

The Psychological Determinants of Rugby Union Player
Performance

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ABSTRACT

The performance of professional sportspeople attracts great interest from the viewing public, team management, coaches, and athletes alike. Contributors to elite performance have been explored across a wide variety of sports, but have generally focused on the physical attributes of athletes, or the differences between athletes across varying levels of competition or compared to non-athletes. This thesis aimed to identify the psychological predictors of elite rugby union player performance through a series of studies. The psychological characteristics of elite rugby union players have only been researched to a limited degree. This was postulated to be in part is due to the relative recent transition to professionalism in 1995, and the time constraints imposed on professional athletes. As such, the access given to players, ex-players, and administrators within professional Australian rugby union for this thesis represent a unique insight into the psychological drivers of elite performance.

Following rugby union's transition to professionalism in 1995, interest in factors that contribute to performance increased, with research focused on performance analysis, physiology of rugby union players, and biomechanics involved in rugby union. The findings of these studies were reviewed in Chapter 1, and whilst these areas of research have provided important information regarding the nature of rugby union and its players, the psychological attributes of elite rugby union players were the focus of the second half of Chapter 1. Studies concerning how rugby union players use mental skills, cope with stress, burnout, achievement goal orientations, decision-making of players, the effect of emotions, and anxiety were reviewed. The studies in these areas provide some important descriptive information concerning adaptive psychological attributes of rugby union players, although a gap in the literature was identified concerning how the psychological attributes of elite rugby union players relate to actual on-field performance. To address this shortcoming, Chapter 2 reviewed extant research concerning sports psychology and performance as a whole, in an

attempt to identify constructs previously utilised to predict performance in sport and elite sport more specifically.

The review took in early attempts to model performance alongside state anxiety and mood assessments of athletes. Focus was placed upon the Individual Zones of Optimal Functioning (IZOF) model and the Mental Health Model (MHM). Both the reviewed models have been utilised successfully to model ideal levels of facilitating and debilitating emotions in the case of the IZOF model, and ideal mood states in the case of MHM for sporting performance. These models, however, do not permit the identification of antecedents of athletes' capacity to deal effectively with theirs and others' emotions or moods, and as such, the remainder of Chapter 2 focused on the review of well established 'trait' psychological constructs, with particular attention being paid to constructs that relate to the regulation of emotion and how athletes deal with emotionally challenging situations in a sporting context. The broad fields of Personality, Perfectionism, Mental Toughness, Sensation-Seeking, Self Esteem, Emotional Intelligence, and Coping with Stress were examined with reference to predicting sporting performance, particularly concerning rugby union. It was noted that a gap in the literature exists concerning how the psychological attributes of elite rugby union players relate to actual on-field performance, and as such, it was elected to conduct a series of in-depth interviews to identify anecdotally reported drivers of elite rugby union player performance.

In Study 1, 59 interviews were conducted with players, ex-players, coaches, and administrators directly involved with Australian rugby union at the elite level. All interviewees were asked to identify psychological predictors of elite rugby union player performance, and to identify behaviours, traits, and examples of players who had previously demonstrated elite performance. A number of common themes emerged from the interview process: effective communication; inspires and motivates team-mates; effectively controls emotions; responsibility; and being adaptable when under pressure were recognised as factors that generally contribute to elite rugby union performance and also reflecting constructs that previously have been

identified as salient predictors of sporting performance in the previous chapter. Given the identified overlap between the reviewed constructs and interview themes, the following constructs were selected to administer to the Australian based Super 12 rugby union players: Personality, Emotional Intelligence, Stress Coping Strategies, Self Esteem, Locus of Control, Sporting Orientation, Life Orientation, Social Desirability and Trait Anxiety. The constructs were assessed via players' self-report and coaches' ratings of players' psychological attributes, performance was assessed via a player's self-rating of their seasonal performance, a coach's rating of each player's seasonal performance, and finally via objective game statistic measures of performance. These three methods of sampling performance were to be utilised in order to identify any overlap in the prediction of performance indicators between the self and coach ratings of players' psychological qualities.

In Study 2, 85 Australian based professional rugby union players completed the self-rating version of the questionnaire; coaches' ratings for their respective playing groups were recorded for the psychological indices and performance ratings; and on-field statistics were collected for all Super 12 matches in which the three Australian based Super 12 teams competed. Coaches' ratings of seasonal performance were found to be significantly predicted by players' self-ratings of the levels of Conscientiousness, and by coaches' ratings of Emotional Control and Goal Orientation. Players' self-rating of their seasonal performance was predicted by players' self-ratings of their levels of Optimism and Win Orientation scores; and by coaches' ratings of Emotional Management and Emotions Direct Cognition. These same constructs were also found to predict small but significant proportion of variance of a number of the on-field statistics collected in 'attack' and 'defence' across the 2004 Super 12 season. It was concluded that given the unique nature of the data collected, and its exploratory nature, that the study should be replicated by collecting the same data from the 2005 Super 12 season.

Study 3 involved 89 players completing the self-report questionnaire, and the coaches' ratings for their respective playing groups were recorded for the psychological indices and performance ratings; and on-field statistics were collected for all Super 12 matches that the three Australian based Super 12 teams for 2005. Coaches' ratings of seasonal performance were found to be significantly predicted by players' self ratings of Emotional Recognition and Expression and Competitiveness; and by coaches' ratings of players' use of Problem-focused coping strategies. Players' self-rating of their seasonal performance was predicted by players' self-ratings of Emotional Control and Goal Orientation; and coaches' ratings of Emotional Recognition and Expression. It was noted that across the two seasons' data collection that the predictors of players' and coaches' subjective ratings of performance stayed relatively consistent and these facets of Emotional Intelligence, Coping and Sporting Orientation further predicted a number of the objective on-field statistics.

The results of this thesis illustrate the importance of how elite rugby union players approach competition, deal with emotional information, and deal with the inherent stress of elite competition through their link to the objective and subjective measures of performance. Given the scrutiny placed upon elite rugby union player performance, assessment of factors that contribute to performance beyond skill level and physical capabilities should be of particular value to athletes and sporting organisations alike. It was concluded that whilst 'trait' profiling of athletes and subjective and objective ratings of performance provide important information concerning adaptive psychological attributes that contribute to elite performance, further research is needed to identify if any 'state' effects have greater predictive efficacy when measuring performance, and to determine how best to assess performance in elite rugby union settings.

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Finally I would like to thank my friends and family, particularly my parents, whose support, understanding and belief has always encouraged me to follow my dreams. Whilst this PhD has seemed like a long journey individually, I have learnt a great many lessons, and gained some life-long friends, and I thank you all for your contribution during this phase of my life.

DECLARATION

I declare that this thesis contains no material which has been accepted for the award to the candidate of any other degree or diploma, except where due reference is made in the text of this thesis. I also declare that to the best of my knowledge this thesis does not contain material previously published or written by another person except where due reference is made in the text of this thesis.

I further declare that the ethical principles and procedures specified in the Swinburne University of Technology Human Research Ethics document on human research and experimentation have been adhered to in the presentation of this thesis.

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Signed:

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CHAPTER 1: RUGBY UNION

1 Introduction

This chapter will give an overview of the sport of rugby union including a history of the game, a positional definition for the individual positions, and description of the physical characteristics of rugby union players and explore how performance has been conceptualised and measured in the sport. This overview will also justify the utilisation of psychological variables to predict measures of subjective and objective performance of elite rugby union players.

1.1 History of Rugby Union

The game of rugby union is apocryphally considered to have been born in 1823 when William Webb Ellis, after whom the rugby world cup is named, disregarded the rule that no player could run with the ball towards the opposition's goal. In spite of this popular account the game of rugby union's birth, via Ellis' alleged infringement, handling of the ball had already been permitted between 1750 and 1823 during the game of football at the rugby school in Rugby, England (Collins, 2009). During these years, players were still not allowed to run with the ball in their hands towards the opposition's goal, and there were no fixed limits of the numbers of players taking part in a game.

Football in its many forms, as teams would agree on a set of rules before the beginning of matches, had been played for 200 years before the first set of written rules were introduced in 1845 (Richards, 2007). As the popularity of rugby grew, a number of clubs were founded. Guy's Hospital Football Club was formed in 1843 by alumni of the Rugby School, and over the next 30 years a number of other clubs were formed across England, Ireland, Scotland and Wales. In 1871, the Rugby Football Union (RFU) was established, leading to a standard set of rules for all the clubs in England to compete within. In the same year, the first international match of rugby union was

played between England and Scotland, with 20 players each a side. In the following 10 years the game of rugby union was introduced in Australia, New Zealand, Argentina, Fiji, and South Africa with each of these countries developing their own national unions and associated competitions.

International tours became a major part of rugby union in the late 1880's and early 1890's, with teams from the British Isles touring the Southern hemisphere playing countries, Australia and New Zealand in 1888, South Africa in 1891, 1896, 1903 and 1910. In 1905 the New Zealand All Blacks toured the British Isles, and were followed by the South African Springboks in 1907 and the Australian Wallabies in 1908. From 1875 all rugby matches were played with 15 players on each side, although teams played in a myriad of alignments. During the 1890's, in what has become known as the 'great schism' between the working men's rugby clubs in northern England and the clubs in southern England occurred over the issue of professionalism. A similar issue over the payment of players also occurred in Australia and other rugby playing nations. On August 29, 1895, the Northern Rugby Football Union (NRFU) of 22 clubs split from the RFU, creating the Northern Rugby League in 1901, and became known officially as Rugby League in 1922. The code played by members of the International Rugby Board (IRB) became known as rugby union, and those that played 'open' rugby and allowed professional players became known as rugby league (Collins, 2009). In 1995, the IRB declared that the restrictions of amateurism would be removed from rugby union, thus removing the major distinguishing difference between the two codes. Despite the common origins of the sports, rugby union and rugby league have evolved into entirely different sports since the original 'schism' around 100 years earlier.

1.2 Rugby Union – The Modern Game

The modern game of rugby union lasts for 80 minutes, divided into two 40 minute halves. Each match is controlled by a referee, who is in sole charge of applying the laws set out by the IRB for each game; the referee is assisted by two touch judges. The following sections provide an overview of the IRB laws

relating to scoring and definitions of instances that occur during matches of rugby union. It is important to define aspects of play that players can engage in, as these instances can be modelled as performance indicators for defensive and offensive performance of individual players and teams. These aspects of play can also be used to understand the role of different players in rugby union, given that the players have specific positional demands and roles.

1.2.1 Scoring

The prime objective of a game of rugby union is to score; this can be done in a number of ways, with different amounts of points allocated for the different methods of scoring. Table 1 details the five ways attacking players can score points, their value, and a short description of how the scoring method is achieved (IRB, 2010).

Table 1: Rugby union scoring values

| Type of scoring method | Value (points) | Description |
|------------------------|----------------|--|
| Try | 5 | When an attacking player grounds the ball in the opposition's in-goal area, a try is scored. |
| Penalty Try | 5 | If the referee deems that a player probably would have scored a try but for a foul by the opposition, a try is awarded. |
| Penalty Goal | 3 | A penalty goal is scored when a player kicks a goal (kicking the ball between the upright goal posts, and over the crossbar) after a penalty is awarded. |
| Conversion Goal | 2 | When a player scores a try (or a penalty try), their team is also afforded the right to kick a goal. This is a conversion kick, which can be taken via place or drop-kick. |
| Dropped Goal | 3 | A player scores a dropped goal when they kick a goal in general play from a drop kick. |

1.2.2 Tackle

Players are allowed to tackle a player who is in possession of the ball using their arms, in an attempt to bring the player in possession of the ball to the ground. Once a player is grounded, they must release the ball, either via a pass to a team-mate, or by placing the ball on the ground. When the player places the ball on the ground following a tackle, this is when a 'ruck' is formed (IRB, 2010). If the player does not go to ground when tackled, a maul may be formed. Apart from the instance of a ruck or maul forming, the major rule applying to tackles centres around the tackler having to tackle the player with the ball below the level of the shoulder.

1.2.3 Ruck

A ruck is essentially a contest for possession once a player has grounded the ball following a tackle. The tackled player must release the ball and try to move out of the way, as must the tackling player. As players arrive from both teams to win or keep possession, they bind together by locking shoulders as they face each other (IRB, 2010). The players then attempt to use their feet to win or keep possession. This process is called 'rucking'. The ruck is governed by a number of laws concerning how players can join the ruck, the process of rucking, and positioning around the ruck. As such, the majority of infringements in a game of rugby union occur in and around the ruck.

1.2.4 Maul

A maul is formed when the player who is tackled does not go to ground, but is held up and players from either side bind to him. A maul consists of at least three players, though more players can join in the maul (IRB, 2010). The maul is used by the team in possession of the ball to advance it towards their goal line. It is the defensive team's aim to stop the advance of the maul without incurring any penalties for collapsing the maul through illegal means.

1.2.5 Mark

A mark is taken when a player catches the ball after a kick from the opposition that travels inside the marking players 22m line. The marking player must shout 'mark' as he catches the ball. Once a mark has been taken, a free kick is awarded to the team who has taken the mark (Hanlon, 2009).

1.2.6 Touch

The line of touch is a line that extends around the field of play. The ball goes into touch when: it is no longer inside the area of play and has touched the touch line or anything beyond the line; when it is kicked over the touch line by a player and has not been touched by anyone or anything else; when a player carrying the ball touches the touch line or any area beyond the line whilst in possession of the ball; or if a player catches the ball and is in contact with the touch line or any area outside the field of play (IRB, 2010).

1.2.7 Line-out

The line-out occurs when the ball enters touch, as a way to quickly and safely re-start play. The line-out takes place where the ball left the field of play, players from both teams line up a metre apart, between 5m and 15m from the touchline (IRB, 2010). The ball is then thrown by a player from the opposition of the team who last touched the ball before it left the field of play. The ball is thrown as straight as possible between the two lines of players, but to the general advantage of a player who is to be the receiver of the ball. At least two players from each team must take part in the line-out, the maximum is set by the number of players in the attacking teams line (Hanlon, 2009). All other players must be at least 10m behind the line of touch (set by where the ball is being thrown from) or on their goal line if it is closer.

1.2.8 Scrum

A scrum is another way of re-starting play after a minor or accidental infringement inside the field of play. A scrum is formed by the eight forwards of each team, who bind together in three rows (Hanlon, 2009). The two packs of forwards engage in a scrum by interlocking their heads with those from the opposition's front row of forwards. The ball is thrown into the tunnel in between the two packs by the scrum-half, and they compete for possession of the ball by hooking the ball with their feet out to the back of the scrum (IRB, 2010).

1.2.9 Penalty and Free Kicks

Penalty and free kicks are awarded to the non-offending team for infringements against the many rules and regulations that apply to the game of rugby union (IRB, 2010). The kicks are taken at the point of infringement, and depending on how the kick is taken (punt, drop-kick, or place kick), play continues. A penalty goal can be scored from a place kick, once the kicker indicates to the referee that he is attempting a penalty goal.

1.3 Positional Definitions for the Game of Rugby Union

There are 15 players on the field for both teams in a game of rugby union. Each player has a designated position as outlined by the IRB (IRB, 2010). These positions are defined in two ways: by a number displayed on the back of the jersey of each player; and by a short description that applies to these numbers, such as the number 9 is referred to as the scrumhalf. A list of these numbers and descriptors appear below, along with Figure 1, which presents a stylised graphic of the position of players across the field of play.

- | | | |
|--------------------|----------------------|--------------------|
| 1) Loose head prop | 6) Blindside Flanker | 11) Left wing |
| 2) Hooker | 7) Openside Flanker | 12) Inside centre |
| 3) Tight head prop | 8) Number 8 | 13) Outside centre |
| 4) Left lock | 9) Scrumhalf | 14) Right wing |
| 5) Right lock | 10) Flyhalf | 15) Fullback |

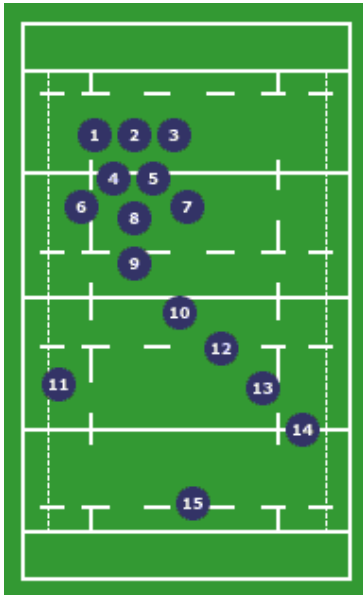


Figure 1: Rugby Union Positional Guide (from: news.bbc.co.uk)

These positions are further grouped together into ‘forwards’, players numbered 1-8, and ‘backs’, players numbered 9-15 (IRB, 2010). These groupings are further divided, with players 1 to 3 being referred to as the ‘front row’; players 4 and 5 are termed the second row, for their roles in the scrum. These two groups of forwards are also referred to as the ‘tight 5’, together their specific role is to contest for possession of the ball at scrums, rucks, mauls, line-outs, kick-offs and drop-outs (Bathgate, Best, Craig & Jamieson, 2002). The players numbered 6 through 8, are referred to as the ‘loose forwards’, or the ‘back row’ for their role in the scrum. They have a less active role in set pieces (e.g., line-out), with their main role being to maintain possession during phase and general play, whilst supporting the ‘backs’ in attacking play and trying to recover the ball in defence.

The 'backs' are further divided into three groupings: the half backs (or inside backs) are numbered 9 and 10 (IRB, 2010), and they are generally seen as the link between forwards and backs. Players wearing the numbers 12 and 13 are referred to as the mid-field backs: they are highly skilled passers, quick and agile runners, whilst also being good strong tacklers in defence. The last three players on the grounds, numbered 11, 14, and 15, are referred to as the outside backs. As with the mid-field backs, these players must be fast and agile, and equally adept at tackling players from the opposition backline. They also have to be proficient in fielding a ball kicked to them, whether by picking it up and counter-attacking, or by taking a mark and re-starting play (Duthie, Pyne & Hooper, 2003).

Given the positional specificity involved in the game of rugby union it is not surprising that variations in physical attributes, skill, and task requirements exist for each position (Quarrie, Hancock, Toomey & Waller, 1996). By virtue of this, rugby union itself is an atypical sport, due to the lack of homogeneity of physiques and how individual performance can be assessed.

1.4 Assessing Performance in Rugby Union

Following rugby union's transition to professionalism in 1995, interest in factors that contribute to performance has increased in academic circles, though not to the levels of sports (e.g., soccer, golf, and cricket) that have been professional for longer periods (Mellalieu, 2008). This research can be grouped into four areas; performance analysis (Hughes, 1996), physiology of rugby union players (Duthie, et al., 2003), biomechanics (Quarrie & Wilson, 2000), and the psychology of rugby (e.g., Beauchamp, Bray, Eys & Carron, 2002; Evans, Jones & Mullen, 2004; Nicholls, Holt, Polman & Bloomfield, 2006). These four areas of investigation all provide valuable information concerning the features of rugby union and its competitors. Of particular relevance to the current thesis are the findings of the psychological attributes of rugby union players, and their relationship to performance, which will be reviewed later in this chapter (see section 1.9).

1.5 Physiology of Rugby Union

Some research has previously focused on the description of the physical attributes of players across various levels of competition in rugby union. These studies have provided physiological estimates of positional work rates of individual players (e.g., Deutsch, Kearney, & Rehrer, 2002; Hughes & White, 1997; Hughes & Williams, 1988), differences in player morphology, and specific biomechanical actions involved in the sport rugby union. This empirical research focused on rugby union has generally been somewhat limited in its relationship to actual performance, as they mostly provide a descriptive focus on specific aspects of rugby union, such as the patterns of play of teams (Deutsch, et al., 2002) or the physical attributes of players (Quarrie & Hopkins, 2007).

1.5.1 Body Mass

The roles of the forward and back divisions of players is reflected in the significant difference in body mass between the two groups (Duthie, et al., 2003), with forwards being significantly heavier consistently throughout studies from 1969-2003 across different levels of competition. This recurring difference is obviously a function of positional specificity. Importantly body size has been related to scrummaging force, an essential facet of rugby union (Quarrie & Wilson, 2000), as possibly reflected in its relation to competitive success (Olds, 2001). Technical ability also plays an important part in scrummaging (McKenzie et al., 1989), and may be of more value when identifying predictors of scrum success rather than just as a product of body mass.

1.5.2 Height

The role of height in rugby union is generally undecided, with forwards and backs being of similar stature across levels of competition (Quarrie, et al., 1996). Players generally get taller with an increase in the level of competition, and a greater distinction between backs and forwards can be observed, which

is representative of the greater specific positional demands, and the greater ability to achieve higher levels of performance with this physical advantage. For example, locks appear to have greater stature than other positions due to the demand for greater jump height in the line-out.

1.5.3 Anthropometry

Anthropometric measurements generally focus on measuring the body fat of players. These measurements are inherently problematic with measurement error of different measures and applications used in establishing body fat percentage from body density or skin-fold measurements (Martin, et al., 1985). Generally findings suggest that body fat decreases in concert with increase in level of play, which may reflect the higher level of training and dietary constraints of professional play. Body fat differences also appear between forwards and backs, with backs being lower, due to the increased aerobic or running demands of their positions.

1.5.4 Aerobic Fitness

Aerobic fitness is commonly assessed via VO_2 max assessment (the volume of oxygen inhaled per kilo per minute). In regards to differences between backs and forwards, backs have been found to have greater VO_2 max capacity (Scott, Roe, Coats & Piepoli, 2002) than forwards at the professional level. This result was interpreted as being due to the different typical body morphology of forwards and backs. With forwards being taller and heavier, and having higher body fat percentage, the differences in peak VO_2 per kilogram may be more a sign of these physical differences than aerobic fitness.

1.5.5 Positional Fitness

In identifying accurate fitness profiles for rugby union players, it has been suggested that position specific fitness profiles may exist, and modelling of these with performance may help explain greater variance in performance.

For example, Deutsch and colleagues observed that forwards show greater overall aerobic intensity during a game in comparison to backs. The backs tended to exert themselves for shorter periods at high intensity, with longer periods of rest (Deutsch, Maw, Jenkins & Reaburn, 1998). This difference is understandable given the general structure of play, and roles of players as forwards or backs. This type of difference has also been acknowledged by Hughes and Bartlett (2002), who advocate the utilisation of specific performance indicators to assess rugby union performance.

1.6 Biomechanics of Rugby Union

The aforementioned (sections 1.5.1 – 1.5.5) physiological descriptors of rugby union players also contribute to the study of the biomechanics of rugby union players. Research in this area has included comparisons with straight line running (Sayers, 2003), with acceleration being identified as the major component of sprints in rugby, and that only a small percentage of sprints are performed from a striding start that permits the attainment of maximal velocity (Benton 2001). Differences between backs and forwards running also exist with the greater distance from the opposition for the backs allowing them to accelerate and achieve higher speeds and change direction more often in comparison to forwards providing greater room to move and the opportunity to run at exposed gaps. Whereas, forward's closer proximity to the opposition, dictates their greater tendency to run straight ahead and use force to push them over the advantage line (Docherty, Wenger & Neary, 1988; Deutsch, et al., 1998; Duthie, et al., 2003). Different methods of ball carrying have also been found to affect running speed (Grant, et al., 2003), agility (Sheppard & Young, 2006), and the notion of cutting (Trewartha, Munro & Steele, 2007).

Some biomechanics research has focused on rugby union specific skills, such as line-out throwing technique (Sayers, 2004), the forces being exerted in the scrum in regards to safety (Milburn, 1990) and the relationship between scrummaging force and individual players' physical and anthropometric characteristics (Quarrie & Wilson, 2000). These descriptive findings provide important information concerning the physical demands of rugby union, but

when considering the performance of elite players, knowing that the key to throwing greater distances in the line-out is linked to greater involvement of the lower limb (Sayers, 2004) does not offer much differentiating information concerning the relative success of players. This work could be expanded upon with the integration of assessment of skill execution under high pressure conditions, or the attempted identification of psychological profiles that contribute to better skill execution.

1.7 Performance Analysis of Rugby Union

Hughes and Bartlett (2002) defined their performance indicators as “a selection, or combination, of action variables that aims to define some or all aspects of a performance” (Hughes & Bartlett, 2002, p. 739). Performance indicators enable the creation of performance profiles for specific positions, players, and teams that can be utilised to assess performance on a normative basis. This is done through the collection of specific performance indices on multiple occasions that can be combined to predict future occurrences of the indices. The challenge with rugby union being such a complex sport whereby performance can be assessed, analysed, interpreted and presented in a myriad of forms is that performance profiles can differ widely between research groups due to the nature and value placed upon the events collated.

1.7.1 Game Analysis

With the increase in professionalism within rugby union worldwide, the advent of performance analysis systems has increased markedly in the last decade (Hughes, 1996). The appeal of recording and coding of events in rugby union pertains to its dynamic nature, and the many events that occur during the game. Given the sheer number of recordable or notable events that occur, it is unreasonable for people to be able to adequately recall all events during games. The use of digital video, computer systems and video analysis software to record performance allows theoretically all events to be recorded accurately and objectively. This type of analysis has been utilised to model player and team performance (Bracewell, 2003; James, Mellalieu, & Jones,

2004), patterns of team play (Hughes & Williams, 1988), and work rates and activity patterns of players (Deutsch, Kearney & Rehrer, 2007; Duthie, Pyne, Marsh & Hooper, 2006). An analysis of this data takes place following the conclusion of a game by trained coders, who review video footage and code events of interest. These events or performance indicators can be used to create performance profiles for individual players or teams (James, Mellalieu & Jones, 2005). A number of systems for recording performance indicators have been developed and utilised within professional rugby union across the world, with the aim of understanding the nature of rugby union and its players.

1.7.2 Time-motion Analysis

Time-motion analysis is one method of quantifying the demands of rugby and can provide assessment of the specific physical activity of players (Deutsch, et al., 2002; Deutsch, Maw, Jenkins, & Reaburn, 1998; Docherty, et al., 1988; Duthie, et al., 2003; McLean, 1992; Menchinelli, Morandini & De Angelis, 1992;). This is done by observing the frequency, mean duration and total time spent in activities, such as running, walking, jumping, lifting, tackling, or any other physical action in a game. Time-motion analysis has been used to model the movements of Super 12 players during competition previously (e.g., Deutsch, et al., 2002). This analysis was used to quantify the physical demands of elite rugby union competition and serves as a useful indicator of the movement patterns in elite rugby competition. For example, a discrepancy exists between the movement patterns of forwards and backs in competitive rugby (Deutsch, et al., 1998, Deutsch, et al., 2002; Docherty, et al., 1988; Treadwell, 1988). Deutsch and colleagues reported the total time spent in work activities by Super 12 forwards (10 min) was substantially greater than by Super 12 backs (4 min) (Deutsch, et al., 2002). They attributed this difference to the greater time spent in static exertion by the forwards, and the greater proportion of high-intensity sprinting efforts by the backs. This information can be utilised by conditioning staff in the prescription of training for forwards and backs, such that their training reflects the positional differences inherent in the game.

In a more comprehensive study using time-motion analysis, Duthie, Pyne and Hooper (2004) observed that forwards spent more time in static exertion than backs, but backs spent more time sprinting than forwards, and sprinted longer. Forwards spent more time in work activities and had longer work durations than backs. The results indicate frequent short duration work efforts followed by moderate duration of rest for forwards, and extended rest duration for backs. High-intensity efforts involved static exertion for forwards and sprinting for backs. The percentages of time spent jogging, striding and sprinting in Super 12 competition were similar to those reported at under 19 level (Deutsch, et al., 1998), club (Docherty, et al., 1988; Treadwell, 1988) and international players (Docherty, et al., 1988). Whilst these results provide important information on the physical characteristics and demands of elite rugby, they do not provide explicit information concerning how these attributes contribute to individual or team performance. It is further limited in its ability to assess the specific demands combinations of activities with respect to skill level, the involvement of decision making, and how tactics impact on the playing style of different teams (Deutsch, Kearney & Rehrer, 2006).

