommended that a study of the psychological characteristics of wicketkeepers should also be explored and compared to the characteristics of batsmen, bowlers and all-rounders.

- Education in psychological-skills training and the use of sports psychologists or mental-skills coaches in South Africa should be encouraged to improve cricket players' knowledge of the psychological aspects associated with effective cricket participation.

- Sports psychologists/mental coaches and cricket coaches ranging from amateur to professional level are advised to collate their efforts to develop and implement sports psychological skills training (PST) programmes specifically for the needs of cricket players in South Africa.

- Since it did not fall within the ambit of this study, a gender comparison of the players' mental skills usage is a topic for recommended consideration.

6.4 IMPLICATIONS FOR FURTHER RESEARCH

The results of this study prompted further research questions regarding the role of mental skills in cricket and presented the following additional research opportunities:

- Identify the direction and interaction between PST and cricket players' performances in South African schools, clubs and senior provincial levels.

- Probe the mental characteristics of successful wicketkeepers in cricket, compared to bowlers, batsmen and all-rounders.

- Explore the mental skills differences between successful and less successful cricket players from the same level of participation.

- Investigate the mental-skills differences between limited-overs and multiple-day cricket players.

- Assess the perceptions of psychology and mental skills of female cricket players.

- Do a gender comparison of the levels of mental-skills usage of successful cricket players.

- Probe the expertise and knowledge of cricket coaches regarding the development and implementation of individualised PST programmes.

6.5 FINAL STUDY CONCLUSION

This study attempted to evaluate the psychological background of cricket participants as well as to discover the relationship between mental skills and level of cricket performance in the one-day cricket format. The relationship between mental skills in other aspects of cricket such as the specialised role and batting order was also assessed. The investigation was conducted on three levels of male cricket participants hailing from Pretoria in the Gauteng region of South Africa. The conclusion was that there is no significant difference in the psychological background information on cricket players competing at junior academy U/19, premier league, and senior provincial levels. Nor is there any relationship between mental skills and level of cricket performance. A prominent mental-skills profile consisting of high levels of motivation, self-confidence, coachability, concentration ability, imagery ability, and the ability to peak under pressure appears to be fundamental to cricket performance across all three levels of participation. Senior provincial cricket players experience the same degree of anxiety as the players playing at premier league and junior U/19 levels, but indicate higher levels of self-

confidence during anxious game situations. All-round cricketers appear to be better mentally equipped in terms of motivation and imagery ability. The only mental skill specifically identified with skilled batting in cricket was the motive to achieve success.

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LIST OF APPENDICES:

APPENDIX A:

INFORMATION LEAFLET AND INFORMED CONSENT FORM

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

FACULTY OF HUMANITIES

Dept of Biokinetics, Sport & Leisure Sciences

Pretoria 0002 RSA

Http://www.up.ac.za

Department of Human Movement Science
University of Pretoria
2010
INFORMATION LEAFLET AND INFORMED CONSENT FORM

PROJECT TITLE:

MASTER'S DEGREE IN HUMAN MOVEMENT SCIENCES: THE RELATIONSHIP BETWEEN MENTAL SKILLS AND LEVEL OF CRICKET PARTICIPATION.

Primary Investigator: Mr. J. Jooste (B-TECH; PGCE; HONS B-ED; CERT SPORTS PSYCHOLOGY)
Study Leader: Dr. J.G.U. van Wyk, Department of Biokinetics, Sport and Leisure Sciences, University of Pretoria.

Co-study Leader: Prof. B.J.M. Steyn, Department of Biokinetics, Sport and Leisure Sciences, University of Pretoria.

Dear Cricketer

Mental skills and coping strategies are vital for high-level cricket participation, optimal performance and longevity in the sports. The skills of self-awareness, and effectively managing thoughts and emotions during the ever-demanding game situation present a daunting task that can take years to master. These cognitive skills and tools that support the players' emotional learning processes are neglected parts of the game, and the knowledge of the optimal cognitive states allowing cricketers to perform according to their highest potential, is limited in South Africa. It is to you that I turn for valuable information regarding the mental skills associated with optimal performances in cricket.

Evidence that psychological skills are important predictors of performance and survival in the sport would provide impetus to an increasing trend on the part of professional cricket organisations to establish psychological-skills-training programmes as part of their player development programmes at school, club and provincial levels.