1.7.3 Performance Indicators

Jones, Mellalieu and James (2004) identified 22 team based performance indicators from analysis of 20 matches played by a UK based rugby team. The team consisted of a high number of internationally experienced players (54%). Unlike the time-motion analyses previously discussed, their aim was to examine the differences between winning and losing performances via the use of on-field performance indicators. They identified 22 performance indicators that were measured and analysed as proportions of successful team involvement in scrums, line-outs, rucks, mauls and tackles. Of the 22 team performance indicators, only percentage of tries scored and percent line-outs stolen demonstrated significant differences between winning and losing performances. Practical differences as defined by the authors were also evident in the percentage of turnovers won by the team in winning or losing games (Jones, et al., 2004).

The identification of the scoring of a greater number of tries as an indicator of better performance is unsurprising as a predictor of greater performance, but the importance of gaining possession through stolen line-outs and turnovers is of interest. Turnovers and stolen line-outs are forms of possession where play is unstructured for a certain amount of time, with the changing of defence to attack and vice versa. This provides a distinct advantage for the team gaining possession of the ball, as their opposition is mostly unprepared for the change in possession and not set up to defend.

1.7.4 Performance Profiles

Further developments in the use of on-field observations of aspects of player performance utilise performance profiles: these can be generated on a positional basis. Using a computerised notational process, James, Mellalieu, and Jones (2005) attempted to develop key performance indicators for each position based upon operationally defined indicators drawn from a panel of elite rugby union coaches. Broadly, they identified that general positional performance profiles existed, but they observed that intra-positional differences occurred, and attributed them to variations in an individual's style of play, the decision-making demands of the position and the effects of potential confounding variables such as time of day, match venue, officials, weather conditions, the effect of injured players, and the nature and strength of the opposition (Hughes & Bartlett, 2002; James, et al., 2002; Rue & Salvesen, 2000). In rugby union, each playing position has specific responsibilities that are distinct to the position and some that are common to all positions in the team (Greenwood, 1997). Measurement of these common and individual behaviours is therefore necessary to present an accurate representation of a player's contribution to a team's performance. Research in this area may also benefit from the development of position specific profiles being generated from multiple players of the same position. These profiles could also be enhanced with attention being given to changes in indicators across positions in different teams who have notable tactical differences.

Notational analysis allows coaches to focus on the 'big picture' of games, as it would be impossible for a coach to identify, record or remember all the key events in rugby games (Parsons & Hughes, 2001). It is also an invaluable tool to assess performance following singular games or on a seasonal basis. Having said this, coaches would attest that even when supplied with a large amount of performance data, a certain degree of performance is related to somewhat intangible aspects of players' efforts, some of which may contribute directly to notational measured aspects of performance, and some to their overall level of performance. The ranking of individuals is a necessary part of the selection process for professional sports teams (Cameron, 2004), and some factors other than notational statistics may contribute to these rankings, or selection in elite sporting teams. As such, the area of psychology of rugby union will now be explored to ascertain what psychological attributes have been identified as important attributes for rugby union players, and whether assessment of these indices can be utilised to predict player performance.

1.8 Psychology of Rugby Union

Assessments of the psychological traits of rugby union players, and their relationship to performance, have not attracted a large amount of academic research. It has been suggested that athletes must excel in four domains to perform at elite levels of sport: physiological, technical, cognitive, and emotional (Starkes & Ericsson, 2003). Whilst time-motion analysis could be suggested to be a measure of athletes' physiological prowess; notational analysis as a measure of technical ability and less so the *strategic* awareness facet of cognitive skills of an individual; the effect of cognitive-emotional aspects of players on performance has yet to be accurately researched. Research into the role of the psychological attributes of players may identify important differences that contribute to performance over and above the attributes assessed by the physiological and technical characteristics of elite rugby union players. The following sections will provide an overview of the academic research concerned with rugby union, such as coping with stress (Nichols, et al., 2009), mental skills use (e.g., Evans, Jones & Mullen, 2004; Neil, Mellalieu & Hanton, 2006), burnout (e.g., Hodge, Lonsdale & Ng, 2008),

achievement goal orientations (e.g., Treasure, Carpenter & Power, 2000), decision-making of players (e.g., Jackson, Warren & Abernethy, 2006), the effect of emotions (D'Urso, Petrosso & Robazza, 2002), and anxiety (e.g., Greenlees, Nunn, Graydon & Maynard, 1999).

1.8.1 Coping with Stress in Rugby Union

Competing at elite levels and professional sport inevitably induces stress on competitors. How rugby union players cope, the affective states they identify when faced with stress (Nichols, Jones, Polman & Borkoles, 2009), and how effective their coping skills are when faced with stressful situations (Nicholls, et al., 2006) have been explored previously in elite rugby union populations. Nicholls and colleagues (2006) aimed to identify the causes of stress, coping strategies, and how effective coping strategies of professional rugby union players were. Their study involved eight first class professional male rugby union players, who were asked to complete diaries over a 28-day period. The diaries included a stressor checklist, an open-ended coping response section, and a Likert-type scale evaluation of coping effectiveness in order to identify what were common stressors, what techniques they used to overcome stressors, and how effective these techniques were. The most frequently cited stressors for the sample were injury concerns, mental errors, and physical errors during training and on the field. Players reported utilising increased concentration, blocking, positive reappraisal, and being focused on the task as coping strategies. In regards to efficacy, the coping strategies that were most effective were focusing on task and increasing effort (Nichols, et al., 2006).

In a later study, Nichols and colleagues (2009) evaluated the sources of sport and non-sport stressors and their associated symptoms on rest days, training days, and match days among a sample of 16 professional rugby union players. Players completed the Daily Analysis of Life Demands in Athletes and the Activation Deactivation Adjective Check List daily for a month. The results highlighted that on match days players reported that a low number of stressors were “worse than normal”. On training days followed by a rest day,

most of the recorded stressors experienced by the players were “worse than normal”, and a higher number of the recorded stressors were “worse than normal” on the day after a match than on match days (Nichols, et al., 2009). Players also reported being in an unpleasant and low activation state across the three analysis days, suggesting they were in an over-trained state. The authors concluded that early detection of stressors and negative affective states could help prevent symptoms of overtraining and burnout and facilitate optimal training and sporting performance. Coping effectiveness and emotional intensity varied amongst the participants in the study (Nichols, et al., 2009), suggesting that athletes (rugby union players in the case of this study and the current thesis) would benefit from assessment of coping strategies and constructs that assess emotion processes in line with performance measures.

1.8.2 The Effect of Burnout in Rugby Union

Burnout has been identified as a concern for elite athletes following the many years of effort and training (Baker, Cote & Abernethy, 2003). In regards to rugby union, burnout in rugby has been suggested to manifest as problems with concentrating, mood swings, poor performance, and possible quitting from the sport (Cresswell & Eklund, 2006). Burnout can be considered to be occurring when an athlete’s sport becomes markedly less fulfilling, and they struggle to find the desire and energy to continue to participate. This experience has been assessed using the Athlete Burnout Questionnaire (Raedeke & Smith, 2001) and has been explored in the context of self-determination theory (Deci & Ryan, 2002) in junior elite male rugby union players (Hodge, Lonsdale & Ng, 2008). Players who were classified as high-burnout had lower competence and autonomy scores than athletes reporting lower burnout symptoms.

An earlier study (Cresswell & Eklund, 2006) concerning burnout and motivation of 392 top amateur male rugby players, the authors employed structural equation modelling to examine links between motivation and burnout. They identified that amotivation (diminished inspiration to participate)

being the least self-determined type of motivation, had a large positive association with burnout. In contrast, self-determined forms of motivation (i.e., intrinsic motivation) exhibited significant negative associations with burnout. Whilst this and the previous finding shed light on the nature of burnout in regards to rugby union, the developmental trajectory of burnout has not been examined nor has its relationship to actual performance.

1.8.3 Achievement Goals and Rugby Union

Treasure, Carpenter and Power (2000) researched achievement goal orientations and the perceived purposes of sport as a function of competitive standard in rugby union following the change to professionalism in 1995. They assessed 73 professional and 106 amateur rugby players in England in the 1996/1997 season on measures of achievement goal orientations and beliefs about the purposes of rugby. They observed that high ego/moderate task orientation was positively related to fitness, aggression and financial remuneration as significant purposes of rugby. Professional players scored higher on those purposes of rugby related to aggression, financial remuneration and fitness, but lower on sportspersonship than amateur players. Professional players also reported higher task and ego goal orientations than amateur players (Treasure, et al., 2000). The authors concluded that how players perceive their success through their achievement goal orientation significantly influences their views about the purposes of rugby (Nicholls, 1989). Further to this, their findings supported Hardy's (1998) earlier contention that elite performers should display both strong ego and task orientation.

More recently, Wilson, Hardy and Harwood (2006) investigated achievement goal orientations and process goals in a sample of 150 rugby union players. Process goals were defined as, four *technical* aspects of rugby (passing, tackling, running with ball in hand, running off the ball), three *physical* aspects (speed / power / agility, strength, stamina / endurance), four *tactical* aspects of rugby (attacking, defence, positional play, game plan), and three *mental* aspects (concentration, communication, positive thoughts about

performance). They identified that self-directed task orientation or a self-directed ego orientation is positively related to the use of process goals in competition. In contrast, they noted that a social approval ego orientation was negatively associated with employing process-oriented activities. The authors suggest that in an applied context, higher levels of self-directed task orientation should be encouraged when the use of process goals may facilitate performance (Wilson, Hardy & Harwood, 2006). As prior to competition a process goal focus may be deemed facilitative, as opposed to a focus upon outcome goals, for successful performance (Kingston & Hardy, 1997). Therefore in the case of rugby, coaches should encourage members of their team to be more self-directed task involved prior to competition so they will employ a process focus. Whilst these results reflect the relationship between important process goals in rugby union, they do not address how well players perform, and how their performance relates to their orientation.

1.8.4 Anxiety and Rugby Union

Assessment of rugby union players' anxiety has been undertaken in a variety of contexts, with anxiety being an extremely popular construct in sports psychology (Martens, Vealey & Burton, 1990). An early study concerning the intensity and direction of state anxiety and its relationship to competitiveness (Jones & Swain, 1992) utilised some rugby union players in addition to other sportspeople. Jones and Swain (1992) identified that highly competitive athletes (N = 34) reported that their anxiety as more facilitative and less debilitating than the low competitive group (N = 35). This study was the first to introduce the concept of *anxiety direction*, and operationally defined it as the athlete's facilitative (i.e., positive) and debilitating (i.e., negative) interpretation of the anxiety symptoms related to performance. More recent research has indicated the direction of anxiety may be the more important dimension when comparing elite versus non-elite performers, with elite athletes having more positive anxiety perceptions (e.g., Jones, Hanton & Swain, 1994; Jones & Swain, 1995).

The effect of anxiety has also been explored in regards to collective efficacy and the pre-competitive anxiety and affect in rugby union (Greenlees, et al., 1999). Before a competitive match, 66 male rugby union footballers completed measures of confidence in their team winning the match, a measure of confidence in their team performing well, a measure of state anxiety, and the Positive and Negative Affect Schedule. Their results suggested that concerns with the team's ability to win a match (lower confidence) were associated with high cognitive state anxiety and doubts regarding the team's ability to perform well were related to low positive affect. Whilst these results point to the possible utility of collective efficacy (Bandura, 1977) in sports, these results do not account for inter-individual differences in 'trait' anxiety, and the actual team and individual performances were not assessed.

More recent research including rugby union players (N = 3, as well as a few other sports) has incorporated anxiety assessment in a cognitive motivational relational theory perspective (Uphill & Jones, 2007). In this way, anxiety and other affective states are investigated with regard to their antecedents, and in this study primary and secondary appraisal components of goal relevance, goal congruence, ego-involvement, blame/credit, coping potential, future expectations were associated with a range of emotions: anger, anxiety, guilt, happiness, pride, relief, sadness, and shame. Given the small sample size and low amount of rugby union players, the value of these results to rugby union is questionable. They do, however, point to the utility of assessment of athletes' ability not to let negative emotional experiences in competition affect their performance, and to use positive emotional experiences to facilitate performance.

1.8.5 Mental Skill Use in Rugby Union

Rugby union players' usage of mental skills to facilitate performance has been explored recently (Neil, et al., 2006), with the use of strategies such as activation, relaxation, imagery, goal setting, self-talk, automaticity, emotional control, and negative thinking/attentional control skills during competition and

practice settings being assessed. This type of research builds upon traditional anxiety research that measures the intensity of the cognitive and physiological symptoms associated with anxiety. Research in this area has identified that the intensity and direction of competitive anxiety symptoms and psychological skill usage in rugby union players vary across skill levels (Neil, et al., 2006). In their sample of elite (n=65) and non-elite (n=50) rugby union players, elite players reported more facilitative interpretations of competitive anxiety symptoms, higher levels of self-confidence, lower usage of relaxation strategies, and greater use of imagery and self-talk than non-elite players.

A mental skill use intervention has also been conducted recently with an elite rugby union player (Evans, et al., 2004) in order to explore the use of imagery by this player and to examine the effects of an imagery based intervention on performance. The study involved a 14-week program consisting of semi-structured interviews, diaries, and administration of a sport imagery questionnaire. The player reported using cognitive specific and cognitive general imagery, and following the intervention, reported greater clarity; detail; control over anxiety, activation, and motivation levels. These improvements translated into greater confidence in playing ability and more structure in the use of imagery (Evans, et al., 2004).

1.8.6 Emotions in Rugby Union

The role of emotions in rugby union and their effect on performance has previously been explored using the Individual Zones of Optimal Functioning (IZOF) emotion model (Hanin, 2000) and the performance profiling approach in predicting performance (D'Urso, et al., 2002). In a sample of 33 male rugby union players, the authors administered pre-game assessments and conducted season end individual interviews to identify traits and emotions that affected performance. Their study findings revealed that emotions change extensively during the competition because of external events (e.g., behaviours of team-mates or opponents) or individual behaviours (e.g., individual faults). In conclusion, these findings add support to the contention that extending the IZOF model to other physical or performance related

components would require situational rather than relatively stable qualities (D'Urso, et al., 2002).

The effect of anger and anxiety on performance has also been explored in rugby union players (Robazza & Bortoli, 2007). This study assessed 197 Italian rugby players on the frequency and direction of symptoms of competitive trait anger and the intensity and direction of multidimensional trait anxiety. The results of the study revealed that rugby players experience a moderate amount of anger related symptoms and they generally interpret these anger symptoms as facilitative rather than debilitating in regards to performance (Robazza & Bortoli, 2007). Player's cognitive anxiety was also found to be a significant predictor of anger, whilst player self-confidence was a significant predictor of control of their anger. In this way, harnessing anger has been suggested to be necessary to outperform opponents (D'Urso, et al., 2002).

1.9 Psychology, Performance and Rugby Union

In the preceding sections (1.8 – 1.8.6) research specifically focused on psychological attributes of rugby union players was reviewed. With only a small amount of research focusing upon the psychological attributes of rugby union players, it was noted that a gap in the literature exists concerning how the psychological attributes of elite rugby union players relate to actual on-field performance. To address this relative shortfall, the following chapter will draw from sports psychology generally to identify salient psychological predictors of sporting performance. This review will take in Inverted-U hypothesis (Yerkes & Dodson, 1908), drive theory (Hull, 1943), multidimensional anxiety theory (Martens, Burton, Vealey, Bump & Smith, 1990), the mental health model (Raglin, 2001), the directional perception approach (Jones, 1995; Jones & Swain, 1992), and the IZOF model as applied to anxiety (Hanin, 2000) and idiosyncratic pleasant and unpleasant emotions (Hanin, 2004). Further to this, the areas of Personality (Costa & McCrae, 1992), Emotional Intelligence (Salovey & Mayer, 1990), and global

and multidimensional self esteem (Rosenberg, Schooler, Schoenback & Rosenberg, 1995) will also be reviewed.

CHAPTER 2: PSYCHOLOGY AND SPORTING PERFORMANCE

2 Introduction

In light of the relative paucity of studies directly assessing the psychological attributes of rugby union players and their relationship to various measures of performance, the following chapter aims to draw upon research in sports and general psychology to identify practical and predictive psychological measures. The chapter begins with a review of extant research in sports psychology of models applied to the assessment of psychological factors suggested to impact upon performance.

2.1 Drive Theory

Drive theory was posited by Hull (1943). It proposed that anxiety can have a positive effect on performance due in part to concomitant physiological arousal that is suggested to be intertwined with habitual behaviour. This suggests that well-learned or practised behaviours will be improved with the experience of high anxiety. Despite the obvious connection between sporting performance and anxiety, far more promising theories relating to this relationship have been developed and non-sporting related research produced less than compelling findings for this theory (Raglin, 1992).

2.2 Inverted-U Hypothesis

The Inverted-U hypothesis offered a far more promising model for the performance-anxiety relationship, based upon the work of Yerkes and Dodson (1908), which have been generalised to human arousal levels (Malmö, 1959). In regards to sporting performance, emotional arousal is assessed along a continuum generally ranging from Low (under aroused), to Moderate (optimally aroused) and up to High (over-aroused) with performance plotted on the y-axis as depicted in Figure 2 below.

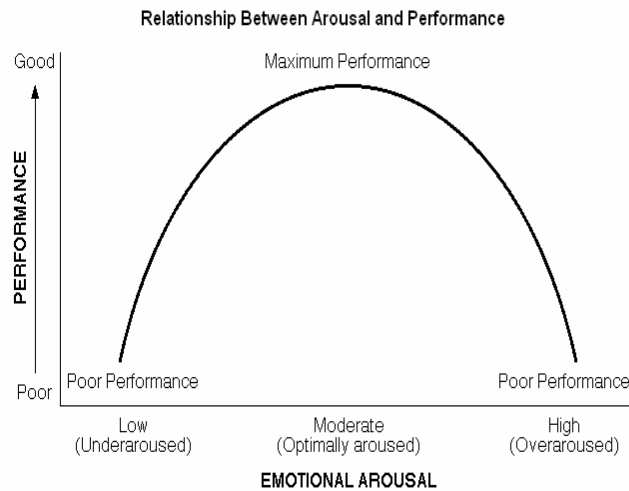


Figure 2: The Inverted-U hypothesis: Relationship Between Arousal and Performance. From: *Williams, J.M., Landers, D.M., Boutcher, S.H., (1993). Arousal-Performance Relationships, Applied Sport Psychology; Personal Growth to Peak Performance, pgs 170-184.*

Further to this, sporting activities that require finer motor skills for high levels of performance benefit from lower levels of arousal, whereas, higher levels of arousal are beneficial for the production of more gross motor skills. An example of this would be a reduction, or lower levels of arousal during a round of golf or long matches of billiards facilitating performance, or in contrast, a high level of arousal prior to a weight-lifting attempt. This is quite a gross distinction considering the variance in motor skills across events, and particularly the individual differences in the possible 'optimal' levels of arousal for independent athletes. Further to this, in team sports such as rugby, players have different roles to fulfil during games; therefore it would be unlikely that a 'specific' level of arousal would be ideal for all players of all positions. As such, it is not surprising that the Inverted-U hypothesis of performance has not been widely used within sport psychology research due to its limited scope and generalisability across sports.

A few studies have incorporated this model into empirical studies, but with limited success. In a sample of 30 female basketball players, Sonstroem and Bernardo (1982) suggested their results using a composite basketball performance factor and anxiety levels supported the Inverted-U hypothesis.

They identified that high levels of state anxiety were associated with poor performance, and a similar polynomial trend in the anxiety-performance relationship has been replicated by male basketball players (Swain & Jones, 1996) that accounted for 18.6% of the variance in the relationship. Reviews of both general and sport anxiety related literature have, however, failed to find support for the Inverted-U hypothesis (Gould & Krane, 1992; Gould & Udry, 1994; Hardy, 1990; Jones, 1995; Neiss, 1988), mostly as a product of the lack of accounting for trait levels of anxiety of various athletes and their 'ideal' pre-competition, and during competition levels of anxiety.

2.3 The Individual Zones of Optimal Functioning Model

The pre-competitive stress associated with competing in sport at all levels can occur days, hours, minutes before competition, with inter-individual variability in intensity and resulting impact on performance being demonstrated in previous investigations (Hanin, 1986; 1995). Findings that between 30 - 45% of athletes report optimal performance whilst experiencing elevated levels of anxiety form the basis of Hanin's IZOF model. According to this model, athletes perform optimally under higher levels of state anxiety that only occur in sporting competition, and factors such as sport type, experience, or skill level do not have any systematic effect on the level of anxiety that produces 'optimal' performance (Hanin, 1986). This position is in contrast to general thinking where elevated anxiety would be seen as destructive to most areas of performance. In general the findings of Hanin indicate that idiographic (individual) responses are a more effective method for studying the effects of transient mood state changes that occur during competition (Hanin, 2000).

2.3.1 Findings Using Hanin's Individual Zones of Optimal Functioning

Hanin's IZOF model aims to provide an integrated approach to the study of idiographic (individualised) emotion-performance relationship within competitive sport (Hanin, 2007). The model was developed with consideration of the sporting person-environment interaction, theories concerning emotional appraisal and processing, and state measures of individual differences

(mostly anxiety). Whilst this model is based upon the collection of individualised information, trends or benchmarking of consistent levels of emotional experience in regards to performance can be generated. Hanin (2000) detailed four particular hypotheses that underlie the individualised emotion-performance relationship: an emotional response occurs in light of cognitive appraisal of probable achievement of individual goals in the sporting event; athletes develop specific emotional responses to competitive situations over time; these emotional responses are specific to the individual, and the time and context in which they occur; a reciprocal relationship exists between the emotions and individual performance; and the emotions can affect performance optimally or in a dysfunctional manner.

Early research using the IZOF model concentrated on the assessment of anxiety, mostly in the form of pre-competition assessment (Hanin, 2007). The central tenet of the IZOF model is that athletes have an optimal range of emotional intensity that leads to successful performance (eg. being high, medium or low in anxiety for example). As such, different athletes will achieve better outcomes when experiencing their optimal level, and more ineffective performance when the level of that 'state' is not in the optimal zone.

Experiencing emotions within or outside the predetermined intensity has been referred to as the *in-out of zone* principle, where athletes recall their *best* and *worst* levels of performance and relate these to the specific emotion and experienced intensity in order to define the *optimal* zone of functioning. Recall of the specific levels of emotional experience for pre-competitive anxiety (the early basis for the IZOF model), has been found in a number of studies to be reasonably accurate (e.g., Hanin, 1995). A study of track and field athletes showed two-day recall of anxiety levels (Harger & Raglin, 1994), regardless of performance, were correlated at high levels ($r = 0.97$ for females, and $r = 0.96$ for males). At longer recall intervals, the correlation has been observed to range between 0.79 and 0.89 between actual levels and recall up to four months post competition (Hanin & Syrja, 1996; Raglin & Morris, 1994). In addition to the accuracy of recall common between elite athletes for their pre-competitive anxiety, skilled athletes are also very good at predicting the emotions and their impending effects upon future performance (Hanin, 1986).

Significant correlations ($r = 0.49 - 0.98$) have been observed between pre-competition anxiety and predicted anxiety over 24 hour and up to 2-3 week intervals (Hanin, 1986; Krane, 1993). Given these results the IZOF had provided an intuitive model to assess the effects of anxiety on athletic performance, in both individual and group sports.

2.3.2 The IZOF Model: Beyond Anxiety

Despite the IZOF's initial success at predicting 'optimal' athletic performance based upon anxiety levels (Hanin, 1980), criticisms concerning the generalisability of findings purely based upon a single indicator have necessitated expansion of the original model, with the expansion including measures of other emotions, both positive and negative. This multidimensional approach has since been employed in a number of studies with analysis centring on the facilitating and inhibiting nature of particular emotions (Russell & Cox, 2000). As with the original IZOF conceptualisation, studies have observed significant *in-zone* and *out-zone* differences with sporting performance (Hanin, 1986). The collection information concerning positive and negative emotional information, the multidimensional IZOF model provides information on the facilitating and inhibiting nature of the particular idiosyncratic levels of the emotion-performance experience of athletes. The types of emotions can be divided on the basis of hedonic tone (pleasant / unpleasant) and the relative effect of that emotion on performance (facilitating / inhibiting) at levels recalled by athletes. This division provides four ways that emotions functionally affect performance: facilitating-positive; facilitating-negative; inhibiting-positive; and inhibiting-negative. This division can be further utilised in regards to the somatic effects of the particular emotions that are assessed in relation to performance outcomes (Robazza, Bortoli & Hanin, 2004). The implication of the somatic effects of emotions on performance is based upon resource matching or availability. This theory suggests that the optimal experience of pleasant (or unpleasant) emotions enhance the recruitment and utilisation of resources, producing an energising or enhanced effort as well as an organised response in competition (such as enhanced skill execution). A dysfunctional experience of pleasant or unpleasant emotions in

contrast, suggests that *dis*-organisation and *dis*-energisation would result from an athlete who was inefficient in recruitment and utilisation of resources due to the non-optimal emotional experience. The addition of measures of somatic in/out of zone effects was utilised by Gould and colleagues (Gould, Tuffey, Hardy & Lochbaum, 1993), which provided strong support for the predictive efficacy of the IZOF model containing somatic outcomes in addition to positive and negative emotional experiences. This multidimensional approach to quantifying the effects of emotions on performance is as such based upon five central tenets: form; intensity; content; time; and context (Hanin, 1997; 2000). These dimensions can be used to describe how idiographic emotional experiences can be directly related to performance, this framework is depicted in Figure 3.

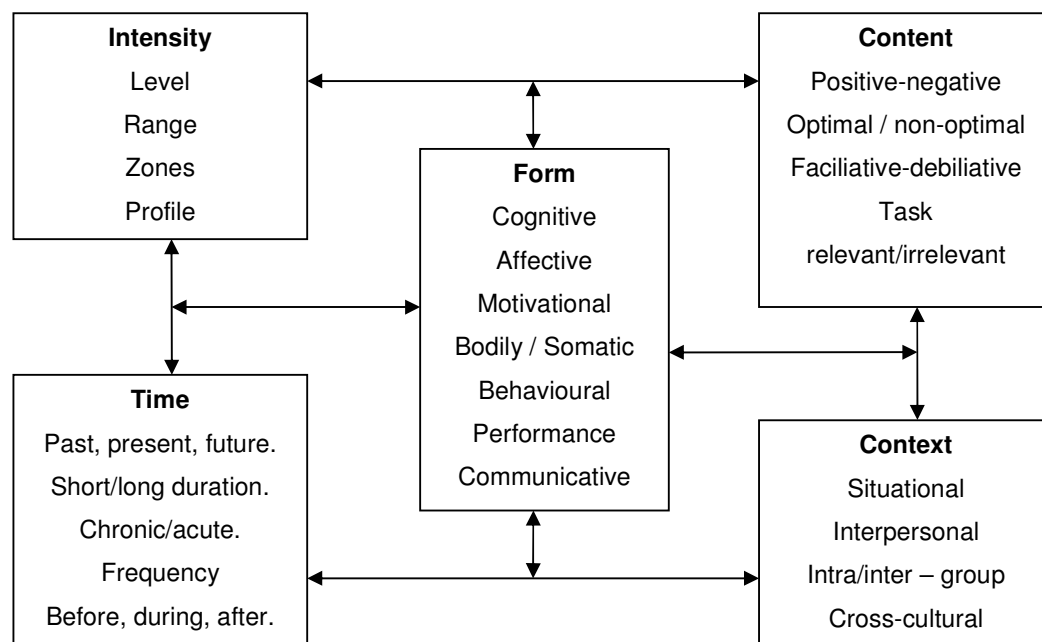


Figure 3: Multidimensional IZOF model: Adapted from *Figure 1*.

Multidimensionality of a systems description of performance psychobiosocial states and emotion-performance relationship (Hanin, Y. (2000) *Individual Zones of Optimal Functioning (IZOF) Model: Emotion performance relationships in sport*. In Y.Hanin (Ed.), *Emotions in Sport*. (pp.65-89). Champaign, IL: Human Kinetics).

Given that a high degree of inter-individual variability exists between the intensity and content; functional or dysfunctional nature; and the valence of the emotions experienced, different athletes perform better and worse at various levels of the emotions measured (Hanin, 2007). Performance is therefore related to the combined effects of positive and negative emotions and what are the optimal and dysfunctional levels at which these emotions can be experienced. These levels are dictated by the athlete in question. For example, a common approach to quantifying the affective experience during competition is for an athlete to recall the positive and negative emotions experienced, and rate their intensity (1 = minimum, 10 = maximum) during their 'best' performance (Hanin, 2000). This information can then be presented graphically as per Figure 4 below.

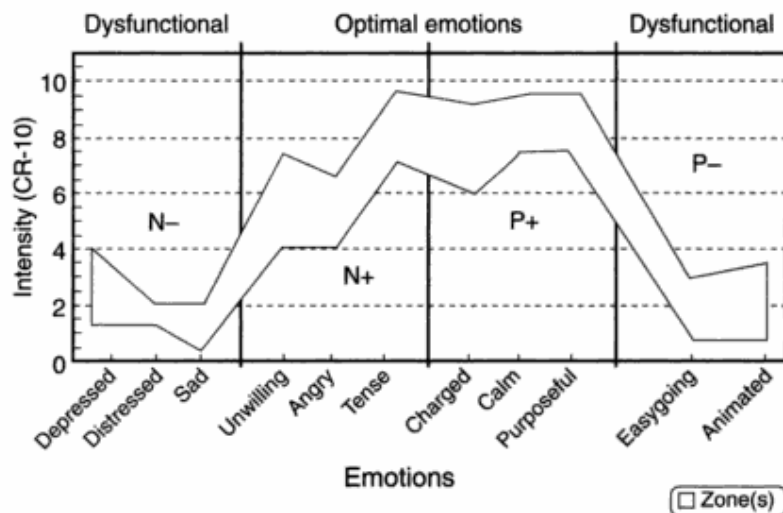


Figure 4: Profile of individual zones of optimal functioning (Hanin, 2000)
Individual Zones of Optimal Functioning (IZOF) Model: Emotion performance relationships in sport. In Y.Hanin (Ed.), Emotions in Sport. (pp.65-89). Champaign, IL: Human Kinetics).

The recalled emotions are grouped in regards to hedonic tone and functionality, as such providing four divisions: Dysfunctional Negative (N-); Optimal Negative (N+); Optimal Positive (P+); and Dysfunctional Positive (P-).

With the dysfunctional emotions being positioned at the ends of the graph, the profile resembles that of the 'iceberg profile' as described by Morgan (1985) as part of the mental health model of sporting performance. This type of IZOF profile can be generated a number of times in order to refine what actually constitutes an *in-zone* or *out-zone* experience of the emotions. Following this necessary refinement, ranges for each emotion can be settled upon that reflect the optimum level of experience during good/best ever performance. In the case represented in Figure 4, the ideal profile for this cross-country skier necessitated being highly purposeful, calm and tense, whilst also experiencing low levels of sadness, distress and feeling easygoing (Hanin, 2000). Experience of these emotions inside the prescribed idiosyncratic levels should produce the best performances as a consequence of the optimal levels of facilitating emotions, and the distance from the debilitating zone for dysfunctional emotions. In another notable finding using the IZOF model as a basis for assessment, good archery performance coincided with the optimal emotional profile in both practice and competition irrespective of changes in heart rate due to competition (Robazza, Bortoli & Nougier, 1999).

2.3.3 IZOF – Mental Training

The logical extension of work using IZOF modelling of the performance-emotion interaction is using these observations as part of mental skills training to improve performance outcomes. Again, individualised profiles need to be generated qualitatively and/or quantitatively to identify the respective idiographic levels of optimal and dysfunctional ranges for the assessed emotions. Techniques shown to be effective in determining the type and levels of emotional arousal include: individualised emotion profiling (Robazza, et al., 1999); semi-structured interviews (Orlick, 2000); emotion and somatic self-regulation profiling (Robazza, et al., 2004); self-report scales concerning emotions (Hanin, 2000); narratives of emotional experience (Sparkes & Silvennoinen, 1999); performance profiling (Jones, 1994); and metaphor generation methods (Hanin & Stambulova, 2002). Following appropriate selection of methods for determining the influencing emotions on athletes (Hanin, 1993), the researcher or sports psychologist has to identify the

emotion(s) intensity (Hanin, 1980) optimal level for the athlete, in order to define a range of optimal emotions or a 'recipe' (Gould & Udry, 1994) for emotional experiences related to optimal performance. In developing any mental training program, researchers or practitioners also need to be aware of the differences between idiosyncratic ratings of affective experiences between training, pre, during, and post competition situations (Hanin, 2007), and how these differences need to be incorporated in to any training program.

Interventions based upon the IZOF model of anxiety (Hanin, 1980) alone, and utilising a wider range of emotions have been utilised previously (Robazza, et al., 2004) in a variety of sporting contexts. The first study conducted by Hanin (1980) focused on optimisation of weightlifters and elite rowers pre-competitive anxiety; with specific focus on determining what the athletes believed rated their anxiety as; five to seven days before competition; expected pre-competition anxiety; actual anxiety during competition and how they could reduce or increase their anxiety levels to enter and maintain their 'optimal' levels. Following the expansion of the IZOF model to include positive and negative emotions (see: section 2.3.2), more inclusive and broad interventions were developed and employed. A recent example of this was a study by Robazza and colleagues (2004) that employed an intervention based upon the IZOF model which revealed that five out of the six participants in the study were able to modify their pre-competition levels of the assessed states to levels that reflected a pattern similar to their 'best ever' performances (Robazza, et al., 2004). The researchers concluded that the performance improvement findings coincided with the psychophysical state of the athletes and confirmed the predictions that performance would relate to the *in/out of zone* notion of the IZOF model (Robazza, et al., 2004). Furthermore, these predictions related to both the levels of emotions experienced during competition, and to the somatic symptoms that were assessed in the study, providing further evidence to the role of the idiosyncratic effects of athletes' psychobiological state on performance. This evidence is in addition to previous studies that have only utilised the anxiety based conceptualisation of the IZOF model.

2.3.4 IZOF Summary

Whilst the IZOF model (Hanin, 2007) has been utilised successfully to model ideal levels of facilitating and debilitating emotions, it does not permit the identification of antecedents of athletes' capacity to deal effectively with his or her own and others' emotions. Whilst knowing what levels of particular emotions athletes perform best at, it could be argued that athletes' ability to modulate emotions may be more important than just knowing the 'ideal' levels of particular emotions. In the case of rugby union, players' emotional states may change vastly (acutely or chronically) during games as a result of many possible events (e.g., being tackled, dropping the ball, scoring a try) that can occur through the course of a single match. As such, players' capacity to maintain optimal levels of emotions throughout the course of matches may better assessed via constructs that relate to the regulation of emotion (e.g., emotional intelligence, section 2.8.1), or deal with emotionally challenging situations in a sporting context (e.g., stress coping strategies, see section 2.8.2). Measures that are focused on the experience and regulation of emotional information and emotional states may provide a more suitable way of examining the enduring ways that rugby union players experience emotions.

2.4 The Mental Health Model of Sporting Performance

An alternative model to the Hanin's IZOF model (Hanin, 2007) discussed in the previous section that has been suggested to be effective in predicting sporting achievement is Morgan's Mental Health model. The Mental Health Model (MHM) of sports performance suggests that an inverse relationship exists between sports performance and psychopathology (Morgan, 1978). The model postulates that as an athlete's mental health either worsens or improves their performance should fall or rise accordingly, in a recent review Raglin (2001) suggests there is considerable support for this view, although he does present evidence to contrary, with studies having shown that between 70 and 85% of successful/unsuccessful athletes can be identified through the use of general psychological measures of personality structure

and mood state, at a level that is superior to chance but insufficient for selecting athletes over and above physical attributes (Raglin, 2001). Given the general homogeneity and high levels 'fitness' within elite sporting environments, the MHM or similar models may provide some predictive efficacy over and above biological variables for athlete performance.

Early research into sports performance largely focused on biological variables to identify the factors most crucial for athletic success (Costill, 1986). Early psychological research examined the relationship between personality traits with sport participation and athletic success (Cooper, 1969; Warburton & Kane, 1966), with these reviews in the 1960's suggesting Extraversion and emotional stability (Neuroticism) being moderately and positively related to sporting participation and athletic success. In the 1970's the role of personality in sport was suggested to not be a meaningful factor (Kroll, 1976; Rushall, 1970; Martens, 1975), with the need to develop sport-specific measures being posited as a better way to adequately explore the role of personality (Martens, 1975). Much of the evidence that suggested there was no relationship between personality and athleticism suffered from methodological flaws, most commonly the lack of controlling of social desirability, where individual's respond stereotypically positively to psychological questionnaires (Eysenck, Nias & Cox, 1982). Although studies that have accounted for response biases have indicated that the relationship between extraversion/emotional stability and sporting performance/participation exists, they infrequently use a theoretical framework (Vealey, 1989) to drive their research question. Further to this, high levels of social desirability have been suggested to be adaptive in some sporting situations (see: section 2.4.3 for a further discussion).

The MHM indicates 'that success in sport is inversely correlated with psychopathology' (Morgan, 1985, p. 71) and was defined over 25 years ago (Morgan, 1978) via eight investigations reviewed in Morgan's 1985 article. The results from these studies suggested "that successful athletes possessed mean scores on psychological measures that indicated better mental health compared with their less successful peers, including measures of mood state

and emotional stability” (p. 878).successful athletes scored lower in the undesirable factors of tension, depression, anger, fatigue, and confusion, and above average in the desirable factor of vigour” on the Profile of Mood States (POMS). These findings have been referred to as the ‘iceberg profile’ by Morgan (see a graphical representation of the ‘iceberg profile’ below in Figure 5), due to the contours that are formed in a T-score plot of the mood scores, and are more pronounced in times of intense training (Morgan & Johnson, 1978).

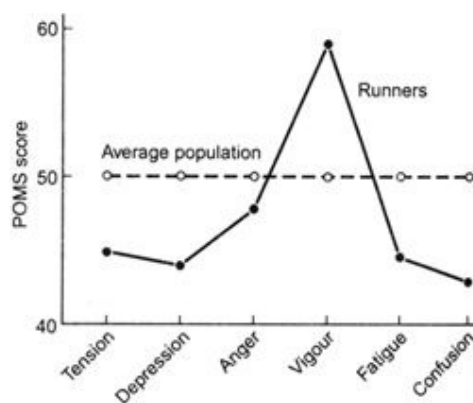


Figure 5: Iceberg Profile: *From Morgan, W.P. (1980) Test of the champions: the iceberg profile. Psychology Today. 6 July, pg. 92-108.*

2.4.1 Dynamic Psychological Factors in the MHM

Morgan (1985) suggested the MHM could be improved as “there is evidence that an athlete’s psychological response to training, not his or her base-line characteristics, represents the important issue” (page 79) when assessing psychological variables. Predicting performance could therefore be improved by assessment of psychological variables at regular intervals (assessing mood via the POMS) to improve upon assessment of trait variables. Some strong support (Morgan, Brown, Raglin, O’Connor & Ellickson, 1987) has indicated that the mental health of athletes measured by mood is related to physical training, with training load changes being associated with mood disturbance as a dose-response function. Over-training produces disturbances in mood state for ~ 10% of athletes, who therefore respond

poorly to training tapers. This effect is due to what is referred to as 'staleness syndrome', a condition that presents with symptoms of massive performance decline, depression and other physical and psychological symptoms (Morgan et al., 1987).

The dynamic aspect of the MHM was applied by Berglund and Safstrom (1994) and evaluated by the use of an intervention strategy intended to reduce staleness. World class canoeists completed the POMS regularly throughout training for the Olympics, with athletes whose scores >50% above baseline values for mood disturbance having their training reduced, and athletes with a reduction in mood disturbance having their training load increased. The MHM postulates that athletes with 'better than average' mental health (Morgan, et al., 1987) would be more capable of handling increased/harder training). The intervention was deemed a success as no athlete suffered from staleness, and some athletes won Olympic medals (Berglund & Safstrom, 1994). With results suggesting that both static and dynamic psychological factors are related to athletic performance, research using the MHM should attempt to integrate these techniques, possibly determining a hierarchical structure for psychological processes in athletic performance (Hirt, Levine, McDonald, Melton & Martin, 1997). As nomothetic (group) responses like personality and other trait-like measures such as stress coping strategies are better at predicting longer term performance differences in groups of athletes. The combination of these two types of measures (the dynamic MHM) could be used to assess the effect of different stressors on athletes (training, competition) in an integrative state-trait methodology. The integration of the two techniques also enables for a contrast between both models (MHM and IZOF), which may determine their relative efficacy, or differential consequences on sporting performance psychological variables produce (trait, state, group-wise or individually).

2.4.2 Reviews of MHM

A number of reviews have focused on the efficacy of the MHM, with equivocal results, but most of these reviews focus solely on the use of the POMS.

Renger (1993) suggested mood was ineffective in distinguishing athletes on levels of success, but suggested athletes that have a more favourable POMS profile than non-athletes. Terry (1995) concluded that the POMS offered only 'a limited capacity to distinguish the athlete from the nonathlete' (Terry 1995, p. 322). Rowley and colleagues (Rowley, Landers, Kylo & Etnier, 1995) meta analysis of POMS research related to the MHM has been questioned for methodological flaws that produced the overall effect size of the 33 studies to 0.15 ($p < 0.05$), leaving the authors to question the efficacy of the MHM. Other researchers have contended that even small effect sizes have practical significance in psychological research (see: Meyer, et al., 2001), where homogenous groups can inhibit the range of scoring. Given this suggestion, the MHM, or similar approaches to assessing the predictive efficacy of psychological variables on sporting performance should be beneficial for elite sporting groups.

In a better designed review, Vanden Auweele and colleagues (1993) controlled for baseline mood state, training effects (tested only during light or no training) and competition effects by not using the 'right now' POMS instructions. The results concluded that 'elite American athletes typically display the iceberg profile, especially during periods some time before competition' (Vanden Auweele, De Cuyper, Van Mele & Rzewnicki, 1993, p. 263). As with other reviewers, the 'iceberg profile' has been defined as desirable, despite the fact that no demarcation point has been established for an undesirable profile and the definition of the profile itself varies widely (Rowley, Landers, Kylo & Etnier, 2007). 'Everest' shaped POMS profiles have been suggested to be associated with successful performance (Raglin, 2001), but could merely be the result of socially desirable responding, even though non-athletes and less successful athletes could possess positive profiles. A further criticism of research using the POMS is that it is not a sports-specific test of mood (Prapavessis, 2000), although this position is not compelling with the POMS being responsive to the stresses of training and competition, as well as non-sports specific stressors that are salient to athletes, but not detected by sport specific measures.

2.4.3 Social Desirability and Success

As mentioned in the previous section, successful athletes have also been found to score lower in measures of social desirability (response distortion). Nagle and colleagues (1975) observed that response distortion was the greatest (psychological) predictor in distinguishing between successful and unsuccessful US Olympic Wrestling team members, with the latter exhibiting socially desirable profiles (Nagle, Morgan, Hellickson, Serfuss & Alexander, 1975). Higher levels of social desirability have previously been found to be associated with over-reporting of physical activity, and overestimation of physical activity energy expenditure (Adams, et al., 2005). Social desirability has also been found to be positively related to task orientation, and negatively related to both ego orientation and performance anxiety in adolescent athletes (Grossbard, Cumming, Standage, Smith & Smoll, 2007).

When considering mental health profiles or psychological attributes of (un)successful athletes it is important to note that successful athletes' profiles generally do not differ from established norms, moreover athletic success is associated with 'above average' psychological health (Raglin, 2001). In short, athletes who are less anxious, angry, depressed, confused and fatigued, and more vigorous are suggested to be more successful (Morgan, 1985). The difference between successful and unsuccessful groups is, however, often small in magnitude, with unsuccessful athletes not presenting unhealthy or clinical results, but an 'average' profile as assessed by the POMS (McNair, Lorr & Droppleman, 1971). This degree of disparity between the groups is also reflected in the definition of some 'unsuccessful' athletes being 'elite' in ability, often involving being candidates for Olympic selection (Renger, 1993). On this issue Raglin comments that "despite the observation that successful athletes and unsuccessful athletes could be consistently be distinguished at the levels better than chance solely on the basis of psychological variables, the level of accuracy attained was deemed to be insufficient for the purpose of selecting individuals for competition" (Raglin, 2001, p. 879). Whilst this suggestion holds some merit in regards to selection criteria at elite sporting

levels, assessment of a wider range of psychological traits, particularly ones that are amenable to development, may offer further insight into the types of traits or processes that are related to sporting performance at elite levels.

2.4.4 The MHM/Mood Research

As previously discussed (section 2.3.4) in relation to the IZOF model and sporting performance: whilst the MHM has identified mood profiles that are preferable when competing in sporting endeavours, assessment of 'ideal' mood states and the effects of training on mood does not allow for assessment of athletes' ability to moderate their mood effectively during competition. As such, the following sections will examine trait based approaches that have been utilised in sporting research previously, with the aim of identifying well established constructs that are suitable for use in the elite rugby union environment.

2.5 Personality

Personality traits are defined as enduring patterns of perceiving, relating to, and thinking about the environment and oneself that are exhibited in a wide range of social and personal contexts (DSM-IV-TR; APA, 2000). These traits are suggested to remain constant over time, vary between people, and direct people's behaviour. A number of theories and approaches have been generated to assess personality, with trait measures generally assessing between three and five dimensions. The dominant model of personality is referred to as the 'Big 5', which assesses the following dimensions (Digman, 1990):

Neuroticism: the tendency to be calm, secure, and self-satisfied versus being anxious, insecure, and self-pitying.

Extraversion: the tendency to be sociable, fun-loving, and affectionate versus being retiring, somber, and reserved.

Openness to Experience: the tendency to be imaginative, independent, and interested in variety versus being practical, conforming, and interested in routine.

Agreeableness: the tendency to be softhearted, trusting, and helpful versus being ruthless, suspicious, and uncooperative.

Conscientiousness: the tendency to be organised, careful, and disciplined versus being disorganised, careless, and impulsive.

A large body of literature exists concerning the role of personality in sporting and exercise related fields. Unfortunately, the literature provides some difficulties in interpreting the exact role of personality in 'sport' per se, given the non-specific definitions sport across studies (Furnham, 1999). Whilst the focus of this thesis and the following review of the role of personality is within the 'elite' sporting environment, some attention will be given to studies assessing the role of personality within non-elite sporting environments, exercise, and other sporting related activities.

2.5.1 *Reviews of the Role of Personality*

A comprehensive review conducted in 1982 by Eysenck, Nias, and Cox outlined 20 points considering the relationship between sport and personality. These 20 points are listed below, as they provide a critically insightful view of the role of personality and many important aspects related to sporting involvement and performance. As this review was conducted prior to the large body of work concerning the 5-factor model of personality, the review focused on Extraversion, Neuroticism and Psychoticism (the degree to which a person displays abnormal or psychotic behaviour or tendencies: Eysenck, 1967).

- 1) Sportsmen and sportswomen tend to be characterised by an *extraverted* temperament. This seems equally true of outstanding performers as of average performers, physical education students, and

others who are at much lower level than Olympic participants or champions in various sports.

- 2) There are many different trains of argument leading from the low levels of cortical arousal level experienced by the extravert to the superior sporting performance characteristic of such individuals. Among these are: high pain thresholds, sensation-seeking, assertiveness, and competitiveness, and generally a lack of cortical control and inhibition of ongoing behaviour and immediate reactions.
- 3) There is a tendency for athletes, particularly outstanding ones, to be *low on neuroticism*, and to suffer less from anxiety than do non-sportsmen and women. The findings do not support this conclusion universally, but the trend is definitely in this direction, particularly with outstanding sportsmen.
- 4) The reaction for the negative relationship between the excellence in sport and anxiety-neuroticism probably lie in the *drive stimulus qualities* of anxiety, which distract the athlete from his appointed task. The situation is complicated because of the curvilinear relationship between anxiety as a drive, and performance; the Yerkes-Dodson law is often invoked in this connection.
- 5) There are few direct studies of the psychoticism-superego variable, but in general very successful athletes seem to have *higher scores on* Psychoticism than do less successful sportsmen or non-sporting persons. Unfortunately, less work has been done with this variable than with Extraversion and Neuroticism, but the results seem fairly well established.
- 6) The reasons for the relationship between Psychoticism and success with sport probably lie in the aggressiveness of the high Psychoticism scorer, his egocentricity, and his general competitiveness. It is possible that these qualities may be less apparent in team sports, where co-operation is necessary, than in individual sports, but there are no data to support this hypothesis yet.
- 7) The body-build of the typical successful athlete is *mesomorphic*, a type of physique usually associated with *extraverted* personality types. The

relationship appears stronger with the physical than with the personality type.

- 8) *Ectomorphic* body types can also be found among successful sportsmen, although not as frequently as mesomorphic body types, and never in extreme form.
- 9) *Endomorphic* body forms are practically never found among successful sportsmen and women, with the exception of swimmers. Even there the endomorphic component is not likely to be strong.
- 10) Body type is quite markedly related to *type of sport*, with long-distance runners being relatively ectomorphic and wrestlers and weight-lifters being strongly mesomorphic. Short-distance runners seem to be intermediate between the other two groups.
- 11) The effects of sporting activities on personality are not really known, although there are many theories in this connection. It is often suggested that sporting activities may have a beneficial effect on personality, particularly in reducing depression and anxiety, but the evidence does not support such a view.
- 12) The effects of competition on personality are also not known, although here too there are many theories equally unsupported by good evidence.
- 13) Driving a car may be regarded as a sporting activity, and is quite definitely related to personality, in the sense that both *extraversion* and *neuroticism* are positively related to accident proneness. The combination of high-Neuroticism and high-Extraversion is uniquely favourable for the occurrence of driving accidents.
- 14) Sexual activity too may be regarded as partaking of the characteristics of a sport, these activities being carried out in many cases for amusement, and being physical in nature. Here too *extraversion* has been found to be the personality component most commonly correlated with different types of sexual activity, such as early sexual activity, activity involving many different partners, activity indulged in frequently, etc. *Neuroticism* appears to have a negative influence on sexual activity, being associated with frigidity, impotence, lack of orgasmic capacity, and other disorders.

- 15) *State measures* of mood may correlate even more highly with athletic performance and sporting activity generally than do traits. Anxiety in particular has been found to be so related when state rather than trait measures are taken. The same is true of feelings of energy, competitiveness, and other similar states. This is a promising area which has not been investigated sufficiently.
- 16) Most investigations use groups which are too heterogenous to give clear-cut results. It has been found that even in apparently homogenous groups, such as shooters, different types of shooting are correlated with quite different personality traits, by depending on such things as time allowed for reaction to the stimulus, etc. Where little time is allowed, *extraverts* excel but where much time is allowed, *introverts* do quite well. Such finer distinctions should always be looked at in future research.
- 17) Physical skills learning, and the strategies which are being developed, are also related to personality, and this type of study has been done almost exclusively in the laboratory. An integration of this experimental approach with the study of sport-type situations could be of considerable importance in throwing a new light on the relation between sports and personality.
- 18) Genetic factors are known to determine to a large extent both personality and physique; it has also been shown that competence in many different sporting activities has a strong genetic component, accounting for between seventy and ninety percent of the total variance. This finding does not suggest that training cannot help people improve their performance, but it does suggest that selection for sport in general, and for specific types of sport in particular, should take account both of personality and physique.
- 19) Behaviour modification, i.e. the application of psychological principles to learning and improvement in sport, could be of considerable importance in leading to greater achievement in sport. The possibility of these methods has not yet been explored sufficiently to make a definitive statement.

20) The technique of behaviour therapy (desensitization, flooding, modelling) could be of considerable use in reducing anxiety insofar as this interferes with optimum performance. Here the evidence for the general usefulness of these methods is very much stronger than in the case of the methods of behaviour modification, but little has been written about their application to sportsmen and women in particular. This illustrates the relative isolation of psychology from sport, and suggests that we already have methods of training and treatment which could be applied in this field.

Despite over 20 years having passed since this review and its associated recommendations were first published, personality research in sports psychology has been affected by theoretical and methodological flaws. These studies have generally been affected by small sample sizes, heterogeneous samples, a lack of age control, unclear definitions of sporting level (elite versus average), and team and individual sporting performance being considered together. Some researchers have suggested that these shortcomings in the field have contributed to inconsistent findings across studies (Egloff & Gruhn, 1996), and as such, the role of personality within and across different sports and sporting levels is difficult to define. As such, the following sections relating to personality factors and athletic success and involvement in sport will be discussed in light of the limitations and generalisations specific to the quality and focus of the research.

2.5.2 Extraversion and Introversion - Athletic Success

Introversion and extraversion are considered to be diametrically opposed, with extraversion being characterised by sociable, talkative, and outgoing behavior; and introversion being characterised by quiet, introspective and reserved behaviour (Costa & McCrae, 1992). The absence of introversion more than the possession of higher levels of extraversion has been suggested to be more important to success in sport (Morgan, 1985), with successful athletes scoring average to high for extraversion. A consistent result across studies suggests that athletes score higher on measures of extraversion and

lower on neuroticism than non-athletes (Kirkcaldy, 1982). These studies have not always been explicitly designed to assess the relationship between sporting performance and personality (Vealey, 1992). Research has also observed that extraverts choose active coping styles (problem-focused coping, seeking social support), whereas individuals scoring highly in neuroticism utilise strategies that involve avoiding or ignoring the problem (stressor). Other research has proposed that introverts provide higher ratings for perceived exertion (Bartram, 1995), and possess lower pain thresholds than extraverts (Hardman, 1973). Contrary to this, introversion has been suggested to be advantageous for particular sports, such as pistol shooting (Eysenck, 1982).

The Eysenck Personality Inventory (EPI: Eysenck & Eysenck, 1963) has been used to assess introversion-extraversion first in 1966 with a group of wrestlers, with Morgan (1968) observing a significant correlation ($r = 0.50$) between tournament success and levels of extraversion. In regards to comparing different levels of sportspeople, Fiegenbaum (1987) identified that high-level long-distance runners had greater levels of extraversion than regular joggers, who in turn scored higher than a control group. Egloff and Gruhn (1996) also observed that outstanding athletes (11 hr or more training per week) were more extraverted than average sportsmen (who trained less than 4 hr) when examining the personality of endurance sports people. Similarly, Brichin and Kochain (1970) identified that Czech athletes of greater accomplishment (success) scored significantly higher on extraversion than less accomplished athletes.

2.5.3 Openness

The openness to experience dimension of the five-factor model of personality relates to a person's interest in expanding their sphere of knowledge or experience, or displaying intellectual curiosity (Costa & McCrae, 1992). The role of this particular personality dimension has been under-researched in relation to its possible role in the prediction of sporting performance. This lack of research may be the product of a number of reasons relating to hypotheses

on the validity of using a measure of this construct in the sporting realm. Whilst behaviours (and associated trait levels of) characterising extraversion and introversion would be considered easier to identify inter-individually, and also at group level (a distinction consistently made between athletes and non-athletes), the six components of the openness to experience construct (fantasy, aesthetics, feelings, actions, ideas and values) are more *internally* experienced, and as such, ostensibly more difficult to identify as possible predictors of sporting performance or involvement.

Higher levels of openness have been observed to play a part in participation in the high risk sport of mountaineering (Sleasman, 2004), and as such, may in part reflect an attraction to high-risk sports. Openness to experience scores has previously been strongly linked to scores on the Sensation Seeking Scale (SSS-V; Zuckerman, 1983). Sensation seeking can be considered as more related to 'physical' sensation, rather than cognition, hence its possible attractiveness to risky sport research. For example, surfers have also been identified as scoring higher on openness than golfers (Diehm & Armatas, 2004) in concert with higher SSS-V scores.