I would appreciate your willingness to participate in this study and to respond to the questions as accurate and honestly as possible. All information supplied will be used for research purposes only, not for player enhancement or selection preferences, and will be treated as confidential.

WHAT THE PARTICIPANT WILL BE REQUIRED TO DO IN THE STUDY

If you decide to take part in the study, you will be required to sign this informed consent form and understand the following:

You will complete the questionnaire containing the following topics:

- Demographic information containing personal particulars.
- Psychological background information.
- The Athletic Coping Skills Inventory-28 (ACSI-28) by Smith, Shutz, Smoll, and Ptacek (1995) which measures coping skills in sport. This consists of seven subscales measuring: (1) coping with adversity, (2) peaking under pressure, (3) goal setting, (4) concentration, (5) freedom from worry, (6) confidence and achievement motivation, and (7) coachability.
- Bull's Mental Skills Questionnaire by Bull, Albison and Shambrook (1996) measures: imagery, mental preparation, goal setting, self-confidence, anxiety and worry management, concentration, relaxation and motivation.
- Competitive State Anxiety Inventory-2 (CSAI-2) by Martens, Burton, Vealey, Bump and Smith (1990) that is one of the most effective available assessments of arousal, anxiety and self-confidence. This inventory is used as a measuring process to assess physiological, cognitive arousal and self-confidence.

The participant will be provided with the above-mentioned questionnaires to complete at a convenient time and it should not take longer than 35 minutes to complete.

WHAT ARE THE RISKS INVOLVED IN THIS STUDY?

The study or procedures should cause you, the participant, no foreseeable discomfort or inconvenience. However, in the rare event that you may experience any discomfort, you are free to withdraw from the study at any time.

WHAT ARE THE POTENTIAL BENEFITS THAT MAY COME FROM THE STUDY?

- It will make a contribution to the broadening of academic knowledge and understanding of the association between mental skills and level of cricket participation and performance.
- It can direct efforts and reform the development of psychological-skills-training programme implementation in an attempt to enhance player potential and development.

WILL THE PARTICIPANT RECEIVE ANY FINANCIAL COMPENSATION OR INCENTIVE FOR PARTITICIPATING IN THE STUDY?

Please note that the participant will not be paid to participate in the study.

WHAT ARE YOUR RIGHTS AS A PARTICIPANT IN THIS STUDY?

Participation in this study is entirely voluntary. You have the right to withdraw at any stage without any penalty or future disadvantage whatsoever. Reasons for withdrawal will not be asked.

WHO CAN YOU CONTACT FOR ADDITIONAL INFORMATION REGARDING THIS STUDY?

The primary investigator, Julius Jooste, can be contacted during office hours at Tel: +27 12 382 5472, or on his cell phone at 084 4008 931. The study leader Dr. J.G.U. van Wyk can also be contacted at +27 12 420 6045 during office hours.

A FINAL WORD

Your co-operation and participation in this study will be greatly appreciated. Please sign the attached informed consent form if you agree to participate in this study.

Julius Jooste

UNIVERSITEIT VAN PRETORIA
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YUNIBESITHI YA PRETORIA

FACULTY OF HUMANITIES

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INFORMED CONSENT

I hereby confirm that I have been adequately informed by the researcher about the nature, conduct, benefits and potential risks of the study. I have also received, read and understood the information leaflet pertaining to the research project titled: **The relationship between mental skills and level of cricket participation**.

I am aware that the results of the study, including personal details regarding my age, psychological background information and cricket participation experience will be anonymously processed into a research report. I understand that my participation is voluntary and that I may, at any stage, without prejudice, withdraw my consent and participation in the study. I had sufficient opportunity to ask questions and of my own free will decide to participate in the study.

Research participant's name: _____ (Please print)

Research participant's signature: _____

Date: _____ Contact no: _____

Researcher's name: Julius Jooste

Researcher's signature: _____

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INFORMED CONSENT: Participant under the age of 18

I hereby confirm that I have been adequately informed by the researcher about the nature, conduct, benefits and potential risks of the study. I have also received, read and understood the information leaflet pertaining to the research project with the title: **Mental skills as predictive factors of level of performance in cricket players**.

I am aware that the results of the study, including personal details regarding my child's/ward's age, psychological background information and cricket participation experience will be anonymously processed into a research report. I understand that his/her participation is voluntary and that he/she may, at any stage, without prejudice, withdraw his/her consent and participation in the study. He/she has had sufficient opportunity to ask questions and, of my own free will, I declare that my child/ward is free to participate in the study.