2.5.4 Sensation Seeking - A Proxy for Openness

The most common measure of sensation seeking is the SSS-V, developed by Zuckerman (1983). This measure has been used to differentiate high-risk sport participating groups from control groups and across sports involving physical contact and non-contact sports (Scroth, 1995). Differences between sports defined as high risk (mountain climbing, water skiing, motorcycling, scuba diving) and a control group not involved in high risk sports indicated that the high risk groups scored significantly higher on the total SSS score and two sub-scale (Thrill and Adventure Seeking; Experience Seeking) scores (Freixanet, 1991). Hang-gliders have also been found to score higher on all four facets of the SSS-V than a control group (golfers) as well as the total score (Wagner & Houlihan, 1994). Further to this, scores across different sports have been compared with participants in contact sports, rugby and lacrosse, scored higher than participants in non-contact sports, rowing and

soccer (Schroth, 1995). These results hold some promise due to the conceptual overlap of openness and sensation seeking, as noted by McCrae and Ingraham (1987) in an early NEO PI-R validation study where significant overlap was observed between openness and three of the SSS-V sub-scales (Thrill and Adventure Seeking; Experience Seeking; and Disinhibition) as well as the total score. Zuckerman (1994) suggests this relationship is mostly due to the Experience Seeking sub-scale, rather than the full SSS-V score.

Levels of openness may then vary between high-risk / low-risk sports, as well as across contact sports, but its relationship with performance in these different sporting endeavours remains less clear than sensation-seeking.

2.5.5 Agreeableness

Agreeableness refers to an individual's orientation towards being helpful and trusting, which is assessed in terms of their thoughts, feelings, and actions (Costa & McCrae, 1984). Several sport based studies have identified that 'tough-mindedness' is an important characteristic of successful athletes, but whether this construct manifests as low(er) agreeableness or as a surrogate of competitiveness (a facet of conscientiousness) is debatable. In a study of NCAA division 1 soccer teams (Piedmont, Hill & Blanco, 1999), agreeableness was found to significantly correlate with coaches' ratings of coachability, and with total games played. The authors concluded from these results that the previous findings that athletes reporting of higher levels of aggressiveness, dominance, tough-mindedness in previous studies could be interpreted as displaying a less confrontative, antagonistic attitude (i.e., lower in agreeableness) but more as a focused and goal driven motivation (Piedmont, et al., 1999).

2.5.5.1 Mental Toughness

The definition and measurement of mental toughness has been the subject of a wide variety of research, with the understanding of what being 'mentally tough' means, and how this impacts on athletic performance being of most

interest to sport psychology researchers (Crust, 2008). It has been suggested that mental toughness reflects the ability to channel energy positively or maintain a positive attitude during times of crisis or challenging circumstances (Loehr, 1982). This definition has been suggested to be too broad, as far as any positive psychological characteristic could be seen as indicative of 'mental toughness' when facilitating relative success. More recent research with athletes has considered mental toughness in a trait-like manner, with higher levels enabling athletes to remain unaffected by the pressures or adversity inherent in sporting competition (Clough, Earle & Sewell, 2002).

The current understanding of mental toughness has developed with the work of Jones and colleagues (e.g., Jones, Hanton & Connaughton, 2007), who through a series of qualitative and quantitative studies on elite athletes defined mental toughness as "having the natural or developed psychological edge that enables you to, generally, cope better than your opponents with the many demands (competition, training, lifestyle) that sport places on a performer and, specifically, be more consistent and better than your opponents in remaining determined, focused, confident, and in control under pressure" (Jones, et al., 2007, p. 247). This definition more specifically relates to 'outcomes' related to being mentally tough, and depends on the assumption that the elite athletes surveyed in the research studies leading to the definition were (are) mentally tough – hence their success is implied from their level of competition. The definition also does not account for the possibility of various forms of mental toughness, some of which are more relevant for particular sporting endeavours. The 'mental toughness' to make a putt to win a golf tournament; to push physical endurance boundaries in endurance sports; maintain performance level across long rugby, soccer, football, basketball seasons; perform one's personal best at an Olympic final; ostensibly take different aspects of mental toughness, or hardiness, to perform ideally. The possible group or intra-individual effects of varying levels of mental toughness within group sports is also worthy of consideration.

Given the reliance on data from elite athletes for the Jones and colleagues definition, and the non-suggestion of psychological prerequisites (e.g.,

particular personality profiles), the definition proposed by Loehr (1995) may be of greater use across levels of competition as mental toughness is described in relative terms, as the ability to consistently perform toward the upper range of one's talent and skill, regardless of competitive circumstances. This definition allows possible analysis of the difference of mental toughness between athletes of different performance levels and non-athletes, whilst suggesting that mental toughness per se, is not just a psychological characteristic of "successful" athletes. This distinction allows measurement of mental toughness levels in concert with other established predictors of performance such as physical attributes, ability, and other pertinent psychological measures. Bull and colleagues (2005) suggest this approach to measurement allows for assessment of a 'determination to make the most of ability', whether at non-elite or elite levels of competition (Bull, Shambrook, James & Brooks, 2005). The link between this approach to the measurement of mental toughness and agreeableness has yet to be determined, but it may manifest as a focused and goal driven motivation (Piedmont, et al., 1999) indicative of lower levels of agreeableness.

2.5.6 Conscientiousness

Individuals high in conscientiousness are generally reliable, hard-working, disciplined, and strive for achievement (Costa & McCrae, 1992). Conscientiousness manifests through a preference for structure, organisation, and self-motivation towards goal directed behaviour: these elements of personality should ostensibly be related to the pursuit of higher levels of performance, and in relation to the current thesis, greater success/higher level of performance (i.e., elite level) in sport. Conscientiousness has been linked to a large variety of positive outcomes across the broad fields of educational, personnel, and health psychology, and as such is considered the most predictive of the Big-5 personality traits (MacCann, Duckworth & Roberts, 2009).

Within athletic populations, male and female athletes have been observed to possess higher levels of conscientiousness than non-athletes (Renfrow &

Bolton, 1981). These higher levels of conscientiousness have been proposed to manifest as athletes' achievement orientation and competitiveness characteristics that have been suggested to be important to athletic success (Garland & Barry, 1990). For example, in a study by Piedmont and colleagues (1999), self-ratings of women soccer players' conscientiousness were found to correlate significantly with coaches' ratings of coachability; game performance; work ethic; and actual performance statistics such as; games played; shots on goal; and a composite of performance statistics. Higher levels of conscientiousness have also been observed in high-risk sporting athletes, in comparison to lower risk sporting athletes and non-athletes (Kajtna, Tusak, Baric & Burnik, 2004). This difference may be more attributable to the inherent danger in high-risk sports, where a higher degree of discipline and planning would contribute to not only good performance, but a reduction in relative risk as participation in these types of sports that inherently involve the risk of serious injury or in extreme cases, death.

Conscientiousness has been shown to be related to perfectionist strivings (e.g., Enns, Cox, Sareen & Freeman, 2001; Stumpf & Parker, 2000), which is not surprising given one facet of the NEO personality inventory revised (NEO PI-R: Costa & McCrae, 1992) is 'achievement striving' (Costa & McCrae, 1992). This facet of conscientiousness has also been shown to be predictive of task performance (Dudley, Orvis, Lebiecki & Cortina, 2006) outside of the sport psychology research, but may be a surrogate of what sporting people see as perfectionism. This may be perceived by coaches of athletes through their dedication to training; adherence to dietary restrictions; and the application of coaching instructions.

2.5.7 Perfectionism

Perfectionism can be described as the disposition to regard anything short of perfection as unacceptable, with perfection defined as flawlessness or an unsurpassable degree of accuracy or excellence (Merriam-Webster, 2010). Academic research concerning perfectionism has defined two forms of perfectionism: a positive form of perfectionism, which has also been called

normal, healthy, functional, or adaptive perfectionism; and a negative form of perfectionism, which has also been called neurotic, unhealthy, dysfunctional, or maladaptive perfectionism (Hamachek, 1978; Rhéaume, Ladouceur & Freeston, 2000; Stumpf & Parker, 2000).

The positive form of perfectionism has been found to correlate significantly with achievement striving in sport (Frost & Henderson, 1991), whereby athletes set reasonable high personal standards but evaluate their performances with flexibility. A perfectionist approach is not uncommon in elite sport, with elite athletes striving for perfection in their chosen sport. A 'practice makes perfect' direction from coaches also conveys the notion that devotion to practising all aspects of the sporting event will lead to perfect performance for athletes. Further to this, an athlete's drive to achieve perfection has been suggested to be essential to achieve elite performance (Flett & Hewitt, 2002). The setting and achieving of high standards is inherent for successful performance at elite levels, and can be equated to the level of professionalism in all aspects of elite sport involvement. There are, however, maladaptive aspects associated with the aim of achieving perfection (Slaney, Rice, & Ashby, 2002), and as such it is important to distinguish between the adaptive and maladaptive aspects of perfectionism.

Common measures of perfectionism include the Multidimensional Perfectionism Scale (MPS; Hewitt & Flett, 1991) which assesses three dimensions of the construct: self-oriented perfectionism (i.e., excessive striving and demanding absolute perfection from the self), other-oriented perfectionism (i.e., demanding perfection from other people), and socially prescribed perfectionism (i.e., the perception that other people demand perfection from oneself). The Frost and Henderson (1991) Multidimensional Perfectionism Scale (FMPS) assesses six dimensions, including personal standards, organisation (i.e., needing to maintain a sense of order), concern over mistakes, doubts about actions, parental expectations, and parental criticism. Socially prescribed perfectionism and excessive concerns over mistakes have been generally considered maladaptive forms of perfectionism. Having high personal standards and self-oriented perfectionist scores have

been suggested to be more adaptive. A further concern with the assessment of perfectionist tendencies is distinguishing between athletes who experience success or failure in line with their levels of perfectionism, and what the implications of the relative levels of success entails for these athletes.

Athletes who display high levels of perfectionist tendencies have previously been shown to experience higher levels of anxiety, particularly related to differences in the ideal level and current level of performance (Koivula, Hassmen & Fallby, 2002). Experience of worry, depression and anxiety concerning athletic performance when a discrepancy exists between actual and desired goals has been suggested to impact negatively on performance (Blankstein & Flett, 1989). Further to this, perfectionists who experience failure, risk experiencing psychological distress and motivational deficits (Flett & Hewitt, 2002). A contributing factor to this is their preponderance to ruminate over mistakes or poor performances, which can lead to doubts concerning their ability (Frost, Marten, Lahart & Rosenblate, 1990).

A lack of success for athletes who have high perfectionist tendencies has been shown to have diverse effects depending on athletes' self-esteem (Koivula, et al., 2002) in relation to the adaptive and maladaptive forms of perfectionism. Using a general measure of self-esteem, Gotwals, Dunn, and Wayment (2003) observed that intercollegiate athletes with low self esteem showed excessive concern over mistakes and poor performances, and were more likely to rate their sporting competence lower than athletes with higher levels of self-esteem. Similarly, Koivula and colleagues (2002) noted that potential Swedish Olympic athletes with different self-esteem strategies displayed varied patterns of perfectionist tendencies. Athletes whose self esteem was based upon having respect and love for themselves reported more positive patterns (high personal standards, positive achievement striving) of perfectionist behaviours, whereas, self esteem based upon competence aspects were related to more maladaptive (concern over mistakes, fear of failure) perfectionist behaviours. Further to this, in an early study in the area, athletes who reported greater concern over mistakes on the Frost Multidimensional Perfection Scale also reported greater levels of anxiety

and negative thinking prior to competition, lower levels of sporting self-confidence, difficulty in concentrating and having negative reactions to mistakes (Frost & Henderson, 1991).

The relationship between self-esteem and perfectionism has been suggested to play a mediating role between the mental health of athletes and the relative adaptability of perfectionism (Blatt, 1995). With low levels of self-esteem having been previously linked to higher levels of depression (Blatt, 1995), the maladaptive effects of perfectionism in athletes should be of some concern for athletes and sports psychologists.

2.5.8 Self Esteem

The construct of self esteem has previously been suggested to play a role in, and be altered by sporting participation, success and general physical activity (McAuley, 1994). Self esteem is generally thought of as the degree of worth or competence that people attribute to themselves, and is widely accepted as a key indicator of emotional stability and a healthy adjustment to life. High self-esteem has been identified as one of the best predictors of subjective well-being (Diener, 1994), and has been linked to positive attributes across work and life; such as leadership, life satisfaction, resilience to stress, adaptability, and independence (Diener, Diener & Diener, 1995). Sport participants generally report higher self-esteem than their nonparticipating counterparts (Fletcher, Nickerson & Wright, 2003). Theory concerning the nature of self-esteem suggests that this link between sport participation and self-esteem may be affected by a number of issues, such as the proposed multidimensionality and hierarchical nature of self-esteem, the level of participation (social through to elite levels), or its differential relevance to individual or team sport participants.

2.5.9 Global Versus Specific Self Esteem

Global self esteem refers to a global value judgement of one's self. It is a subjective rating, rather than an objective rating of one's aptitude or

accomplishments. As such, it is an affectively laden construct that has been demonstrated to be strongly related to the perception of others' evaluations of oneself, and have broad implications concerning mental health, behaviour, cognition and affect (Diener, 1994). These broad implications have generated a remarkable amount of academic research, with researchers predominantly focusing on the effects of individual differences in 'trait' or dispositional self esteem. This type of self esteem represents an average of the long-term affect laden self evaluations of individuals. This "average tone of self-feeling" (James, 1890) is generally seen as the person's self esteem, or own self worth, that they convey to their peers and the world. In comparison, 'state' self esteem is a measure of how a person feels about themselves at a particular moment. This measurement of self esteem can be affected by perceived success or failure in most facets of life, and to varying degrees dependant on how valuable the instance is to the person. This distinction is suggested to be especially relevant where specific self esteem is assessed in relation to specific behaviours, whereby, it would be a better predictor of the associated outcome/behaviour. Whereas, global self esteem, has been suggested to be more predictive of more general behaviours or constructs like psychological well-being (Rosenberg, et al., 1995).

2.5.10 Global Self Esteem and Behavioural Outcomes

Global self esteem has been shown to be linked to the psychological well-being of people, with the association being a product of the need for people to have positive feelings of self worth, and that any threat to this causes psychological distress (Maslow, 1970). Further to this, is the commonly noted inverse relationship between self esteem and depression (Rosenberg, 1985). Low self esteem has also been linked to greater levels of anxiety, in both somatic and psychological forms (Rosenberg, et al., 1995). Measures of global self esteem have also been found to be strongly related to body self concept and appearance satisfaction (Harter, 2006), though whether satisfaction with one's appearance leads to high self esteem, or high self esteem leads to greater satisfaction with one's appearance is difficult to determine. This problem, of whether self esteem levels are a consequence or

antecedent of specific outcomes or behaviours is a concern across all studies utilising measures of global self esteem.

Engagement in physical activity has also been strongly linked to higher levels of self esteem, with a positive association being reported in approximately 60% of studies (McAuley, 1994). The difficulty in interpreting these findings is the ubiquitous usage of global self esteem measures, their cross sectional nature, and low baseline levels of self esteem. Even more difficult to disentangle with the use of global self esteem measures, is the conceptual overlap inherent in the scales make-up, and the behaviours self esteem measures are purported to relate to. Most self esteem measures are made up of items that assess social attributes (how likeable or friendly people are) and self perceptions of competence (often across disparate fields such as, academic, sporting, career, and physical). People often differ in their self esteem when specifically looking at intellectual ability, physical attractiveness, interpersonal skills, physical ability (Heatherton & Polivy, 1991), and more importantly differ on the relative importance these contributors to their self esteem. As such, findings from studies directly assessing changes in levels of global self esteem due to engagement in physical activity may be confounded due to the possibility of any global change being a consequence of changes in only some items from the scales that directly relate to the treatment or behaviour. Despite this, the indicators assessed using overall measures represent primary self perceptions of competence, likeability and attractiveness that strongly predict individual self esteem.

2.5.11 Domain Specific Self Esteem

Domain specific self esteem represent value judgements of one's value in specific areas, with subjective ratings of satisfaction with one's attributes, competence, or perceived likeability representing separate indices of self esteem. These models of self esteem suggest that it is multidimensional and arranged hierarchically (Marsh, Byrne & Shavelson, 1989), with several first order dimensions that sit below global self esteem, and the first order dimensions also have sub-factors that influence them. For example, in the

case of physical self esteem, sub-factors that could contribute to levels of physical self esteem could be strength, muscle size or tone, and aerobic fitness (McAuley, Mihalko & Bane, 1997). Whereas, academic self esteem would be underpinned by specific outcomes such as school marks (Rosenberg, et al., 1995).

People's levels of self esteem have been widely suggested to depend on an individual's belief of their value (in both global and domain specific instances) based upon perceptions of other people's evaluations of one's self. Protection of one's self esteem, and prove that they are worthy, is a strong driver of behaviour which shapes how people think about themselves (Crocker, 2002). Sociometer theory proposes that self esteem is a function of relational value, specifically for social inclusion or exclusion (Leary & Baumeister, 2000). As such, people are motivated to engage in activities and behaviours that lead to higher self esteem, via satisfying culturally determined standards of worth of value that increase their includability. Consistent with this, lower levels of self esteem have been linked with increased anxiety, friendship problems, and perceptions of social mistreatment (Crocker & Luhtanen, 2003). Whether these types of negative outcomes are relevant in regards to team sport performance is particularly relevant to the current thesis.

2.6 Trait Versus State Athletic Profiling

As foreshadowed in the previous section concerning self esteem, assessment of theoretically relevant psychological traits, rather than state measures, may be of greater value in the prediction of 'elite' sporting competition. Their greater appropriateness may also lay in the temporal constraints imposed within elite sporting competition, where researchers have limited access to athletes. Whilst some researchers have advocated the use of multiple assessments, prior, during (retrospectively), and after single competitions (see IZOF and POMS review): what is the best for the researcher (non-retrospective mood measurement during competition) is impossible for athletes to complete. As such, the assessment of traits that are related to previously used 'state' measures may provide greater predictive efficacy of

sporting performance, whilst also being relatively easier to administer to athletes.

2.7 Mood and / or Emotion in Sport

The difficulty in the assessment of mood or the experience of emotion during sporting competition is two-fold, with the words often used interchangeably to describe emotions, emotional arousal, or ongoing feelings, and the reliance on sports people's ability to recall levels of specific emotions or types of moods experienced during sporting competition. Whilst an emotion is generally defined as a reaction to a real or imagined event that involves a subjective response (or experience) as well as a physiological response leading to a related action (Deci, 1980); moods are considered as a temporary state of mind or a distinctive emotional quality or character, such as being in a 'bad' or 'good' mood. Constructs that relate to the regulation of emotion, or emotional states, may provide a suitable way of examining enduring ways sportspeople experience emotions, or deal with emotionally challenging situations in a sporting context.

2.7.1 Emotional Intelligence

The emerging construct of emotional intelligence may offer a means to assess how elite athletes generally experience, express, understand, use, manage and control their emotions. As people differ in their ability to perceive, utilise, regulate and understand emotional information and this contributes to their emotional and intellectual growth – an understanding of these capacities in athletes may elucidate the importance of the emotional factors inherent in sporting involvement. Assessments of 'trait' levels of emotional intelligence have previously been associated with positive life and workplace outcomes.

In regards to life outcomes, recent studies suggest that higher levels of emotional intelligence lead to greater feelings of emotional well-being (Bar-On, 1997; Goleman, 1995), reduced psychological stress (Slaski & Cartwright, 2003), higher positive mood (Schutte, Malouff, Simunek, McKinley &

Hollander, 2002), higher self-esteem (Schutte, et al., 1998), lower depression (Downey, et al., 2008), higher optimism (Schutte, et al., 1998) and greater life satisfaction (Dawda & Hart, 2000). These findings are similar to the suggestion from sport specific models like the MHM (see section: 2.4) with studies having shown that between 70 and 85% of successful and unsuccessful athletes can be identified through the use of general psychological measures (Raglin, 2001).

Positive relationships have also been observed between emotional intelligence measures and workplace indicators such as job performance (Janovics & Christiansen, 2001); effective leadership (Downey, Papageorgiou & Stough, 2006); job advancement (Dulewicz & Higgs, 2000); team effectiveness (Druskat & Wolff, 2001); organisational commitment (Nikolaou & Tsaousis, 2002); reduced workplace stress (Nikolaou & Tsaousis, 2002); sales performance (Wong, Law & Wong, 2004); supervisory ratings of job performance (Slaski & Cartwright, 2002); selection interviews (Sosik & Mengerian, 1999); and adaptive conflict resolution techniques (Jordan & Troth, 2004). Whilst sports psychology research has mostly focused on intra-individual mental states or processes, findings from the emotional intelligence area point to the utility of these measures predicting climatic or group behaviour, aspects of which are generally overlooked in elite sports research (Fletcher & Wagstaff, 2009).

Only recently have some researchers instituted emotional intelligence assessments within a sports psychology context. Zizzi and colleagues (2003) assessed 61 NCAA Division I baseball players hitting and pitching performance and emotional intelligence scores using the scale developed by Schutte and colleagues (1998). Only the performance statistic of concerning pitching strike-outs was found to be significantly related to the reported total levels of emotional intelligence of players, though low to moderate correlations (with moderate effects size) were observed with the other pitching statistics (Zizzi, Deaner & Hirschhorn, 2003). Thelwell and colleagues investigated self-reports of perceived coaching effectiveness and emotional intelligence, and observed motivation efficacy to be significantly associated

with the regulation of emotions, and social skills, whereas character-building efficacy was associated with optimism (Thelwell, Lane, Weston & Greenlees, 2008). Teaching technique efficacy was significantly associated with appraisal of own emotions with no significant predictors for game strategy efficacy, pointing to the utility of emotional intelligence assessments for coaches. In a student based study, Lane and colleagues (2009) observed that optimal sporting performance was associated with the emotional intelligence sub-component, social skills, and that appraisal of one's own emotions was predictive of mood states such as; anger, optimism, and vigour measured by the POMS (Lane, Thelwell, Lowther & Devonport, 2009). This supports the notion that greater levels of emotional intelligence could facilitate optimal sporting performances (Zizzi, et al., 2003), though the authors rightly conclude that further research is required to ascertain the influence of emotional intelligence on sporting performance (Lane, et al., 2009).

2.7.2 Coping with Stress

The experience of stress on the sporting field is omnipresent for most elite athletes, with the adequacy of the way they deal with stress being implicated in reasoning for their long and short-term success in competition. At the extreme end of failure to deal with stress adequately in sport is the experience of choking; which is generally defined as the occurrence of sub-optimal performance under pressure (Baumeister, 1984). Generally, coping with stress represents an individual's cognitive, affective, and behavioural efforts to manage specific external and/or internal demands (Crocker, Kowalski & Graham, 1998; Lazarus, 1999). When specifically applied to athletes, this refers to the range behaviours or cognitive skills athletes develop and utilise to manage the stress of competition (Scanlan, Stein & Ravizza, 1991).

The most commonly used model of the stress-coping process is that of Lazarus and Folkman, which is based upon the transactional stress-coping process (Folkman, Lazarus, Dunkel-Schetter, DeLongis & Gruen, 1986). This view of coping suggests that the process begins with appraisal of a situation, when an individual evaluates the personal significance of situations with

regard to their values, personal beliefs, situational intentions, and goal commitments. These appraisals allow people to ascertain whether their goals are at stake, and they produce an associated emotional response in light of the outcome of the process. These outcomes are perceived generally as, harm/loss (i.e., damage has already occurred in the situation), threat (i.e., the possibility that damage may occur following the appraisal), or challenge (i.e., where people enthusiastically confront their perceived obstacles). Following the original appraisal of the situation (Primary appraisal), a cognitive evaluation of the situation occurs (Secondary appraisal) concerning what can be done to alleviate the effect of the situation, particularly in harm/loss or threat instances (Folkman, et al., 1986).

The reaction to the cognitive appraisal(s) of stressful situations invokes the use of coping strategies to deal with the effects of the situation. Coping strategies are generally grouped in to either problem-focused or emotion-focused strategies. These different coping styles or strategies have been identified as more or less adaptive in certain situations and personal experiences, with problem-focused coping being considered the more adaptive technique for dealing with stress. In an elite sporting context, both acute and chronic stressors have been assessed in concert with coping responses in a variety of athletes and competitions (e.g., Anshel, 1997; Goyen & Anshel, 1998). Problem-focused coping refers to athletes' attempts to right the difficult problem-environment relationship that is the source of stress, by focusing on problem-solving or altering the stressor. Emotion-focused coping in contrast is intended to manage or reduce the emotional distress associated with the stressful situation. This type of adaptation manifests through emotional regulation via avoiding the stressor, cognitively reframing the stressor, or attending to more positive aspects of the situation or one's self (Compas, 1987). Use of both these different coping strategies is thought to occur to various degrees during most stressful situations (Compas, 1987), despite the reported greater adaptiveness of problem-focused strategies.

The concept of acute stress associated with competitive sport has been widely examined in the sport psychology literature. The coping processes utilised in stressful situations in sporting situations still require further investigation. It is generally acknowledged that the use of 'more' effective coping strategies is intrinsically related to successful performance (Anshel, Kim, Kim, Chang & Eom, 2001). Ineffective or maladaptive coping strategies are also considered to be detrimental to performance, with the consequences of maladaptive coping being linked previously to reduced attentional focus (Krohne & Hindel, 1988) and increased muscular tension (Anshel, et al., 2001) during competition. Coping with stressful situations is generally regarded as a function of personal and situational influences (Anshel, Williams & Hodge, 1997), although athletes are thought to respond to stressful situations in a consistent manner over time according to the trait theory of coping (Leventhal, Suls & Leventhal, 1993).

In regards to specific sporting findings, elite male runners have reported using the problem-focused strategies of seeking social support and increased effort and resolve to cope with poor performance (Madden, Kirby & McDonald, 1989). Gould, Eklund, and Jackson (1993) showed that 1988 US Olympic wrestlers dealt with adversity during their bouts by using thought control, maintaining task focus, behavioural changes, and emotional control. Similar to this, Gould, Finch, and Jackson (1993) assessed what coping strategies were used by former elite figure skaters to manage stress during training and competition. They identified the use of both problem-focused and emotion-focused strategies that were often used in combination; rational thinking and self-talk, positive focus and orientation, social support, time management, training hard, isolation, and blocking. In relation to elite rugby union players, Nicholls and colleagues (2008) identified injuries, physical and mental errors as the most reported stressors they face in competition. These players reported using increased concentration, blocking, and increasing effort as strategies used to cope with the aforementioned stressors (Nicholls, Holt, Polman & Bloomfield, 2008). In a later study (Nicholls, Jones, Polman & Borkoles, 2009) identified that the lack of assessing commonly experienced emotions (e.g., anxiety, anger, hope and pride) limited the validity of their

findings as stress, coping and emotion should be examined together (Lazarus, 2000). To counteract this, Nicholls and colleagues (2009) administered a diary to five professional rugby union players that consisted of lists of stressors, coping responses, coping effectiveness, emotion responses to stressors, and emotional intensity to be completed in relation to training and match experiences. The results of the study revealed that the players reported more stressors and more effective coping during training, higher emotional intensity during matches, and differential use of coping strategies for matches and training. Coping effectiveness and emotional intensity varied amongst the participants in the study, suggesting that athletes (rugby union players in the case of this study and the current thesis) would benefit from assessment of coping strategies and constructs that assess emotion processes (e.g., emotional intelligence) in line with performance measures.

2.8 Rugby Union Performance

The previous chapter has detailed the nature and history of rugby union. Four distinct areas of rugby union were also reviewed; performance analysis (Hughes, 1996), physiology of rugby union players (Duthie, et al., 2003), biomechanics (Quarrie & Wilson, 2000), and the psychology of rugby (Beauchamp, et al., 2002; Evans, et al., 2004; Nicholls, et al., 2006), with the focus of identifying their role in performance. It was noted that gap in the literature exists concerning how the psychological attributes of elite rugby union players relate to actual on-field performance. This lack of research into specific drivers of performance within the rugby union environment dictated that the current thesis should attempt to identify attributes that have previously shown predictive efficacy in sports research. Further to this, the following chapter details the extensive interview process that was undertaken to identify drivers of performance in rugby union, the conversion of this anecdotal evidence to measurable constructs, and discussion of these constructs in regards to previously used models of sporting performance.

CHAPTER 3: STUDY 1 - INTERVIEW PROCESS

3 Introduction

In order to identify specific 'rugby union' drivers of performance, a semi-structured interview process was employed. Interviews were conducted with a range of players, ex-players, current and previous coaches of the state and national teams, administrators and team advisors. This process aimed to draw upon the years of exposure to the professional rugby union environment, and then convert anecdotal evidence of the predictors of performance into measurable constructs that could be assessed via questionnaire.

3.1 Research Question

The main research question that was addressed / asked of all interview participants concerned players on-field performance: *"What are the psychological determinants of performance in the Rugby Union domain?"* Interviewees were encouraged to provide as much detail concerning their beliefs on what contributes to successful performance within the elite rugby union environment. In addition to this, interviewees were encouraged to provide descriptions of particular players who demonstrated behaviours or psychological traits that were consistent with their descriptors of the predictors of elite performance. Open-ended questions were utilised as to allow all interviewees to provide as much, or as little information concerning their beliefs. All interviews were conducted face-to-face at the place of work of the interviewee and responses were recorded on paper and analysed at the conclusion of all the interviews.

3.2 Characteristics of Interviewees

Current and previous player and administrator interviewees were recruited from the three Australian based Super 12 teams and the national representative team, the Australian Wallabies. All interviewees were contacted by a member of the Australian Rugby Union Players' Association in

order to ascertain interest and availability, and then scheduled for an interview. Interviews were conducted by the PhD student, a professor of psychology, and a sports psychology consultant.

3.2.1 ACT Brumbies

Seven coaches and administrators were interviewed from the ACT Brumbies. A further 12 players were interviewed, five of whom were current National squad members.

3.2.2 NSW Waratahs

Seven coaches and administrators were also interviewed at the NSW Waratahs; eight players were also interviewed, all but one having had international experience playing for the Wallabies.

3.2.3 QLD Reds

The QLD Reds interviewees consisted of five coaches and administrators; three previous players; and six current players.

3.2.4 Wallaby Coaching Staff and Ex-Wallaby Players

Eleven ex-wallaby players volunteered their time to take part in the interview process along with the six current coaching staff from the Australian Wallabies international team.

3.3 Interview Results

At the conclusion of the 59 interviews, all data was collated and all interview data recorded was read by the current thesis author. All interviewees were able to identify behaviours, traits, and examples of players who had previously demonstrated elite performance. A grounded theory approach was utilised (see for example: Ward, Fon, Hudson & McCormack, 1998). Predictors of

performance endorsed by the participants were examined for meaning units (i.e., descriptions that express a distinct idea). The meaning units were collapsed into provisional categories and, after a period of further refinement, a final set of mutually exclusive categories were derived. It was at this point that saturation was deemed to have occurred (i.e., no new categories were suggested by the meaning units). These categories were formed according to semantic similarity. A number of common themes emerged from interviews in regards to what interviewees saw as psychological drivers of elite performance, and behaviours that were consistent with elite performance. These themes will be addressed in the following section.

3.3.1 *Effective Communication*

Effective communication or “getting the message across” was consistently identified as a very important facet that contributed to levels of performance (directly and indirectly). Communication skills were acknowledged as critical for coaches with “clarity in a player’s role – achieved by effective communication” on an individual level, and at a team level to provide “clarity in their vision” for the team and to be able to “communicate that vision”. Further to this, effective communication between team-mates needed to be “individualised”, with players in leadership positions needing to tailor their message depending on who they were communicating with, so the correct message gets across. Players in leadership positions (e.g., Captain), or players who demonstrated effective leadership behaviours need to be “very good communicators”, and “know what to say” and when. These communication skills were deemed “critical on and off the field”, as on-field talk can stimulate players such that “if down in game, the revenge stimulated by the talk can motivate you, if you’re up in the game, talk can help you stay on top and dominate the opposition”. A similar example is when a player is not confident to talk (communicate) on the field to the detriment of the team: “players who aren’t good communicators miss opportunities – having a three man overlap and not yelling for the ball”. Off-field, communication concerning training, previous and future games, also needs to be effective as “getting to

know players is important in developing a relationship with them – need to display a comfortable persona, empathy, and (develop) two way trust”.

The other facet of communication involves listening, with players’ listening ability, and the ability to know if a player is listening being recognised as equally important as the message attempting to be conveyed. To “listen actively” not only was the best way to take in information, it also was described as a way to show “respect”. Listening was also identified as important in regards to on-field performance with the amount (“good players increase the amount of listening they do getting closer to the game”) and timing of listening (“players who warm up poorly and don’t remember calls are a worry – haven’t been listening”) being suggested as having direct impact of an individual’s and team’s performance. The broader implications of effective communication skills within the rugby union environment is that it “supports all (other) skill areas”, and affects all “ages and levels of expertise”. A willingness to “consult and listen, share experiences” with other players was also reported to “ultimately influence” team mates in a positive manner.

3.3.2 Inspires and Motivates Team-mates

Inspiring and motivating team mates were identified as a way to influence player performance as players need “to realise when things are going wrong they need to pull others into line. Thus, they need to have the respect of their team-mates, have a presence, and be able to read what is going on/how specific individuals are going. This can be achieved in a number of ways: eye-balling people, talking in such a way to get players (re)motivated (confident), exuding positive body language”. Motivation and inspiration were also thought to be a product of noticeable performance(s) on the field, like “a run, or a big hit” in the midst of a game. Motivation was also described in simple terms where giving a “timely pat on the back for good performance” would provide positive feedback that would motivate players. This type of motivation could also manifest through players showing “enthusiasm” towards their team mates and “supporting and encouraging them when they need assistance to overcome problems” on or off the field. Knowing “when to motivate” (give the

speech) and when it is best unsaid is a real skill” that was identified as a quality of less extraverted players who were identified as players who inspired with their actions on the field, more so than through speeches to the entire playing group.

3.3.3 Effectively Controls Emotions

The experience of emotions was identified as a salient feature of all rugby union contests, acting in both a facilitative and debilitating manner. “Composure/poise” are considered essential, so players can “stay focused on what they can control” during tense or exciting moments in matches. This ‘trait’ like ability to deal with emotions was viewed as more important than the ‘state’ levels of for example “nervousness before a game in being anxious” or “physical illness (vomit)”. The “important issue is whether this (levels of emotional disturbance) detracts from their ability”, as some players habitually experience high levels of anxiety prior to competition, whereas, some players show little or no physical or psychological symptoms of anxiety. With some players “being calm before they run out, and that some players perform equally well whilst being anxious about the game and their own performance”, the control and management of one’s own and others’ emotions were acknowledged to be multi-faceted and enduring elements of performance.

In specific regards to performance, a loss of emotional control was linked with “giving away unnecessary penalties”; being overtly emotional (or emotionally expressive) in negative manner concerning on field performance or referee decisions; losing focus on the common aim of the team. Whereas good management and control of positive and negative emotions were associated with being able to bounce back after setbacks and remain positive; maintaining energy and lifting (performance) when required. The ability to tailor one’s interactions with team mates such that players “can manage the balance between the players who are cool heads and those that can “go nuts” so all team members feel their experiences are being dealt with individually, and yet are working towards a common goal, was identified as a way that

players' ability to manage and control their emotions contributed to team performance.

3.3.4 Responsibility – On and Off-Field

Responsibility, professionalism, and conscientiousness were descriptions used interchangeably to describe players' approaches to the on and off field demands of the rugby union environment. Off field "discipline" was felt to directly relate to on field success, with "training" being highlighted as critical. "Differences in the way people train (variance in intensity)" were thought to be indicative of a level of "professionalism" that commanded respect, due to the "setting of standards" or "leading by example" to successful players. One current player in describing his captain's leadership believed that his success on-field and as a leader stemmed from his "strong personality, good personal example to team, very professional".

On the field, "some positions have inherent roles - 9/10 - structure and control", and as such are depended upon being disciplined in providing that structure. In addition to this, players needed to "practise in reading the game" such that they could predict the occurrence of particular set-plays or consistent ways that opposition teams or individual players react in given situations. From a coaching perspective, players also need to be able to implement "tactical changes during a game...immediately and successfully"; hence players need to have knowledge of what is involved in their new role. Further to this, players then have to "take responsibility for decisions and get them right" on the field in the face of changing tactics.

3.3.5 Adaptable When Under Pressure

Performing "under pressure" and coping with the high stress environment of Super 12 competition were recognised as salient predictors of performance. Players "need to be able to rebound emotionally, and focus energy on current event (e.g., their role)" when confronted with stressful moments during games, as "being able to deal with the uncontrollable successfully is what makes a

champion”. More specifically, players need to be “able to manage a situation or a moment of stress” successfully. This also applied in relation to game preparation or training, as “generally players show leadership (and maintaining the composure of the team) by not losing their cool on minor things at training”. In dealing with stress, players “need to be able to work well under pressure whilst performing their own role, and reading the game from your team’s and the opposition’s points of view”. Players need both these aspects of techniques of dealing with the stress of the game, as coming up with a plan to deal with or solve their stressor, would involve an understanding of what is causing the stress, and what sort of action would solve the problem. On-field, dealing with stressful situations effectively translated into not “letting an opponent get on top” and not “letting team members down” by not altering their actions to deal with the stress caused by the contest, or being beaten by a direct opponent.

3.4 Chapter Summary

Following the identification the common themes via the grounded theory approach to the interview data, and the review of rugby specific and general sport psychology findings in preceding chapters, selection of the constructs to be assessed could be addressed. Considering that the traits described through the interview process can be recognised as essentially positive aspects of mental function, attention was given to established psychological traits (and measures of) and their relationship with sporting research. Traditional approaches to the study of emotions, more specifically anxiety, effect on sporting performance were grounded on the notion that anxiety was generally harmful to performance (Hanin, 2000). In contrast, positive emotions or traits were suggested to be facilitative towards performance (Robazza, et al., 2007). Given this contrast, early sport psychology research, and interventions based upon these notions focused on identification of methods to assess the impact of anxiety, and techniques to reduce anxiety and enhance positive emotional experiences within the sporting environment. These efforts spawned a number of hypotheses and models of sporting performance that were reviewed in the previous chapter.

The aim of this chapter was to detail the interview process that was undertaken to identify behaviours, traits, and examples of players who had previously demonstrated elite performance within the context of the three Australian based Super 12 teams and Australian Wallabies rugby union teams. A number of common themes emerged from the interviews in regards to what interviewees identified as psychological drivers of elite performance, and behaviours that were consistent with greater levels of performance. The themes: effective communication; inspires and motivates team mates; effectively controls emotions; responsibility; and being adaptable when under pressure were recognised as factors that generally contribute to mental health and also reflecting constructs that previously have been identified as salient predictors of sporting performance.

Three major fields of interest were identified, as well as six other constructs that have been previously linked to sporting performance and appropriate for use in the Super 12 rugby union setting. The three major fields were personality, emotional intelligence, and stress coping strategies, and the six other constructs were self esteem, locus of control, sporting orientation, life orientation, social desirability and anxiety. The following chapter details the nature of the selected constructs; assessments employed to measure these constructs; and a case for the selection of a particular measure.

CHAPTER 4: DEVELOPMENT OF SELF REPORT QUESTIONNAIRE

4 Introduction

This chapter details the measures and constructs chosen to assess the psychological qualities identified through the interview process detailed in Chapter 3. Three major fields of interest were identified as anecdotal predictors of performance. They included the Five-Factor Model (FFM) of Personality, Emotional Intelligence and the ability to cope with stress. A description of these three fields of study, the measure selected for assessment, and a case for utilising the assessments of normal personality traits, emotional intelligence, and stress coping strategies in professional rugby players and other sportsmen will also be provided. Further description of constructs that were both identified through the interview process and from previous sporting performance research will also be provided.

4.1 Emotional Intelligence

The emotional experience of sporting involvement and its relationship to performance is one of which sporting combatants and viewers are all intuitively aware. The nature of this relationship is, however, is one that has only received minimal attention in scholarly research. The relatively young concept of emotional intelligence may offer a window to explore how emotional abilities of sportspeople relate to their on field performance. The generally accepted definition of the construct of emotional intelligence after its conception in the 1990's by Peter Salovey and John Mayer is the ability to perceive, understand, utilise, manage and control emotions (Mayer & Salovey, 1997).

Analogous concepts to the abilities encompassed by the Emotional Intelligence construct have previously been implicated in affecting sporting performance. Emotional control and the 'experience' of peak emotional levels (Hanin, 2000) have been identified as relevant factors in sporting performance, as well as sporting involvement (Biddle, 2000). Further work on

the elucidation of how emotions, the ability to identify, understand and utilise emotions adaptively in sporting competition is necessary. This view was raised by Botterill and Brown (2002), who noted that mostly “athletes just experience their emotional responses and do not stop to reflect on them critically and constructively” (Botterill & Brown, 2002, pg. 50).

4.1.1 Models and Measures of Emotional Intelligence

Emotional Intelligence has been touted as “the panacea for modern business” (Matthews, Zeidner & Roberts, 2002, pg. 4.) and the key to individual performance and career success (Lam & Kirby, 2002). Some researchers have also argued (Ciarrochi, Chan, Caputi & Roberts, 2001) that developing emotional intelligence in individuals can lead to more adaptive behaviour and better mental health. Given the potential benefits and theoretical importance of these claims, it is somewhat surprising that there is no universal definition of Emotional Intelligence (Ashkanasy, Zerbe & Hartel, 2002). Additionally, there is yet to be consensus on the competencies that define emotional intelligence or how it should be measured (Ashkanasy, et al., 2002). Research continues in an effort to better define the meaning of Emotional Intelligence, as well as to develop robust test measures (Mayer, 2001). The following sections will describe the competing models, and measures of Emotional Intelligence that have been developed over the preceding 20 years.

4.1.2 Mayer and Salovey – The Ability Model of Emotional Intelligence

Salovey and Mayer (1990, pg. 189) describe Emotional Intelligence as “the ability to monitor one’s own and others’ feelings and emotions, to discriminate among them and to use this information to guide one’s thinking and actions”. Their ability-based model presents Emotional Intelligence as a form of actual intelligence, combining emotions and thinking (Mayer, Salovey & Caruso, 2000). This perspective maintains that Emotional Intelligence is best measured using the same type of performance-based measures used for psychometric intelligence (Mayer, et al., 2000). The Mayer and Salovey model (1997) comprises of four branches or skills: Branch 1 – the perception of

emotions; Branch 2 – the ability to use emotion(s) to facilitate thinking; Branch 3 – the understanding of emotions and their meaning; Branch 4 – the ability to regulate and manage emotions. The model is arranged hierarchically, following the suggestion that the abilities develop in succession and as a function of age (Mayer & Salovey, 1997). The tests developed to operationalise the model, the Multifactor Emotional Intelligence Scale (MEIS) and Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT), are designed to tap intellectual abilities that relate to feelings and emotion (Gowing, 2001). In contrast to self-report measures, an ‘ability’ measure is purportedly not influenced by mood or a person’s own judgment of their emotions (Mayer, Caruso & Salovey, 2000). For example, perception of emotion in oneself is significantly correlated with the ability to recognise emotions in others (Zuckerman, et al., 1975). This skill of accurately recognising emotions in others is the basis behind the MEIS and MSCEIT faces task, where there are ‘right answers’ based on correctly identifying “universal facial expressions of emotions among humans” (Mayer, et al., 2000).

There has been some criticism of the use of the currently available ‘ability’ measures of Emotional Intelligence. These criticisms centre around the validity of the scoring procedures (expert or consensus) used to evaluate responses on the MEIS and MSCEIT (Zeidner, Shani-Zinovich, Matthews & Roberts, 2005). Other researchers have reported less than ideal reliabilities for the sub-scales of the MEIS (Mayer, Salovey, Caruso & Sitarenios, 2003) and MSCEIT (Palmer, Gignac, Manocha & Stough, 2005). Despite these criticisms these tests have otherwise demonstrated adequate validity in predicting everyday (e.g., Lopes, Salovey & Straus, 2003) and workplace (Rosete & Ciarrochi, 2005) criterion. They also show good discriminant validity from personality measures (Lopes, et al., 2003) and discriminant and convergent validity from psychometric tests of intelligence (MacCann, Matthews, Zeidner & Roberts, 2003). As yet, no published study has utilised either the MEIS or MSCEIT in the sporting field.

4.1.3 Self-report Measures of Emotional Intelligence

A number of self-report, or 'trait' measures of Emotional Intelligence, have also been developed in the past 20 years of emotional intelligence research (e.g., Bar-On, 1997; Schutte, et al., 1998). These types of measures have also received their fair share of criticisms, concerning their construct validity (Matthews, et al., 2002), internal consistency, predictive validity (Janovics & Christiansen, 2001), and susceptibility to socially desirable responding. These criticisms centre on whether self-report measures of emotional intelligence are distinguishable from common personality traits, and whether they can provide incremental predictive validity beyond personality and psychometric intelligence measures. The resolution of these issues is vitally important considering the investment that organisations throughout the world are currently making in emotional intelligence testing in light of the various claims of Emotional Intelligences relationship with job performance (e.g., Bachman, Stein, Campbell & Sitarenios, 2000; Janovics & Christiansen, 2001), and other work behaviours (Zeidner, Matthews & Roberts, 2004).

4.1.3.1 Bar-On and the Emotional Quotient Inventory (EQ-i)

Bar-On's model of Emotional Intelligence (Bar-On, 1997) and its associated measure, the EQ-I, is regarded as a measure of "emotional and social intelligence" (Bar-On, 2000, p.363), as it covers a large array of emotional and social abilities. The EQ-i aims to assess 15 components of emotional functioning previously identified as predictors of good mental health (Bar-On, 1997). These 15 components are further grouped together to ostensibly measure five areas of functioning more closely related to the emotional intelligence construct: intrapersonal (emotional self-awareness, assertiveness, self-regard, self-actualization, independence); interpersonal (interpersonal relationships, social responsibility, empathy); adaptability (problem-solving, reality testing, flexibility); stress-management (stress tolerance, impulse control); and general mood (optimism, happiness). The model itself has been described as "an array of non-cognitive abilities, competencies, and skills that influence one's ability to succeed in coping with environmental demands and

pressures” (Bar-On, 1997, pg. 16), and the 15 components that “resemble personality factors”, the Bar-On EQ-i is the most widely used Emotional Intelligence assessment to date.

The EQ-i is a 133-item assessment which has been shown to have good internal reliability (Bar-On, 1997), test-re-test reliability, and reasonable convergent reliability. The discriminant validity of the EQ-i is where most of the criticism of this measure stems from. Overlap with common established measures of personality such as the 16-PF, a -0.77 correlation with Anxiety sub-scale for example, and with the NEO-FFI; the total emotional intelligence measure correlated -0.62 with Neuroticism; 0.52 with Extraversion; 0.43 with Agreeableness; and 0.51 with Conscientiousness (Dawda & Hart, 2000). In regards to the prediction of workplace and life criteria, the EQ-i manual details a large number of correlational studies (Bar-On, 1997) that suggest the total Emotional Intelligence score relates to life satisfaction, acculturation, and depression. Independent studies of the EQ-i have demonstrated meaningful relationships with Alexithymia and Psychological well-being (Dawda & Hart, 2000), as well as predictive validity in regards to ratings workplace performance, morale, and general health (Slaski & Cartwright, 2002).

Researchers have recently begun to explore whether EI may help explain variance in academic achievement (Schutte, et al., 1998; Lam & Kirby, 2002; Newsome, Day & Catano, 2002; Parker, Summerfeldt, Hogan & Majeski, 2004). The research in this area has thus far shown inconclusive results, which may be explained by the different measures of Emotional Intelligence used across the studies, as well as the different measures of academic achievement employed (Parker, et al., 2004). Parker and colleagues examined the relationship between Emotional Intelligence and academic achievement in 667 high school students using a modified version. A moderate association between scores on the EQ-i Youth Version and students' GPA, and when emotional intelligence variables were compared in groups of highly (80th percentile or better) moderately (21st – 79th percentile) and less successful (20th percentile or less) GPA students, academic success was strongly associated with several dimensions of Emotional Intelligence

and there was a moderate correlation between Emotional Intelligence and academic success in the total sample (Parker, et al., 2004).

Whilst the EQ-i has demonstrated reasonable reliability and validity evidence, it's lack of demonstrated discriminant validity from established personality measures promote the need for studies to assess whether the EQ-i can predict outcome (criterion related) measures over and above measures of IQ and Personality. As yet, no sporting based publication has utilised the EQ-i as a measure of Emotional Intelligence or more broadly, emotional and social functioning. Given the questions regarding the validity of the EQ-i to measure the Emotional Intelligence construct and the use of a personality measure in the current thesis, the EQ-i was not selected as the measure of Emotional Intelligence for this thesis.

4.1.3.2 The Schutte Measure of Emotional Intelligence

The scale developed by Schutte and colleagues (1998) is widely used in academic circles, but has received considerable criticism concerning its reliability and validity (Austin, 2005). Whilst Schutte's and colleagues' original conception (Schutte, et al., 1998) of their scale proposed that it was a uni-dimensional Emotional Intelligence measure, two separate studies have suggested that there are four sub-factors (Optimism/Mood Regulation, Appraisal of Emotions, Social Skills and Utilisation of Emotions) in addition to an overall Emotional Intelligence factor (Petrides & Furnham, 2000; Saklofske, Austin & Minski, 2003). The Schutte Self-Report Inventory (SSRI) was derived using a three-component model of Emotional Intelligence (appraisal/expression of emotions, regulation of emotions and utilisation of emotions) proposed by (Salovey & Mayer, 1990). The SSRI is a 33-item self-report inventory that aims to measure people's ability to recognise and express their own emotions; perceive the emotions of others; regulate one's own and the emotions of others; and to be able to utilise emotions in thought or decision-making. In the initial validation study on the self-report Emotional Intelligence (SEI) instrument suggested that it had good convergent and discriminant validity, with the authors reporting sensible correlations between

measures of Alexithymia, optimism, and another measure of Emotional Intelligence, the Trait Meta Mood scale (Salovey, Mayer, Goldman, Turvey & Palfai, 1995). Females were also found to score higher than males on the measure, which is consistent with the findings of other self-report Emotional Intelligence measures and Emotional Intelligence theory.

Further studies have assessed the predictive validity of the SEI, with positive relationships being observed between the SEI and cognitive performance (Van Rooy & Viswesvaran, 2004), positive mood and self-esteem (Schutte, et al., 2002), life satisfaction (Austin, Saklofske & Egan, 2005) and other theoretically related variables with reasonable success. Some question still remain concerning the SEI's incremental predictive validity, in being able to adequately predict important life outcomes over and above established measures of personality and intelligence (Austin, 2005). As yet, no study has used the SEI to assess sportspeople's levels of Emotional Intelligence, or how that relates to important sporting criteria for success.

4.1.3.3 The Swinburne University Emotional Intelligence Test

Palmer and Stough (2001) developed a self-report measure of Emotional Intelligence named the Swinburne University Emotional Intelligence Test (SUEIT). It provides scores on five factors: Emotional recognition and expression (in oneself) – the ability to identify one's own feelings and emotional states, and the ability to express those inner feeling to others; emotions direct cognition – the extent to which emotions and emotional knowledge are incorporated in decision making and/or problem solving; understanding of emotions external – the ability to identify and understand the emotions of others; emotional management – the ability to manage positive and negative emotions within both oneself and others; and emotional control – how effectively emotional states experienced, such as anger, stress, anxiety and frustration are controlled. The SUEIT was developed following a factor analytic study involving six of the predominant models and measures of Emotional Intelligence including: (1) the Mayer, Salovey, Caruso Emotional Intelligence test (MSCEIT Research Version 1.1; Mayer, Salovey & Caruso,

1999); (2) the Bar-On Emotional Quotient Inventory (Bar-On, 1997); (3) the Trait Meta-Mood Scale (Salovey, et al., 1995); (4) the twenty-item Toronto Alexithymia Scale-II (TAS-20; Bagby, Taylor & Parker, 1994); (5) the scale by Schutte, et al., (1998); and (6) the scale by Tett, Wang, Thomas, Griebler Linkovich (1997). The SUEIT is a 64-item self-report Emotional Intelligence scale that has shown predictive validity in a range of workplace, clinical and non-clinical environments.

Some recent studies utilising the SUEIT have demonstrated that positive associations between SUEIT scores and Transformational Leadership in both senior levels managers (Gardner & Stough, 2002) and females managers (Downey, et al., 2006) and with Intuition (Downey, et al., 2006); low scores on the SUEIT have also been found to predict levels of depression in a clinical sample (Downey, et al, 2008). Further to this, the SUEIT has shown predictive validity over and above measures of IQ and personality for a measure of Life Satisfaction (Gannon & Ranzijn, 2005), good test-re-test reliability (Palmer & Stough, 2001), and good internal reliability in a wide variety of samples (Downey, et al., 2006, 2008; Gannon & Ranzjin, 2005; Gardner & Stough, 2001; Palmer & Stough, 2001). Given the SUEIT's brevity, ability to predict positive and negative outcomes in the workplace and in clinical population(s) and theoretical independence from personality measures, it was selected to assess the concept of Emotional Intelligence in the current thesis. A recent book chapter by Stough, Clements, Wallish and Downey (2009) has provided some preliminary empirical evidence of the existence of a relationship existing between Emotional Intelligence measured by the SUEIT and sporting performance.

Stough and colleagues (2009) collected Emotional Intelligence data from 49 elite basketball players, and explored the relationship between scores on the indices of Emotional Intelligence with on-court performance variables such as: field shooting accuracy; 3-point shooting accuracy; free throw shooting accuracy; rebounding (defensive and offensive); steals; and blocked shots. Their analysis showed that the emotional management and emotional control dimensions of the SUEIT were significantly correlated with the 'number' of 3-

point, 2-point, and free-throws taken by players. Significant positive relationships also existed between the emotional management and emotional control scores and the success of the shooting performance measures and the resulting amount of points scored. In regards to the defensive performance measures, two significant relationships existed between the emotional recognition and expression dimension of the SUEIT and the number of steals and blocked shots. The emotional management dimension was significantly related to both offensive and defensive rebounding statistics (Stough, et al., 2009). Given these preliminary findings of the existence of relationships between the Emotional Intelligence dimensions assessed by the SUEIT and seasonal sporting performance, the SUEIT was selected as the appropriate measure of Emotional Intelligence for this study.

4.2 Strategies for Coping with Stress

The ability to cope adaptively within a stressful environment has been identified anecdotally as a major component to successful sporting performances. For example, the following quote from Matt Giteau ostensibly relates to dealing with the stress of being behind in a rugby union match. "That's important when you are a playmaker. You've got to look for opportunities, and you can't dwell on thinking that you are going to lose this one. You have to look more at 'how are we going to get out of this one'." Matt Giteau, 24th November, 2008. Alongside 'trait' levels of Emotional Intelligence that are to be assessed in this thesis, the use of particular coping strategies will be assessed to identify strategies that predict levels of performance.

The way in which people react to stressful situations in regards to their emotional reactions and their relative coping responses or styles has long been an area of interest for psychologists (Lazarus, 2000). Research concerning how people cope with stress and how effective their responses are to stressors in the short and long term has produced a wide range of theories (and measures) over the past 30 years. This section will focus on coping and emotion in the context of acute experiences of stress, rather than

chronic stress that is more associated with enduring levels of stress or anxiety due to a single acute event that is unresolved or ongoing.