Research participant's name: _____ (Please print)

Research participant's parent's/guardian's name :_____(Please print)

Research participant's parent's/guardian's signature: _____

Date: _____

Researcher's name: Julius Jooste

Researcher's signature: _____

SECTION ONE: DEMOGRAPHICS AND PSYCHOLOGICAL BACKGROUND INFORMATION

APPENDIX B:

QUESTIONAIRE FOR DEMOGRAPHIC INFORMATION

Demographic information:

Personal particulars

Name: …… Male: ☐ / Female: ☐

Level of participation: Junior Academy / Club / University / Senior Provincial Age: ……

Specialised role: batting ____ / bowling ____ / all-rounder _____ / keeper _____

Batting order: Top order (1-4) ____ / middle order (5-7) ____ / lower middle order (8-9) ____ lower order (10-11) _____

Personal rating of your batting form so far this season:

Good ☐ / Average ☐ / Poor ☐

Personal rating of your bowling form so far this season:

Good ☐ / Average ☐ / Poor ☐

Self-confidence level at present:

High ☐ / Average ☐ / Low ☐

APPENDIX C

PSYCHOLOGICAL BACKGROUND INFORMATION

General psychological perspectives of the respondents:

Mark your answer with ☑ or ☒.

1. Competitive cricket participation is as mental as it is physical.

Not at all	Somewhat	Moderately so	Very much so

2. I think mental skills play an important role in successful cricket participation and performance.

Not at all	Somewhat	Moderately so	Very much so

3. I have sufficient knowledge of mental skills related to effective cricket participation and performance.

Not at all	Somewhat	Moderately so	Very much so

4. I have consulted a sports psychologist / mental skills coach in the past to improve my performance in cricket.

Not at all	Somewhat	Moderately so	Very much so

5. I spend a lot of time on a psychological skills training programme to help exercise my mind in cricket.

Not at all	Somewhat	Moderately so	Very much so

6. I know how to prepare myself psychologically for an important game.

Not at all	Somewhat	Moderately so	Very much so

7. I consistently perform according to my full talent and potential.

Not at all	Somewhat	Moderately so	Very much so

8. I 'choke' at critical times in competitions.

Not at all	Somewhat	Moderately so	Very much so

9. More successful players possess more mental skills than less successful players.

Not at all	Somewhat	Moderately so	Very much so

10. The difference between me and a top-level cricket player is not physical abilities, fitness or technically-related issues but rather the cognitive ability to cope in pressure situations.

Not at all	Somewhat	Moderately so	Very much so

11. I want to learn more about psychological-skills training.

Not at all	Somewhat	Moderately so	Very much so

12. I think psychological-skills training is of little use in aiding cricket performance.

Not at all	Somewhat	Moderately so	Very much so

13. My coach has sufficient knowledge of the importance and implementation of psychological-skills training in cricket.

Not at all	Somewhat	Moderately so	Very much so

SECTION TWO: PSYCHOLOGICAL-SKILLS PROFILES

APPENDIX D

THE ATHLETIC COPING SKILLS INVENTORY (ACSI-28)

The Athletic Coping Skills Inventory (ACSI-28) Survey by Smith, Shutz, Smoll, & Ptacek, (1995)

There are no right or wrong answers. Do not spend too much time on any one statement. Directions: Answer the following questions as honestly as possible, according the scale, 0 to 3.

0 = ALMOST NEVER; 1 = SOMETIMES; 2 = OFTEN; 3 = ALMOST ALWAYS

1) On a daily or weekly basis, I set myself very specific goals that guide what I do.	0 1 2 3
2) I get the most out of my talent and skills.	0 1 2 3
3) When a coach or manager tells me how to correct a mistake I've made, I tend to take it personally and feel upset.	0 1 2 3
4) When I am playing sport, I can focus my attention and block out distractions.	0 1 2 3
5) I remain positive and enthusiastic during competition, no matter how badly things are going.	0 1 2 3
6) I tend to play better under pressure because I think more clearly.	0 1 2 3
7) I worry quite a bit about what others think about my performance.	0 1 2 3
8) I tend to do lots of planning about how to reach my goals.	0 1 2 3
9) I feel confident that I will play well.	0 1 2 3
10) When a coach or manager criticises me, I become upset rather than helped.	0 1 2 3
11) It is easy for me to keep distracting thoughts from interfering with something I am watching or listening to.	0 1 2 3
12) I put a lot of pressure on myself by worrying about how I will perform.	0 1 2 3
13) I set my own performance goals for each practice.	0 1 2 3
0 = ALMOST NEVER; 1 = SOMETIMES; 2 = OFTEN; 3 = ALMOST ALWAYS	
14) I don't have to be pushed to practise or play hard; I give 100%.	0 1 2 3
15) If a coach criticises or yells at me, I correct the mistake without getting upset about it.	0 1 2 3
16) I handle unexpected situations in my sport very well.	0 1 2 3
17) When things are going badly, I tell myself to keep calm, and this works for me.	0 1 2 3
18) The more pressure there is during a game, the more I enjoy it.	0 1 2 3
19) While competing, I worry about making mistakes or failing to come through.	0 1 2 3

20) I have my own game plan worked out in my head long before the game begins.	0 1 2 3
21) When I feel myself getting too tense, I can quickly relax my body and calm myself.	0 1 2 3
22) To me, pressure situations are challenges that I welcome.	0 1 2 3
23) I think about and imagine what will happen if I fail or screw up.	0 1 2 3
24) I maintain emotional control no matter how things are going for me.	0 1 2 3
25) It is easy for me to direct my attention and focus on a single object or person.	0 1 2 3
26) When I fail to reach my goals, it makes me try even harder.	0 1 2 3
27) I improve my skills by listening carefully to advice and instruction from coaches and managers.	0 1 2 3
28) I make fewer mistakes when the pressure is on because I concentrate better.	0 1 2 3

APPENDIX E

BULL'S MENTAL SKILLS QUESTIONAIRE

Mental Skills Questionnaire by Bull, Albison & Shambrook (1996)

Please complete the following questions related to mental skills. Please be as honest as possible. There are no right or wrong answers.

	Strongly Disagree					Strongly Agree
Imagery ability						
1. I can rehearse my sport in my mind.	1	2	3	4	5	6
2. I rehearse my skills in my head before I use them.	1	2	3	4	5	6
3. It is difficult for me to form mental pictures.	6	5	4	3	2	1
4. I can easily imagine how movements feel.	1	2	3	4	5	6
Mental preparation						
5. I always set myself goals in training.	1	2	3	4	5	6
6. I always have very specific goals.	1	2	3	4	5	6
7. I always analyse my performance after I complete my performance.	1	2	3	4	5	6
8. I usually set goals that I achieve.	1	2	3	4	5	6
Self-confidence						
9. I suffer from lack of confidence about my performance.	6	5	4	3	2	1
10. I approach all competitions with confident thoughts.	1	2	3	4	5	6
11. My confidence drains away as competitions draw nearer.	6	5	4	3	2	1
12. Throughout competitions I keep a positive attitude.	1	2	3	4	5	6
Anxiety and worry management						
13. I often experience fears about losing.	6	5	4	3	2	1
14. I worry that I will disgrace myself in competitions.	6	5	4	3	2	1
15. I let mistakes worry me when I perform.	6	5	4	3	2	1
16. I worry too much about competing.	6	5	4	3	2	1
Concentration ability						
17. My thoughts are often elsewhere during competitions.	6	5	4	3	2	1
18. My concentration lets me down during competition.	6	5	4	3	2	1
19. Unexpected noises put me off my performance.	6	5	4	3	2	1
20. Being easily distracted is a problem for me.	6	5	4	3	2	1
Relaxation ability						
21. I am able to relax myself before a	1	2	3	4	5	6

competition.						
22. I become too tense before competition.	6	5	4	3	2	1
23. Being able to calm myself down is one of my strong points.	1	2	3	4	5	6
24. I know how to relax in difficult circumstances.	1	2	3	4	5	6
Motivation						
25. At competitions I am usually psyched enough to compete well.	1	2	3	4	5	6
26. I really enjoy a tough competition.	1	2	3	4	5	6
27. I am good at motivating myself.	1	2	3	4	5	6
28. I usually feel that I try my hardest.	1	2	3	4	5	6

APPENDIX F

COMPETITIVE STATE ANXIETY INVENTORY-2 (CSAI-2)

Competitive State Anxiety Inventory 2 (CSAI-2) by Martens, Burton, Vealey, Bump & Smith, (1990)

Directions:

A number of general statements that athletes have used to describe their feelings before competition are given on the next questionnaire you are about to complete. Read each statement and circle the appropriate number to the immediate right of the statement to indicate *how you feel right before* competing **(intensity scale)**. Then, when you have this feeling, do you normally regard it as being negative or positive in relation to competing **(directional scale)**. That is, do you feel as if the symptom will help (positive), hurt (negative), or have no effect on your performance (unimportant). Always answer both sides of the scales for each question before moving to the next item. Do not spend too much time on any one statement, but choose the answer which best describes your feelings *in general* before a competition.