4.2.1 Stress and Coping Theory

Cognitive-relational theory defines stress as a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being (Lazarus & Folkman, 1984). Coping is defined as the efforts used to deal with the imbalance between the demands placed upon a person and their resources. In the transactional theory of coping (Lazarus & Folkman, 1984), coping is viewed as part of a process that occurs in response to the demands of situations, as such, coping itself needs to be assessed within the context of a stressful situation. There are three main components of the transactional stress-coping process: appraisal, emotion and coping (Lazarus, 1995). These three components are considered to occur in turn during a stressful event, with the appraisal of a situation producing an emotion, and that emotion in turn prompts coping, this produces a further emotion and a subsequent reappraisal of the situation (Lazarus, 1993). This process continues until the situation has been resolved or appraised as no longer being stressful. As the process is dynamic and changeable across different stressful instances, it is difficult to delineate the causality between the appraisal, coping, and emotion facets of the process as they influence each other through the process. Experiencing stress and the relative success of the coping strategies employed produce immediate effects, such as emotions and physiological changes (Lazarus, 1995), and long-term results concerning psychological well-being, physical health and social functioning (Aldwin, 2007).

4.2.2 Appraisal

The appraisal facet of the stress coping process can be divided into two types: primary and secondary (Lazarus & Folkman, 1984). Primary appraisal deals with how much a person has at stake in a certain encounter. In primary appraisals, a situation is perceived as being either irrelevant, benign-positive

or stressful (Lazarus & Folkman, 1996). Those events classified as stressful can be further subdivided into the categories of irrelevant, benign/positive, challenge, threat and harm/loss (Lazarus, 1998). Events that are appraised as irrelevant do not produce an emotion or coping response as the event in no way effects the person's life in a meaningful way. Events that are deemed stress relevant but benign/positive are likely to produce positive emotions in response to the event and won't necessitate a coping response. In a situation that is appraised as a challenge a person may see an opportunity to prove herself or himself, anticipating gain, mastery or personal growth from the venture. If the situation is experienced as pleasant, exciting, and interesting, and the person is hopeful, eager, and confident to meet the demands. If the situation is negative, the person can experience anxiety or fear in response to the uncertainty concerning their ability to meet the demands of the stressful situation. A threat appraisal occurs when the individual believes they are in danger, and it is experienced when the person anticipates future harm or loss (Lazarus, 1998). Harm or loss can refer to physical injuries and pain or to attacks on one's self-esteem. In threat appraisal, future prospects are seen in a negative light, and the individual seeks ways to master the situation they are faced with. The individual is partly restricted in his or her coping capabilities, striving for a positive outcome of the situation in order to gain or to restore his or her well-being. Threat appraisals can be seen to have a relational property concerning the balance between perceived coping capabilities and the potentially hurtful aspects of the stressful situation. Harm/loss appraisals occur as a result of damage that has already occurred, such as experiencing pain or injury (Lazarus & Folkman, 1984), which can result in a passive action such as withdrawal or depression.

Secondary appraisal refers to what type of action (if any) is taken in response to the event (Lazarus & Folkman, 1996). This part of the process is driven by the availability of coping resources appropriate to the situation and the likelihood that they will be successful. At the theoretical level, there are two distinguishable coping styles: problem-focused coping and emotion-focused coping. Problem-focused coping involves directly dealing with the problem/stressor through logical steps (Lazarus & Folkman, 1996). Emotion-

focused coping is more concerned with attending to the negative emotions that are induced in the stress and coping process (Lazarus & Folkman, 1996). Despite the theoretical distinction, coping is considered a dynamic process whereby both types of coping can be used simultaneously, and can also serve the complementary functions (Lazarus, 1998).

4.2.3 Coping Styles and Measures

Over the past 40 years, a significant amount of research has focused on how coping affects short to long term outcomes of different types of stress in people's lives. Use of these different coping styles or strategies has been identified as more or less adaptive in certain situations and personal experiences. Within the two distinguishable coping styles: problem and emotion focused; lay further factors/styles that can be measured via self-report inventories. Several measures of coping are commonly used to assess similar aspects of problem and emotion focused coping styles that relate to aspects of stressors, rather than to specific stressors. Popular measures include: the Ways of Coping (Lazarus & Folkman, 1984), the Multidimensional Coping Inventory (Endler & Parker, 1990), the Coping Strategies Inventory (Tobin, Holroyd, Reynolds & Wigal, 1989), and the COPE inventory (Carver, Scheier & Weintraub, 1989).

4.2.3.1 The COPE Inventory

The COPE inventory was developed as an alternative measure of the Lazarus and Folkman (1984) model of coping and the behavioural regulation model of Carver and Scheier (1990). The COPE comprises of 15 sub-scales that reflected previously identified meaningful aspects of coping from extant literature, and other aspects identified as relevant to the coping process. The 15 sub-scales include assessments of problem-focused coping (active coping, planning, suppression of competing activities, restraint coping and instrumental social support), emotion-focused coping (positive reinterpretation, acceptance, denial, turning to religion, and emotional social support), "less useful" (focus on and venting emotions, behavioural

disengagement, mental disengagement) and recently developed scales (humour, and substance use), and consist of four items per scale (Carver, et al., 1993).

The COPE inventory has displayed good factor structure and reliability throughout numerous studies (Litman, 2006), and COPE scores have been shown to correlate with optimism, perceived control over stress, self-esteem, hardiness, competitive achievement orientation, and trait anxiety (Carver, et al., 1989). Specifically, problem-focused sub-scales correlate with positive psychological constructs like optimism and positive life orientation (Fontaine, Manstead & Wagner, 1993), and that this type of adaptive coping is negatively correlated with psychopathology (Petrosky & Birkimer, 1991). Emotion-focused coping sub-scales have been found to be negatively associated with perceived control over stress (Fontaine, et al., 1993) and psychological dysfunction (Billings & Moos, 1981).

The COPE has been utilised in a number of sporting based studies, and has been modified by Crocker and Graham (1995) to assess coping in relation to recent stressful performance situations in sport. The modified COPE contains nine of the original COPE scales, and three sport related scales identified from sports related research (Crocker, 1992; Madden, Summers & Brown, 1990). As such, the scales included were active coping, seeking social support for emotional reasons, humour, denial, seeking social support for instrumental reasons, planning, behavioural disengagement, venting of emotion, suppression of competing activities, self-blame, increasing effort and wishful thinking.

Athletes high in task orientation and competing in a high mastery climate have been found to favour adaptive coping strategies (Ntoumanis, Biddle & Haddock, 1999). The use of coping strategies including increased effort, suppression of competing activities, seeking social support, and reduced behavioural disengagement reflect the athletes' relative levels of situational control and resulting better performance. The same 56 UK University athletes also reported that being high in ego orientation, versus task, was associated

with a more dysfunctional coping response, venting of emotions (Ntoumanis, et al., 1999). In a large study using the COPE with regional to national competitive athletes (N = 235), Crocker and Graham (1995) identified that athletes primarily used strategies such as increasing effort, planning, suppressing competing activities, active coping, and self-blame to cope with a lack of goal attainment (the measure of stress utilised within the study). Their findings also suggested that female athletes tended to use the seeking social support for emotional reasons and increasing effort strategies more than male athletes to cope with goal frustration (non-goal attainment). In another large study (N = 482 athletes from international level competition down to University level), Kaiseler, Polman and Nicholls (2009) investigated the inter-relationship between mental toughness, coping strategies using the modified version of the COPE (Crocker & Isaak, 1997), and coping effectiveness. The identified that athletes who reported being more mentally tough used more adaptive (problem-focused) and less maladaptive (emotion-focused) coping strategies, which in turn strongly predicted the reported relative efficacy of coping. Further to this, the authors concluded that the ability to control emotions was the most important factor in the coping process for the athletes assessed (Kaiseler, et al., 2009).

The modified-COPE (M-COPE) has also been used in two studies concerning golfers. Gaudreau, Blondin and LaPierre (2002) noted that utilisation of coping strategies changed through three phases of competition (pre, during, post) and achievement of performance goals was related to maintaining the use of task-oriented (adaptive) coping strategies. Further to this, a reduction in the use of emotion-focused coping (or avoidance oriented) from pre- to post competition was also significantly related to achieving performance goals for the golfers assessed. This pattern of results had also previously been identified in a study on adolescent golfers by the same research group (Gaudreau, et al., 2001). The M-COPE has also been used in larger studies, for example, Ntoumanis, Biddle, and Haddock (1999) administered the M-COPE to 356 athletes at British Universities and asked them to recall a recent sport related stressful experience in addition to task and ego orientation, motivational climate, affect, and perceived control measures. Using structural

equation modelling, the authors identified that problem-focused coping strategies were related to task orientation and climate mastery, whereas, emotion-focused coping strategies were linked to ego orientation and performance climate (Ntoumanis, et al, 1999). This pattern of results was in line with the suggestion of Ame's (1999) that focusing on task, and completing it (mastery), is related to adaptive behaviours and cognitions. As such, if athletes feel as though they are in control in sporting situations, when faced with a stressful situation, they will more often choose adaptive coping strategies.

Overall the COPE, and more specifically the M-COPE, has provided adequate reliability and predictive efficacy in their use across sporting studies. It is however, important to note that three (wishful thinking, self-blame, increased effort) of the M-COPE sub-scales are derived from the Ways of Coping Questionnaire (WOCQ – Folkman & Lazarus, 1985) which has also been modified for use in sporting settings in two forms: the Ways of Coping for Sport (WOCS; Madden, Kirkby & McDonald, 1989) and the Modified Ways of Coping Questionnaire (MWOCQ; Crocker, 1992), which will be reviewed later in this chapter.

4.2.3.2 Coping Inventory for Competitive Sport

The Coping Inventory for Competitive Sport (CICS) was developed by Gaudreau and Blondin (2002). They aimed to develop a measure with theoretical and conceptual relevance in sporting settings the available inventories used to assess coping strategies in athletes generally lacked content relevance as they were developed from general psychological measures. Three-hundred and sixteen French-Canadian athletes from various sports and levels of competition completed a large pool of items theoretically derived from extant coping literature and measures. Following a review of the internal reliability of the scales generated from factor analysis of the item pool, the ten sub-scales that were maintained were: Thought control, Mental imagery, Relaxation, Effort expenditure, Logical analysis, Seeking support, Social withdrawal, Mental distraction, Disengagement/resignation, and

Venting of unpleasant emotions (Gaudreau & Blondin, 2002). Convergent validity was assessed for the scale with a correlational analysis with the M-COPE and WOCQ, with the CICS sub-scales displaying significant and logical overlap with the sub-scales from the two coping measures. The sub-scales were also found to correlate meaningfully with affect appraisal variables from the Positive and Negative Affect Scale (PANAS) and with anxiety assessed by the CSAI-2. In regards to the relative usage of the various coping strategies assessed by the CICS, effort expenditure, mental imagery, relaxation, and venting of emotions were found to be used more frequently by athletes competing at higher competitive levels (e.g., Elite athletes).

Following the promising development of this sports specific measure of coping, a number of studies have utilised the CICS as their measure of coping strategies. The CICS developers utilised their assessment in a study of 151 French-Canadian athletes to identify if the use of several coping strategies together could be combined to form coping profiles (Gaudreau & Blondin, 2004). Four distinct coping profiles emerged from the cluster analysis of the data collected, with the profiles being: Low COPE (Low utilisation of all coping strategies); High COPE (High utilisation of all coping strategies); High TOC (High utilisation of task-oriented coping); and High DOC (High utilisation of disengagement-oriented coping). Using the identified coping profiles, the authors then aimed to identify if the groups of athletes differed in goal achievement (success) and the affective states experienced within competition. They noted that the experience of positive affect, anger-dejection, experience of control, and goal attainment differed across all for coping profile groups (Gaudreau & Blondin, 2004). Further to this, when goal attainment was covaried in further analysis (as use of better coping strategies is often associated with better performance), the group differences were maintained. The authors concluded from these analyses that in line with previous studies (Crocker & Graham, 1995), use of task-oriented coping styles versus disengagement-oriented styles, are associated with greater levels of goal attainment, positive affect, and control in sporting competition.

The same authors have also attempted to disentangle the coping-affect relationship, with the assessment of athletes' dispositional optimism/pessimism along with coping, affect during competition, and level of goal attainment (Gaudreau & Blondin, 2004a). A large cohort (N = 144) of French-Canadian golfers of varying levels (handicaps ranged from -2 to 11) completed the assessments in two parts, with the CICS, goal attainment measure, and the PANAS being completed following competition. A finding of note was that the coping style used during competition was more predictive of the golfer's performance than their level of expertise. The major findings of the study indicated that task-oriented coping partially mediated the relationship of optimism with post-competition positive affective state, whereas disengagement-oriented coping fully mediated the relationship of pessimism with post-competition anger/dejection. These findings support the notion that the relationship between coping and performance can be further mediated by affect-laden constructs such as the optimism/pessimism continuum (Gaudreau & Blondin, 2004a), and should be considered when modelling performance-coping relationships.

The CICS has demonstrated adequate predictive validity in a number of studies, some reviewed above, and displayed reasonable levels of internal reliability when administered in French. The English translation however, has been shown to be somewhat less reliable (Nicholls, Polman, Levy & Backhouse, 2008), and was not validated in the original study concerning the development of the scale (Gaudreau & Blondin, 2002). Whether this limitation or the relatively recent development of the scale versus more established measures has contributed to a paucity of research using the scale outside of the developer's research group is difficult to ascertain, especially given the promising findings detailed in this section.

4.2.3.3 The Ways of Coping Scales

The Ways of Coping Checklist (WCC: Folkman & Lazarus, 1985) was developed to assess coping strategies utilised by people in everyday life. This assessment was based upon the distinction between emotion-focused coping

and problem-focused coping, and consisted of 66 items that reflected behavioural or cognitive actions that could be utilised in dealing with stressful situations. In the original factor analysis conducted by Folkman and Lazarus (1985), eight types of coping strategies were identified; problem-focused, seeking social support, wishful thinking, detachment, tension reduction, detachment, self-blame, and keeping to self. In a follow-up study (Folkman, et al., 1986), eight factors were again identified, but with slightly different item clustering and sub-scale naming; confrontive coping, distancing, seeking social support, self-controlling, escape-avoidance, accepting responsibility, planful problem-solving, and positive reappraisal. Sport modifications of this instrument by independent researchers have also resulted in variable test length, factors, and reliability, as such; these modified versions of the WCC will be reviewed independently.

One sporting derivation of the WCC is the Ways of Coping in Sport (WOCS) originally the subject of an unpublished paper, but referenced by Madden and colleagues (Madden, Summers & Brown, 1987) in studies concerning the coping skills of middle distance runners and basketball players. From the 66 items that appear in the original WCC (Folkman & Lazarus, 1985), 54 items were maintained following the sporting modifications. These items were selected on the basis of factor analysis, with items that loaded over 0.4 on eight identified factors being considered suitable for inclusion in the WOCS. The eight identified factors bear some resemblance to the original WCC and are entitled; problem-focused coping, seeking social support, increased effort and resolve, general emotionality, denial, detachment, emphasising the positive, and wishful thinking.

In a sample of 23 middle-distance runners, Madden and colleagues (1989) identified that during slumps in performance the assessed runners utilised the seeking social support, increasing effort and resolve, and problem-focused strategies more often to cope with the stress of poorer performance. In addition to this finding, Madden and colleagues (1990) found that a sample of basketball players also reported greater usage of problem-focused, wishful thinking, increased effort and resolve and seeking social support strategies to

overcome high levels of stress specific to basketball. Taken together, these findings illustrate both the utility of a sporting version of a coping measure, and the face validity of the instrument.

The second sporting derivation of the WCC is the modification conducted by Crocker (1992), where athletes respond in relation to their usage of various coping strategies during a recent stressful sporting situation. Some items from the WCC were reworded to make them more sport relevant, and four additional questions derived from athlete interviews and responses were originally added during the modification process. Thirty of these items were removed (12 due to positive skewness, and 18 for not providing adequate fit in the factor analysis), which left 38 items across eight sub-scales; problem-focused coping, active coping, social support, wishful thinking, positive reappraisal, self-control, detachment, and self-blame (Crocker, 1992). The resulting questionnaire was administered to 237 athletes from various sports and levels of competition. The internal reliability of the sub-scales was assessed, with some sub-scales showing questionable internal consistency (problem-focused coping – $\alpha = 0.77$, active coping – $\alpha = 0.78$, social support – $\alpha = 0.70$, wishful thinking – $\alpha = 0.73$, positive reappraisal – $\alpha = 0.68$, self-control – $\alpha = 0.60$, detachment – $\alpha = 0.58$, and self-blame – $\alpha = 0.68$).

Further criticisms of the modified WCC exist, despite its originally strong construct validity. The factor structure differs from both the WCC and WOCS, this occurs at the item level in the sport modifications, beyond just the different sub-scale naming. Whether these differences occur due to the differences in test construction (not all modified WCC items were made sport specific), or the factor analytic technique employed (principal components for the WOCS, principal axis for the modified WCC) in sub-scale derivation has been posited in reviews of these assessments (e.g., Crocker, et al., 1998). A further possible explanation for the factorial instability of the modified versions of the WCC was raised by Aldwin (1994), who suggested that as the coping processes change across situations; this variability may be reflected in the lack of internal consistency and factorial differences between modified versions of the WCC. This may in part be true, as coping is a process, which

would account for decrements in internal reliability, but not the movement of items across sub-scales. Other notable concerns for the use of the modified WCC (Crocker, 1992) and the WOCS (Madden, et al., 1989) were identified by Stone, Greenberg, Kennedy-Moore and Newman (1991). They identified three issues pertaining to the use of these scales; the applicability of the scales items across situations, the adequate definition of the coping period being assessed, and inter-subject definition of the responses to the use of coping strategies. Despite these concerns, both the modified WCC and WOCS have been utilised in a wide variety of sport based studies of the coping strategies of sportspeople.

Grove and colleagues (Grove, Eklund & Heard, 1997) utilised the WOCS in a large study (N = 630) of athletes from various sports and levels of competition. This study focused upon how athletes deal with performance slumps and the coping strategies they utilise in overcoming these slumps by using the slump modified instructional version of the WOCS (Madden, et al., 1987, 1989, 1990). The data collected underwent three levels of analysis; an initial confirmatory factor analysis, a scale reconstitution analysis, and factor analysis of the reconstituted scale. Of specific interest were the initial confirmation analyses, where most items emerged unproblematic at the item (univariate) level. At the factor level, all but one item loaded significantly onto the desired factor, although the correlations for some items were less than ideal (< 0.4), thus revealing a non-viable factor structure (Grove, et al., 1997). The reconstitution analysis revealed a 26-item, four or five factor solution for coping with slumps. These five-factors were; effort/resolve, control (the 5th factor) emotion, social support, wishful thinking, and denial/avoidance. The authors of the study concluded that the original eight factor structure of the WOCS may be too inclusive, and the four or five factor solution from their study could be a superior structure. They concede that their new solutions only accounted for 35-40% of variance in the data, and suggest use of the WOCS should be accompanied by other measures to fully assess coping behaviour.

The WOCS has also been utilised in a sample of male (N = 32) and female (N = 83) gymnasts, competing at club through to international level (Kolt, Kirby & Lindner, 1995). Kolt and colleagues also investigated what coping strategies gymnasts use to overcome performance slumps. The coping responses that were utilised the most often were; increased effort and resolve, wishful thinking, seeking social support, and problem-focused coping (Kolt, et al., 1995). Further to this, female gymnasts utilised the seeking social support coping strategy significantly more often than male gymnasts. Prapavessis and colleagues also utilised the WOCS (Madden, et al., 1987) as their measure of coping in a study of Australian athletes (N = 141) from a wide variety of sports and competitive levels (Prapavessis, Grove, Maddison & Zillman, 2003) including rugby. They investigated the tendency to self-handicap and the use of coping strategies to break out of performance slumps. They identified that the tendency to self-handicap was related to emotion-oriented coping. Specifically, athletes with strong self-handicapping tendency used the emotion-oriented strategies of denial/avoidance and wishful thinking significantly more often than athletes with weak self-handicapping tendencies. These findings replicated those from earlier studies using a different coping strategy assessment (The Coping Inventory for Stressful Situations; Endler & Parker, 1990), and led the authors to conclude that athletes with strong self-handicapping tendencies may be prone to use less adaptive emotion-oriented strategies that involve disengagement, passivity, and/or fantasy when experiencing poor performance (Prapavessis, et al, 2003).

The Prapavessis and colleagues study also provided evidence of good internal reliability of the WOCS sub-scales, with Cronbach's alphas in the study being 0.84 for seeking social support, 0.80 for denial/avoidance, 0.72 for wishful thinking, and 0.73 for increased effort and resolve. These good levels of internal consistency, point to the utility of using specific instructional sets (in this case, use of coping strategies during performance slumps) when administering this assessment to athletes. Given these findings of the existence of relationships between the coping strategies assessed by the WOCS and sporting performance, the WOCS (Madden, et al., 1989) was selected as the appropriate measure of coping for this study. Further to this, it

was decided to use a 'rugby' specific instructional set when administering the assessment.

4.3 Personality Assessment

The value of personality assessment in sport has been viewed with some cynicism regarding its usefulness in predicting physical activity or sporting success (Morgan, 1980; Vealey, 2002). Some of this doubt concerning its value stems from research conducted during the 1960's and 1970's that was based upon early trait research models and descriptive personality profiling. These studies aimed to identify if an elite athlete personality profile existed, and how it could be used to predict performance (Ogilvie, 1968; Tutko, Lyon & Ogilvie, 1969). For example, following Tutko's development of the Athlete Motivation Inventory (AMI) in 1969, it was to be used in attempts to predict athlete performance with the measured global personality traits, with over 1000 studies being conducted in the following 20 years (Fisher, 1984). Reviews of these studies have generally suggested that the relationships between these poor measures of personality and athlete performance varied widely, leading researchers to question the value of personality assessment (Van den Auweele, et al., 2001).

The tests utilised in these early attempts to model performance with personality include the AMI (Tutko, et al., 1969), Cattell's 16 personality factors (16PF) inventory (Cattell, Eber & Tatsuoka, 1970) and the Minnesota Multiphasic Personality Inventory (MMPI: Hathaway & McKinley, 1967). The AMI has been reported to have been developed from Cattell's 16PF and the Jackson personality research form (Ogilvie, Johnsgard & Tutko, 1971) to assess personality traits that are related to sporting achievement. These traits include: mental toughness, emotional control, drive, aggression, leadership, self confidence, determination, conscience development and trust (Tutko & Richards, 1971). The reliability and validity of the AMI has been repeatedly questioned (e.g., Vealey, 1992), and as such, findings using the AMI to predict sporting performance should be interpreted with caution. Further to this, the AMI has been found to be only marginally predictive of athletic

success, with Davis (1991) observing that the criterion validity of the AMI was negligible (4% of variance) when used to predict National Hockey League draftees on ice play.

In regards to the 16PF (Cattell, et al., 1970), it has been the most frequently utilised personality inventory in sports psychology. Unfortunately, research utilising the 16PF has been criticised for extensive methodological problems (Morgan, 1978), particularly the lack of controlling for response distortion. The 16PF measures 16 primary factors; Warmth, Reasoning, Emotional Stability, Dominance, Liveliness, Rule-Consciousness, Social Boldness, Sensitivity, Vigilance, Abstractedness, Privateness, Apprehension, Openness to Change, Self-Reliance, Perfectionism, and Tension (Cattell, et al., 1970). In studies comparing athletes to non-athletes, athletes have been found to be more dominant, self-assured, suspicious, and radical (e.g., Cattell, et al., 1974) than non-athletes. Use of the 16PF has not been successful in separating different levels of athletic performance though, with criticism of the measure centring on the need to separate sub-groups of athletes from each other, rather than from non-athletes (Dowd & Inness, 1981; Valliant, Simpson-Housley & McKelvie, 1981).

The MMPI (Hathaway & McKinely, 1967) has also been utilised in sports psychology research, despite the test being developed for clinical application. The MMPI is a measure of personal and social adjustment, specifically related to disabling psychological abnormalities. The MMPI assesses 12 scales, including; Schizophrenia, Depression, Psychopathic Deviation and Paranoia (Hathaway & McKinely). Clinically relevant scores on these dimensions are maladaptive for all people, and should not be particularly prevalent in normally functioning sportspeople. As such, the suggested low levels of reporting of these clinical conditions may contribute to the lack of predictive efficacy of the MMPI for sporting performance (Brown, Morgan & Kihlstrom, 1989). The MMPI has however, been utilised in a descriptive study on a sample of ballet dancers who reported low self-esteem, and elevated levels of obsessive compulsive tendencies, hypochondriasis, anxiety, and a strong sense of femininity, and sensitivity (Taylor, 1997).

As discussed previously (see: section 2.5.1), the review conducted by Eysenck, Nias, and Cox (1982) pointed to the utility of the then recently developed FFM of personality, and its probable predictive utility in the sporting arena. Since the aforementioned review, the FFM of personality has become the dominant paradigm for personality assessment, with a number of models and measures being utilised in psychological assessment and research. This view of personality assessment (whether in a social or sports psychology sense) is conceptualised as the study of why we are the way we are in terms of how we think, act, and feel as human beings. The FFM model currently represents the most accepted method of personality testing. The five factors assessed have further been shown to represent higher order factors of earlier measures of personality like the 16PF, and relate to clinical measures of personality in a similar manner (McCrae & Costa, 1989).

The FFM is a representation of the structure of personality traits which have been developed and elaborated over a number of years (Digman, 1997). The five factors represent basic dimensions underlying personality traits, identified as a result of factor analytic studies of both natural language and personality questionnaires. The FFM allows investigation of the five broad domains of personality as well as the lower-order facets that comprise each domain. The five broad personality factors or domains consist of: Neuroticism, Extraversion, Openness-to-Experience, Agreeableness and Conscientiousness. The five factors are defined by groups of inter-correlated traits referred to as facets (Costa & McCrae, 1992). There is a growing body of theoretical and empirical evidence linking normal personality traits represented by the FFM to sporting involvement (Rhodes & Courneya, 2003) and performance, and as such will be the focus of the following sections.

4.3.1 Development of the FFM of Personality

The FFM of personality or Big-5 factor representation of personality emerged from re-analysis of datasets created by Cattell (1957) by Tupes and Cristal (1961). The attraction of the FFM (and measures of it) lie in this empirical

foundation (Digman, 1990), rather than being theoretically derived. This type of development produces traits of personality that are most central in the description of people. These traits are generated from an exhaustive list of words used to describe personality in the common lexicon, which are factor analysed and generally five-factors have emerged (Goldberg, 1990). Lexical derivations of the FFM attempt to provide a comprehensive, yet parsimonious taxonomy of personality traits at the highest level of hierarchy (Digman, 1990). These five factors are suggested to be consistent and enduring across the lifespan (McCrae & John, 1992). These five-factors are made up of narrower terms that covary with levels of the broader factor, for example, in the NEO PI-R these are referred to as facets (Costa & McCrae, 1995).

The five factors have traditionally been referred to and numbered as follows, I. Surgency (Extraversion); II. Agreeableness; III. Conscientiousness (Dependability); IV. Emotional Stability (Neuroticism); and V. Culture (Intellect or Openness). A follow-up study to the Tupes and Cristal (1961) study was conducted by Norman (1963), who selected four variables for each of the five factors with the highest factor loadings, and using peer nominations was able to confirm that the five factors could be reproduced across four samples. These Big-5 markers (Norman, 1963) have been used in a wide variety of studies (see: Goldberg, 1992, for a detailed description), though alternative measures of the FFM have been developed to address the relative shortcomings of this assessment due to its brevity (20 items) and the original idiosyncratic nature of the Cattell variables (Angleitner & Ostendorf, 1988).

The FFM of personality has emerged as the dominant framework for the study of personality (Digman, 1990; McCrae & John, 1992). The FFM of personality has obtained construct validity, recognition, and widespread use across various fields of psychology; including clinical psychology, organisational psychology, sport and health psychology. As a result, a number of instruments have been developed to assess personality using the FFM. The following section will present an overview and critique of two popular measures (the Goldberg Big Five Markers and the NEO PI-R) that through their robustness in replicating the five-factor model of personality across

populations and the availability of shorter forms of the assessments serve as good candidates for use in the current thesis to assess personality.

4.3.1.1 The Goldberg Big Five Markers

The Goldberg Big Five Markers were developed to address the limitations of Norman's (1963) measure of the FFM of personality (Goldberg, 1992). From a series of four studies, Goldberg aimed to identify a relatively small set of variables that could uniformly produce the Big-5 factor structure. From these studies Goldberg developed a set of 100 adjective markers, 20 for each of the five factors, that had good internal consistency (0.82 – 0.97), and robustly reproduced the five desired factors across diverse samples (Goldberg, 1992). Goldberg also noted that the scores correlated highly with the five trait scores of the Neuroticism, Extraversion, Openness Personality Inventory (NEO PI) (Costa & McCrae 1985), another inventory specifically tailored along the lines of the FFM. The adjective markers can be administered in a unipolar format, where respondents rate how accurate an adjective is in describing them on a 9-point scale (1 = extremely inaccurate, 9 = extremely accurate) or in a 50 item bi-polar format.

There are some relative advantages and disadvantages in the use of adjective checklists. Whilst 100-item checklists can be completed relatively quickly, 10 – 15 minutes, but often adjectives intended meaning can be confused or misinterpreted due to their presentation without context. To address these concerns Goldberg has administered the assessment in a bipolar format, where calm is opposite to anger, and cold opposite to warm (Goldberg, 1982). Further to this, the ordering of items can be random (alphabetical order) or in a transparent format, where items are grouped in ten bipolar pairs, labelled with a title. These titles are silent-talkative, unadventurous-adventurous, introverted-extraverted, unenergetic-energetic, timid-bold, unsociable-sociable, inhibited-spontaneous, unenthusiastic-enthusiastic, inactive-active, and unassertive-assertive. Whilst these titles leave less room for incorrect interpretation of non-labelled or unipolar terms, they may produce response sets.

The obvious advantage of the Goldberg (1992) scales, administered in any format, is that the items actually are the lexical domain he sampled. This being the case, this scale most strictly assesses FFM lexical domains, assuming the process utilised by Goldberg best samples the personality lexicon. The type of sampling used by developers of lexically derived assessments of personality may impact on the quality of assessment, and the representation of the lexical space (Goldberg & Digman, 1994). Types of sampling that can and have been utilised are, uniform sampling, representative sampling and cluster sampling. Goldberg (1992) utilised cluster sampling, whereby each of the five factors were represented by equal numbers of adjectives in both unipolar and bipolar formats. This type of sampling is unlike representative sampling, where the number of adjectives per domain is determined by the density of traits terms used in the common lexicon.

4.3.1.2 Goldberg – 40-item Mini-Markers

Whilst Goldberg aimed to identify a relatively small set of variables that could uniformly produce the Big-5 factor structure, 100 items in a research sense, can be regarded as lengthy, this is especially relevant for elite sports people. Saucier (1994) published a shortened version of Goldberg's Big-5 personality markers, that was comprised of 40-items (adjectives) taken from the original set of 100. Goldberg (1992) himself noted that small sets of variables can serve as markers of the FFM of personality, and do this reliably in a unipolar format. Saucier (1994) aimed to factor analyse data from the 100-item scale, and on the basis of 'factor purity', reduce the number of necessary items to assess the FFM.

The resulting 40-item mini-marker set of adjectives contains fewer difficult items, lower inter-scale correlations, and internal reliability comparable to Goldberg's original measure. The availability of such a measure is suggested to increase the availability of FFM assessment to instances where time is short. The measure is administered in the same format as Goldberg's Big-5

markers, on a 9-point scale (1 = extremely inaccurate, 9 = extremely accurate) that respondents rate how they see themselves in regards to the adjectives.

4.3.1.3 The Revised NEO Personality Inventory

In a series of studies, that led to the development of the NEO PI (Costa & McCrae, 1985) Costa and McCrae (1985) developed an inventory to assess the five trait dimensions of the FFM identified in earlier factor analytic studies. This research began with cluster analyses of the 16PF (Cattell et al., 1970) which was a product of Cattell's lexical work. This analysis unsurprisingly revealed the Extraversion and Neuroticism dimensions, but pointed to the importance of Openness, which was originally identified as one of Cattell's primary factors. Costa and McCrae (1983) extended their model with the addition of Agreeableness and Conscientiousness as their model already resembled three of the Big Five. In follow-up studies, McCrae and Costa (1985; 1987) demonstrated that their questionnaire assessment correlated strongly with adjective-based measures of the Big Five. It has been noted that their conception of Openness seems broader than the Intellect or Imagination factor originally identified from the lexical analyses (Saucier & Goldberg, 1996). Further studies have observed that Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness factors could be identified in other personality questionnaires (see: Costa & McCrae, 1992).

The NEO PI-R (Costa & McCrae, 1992) consists of 240 statements (e.g., "I often feel helpless and want someone else to solve my problems") to which the respondent indicates an extent of agreement on a 5-point scale. In addition to factor scores for the five-factors, the NEO PI-R also allows for further differentiation in terms of six more specific facets per factor (Costa & McCrae, 1995). For example, the facets that make up Extraversion scores are labelled; Gregariousness, Assertiveness, Activity, Excitement-seeking, Positive emotions, and Warmth. The NEO PI-R use of statements rather than adjectives like Goldberg's markers is suggested to be advantageous in its

provision of more precision and clarity for the respondents. For example, less ambiguity exists in the statement that "I'm known as a warm and friendly person" (Costa & McCrae, 1992) compared to the Goldberg (1992) adjective "warm". The NEO PI-R was developed in samples of middle-aged and older adults, using both factor analytic and multi-method validation procedures. Following its development, the NEO PI-R has shown substantial internal consistency at the factor and facet level, temporal stability, and convergent and discriminant validity against various rater versions of personality (Costa & McCrae, 1992; McCrae & Costa, 1990).

The NEO PI-R has also demonstrated consistent convergent and discriminant validity with respect to adjective checklist measures of the lexical FFM (e.g., Goldberg, 1990, 1992; Trapnell & Wiggins, 1990), as well as indicating how alternative models of personality can be understood from the perspective of the FFM (McCrae & Costa, 1989). For example, Costa and McCrae have been able to demonstrate the presence of the five-factor model within the Eysenck Personality Inventory (McCrae & Costa, 1985), the Jackson Personality Research Form (Costa & McCrae 1988), the Myers Briggs Type Indicator (McCrae & Costa 1989), and the California Q-Set (McCrae, Costa & Busch, 1986). As such, the NEO PI-R represents a reliable measure of the FFM of personality, and a preferred method of administration with the use of statements rather than adjectives.

4.3.1.4 The NEO FFI

The NEO PI-R at 240 items could be considered too long for research purposes. As such, Costa and McCrae (1992) developed a 60-item abbreviated version of the NEO PI-R based upon factor analysis of its items (Costa & McCrae, 1985). The NEO FFI was developed to provide a concise measure of the five basic personality factors (Costa & McCrae, 1989). For each scale, 12 items were selected from a pool of 180 NEO PI items on the basis of their correlations with validimax factor scores (McCrae & Costa, 1989). The NEO FFI uses the same 5-point Likert-type response format. It has demonstrated high two-week retest reliability, ranging from 0.86 to 0.90

for the five scales (Robins, Fraley, Roberts & Trzesniewski, 2001), and adequate levels of internal consistency ranging from 0.68 to 0.86 (Costa & McCrae, 1992). This measure contains 12 item scales of the five factors, made up of the items that loaded most strongly in each factor, and they strongly correlate with the NEO PI-R scales, suggesting they inherited a substantial portion of the validity of the longer scales.

The NEO FFI is a measure of normal personality that has been successfully used with clinical and non-clinical populations (Costa & McCrae, 1992). With its brevity, strong reliability, and validity as a measure of the FFM of personality, it was selected as an appropriate measure for the current thesis.

4.4 Sporting Orientation

Achievement orientations provide information on how individuals define success by reflecting the criteria individuals use to subjectively define success and failure in achievement settings, and have been used extensively to understand sport motivation (e.g., Biddle, 2001; Duda, 1989). Researchers have identified two distinct competitive orientations in sport: an orientation focused upon outcomes, specifically a desire to win or place high relative to other competitors or opposition; and a performance orientation indicates a goal of performing well, relative to one's own ability (Gill & Deeter, 1988; Vealey, 1986).

Research concerning achievement goals in sport began with the transfer of achievement-goal theory (Nicholls, 1984, 1989) from the educational field. Nichols defined achievement behaviour as “behaviour directed at developing or demonstrating high rather than low ability. It is shown that ability can be conceived in two ways. First, ability can be judged high or low with reference to the individual's own past performance or knowledge. In this context, gains in mastery indicate competence. Second, ability can be judged as capacity relative to that of others. In this context, gain in mastery alone does not indicate high ability. To demonstrate high capacity, one must achieve more with equal effort or use less effort than do others for an equal performance.

The conditions under which these different conceptions of ability function as individuals' goals and the nature of the subjective experience in each case specified" (Nicholls, 1984, p 328). Nicholls proposed that when people are engaged in achievement oriented tasks that two orthogonal orientations exist (Nicholls, 1984, 1989). These orientations are task and ego orientations, and Nicholls suggests that people develop a tendency to be more or less ego and task oriented in achievement situations. A person with a high task orientation defines success in self-referenced terms, such as through mastering tasks or improving one's own personal skills. An individual with a high ego orientation defines success normatively, such as being better than others. As individuals can differ in both forms of orientation, it is possible to explore the effects of these individual differences on a continuous basis, or as has been utilised in sports psychology, by generating goal profiles (high task-high ego, low task-high ego, low task-low ego, high task-low ego).

Duda (1987) provided a rationale for the use of achievement-goal theory within a sporting context. She argued that based on Nicholl's theory (1984), children who participate in highly evaluative and competitive sport organisations, rather than in leagues that are recreational and participation oriented, would be more likely compare their ability with others as they grow older. Sport, more so than education, is predicated on the basis of competition (Coakley, 1986). Duda's early work in this area identified that task- and ego-oriented goals are relevant in the athletic setting via open-ended interviews and sentence completion studies (Duda, 1986, 1989). Further to this, these goal-belief dimensions, or theories about what beliefs contribute to success, have been found to be consistent across sport and education (Duda & Nicholls, 1992). In a study concerning the causes of success in school and sport, Duda and Nicholls (1992) sampled 207 high school students and identified that the ego-involved goal of superiority was associated with the belief that success requires high ability, whereas task orientation (the goal of gaining knowledge) was associated with beliefs that success requires interest, effort, and collaboration with peers for both sporting and educational outcomes.

Following these initial findings concerning the generalisability of the achievement-goal theory to sport, a number of theories and sporting measures were created to assess the involvement of sporting orientation across a wide variety of sports and sports related outcomes. Research in this area has generally focused upon two distinct competitive orientations in sport. An outcome orientation is a desire to win or place high relative to other competitors. A performance orientation indicates a goal of performing well, relative to one's own ability (Gill & Deeter, 1988; Vealey, 1986). Four measures of sporting orientation have been utilised in research studies concerning achievement orientations. The Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda, 1989); Perception of Success in Sport Questionnaire (POSQ; Roberts, Treasure & Balague, 1998); the Competitive Orientation Inventory (COI; Vealey, 1986); and the Sport Orientation Questionnaire (SOQ; Gill & Deeter, 1988) will be reviewed separately in order to assess their appropriateness for use within the current thesis.

4.4.1 *Task and Ego Orientation in Sport Questionnaire*

The TEOSQ was designed explicitly to assess individual differences in the proneness for task and ego involvement as defined by Nicholls (1986). As such, the items and format of the TEOSQ closely resemble those of the Motivational Orientation Scales (MOS; Nicholls, Pataschnick & Nolen, 1985). This sports modified version of the MOS contains 13 items with two subscales determining task (e.g., “*I learn a new skill by trying hard*”) and ego (e.g., “*I am the best*”) orientation. All the items are rated on a 5-point Likert-type scale that ranges from one (strongly disagree) to five (strongly agree). The task and ego subscales of the TEOSQ have good internal consistency with reported alphas of 0.79 and 0.81, respectively (Duda & Whitehead, 1998). Close examination of the items for each sub-scale reveal that success on task items is mainly comprised of learning, fun, trying hard, and practising skills. Success on ego items is referenced against scoring of points, defeating peers, and generally doing better than others (Duda, 1989).

A wide variety of studies have utilised the TEOSQ, with task and ego scores being consistently related to interest and enjoyment of sporting activities (Boyd & Yin, 1996; Duda, Fox, Biddle & Armstrong, 1992; Jagacinski & Strickland, 2000; Viira & Raudsepp, 2000), beliefs about sporting success (Duda & White, 1992), perceived competence (Hom, Duda, & Miller, 1993; Lintunen, Valkonen, Leskinen & Biddle, 1999) the purpose of sport participation (Duda, 1989), motivation (Biddle, Akande, Vlachopoulos, & Fox, 1996; Escarti & Guiterrez, 2001; Fox, Goudas, Biddle, Duda & Armstrong, 1994; Spray & Biddle, 1997) and sportsmanship behaviours (Duda, Olsen & Templin, 1991). The factor structure for the ego and task orientation sub-scales have been reliably reproduced (Hanrahan & Biddle, 2002) and they have demonstrated good levels of internal consistency across samples (Hanrahan & Biddle, 2002; White & Duda, 1994). No gender differences generally occur in levels of task orientation, but males tend to report being more ego oriented than females (Li, Harmer & Acock, 1996).

4.4.2 Perception of Success in Sport Questionnaire

The POSQ's development was also based upon the achievement goals in education conceptualisation concerning the proneness for task and ego involvement as defined by Nicholls (1989). Roberts and Balague (1989) developed the POSQ to measure mastery (task) and competitive (ego) goal orientations in sport. The POSQ was designed specifically for the context of sport and as such, recognises the differences between the sport and educational environments. Competitive orientation includes items that reflect the desire to be superior to and defeat other performers. The task orientation reflects the desire to work hard and reach personal goals.

The POSQ is a 12-item sport specific measure of achievement goal orientation made up of six item sub-scales designed to assess task and ego goals. Participants respond on a 5-point scale to both task ('I work hard') and ego ('I am the best') items. The scales have previously demonstrated good levels of internal consistency (Roberts, Treasure & Hall, 1994). Task and ego orientations have been differentially associated with moral functioning in sport;

with higher ego orientation being linked to reported appropriateness of intimidating opponents, faking injury and causing injury to opponents (Kavussanu & Roberts, 2001). Task orientation has also been found to be positively associated with more self determined types of situational motivation, and ego orientation to less self determined types of motivation (Standage & Treasure, 2002). Although ego orientation has often been seen as less motivationally adaptive (positive) than a task orientation, research has shown that being ego oriented, when combined with a high task orientation, is associated with high motivation (Fox et al., 1994; Wang & Biddle, 2001). Using goal profiling clustering of POSQ scores, Wang and colleagues identified that high motivation towards physical activity is characterised by high task and high ego orientation, and high perceived competence (Wang, Chatzisarantis, Spray & Biddle, 2002). Another example of the use of POSQ profiling identified that people high in ego and low in task orientation believe effort to be less of a cause of success, and people with high task/low ego-oriented are less likely to attribute success to external factors (Roberts, Treasure & Kavussanu, 1996).

4.4.3 Competitive Orientation Inventory

The COI was developed by Vealey (1986) to measure outcome (ego) and performance (task) orientations. The two orientations are placed in opposition to each other, rather than as separate sub-scales. This approach is in contrast to Nicholls' (1984) theory that states the two achievement goal orientations are orthogonal. As such, in administering the COI (Vealey, 1986) respondents weigh varied performance and outcome combinations, and the resulting COI total performance orientation score ranges from 0 to 1. Not being an additive scale, internal consistency for the measure cannot be calculated, though test-retest reliability for performance orientation (0.69) and for outcome orientation (0.67) have been reported (Vealey, 1986). Two studies (Gill, Kelley, Martin & Caruso, 1991; Martin & Gill, 1991) have utilised both the SOQ and COI, and despite both ostensibly measuring goal orientations, found low magnitude and non-significant overlap between the two measures goal orientation scales. A possible explanation for this is that the two questionnaires are measuring

different constructs. The SOQ aims to assess achievement goal orientations in sport (win, goal, competitiveness), whereas the COI assesses retrospective ratings of satisfaction with performing well or poorly and winning or losing. Given this difficulty in interpretation, the COI was not selected for use in the current thesis.

4.4.4 *Sporting Orientation Questionnaire*

Unlike the TEOSQ and POSQ, the SOQ is a sporting assessment of achievement motivation based on Atkinson's (1974) theory (Gill & Deeter, 1988). Atkinson's theory provides a general model for studying competitive behaviour, others have proposed that achievement motivation is multidimensional and developed models specific to application in sport. Dweck (1986), Nichols (1984), and Spence and Helmreich (1983) have all proposed that achievement motivation is multidimensional and suggest that it involves either a primary orientation or emphasis on one's task performance, task outcome, or a combination of both. Gill (1993) defined competitiveness as the desire to enter competitive sport situations and strive for excellence, and has been identified as an important aspect of the multidimensional modelling of achievement orientation (Gill & Deeter, 1988; Gill & Dzewaltowski, 1988; Gill, Dzewaltowski & Deeter, 1988). This multidimensional modelling for athlete competitiveness involves also involves both the orientation toward achieving performance goals, striving to win, or some combination of both motives.

The development of the SOQ has allowed sport psychology researchers to investigate the sport specific form of achievement motivation; competitiveness. In addition, the SOQ also assesses goal orientation, or the way in which athletes usually direct their motivation towards specific goals. The third sub-scale is referred to as the win orientation subscale assesses the degree to which athletes pursue outcome goals such as winning whereas the goal orientation subscale indicates the degree to which subjects endorse performance or mastery goals such as trying to run a particular time.

Research using the SOQ has suggested that adolescent male runners are more competitive than females (Martin & Gill, 1991) and that American, Filipino, and Taiwanese athletes report similar levels of competitiveness (Kang, Gill, Acevedo & Deeter, 1990; Martin & Gill, 1991). In addition, competitiveness has distinguished between students entering competitive and non-competitive activity classes (Gill & Deeter, 1988; Gill & Dzewaltowski, 1988). The SOQ has been widely used with competitive sport participants, and Gill and colleagues (Gill & Deeter, 1988; Gill & Dzewaltowski, 1988) provided good evidence for its reliability and validity. It was also noted in its initial design that sport participants score higher on the competitiveness subscale than non-sport participants (Gill & Deeter, 1988). Gill and Dzewaltowski (1988) have reported significant differences between sports on the SOQ for competitiveness, win and goal orientation, suggesting different multidimensional profiles may be more adaptive across sports. Gender differences have been consistently noted in competitive sport orientation, with males scoring higher on competitiveness and win orientation than females; however females scored higher on goal orientation than males (Gill, 1986; Gill & Deeter, 1988; Gill & Dzewaltowski, 1988; Kelley, Hoffman & Gill, 1990).

A further appeal of measurement of sporting orientation using the SOQ could lay in coaches' ability to successfully motivate athletes. If coaches can understand the orientation of the athletes, this may provide them with a method to motivate them on the basis of their competitiveness and competitive orientation. The assumption that all athletes (especially at elite level) are focused on the competitive outcome (win orientation) may be incorrect, and motivational strategies that emphasise winning may not be effective for all athletes. In contrast, motivational strategies that are focused on accomplishing personal performance goals may not sufficiently motivate athletes focused on winning in competition. A comparison of coaches' ratings of athletes' orientation and athletes' self-ratings of their orientation may provide an avenue to identifying appropriate motivational techniques and their effect on performance.

Given the multidimensional nature, the reliability and validity, and the relative ease of administration and interpretation, the SOQ was selected as the measure of sporting orientation for the current thesis.

4.5 Anxiety: Trait and State

Anxiety is an emotional reaction to a stimulus perceived as threatening or to the reduced perception of control over the environment (Spielberger, 1972) and can be identified as either a trait or state response. Martens and colleagues (1990) defined trait anxiety (A-trait) as an individual's predisposed tendency to perceive their environmental demands as threatening, resulting in an anxiety response. State anxiety (A-state) is a temporary anxiety response to specific situational demands caused by a discrepancy between demand and response capabilities. A-trait is considered a relatively stable characteristic and A-state is predicted by more immediate factors which pose an immediate threat to the individual (Wandzilak, Potter & Lorentzen, 1982). Highly competitive A-trait individuals have a tendency to perceive competitive situations as threatening, resulting in an elevated A-state reaction. It is feasible therefore to expect that highly trait anxious individuals experiencing changes to their competitive environment in comparison to the environment they usually experience will have a greater tendency to perceive their environment as threatening thus responding with either a greater intensity or frequency of A-state.

Assessment of anxiety levels and its relationship to performance have been widely studied in sports psychology (see: section 2.2 – 2.3). Across the sport competition anxiety literature, a number of causes of competitive anxiety have been explored. Some of the researched causes of competitive anxiety include; the athletes skill level (Heckhausen, 1990; Hembree, 1988; Kroll, 1979), fear of failure (Gould, Horn & Spreeman, 1983; Kroll, 1979), years of experience in the current sport (Fenz & Jones, 1972; Gould, Petlichkoff, & Weinberg, 1984), perceived importance (Martens, et al., 1990), ongoing performance result (Highlen & Bennett, 1979; McAuley, 1985), age (Hammermeister & Burton, 1995), coping style (Williams & Krane, 1992), type

of sport (whether it is a contact or non-contact sport, or an individual or team sport), or how 'performance' is assessed (Krane & Williams, 1987).

The role of anxiety has been assessed retrospectively by questionnaire in relation to the conceptualisations of Drive theory, the Inverted-U hypothesis and IZOF models of the effects of anxiety on performance. These early studies of the effects of anxiety on sporting performance were grounded on the notion that anxiety was generally harmful to performance. More recent research has suggested that anxiety is but one of the mediating somatic factors affecting sporting performance, and should be assessed in concert with other state or trait measures. A consequence of the early focus of the effects of anxiety on performance is the large literature concerning its assessment, and the reliability, validity, and predictive efficacy of measures of anxiety. The following sections will provide a concise review of the available measures, and the rationale for assessment of trait anxiety in this thesis in concert with the other trait assessments detailed in this chapter.

4.5.1 Sport Specific Anxiety Assessment - The CSAI-2

The multidimensional approach to the study of anxiety considers subcomponents of anxiety, specifically cognitive anxiety, somatic anxiety, and self-confidence. Much of the research based on this theory has utilised the Competitive State Anxiety Inventory (CSAI-2), a measure specifically developed for use in sporting settings. Cognitive anxiety is the mental component of anxiety where the individual is consciously aware of worries and unpleasant feelings (Morris, Davis & Hutchings, 1981), caused by negative expectations about success or by negative self-evaluation (Martens, et al., 1990a). Somatic elements of the anxiety response represent awareness and interpretation of autonomic arousal, which includes symptoms such as rapid heart rate, shortness of breath, clammy hands, butterflies in the stomach and tense muscles (Martens, et al., 1990a). Elevated anxiety has been suggested to interfere with performance (Masters, 1992) via conscious processing of what is causing the anxiety. This hypothesis suggests elevated anxiety may cause reduced performance because it causes athletes to

internalise their focus of attention on skills relevant to the task. This change in focus is suggested to interfere with the automatic processing of sporting skills, thus performance suffers. Whilst this hypothesis offers interesting explanation for anxiety causing reduced performance, research investigating the anxiety-performance hypotheses has been equivocal (Craft, Magyar, Becker & Feltz, 2003; Woodman & Hardy, 2003).

Findings from studies utilising the CSAI-2 have generally been inconsistent, with the three measured subcomponents of anxiety demonstrating diverse relationships with performance and other studies failing to find any relationship between the anxiety subcomponents and performance. Martens and colleagues (Martens, et al., 1990a) suggest a negative linear relationship exists between cognitive anxiety and performance and a curvilinear relationship between somatic anxiety and performance. Other studies have reported that individual sport participants manifest greater state anxiety than team sport participants (Simon & Martens, 1979), while other researchers have reported no significant differences in state anxiety between team and individual sport athletes (Colley, Roberts & Chipps, 1985; Tenenbaum & Milgram, 1978). The comparison of anxiety levels between athletes from team sports such as basketball and volleyball against athletes from sports such as gymnastics, swimming, and track and field may be affected by factors inherent to the sport such as physical contact, threat of physical harm, and possible subjective versus objective scoring procedures may moderate competitive state anxiety levels (Martens, et al., 1990; Simon & Martens, 1979).

The CSAI-2 (Martens, et al., 1990) is a 27-item measure of athletes' cognitive and somatic anxiety as well as self-confidence. Reports of internal consistency across studies have been generally high (e.g., Burton, 1998), especially across repeated assessments, similar to those noted by Martens and his colleagues (1990) during its development. Though, as mentioned previously, some doubt has been cast upon its factorial validity (Iosifidou & Doganis, 2001; Tsorbatzoudis, Barkoukis, Sideridis, & Grouios, 2002), and utility when considering possible facilitative effects of anxiety (Jones, 1995). In

completing the assessment, athletes are asked to indicate on a 4-point scale 'how they feel right now' on items such as "I am concerned about this competition" for cognitive anxiety, "I feel nervous" for somatic anxiety, and "I'm confident that I can meet the challenge" for self-confidence. In an early study utilising the CSAI-2 in elite athletes, Burton (1989) noted that elite level swimmers levels of cognitive anxiety were more closely related to swim times (the performance outcome utilised in this study. Further to this, somatic anxiety formed an inverted-U relationship with performance, cognitive anxiety was negatively related to performance and self confidence was positively related to performance as would be theoretically expected. Rodrigo, Lusiardo, and Pereira (1990) observed that male professional soccer players found that both cognitive and somatic anxiety were significantly and negatively associated with performance score (operationalised as the mean subjective and objective evaluation scores)

Despite the CSAI-2 promising beginning as a measure of the multidimensional approach to studying anxiety, a recent meta-analysis study observed that CSAI-2 scales have poor predictive validity (Craft, et al., 2003). A mediating factor in the predictive efficacy of the CSAI-2, may be whether athletes are competing in open or closed skill sports (Kleine, 1990; Terry, 1995) as suggested by Craft and colleagues (2003) who stated that the relationship between anxiety and performance may vary according to differences in sport. Further to this, factors that are specifically anxiety inducing in similar sports have been examined in basketball, field hockey, ice hockey and soccer (Dunn & Nielsen, 1996). Their results identified the following situations as anxiety inducing, ongoing game situations such as game/score/time; criticality of situations; coach related situations and, miscellaneous factors (audience, officiating, team mates and opponents). Whilst these factors are largely uncontrollable for athletes, they do provide random effects on the presence and intensity of state anxiety for athletes that would in turn affect individual and team performance indices.

4.5.2 The Sporting Competition Anxiety Test - Trait Anxiety

Assessment of trait anxiety in preference to state anxiety offers a different approach to quantifying the effects of anxiety on performance. Whether trait assessments provide greater or lesser insight in to anxiety's effect on performance is contingent on the type of sport, appropriateness of assessment, and availability of athletes. Assessment of A-state was ultimately deemed inappropriate for this study, as coaches and athletes are hesitant to commit to repeated testing, especially during elite levels of competition. The availability of elite athletes is of particular concern in the current thesis, therefore, assessment of trait levels of anxiety were deemed the most appropriate type of assessment.

Previous research has demonstrated that A-trait is positively related to denial, behavioural disengagement, focusing on and venting emotions (Carver, et al., 1989). Higher levels of A-trait have also been linked to greater engagement in emotion-focused coping strategies (Endler, Kantor & Parker, 1994) and lesser use of problem-focused coping (Carver, et al., 1989). It is generally accepted that within sport settings that athletes with high A-trait is reflected in their tendency to perceive competitive situations as threatening and to respond to these situations with a congruent level of A-state (Martens, et al., 1990). This inherent level of anxiety has been found to be associated with athletes' self esteem (Robinson & Carron, 1982), perceived control over situations (Kroll, 1979), and use of coping strategies to deal with the stress of competition (Carver, et al., 1989); which have concurrently been linked to athletic performance.