Athletic Competition Self-Evaluation Questionnaire

	INTENSITY SCALE				DIRECTIONAL SCALE						
	Not At All			Very Much	Very Negative			Unimportant			Very Positive
1. I'm usually concerned about competing	1	2	3	4	-3	-2	-1	0	+1	+2	+3
2. I feel nervous before I compete	*1*	*2*	*3*	*4*	*-3*	*-2*	*-1*	*0*	*+1*	*+2*	*+3*
3. I feel at ease before competing	1	2	3	4	-3	-2	-1	0	+1	+2	+3
4. I have self-doubts before I compete	*1*	*2*	*3*	*4*	*-3*	*-2*	*-1*	*0*	*+1*	*+2*	*+3*
5. Usually I feel jittery before competing	1	2	3	4	-3	-2	-1	0	+1	+2	+3
6. I usually feel comfortable before competing	*1*	*2*	*3*	*4*	*-3*	*-2*	*-1*	*0*	*+1*	*+2*	*+3*
7. I am concerned that I may not do as well as I could when competing	1	2	3	4	-3	-2	-1	0	+1	+2	+3
8. My body feels tense before competing	*1*	*2*	*3*	*4*	*-3*	*-2*	*-1*	*0*	*+1*	*+2*	*+3*
9. I usually feel self-confident before competing	1	2	3	4	-3	-2	-1	0	+1	+2	+3
10. In general, I am concerned about losing	*1*	*2*	*3*	*4*	*-3*	*-2*	*-1*	*0*	*+1*	*+2*	*+3*
11. I feel tense in my stomach before a competition	1	2	3	4	-3	-2	-1	0	+1	+2	+3
12. I feel secure before I compete	*1*	*2*	*3*	*4*	*-3*	*-2*	*-1*	*0*	*+1*	*+2*	*+3*
13. I get concerned about choking under pressure	1	2	3	4	-3	-2	-1	0	+1	+2	+3
14. My body usually feels relaxed	*1*	*2*	*3*	*4*	*-3*	*-2*	*-1*	*0*	*+1*	*+2*	*+3*
15. I'm usually confident I can meet the challenge	1	2	3	4	-3	-2	-1	0	+1	+2	+3
16. Usually I'm concerned about performing poorly	*1*	*2*	*3*	*4*	*-3*	*-2*	*-1*	*0*	*+1*	*+2*	*+3*
17. My heart is usually racing before I compete	1	2	3	4	-3	-2	-1	0	+1	+2	+3
18. I'm usually confident about performing well	*1*	*2*	*3*	*4*	*-3*	*-2*	*-1*	*0*	*+1*	*+2*	*+3*
19. I'm usually concerned about reaching my goal	1	2	3	4	-3	-2	-1	0	+1	+2	+3
20. I get a sinking feeling in my stomach	*1*	*2*	*3*	*4*	*-3*	*-2*	*-1*	*0*	*+1*	*+2*	*+3*
21. I usually feel mentally relaxed	1	2	3	4	-3	-2	-1	0	+1	+2	+3
22. I am concerned that others will be disappointed with my performance	*1*	*2*	*3*	*4*	*-3*	*-2*	*-1*	*0*	*+1*	*+2*	*+3*

23. My hands get clammy before I compete	1	2	3	4	-3	-2	-1	0	+1	+2	+3
24. In general, I'm confident because I mentally picture myself reaching my goal	*1*	*2*	*3*	*4*	*-3*	*-2*	*-1*	*0*	*+1*	*+2*	*+3*
25. I'm concerned I won't be able to concentrate	1	2	3	4	-3	-2	-1	0	+1	+2	+3
26. My body usually feels tight before competing	*1*	*2*	*3*	*4*	*-3*	*-2*	*-1*	*0*	*+1*	*+2*	*+3*
27. I'm confident of coming through under pressure	1	2	3	4	-3	-2	-1	0	+1	+2	+3