The Sporting Competition Anxiety Test (SCAT; Martens, 1977) contains 15 items, ten of which measure symptoms associated with anxiety. The five items that are not scored are included in the inventory to reduce the likelihood of an internal response-set bias. Athletes are asked to indicate how they "usually feel when competing in sports and games", thus providing a 'trait' level of anxiety associated with sporting competition. Whilst not a multidimensional measure of A-trait the SCAT contains eight items that

describe somatic symptoms of anxiety and two items that describe cognitive elements of anxiety. It should be noted that the two cognitive items focus solely on athletes' concerns about performance failure: "Before I compete I worry about not performing well" and "When I compete I worry about making mistakes." The SCAT responses are summed to produce a unidimensional score reflecting competitive A-trait, and is commonly utilised in sport anxiety research (Wilson & Eklund, 1998). Scores on the SCAT have been found to be predictive of precompetitive A-State in golfers (Weinberg & Genuchi, 1980) and furthermore, several early studies (Gill & Martens, 1977; Martens & Gill, 1976; Martens & Simon, 1976; Scanlan, 1977) have indicated that the SCAT predicts state anxiety in sport competition significantly better than general trait anxiety measures.

Pre-competition levels of anxiety have been identified as potentially important psychological variables that may have a significant impact on competitive sport performance (Craft, et al., 2003; Woodman & Hardy, 2003; Skinner & Brewer, 2004). If A-trait levels of anxiety can be utilised as indicators of the level of anxiety typical of athletes over the course of competition (e.g., a rugby union season), then administration of the SCAT should provide a good indicator of the effects of anxiety on seasonal performance. Further to this, administration alongside other measures of emotional-laden constructs such as Emotional Intelligence may help to identify important interrelations between these constructs and performance.

4.6 Self Esteem

The role of self esteem in the sporting arena has been the subject of a wide variety of research, although the suggested multidimensionality and hierarchical nature of self-esteem, the level of sporting participation, or its relevance to individual or team sport participants is complicated. As foreshadowed in the previous chapter, (see section 2.5.7 – 2.5.10), assessment of team sport members' self esteem outside of competition (when the possibility of any 'state' changes in self esteem due to wins or losses could be discounted), may provide an indicator of players 'trait' level of self

esteem that could be used to predict seasonal performance. As such, this section will focus exclusively on previous studies of the role of self esteem in sporting performance, what other psychological indicators are closely linked to self esteem, and what measure is appropriate for the current thesis' population in light of the literature being reviewed.

4.6.1 Self Esteem and Team Sport

In regards to the effect of individual and team levels of self esteem at the elite level, a relatively small amount of research has been conducted. As mentioned earlier, athletes of both sexes have reported higher levels of self esteem than non athletes (see section 2.5.10). This difference has been suggested to be more of a consequence of higher scores on the physical ability scale (Marsh et al, 1995), though further research needs to be conducted to assess the relationship across more levels of sporting participation and achievement. Whilst at an individual level, athletes report higher levels of self esteem; the effect of individual levels of self esteem upon team performance has yet to be investigated. Whether individual or group levels of self esteem affect measurable constructs like cohesiveness, or directly or indirectly effect team performance should be of concern to elite sporting teams or individuals.

Assessment of team sport members' self esteem outside of competition (when the possibility of any 'state' changes in self esteem due to wins or losses could be discounted), may provide an indicator of players 'trait' level of self esteem that could be used to predict seasonal performance. This type of assessment of 'trait' like variables that have theoretical linkages to sporting performance may provide an avenue for selecting appropriate, predictive, non-time consuming measures to administer to elite sporting athletes.

4.7 Life Orientation

Life orientation differs from sporting orientation (see section 4.4) in that it is essentially a measure of dispositional optimism, or the tendency for people to

expect positive outcomes in life (Scheier & Carver, 1985). People's levels of optimism (or pessimism) have previously been associated with a variety of generally beneficial psychological and behavioural outcomes. For example, greater levels of optimism have been linked to greater psychological well-being (Scheier, Carver & Bridges, 2001), better physical health (Scheier & Carver, 1985), lower levels of depression (Carver & Gaines, 1987), lesser levels of trait anxiety (Schuller, 1995), self-efficacy or self-mastery (Marshall & Lang, 1990), and differential use of strategies to cope with stress (Scheier & Carver, 1987; Scheier, Weintraub & Carver, 1986). Two lines of research have emerged from the study of optimism, or thinking in a positive manner.

Optimism has been conceptualised as an explanatory style; an explanatory style relates to how people routinely explain events in their lives (Seligman, Rashid & Parks, 2006). Individuals who are high in optimism attribute problems in their lives to temporary, specific, and external causes, whereas if they are higher in pessimism (or less optimistic) they tend to attribute problems to permanent, pervasive, and internal causes (Gillham, Shatte', Reivich & Seligman, 2001). In this way, optimism relates to the causal explanation of future events from expectancies generated from past events. Seligman, Abramson, Semmel, and von Baeyer (1979) developed the Attributional Style Questionnaire (ASQ) to assess explanatory style based on individuals' perceptions of 12 hypothetical situations. The ASQ measures how consistently people explain events in their lives in a specific manner and therefore provides a measure of optimism on a global level (Seligman, et al., 1979).

A second conceptualisation of optimism assessment was proffered by Scheier and Carver (2001). According to their theory, dispositional optimism is the tendency to believe that good things will happen in the future (Scheier & Carver, 2001). In other words, optimistic individuals tend to have global positive expectancies for future events (Carver & Scheier, 2003). This approach differs from the explanatory style approach in that it does not examine causal expectations of the past to determine an individual's expectation for the future. An advantage to assessing expectancies directly is

that it specifically targets the construct of interest (Carver & Scheier, 2003). The assessment designed to measure optimism in this case is the Life Orientation Test (LOT; Scheier & Carver, 1985) and its subsequent version the Life Orientation Test – Revised (LOT-R; Scheier, Carver & Bridges, 1994). Both versions are designed to measure an individual's general perception about future events. The revisions to the original scale removed two items which related to measuring the personality variable of neuroticism (Scheier, et al., 1994). The resulting scale includes ten total items, three optimistic, three pessimistic, and four filler (Scheier, et al., 1994). Instead of limiting each item to a specific domain, the items are worded in a way so that they are evaluated across all situations and domains, thus when combined produce a global measure of optimism.

Scheier and Carver's (2001) view of optimism is based within an expectancy – value framework of motivation which suggests that behaviour is best predicted by expectancies when the level of specificity of the expectancy matches that of the behaviour. As such, the LOT may be best in measuring life orientation or general levels of optimism across the life span. Scheier and Carver (1985) designed the LOT to assess these generalised expectancies about future events in an attempt to predict behaviour at the broadest level as well as other theoretically convergent global constructs. Creed, Patton, and Bartrum (2002) observed that a strong positive relationship ($r = 0.55$) existed between total LOT-R scores and self-esteem. Huprich and Frisch (2004) reported a strong positive relationship between trait hope and optimism scores.

In specific regards to findings in sport, Grove and Heard (1997) reported that optimism was associated positively with task-oriented and negatively with avoidance-oriented coping. Another similar finding with a sample of national level rowers indicated a significant association existed between levels of optimism and task-oriented coping and well-being (Baltzell, 1999). Wilson, Raglin, and Pritchard (2002) observed that optimistic individuals experience significantly lower levels of pre-competitive anxiety when assessing optimism and pessimism levels using the Defensive Pessimism Questionnaire. In a study of 188 non-elite sporting participants from various university staff and

health clubs, Kavussanu and McAuley (1995) observed that more physically active people were more optimistic and less pessimistic compared to less active individuals. Further to these findings, athletes with greater levels of optimism have been found to recover from setbacks more easily than less optimistic athletes or teams, and perform with greater levels of success. For example, basketball teams who are more optimistic were more likely to move on from a loss and win the following game more often than teams with a more pessimistic description of their performances (Rettew & Reivich, 1995).

There has been some suggestion that global, non-specific measures of optimism may not provide adequate measurement of athletes' optimism specific to their sport. Contextualised sporting versions of the LOT have been utilised, with the addition of "in sports" where applicable in the items. Whether this enhances the predictive validity of the measure is of some debate, as athletes may have greater optimism directed towards their sport of choice, but less in regards to sports in which they are less inclined to compete. Using this technique, Waddell (2003) observed that scores on the modified version of the LOT-R correlated significantly, but weakly with engagement in active-coping strategies and self-worth. Whilst this result indicates some utility in sporting contextualisation of the LOT-R, it was elected to administer the LOT-R in its original item format, given the inclusion of other more predictive sports specific (particularly the SOQ) modified questionnaires and the uncertainty in validity of the modified items.

4.8 Social Desirability

Assessment of levels of socially desirable responding in sports based psychological studies offers two aspects of appeal. Successful athletes have been found to score lower in measures of social desirability (Nagle, et al., 1975), and the assessment of trait psychological constructs conducted by questionnaire can produce socially desirable responding. The success of athletes who score lower in social desirability measures may be reflected in how some athletes can present themselves in a desirable manner when competing (e.g., high in confidence, fitness, ability, etc). Social desirability has

been described as a tendency to overestimate desirable traits and behaviours and underestimate undesirable ones, and when using self-reported measures this bias can be of particular relevance.

4.9 Locus of Control

As foreshadowed earlier, athletes' attribution of the relative factors contributing to success (internal or external), may also relate to the performance measures to be utilised in this thesis. Whether athletes believe that internal or external forces are responsible for differences in their performance and what causes the good or bad results in their life could have inter-individual effects on performance. Locus of control is commonly associated within the framework of Rotter's (1954) social learning theory of personality. Rotter developed the 23-item forced choice item (six filler items) Internal-External (I-E) questionnaire to assess how *Internal* (the tendency to attribute outcomes of events to their own control) or *External* (to attribute outcomes of events to external circumstances) people are in everyday life. This questionnaire has been widely utilised in the health psychology domain, with having a greater internal locus of control being associated with improved physical health, mental health and quality of life in people undergoing conditions as diverse as HIV, migraines, diabetes, kidney disease and epilepsy (Maltby, Day & Macaskill, 2007).

4.10 Measuring Athletic Performance

Athletic performance can be assessed in many ways. It can be assessed via objective outcomes such as a placing in a competition, or time to complete an activity, or via subjective methods, such as self-evaluation or coach evaluation (Edwards & Hardy, 1996). It has been suggested that the most content valid approach to directly assess performance is to use actual game statistics. This provides a direct index of actual level of performance in comparison to opposition of relatively equivalent ability (especially in the case of elite sporting events or teams). This approach does have some short-comings. Performance statistics are hard to generalise across sports, and sometimes

across positions in team sports. For example, a high percentage of completed passes in rugby union by a 'back' is relatively more important than passes completed by 'forwards' who not only pass the ball less, but generally pass over lesser distances. Further to this, there may be salient qualities of performance not directly measured via objective performance statistics. Actual performance statistics may also overlook the contribution of other factors which may affect performance positively or negatively. A player may possess great ability and statistically 'perform well', but may possess less desirable personality characteristics that could affect their relationship with coaches or teammates, which may affect team performance beyond what is measured statistically.

A second technique that can be used to assess athlete performance is an athlete's own rating of how they have performed during competition. Individual assessment of one's own performance has only been utilised in a small amount of sporting research, despite the possibility that subjective ratings or interpretations of performance may be as or more important than objective measures. In one of the few studies that utilised self-ratings of performance, Gould and colleagues (1993) asked Olympic level wrestlers to recall their best performance and the associated pre-competitive cognitions and noted that their best performances were strongly associated with positive optimal arousal level before the competition (i.e. positive expectations, heightened arousal and intensity, and heightened effort and commitment). A study by McAuley (1985) investigated the impact of perceived success and objective performance upon causal attributions among female collegiate gymnasts, and found that perceptions of success had a greater influence than their perception of causality of their performance. Subjective ratings of performance can then be analysed with respect to psychological attributes of players, in order to identify if any relationship exists between subjective performance scores and the psychological skills of athletes. This approach to performance assessment also has some limitations with how players interpret seasonal performance possibly varying for a number of reasons; how well they performed against specific opponents, the quality of opponent, how

successful their team was for the season, and how well players performed in regards to how well they believe they are capable of performing.

Another technique to assess aspects of performance that are not measured via objective statistics is to make use of coaches' ratings of performance, and of mental skills that contribute to performance. In team sports, one of the coaches' roles outside of selecting highly talented/skilled individuals is to identify qualities outside of 'actual performance' that contribute to a team's performance. These 'incidental' abilities may contribute to team-work, team-cohesiveness, higher quality training, greater understanding of coaching instruction, and other less tangible contributors to performance. These abilities may be responsible for elite athletes reaching their full potential, or small but important differences in performance especially relevant in elite sporting settings. A further advantage of the use of coaches' ratings is that they can be reliably administered on all players under a coach's purview. These types of ratings can also be used across different sports, as qualities like being a good communicator would be relevant for most team sports for example. A further appeal of this type of rating may lie in the possibility that coaches can rate the mental abilities of their players according to well-established psychological indices, with these ratings being generated from coaches' observation of behaviours indicative of the assessed constructs.

Applying multiple methods for rating performance and applying multiple regression analyses, the relative predictive efficacy of different classes of constructs can be compared. This process will allow comparison of the utility of different types of performance measures (objective and subjective measures) and different rating methods of psychological constructs (self-rated and coaches' rated).

4.11 Summary

The aim of this chapter was to describe the measures and constructs chosen to assess the psychological qualities identified through the interview process detailed in the previous chapter. The constructs selected were the five-factor

model of Personality, Emotional Intelligence, Stress Coping Strategies, Self Esteem, Locus of Control, Sporting Orientation, Life Orientation, Social Desirability and Trait Anxiety. As detailed in the previous sections (4.1 – 4.9), these constructs have been used in attempts to predict sporting performance, or have been identified as antecedents to sporting success either theoretically or empirically. As such, the selected constructs aim to reflect an inclusive yet parsimonious collection of psychological qualities that contribute to athletic performance. Assessment of these constructs will be undertaken in both a self-report and rater format. A description of these assessments appears in the following chapter.

In regards to the assessment of performance, in line with the assessment of 'trait' psychological constructs, performance was planned to be assessed via a player's self-rating of his seasonal performance, a coach's rating of each players seasonal performance, and finally via objective game statistic measures of performance. These three methods of sampling performance were to be utilised in order to identify any overlap in the prediction of performance indicators between the self and coach ratings of players' psychological qualities. In this way, if particular psychological attributes of players predict the various measures of performance (self-rated, coach rated, and on-field statistics), this may indicate greater importance of particular qualities for success in elite rugby union. Differences in the psychological qualities rated by coach and player that predict the various performance measures may be due to differences in how players and coaches perceive performance or themselves; with the self-ratings of players' psychological attributes relying on players' understanding of themselves, and coaches' ratings being based upon observable behaviours of their players that reflect particular levels of the psychological attributes.

The following chapter details the measures selected to assess the psychological attributes of the elite rugby union players in both self-report and coaches' rating formats. The chapter will also describe the various measures of performance that were to be utilised.

CHAPTER 5: MEASURES

5 Introduction

This chapter describes the selected self-report assessments, the construction of rater assessments of the same constructs, and the methods and data used to assess 'performance' during the Super 12 rugby union season.

5.1 Ethical Approval

Ethics approval for the study was sought and received from Swinburne University of Technology. Refer to Appendix 1 for the information sheet, consent form and ethical approval.

5.2 Self Report Assessment of Psychological Variables and Performance

All Super 12 contracted players were issued with a questionnaire package that consisted of a short rugby specific demographic section, a section concerning how they rated their performance for the season, and a suite of questionnaires selected to assess the psychological attributes identified in the preceding chapter.

5.2.1 Emotional Intelligence

The measure of Emotional Intelligence selected for this study was the SUEIT, which provides scores on five dimensions (Palmer & Stough, 2001): Emotional Recognition and Expression (in oneself), the ability to be aware of and identify one's own feelings and emotional states as well as being able to express those inner feelings to others; Understanding Emotions, the ability to identify and understand the emotions of others and feelings that manifest in response to the environment (e.g., team meetings); Emotions Direct Cognition, the extent to which emotions and emotional knowledge are incorporated in decision making and/or problem solving; Emotional Control,

the ability to control strong negative emotions such as anxiety or anger; and Emotional Management, the extent to which individuals are able to repair negative moods and emotions and maintain positive emotions, both within themselves and others. The SUEIT is a 64-item measure of Emotional Intelligence which provides scores on five dimensions: Emotional Recognition and Expression (11 items); Understanding Others Emotions (20 items); Emotions Direct Cognition (12 items); Emotional Management (12 items); and Emotional Control (9 items). Responses are scored on a five-point Likert-type scale ranging from one (very seldom) to five (very often), with respondents indicating how they typically think, feel and act.

The SUEIT factor scores have previously shown good levels of internal consistency (Downey, et al., 2006); Emotional Recognition and Expression ($\alpha = 0.91$), Understanding Emotions ($\alpha = 0.89$), Emotions Direct Cognition ($\alpha = 0.70$), Emotional Management ($\alpha = 0.83$), Emotional Control ($\alpha = 0.77$) and one-month test re-test reliability ($r = 0.83 - 0.92$). The five SUEIT dimensions have demonstrated adequate discriminant validity from the personality dimensions Neuroticism, Extraversion and Openness (Palmer & Stough, 2001) and Agreeableness and Conscientiousness (Gannon & Ranzijn, 2005), and concurrent validity with another measure of Emotional Intelligence, the trait meta-mood scale (Downey, et al., 2006). Scores on the SUEIT have also been found to be related to theoretically relevant constructs such as depression (Downey, et al., 2008), effective leadership (Gardner & Stough, 2002), and intuition (Downey, et al., 2006).

5.2.2 Personality

Personality was assessed using the NEO FFI (Costa & McCrae, 1989). This 60-item, self-report instrument assesses the broadband personality factors of Neuroticism (a measure of how much the respondent displays the following behaviours: anxiety, anger, hostility, depression, self-consciousness, impulsiveness and vulnerability), Extraversion (how outgoing, sociable the respondent is, and whether they prefer large groups and gatherings: higher scorers are generally more assertive and talkative), Openness to Experience

(a measure of how active an imagination, intellectual curiosity, preference for variety and independence of judgment the respondent has), Conscientiousness (how purposeful, determined, and good at planning and organising tasks the respondent is), and Agreeableness (how generally altruistic, sympathetic, eager to help and cooperative the respondent believes they are), with reported internal consistencies of 0.86, 0.77, 0.73, 0.68, and 0.81 for the Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness domains respectively (Costa & McCrae, 1992). The NEO FFI domain scores show good concurrent validity with those of the NEO PI-R, correlating 0.92, 0.90, 0.91, 0.77, and 0.87 (Costa & McCrae, 1992) with the same sub-scales, and demonstrated adequate overlap with self-reported, spouse and peer rated adjective factors (Costa & McCrae, 2008). A 5-point Likert-type scale ranging from one (*strongly disagree*) to five (*strongly agree*) was attached to the items.

5.2.3 Stress Coping Strategies

The WOCS was the assessment utilised to measure the usage of various coping strategies (Madden, et al., 1987, 1989, 1990). The WOCS is a 54 item derivation of the WCC that utilises some sporting modifications. The WOCS provides scores for eight factors; problem-focused coping, seeking social support, increased effort and resolve, general emotionality, denial, detachment, emphasising the positive, and wishful thinking. The WOCS sub-scales have been previously shown to have adequate internal reliability, for example Cronbach's Alphas of 0.84 for seeking social support, 0.80 for denial/avoidance, 0.72 for wishful thinking, and 0.73 for increased effort and resolve (Prapavessis, et al., 2003). These good levels of internal consistency, point to the utility of using specific instructional sets (in this case, use of coping strategies during performance slumps) when administering this assessment to athletes.

In terms of validity, construct validity has been demonstrated for the WOCS in studies concerning the use of adaptive coping strategies to deal effectively with performance slumps (Madden, et al., 1989), and the use of ineffective

coping strategies being related to the tendency to self-handicap (Prapavessis, et al., 2003). The WOCS has also displayed concurrent validity with the scales of the ISCCS (Gaudreau & Blondin, 2002), another measure of coping strategies employed by athletes.

5.2.4 Sporting Orientation

The athlete's motivation or orientation for competing was assessed using the SOQ. The SOQ is a 25-item scale consisting of three subscales that assess competitiveness, win orientation, and goal orientation (Gill & Deeter, 1988). The competitiveness subscale measures the desire to enter and seek success in sports competition. The win orientation subscale measures one's desire to win and beat others. The goal orientation subscale measures the desire to reach personal goals set relative to mastery of a given sport or skill. Participants responded to SOQ items based on a 5-point Likert-type scale ranging from "strongly agree" to "strongly disagree". Test-retest reliability (0.73-0.89), intra-class reliability (0.84-0.94), internal consistency (0.79-0.95) and construct and concurrent validity have been adequately demonstrated (Gill & Deeter, 1988). The SOQ was developed as a sport-specific measure of achievement orientations (Gill & Deeter, 1988). Factor analyses of the SOQ have revealed three subscales: desire to reach personal goals (task), win (ego), and general competitiveness or the desire to strive for success in sport achievement situations. Alpha coefficients ranged from 0.79 to 0.95 for the three subscales, suggesting adequate internal consistency. Test-retest reliability over a 4-week time span revealed correlations of 0.73, 0.82, and 0.89 for the subscales. Validity of the SOQ was determined by convergent and divergent evidence (Gill & Deeter, 1988). The SOQ scales were found to be uncorrelated with competitive anxiety and social desirability, but were correlated with other competitiveness measures and general achievement measures (Gill & Deeter, 1988).

5.2.5 Anxiety

Levels of trait anxiety were assessed by the SCAT. The SCAT contains 15 items, ten of which measure symptoms associated with anxiety. The five items that are not scored are included in the inventory to reduce the likelihood of an internal response-set bias. The standard instructions of the SCAT ask respondents to indicate how they “usually feel when competing in sports and games” making it ideal to assess anxiety specifically in a sporting context. To make the instrument more contextually relevant to the athletes in this study, the phrase “sports and games” was replaced with the word “rugby.” On a 3-point scale (1 = *hardly ever*, 2 = *sometimes*, 3 = *often*) respondents indicated the frequency with which they generally experienced the ten anxiety related symptoms. The scores for the ten items are summed to provide an overall measure of anxiety, with a high composite score (as opposed to a low composite score) reflecting a greater tendency to experience competitive anxiety. Martens and colleagues (1990) provided a detailed overview of the validation process pertaining to the SCAT’s development including evidence of high internal consistency (KR-20 values ranging from 0.95 to 0.97), high test-retest reliability (mean retest reliability = 0.77), and a list of over 80 published studies that have employed the instrument as a measure of specific sporting anxiety levels.

In regards to validity, competitive anxiety as measured by the SCAT has been found to be uncorrelated with dimensions of the SOQ (Gill, et al., 1988). High competitive trait anxiety has also been observed to relate to the degree of tension/anxiety, anger/hostility, and total negative mood state recorded by the POMS in athletes (Lavalley & Flint, 1996).

5.2.6 Self Esteem

The Rosenberg Self Esteem scale (Rosenberg, 1965) was employed to assess trait levels of self-esteem. It consists of ten statements related to overall feelings of self-worth or self-acceptance. The items are answered on a four-point scale ranging from strongly agree, to strongly disagree. Previous

research has observed that this scale has good internal reliability 0.82 (Wylie, 1979; Blascovich & Tomaka, 1991). This measure was chosen because it has been used, and continues to be used amongst various populations and is widely accepted as having good psychometric properties (Baker & Gallant, 1984; Blascovich & Tomaka, 1991) across these varied populations. For example, self esteem scores on the Rosenberg measure have been found to correlate with confidence ($r = 0.65$) and popularity (0.35) in expected manner, and negatively with depression (-0.54) and anxiety (-0.64) scores (Fleming & Courtney, 1984).

5.2.7 Life Orientation

Life Orientation was assessed with The Life Orientation Test (LOT), which is essentially a measure of dispositional optimism versus pessimism (Carver & Scheier, 1992). The LOT consists of ten questions, four of which are filler or distracter items. Previous studies of the convergent and discriminant validity of the LOT have suggested that scores of the LOT are meaningfully related to anxiety, stress and self-esteem for example (Terrill, Friedman, Gottschalk & Haaga, 2002). Scheier and Carver (1985) demonstrated adequate internal reliability, and further studies using the measure have reported similar findings (Terrill, Friedman, Gottschalk & Haaga, 2002). The LOT is administered on a four-point scale, ranging from strongly agree (4), to strongly disagree (0).

5.2.8 Social Desirability

Levels of Social Desirability or response distortion were assessed using four questions taken from the scale developed by Paulhus (1984). The Balanced Inventory of Desirable Responding (BIDR) was selected as the measure of social desirability as it is one of the most widely used measures in this area (Li & Baggar, 2007). The four items were selected on the basis of their face validity and appropriateness for the study sample from the original set of 40 questions that make up the full BIDR. The BIDR is assessed on a seven-point Likert-type scale ranging where participants rate their level of agreement with the statements, with one denoting 'not at all true' and seven 'very true'.

According to Paulhus (1991), there are two alternative methods to score the BIDR items, namely, dichotomous and continuous scoring. With dichotomous scoring, responses of six or seven are scored one, and responses of one to five are scored zero. With continuous scoring, the raw score is used in the subsequent statistical analysis. The discriminant and convergent validity of the BIDR has been established with correlational studies between the BIDR and other measures of socially desirable responding (Paulhus, 1991).

5.2.9 Locus of Control

Locus of Control was assessed with a selection of questions from the Rotter Internal-External scale (Rotter, 1971). The Rotter scale is a measure of how much control the respondent expects theirs and others actions have on the course of events in their lives. The Rotter scale is administered in a forced-choice format, where respondents are presented with a pair of alternative statements concerning common events/situations in society, and the respondent has to select which statement is reflective of their beliefs.

5.2.10 Player Rating of Seasonal Performance

Players were asked to rate their seasonal performance on an 11-point scale in relation to their ability. The aim of this assessment of 'performance' was to quantify how players in a highly professional and elite sporting competition appraised their performance. Athletes competing at an elite level are expected to perform at a level 'appropriate' for elite competition. Further to this, obvious differences exist in the performance or 'ability' of elite sportspeople and non-sportspeople. Across a season, players' performance may fluctuate, but this fluctuation occurs within an 'elite' performance range. This measure of self-rated performance was utilised to assess how well each player performed within the context of elite competition across the season, ostensibly measuring 'elite performance'. A copy of the questionnaire supplied to players appears in Appendix 2.

5.3 Rater Assessment of Psychological Variables and Performance

Coaches of the three respective Super 12 franchises were provided with rater versions of the same scales completed by their players in self-report format. In order to obtain accurate ratings from coaches in respect to their players' psychological attributes, coaches received instruction on what all the scales were measuring; what types of behaviours players would exhibit if they were high/medium/low on all traits assessed via the rating questionnaire; and were encouraged to consult the team psychologist and PhD researcher conducting the study if they encountered any difficulty with the rating procedure.

5.3.1 Coaches Instruction/Definitions of Psychological Ratings

Following the instruction from the PhD researcher, coaches were provided with definitions of all the relevant psychological constructs on which they were to rate their players' levels. Table 2 below contains the definitions provided to the coaches.

Table 2: Description of scales provided to coaches

| | |
|------------------------------------|--|
| Emotional Recognition & Expression | The ability to identify one's own feelings and emotional states, and the ability to express those inner feelings to others. |
| Understanding Emotions | The ability to identify and understand the emotions of others and those manifest in external stimuli |
| Emotions Direct Cognition | The extent to which emotions and emotional knowledge is incorporated in decision-making and/or problem solving. |
| Emotional Management | The ability to manage positive and negative emotions both within oneself and others. |
| Emotional Control | The ability to effectively control strong emotional states experienced such as anger, stress, anxiety and frustration. |
| Neuroticism | Displays the following behaviours: anxiety, anger, hostility, depression, self-consciousness, impulsiveness and vulnerability. |
| Extraversion | Is outgoing, sociable, prefers large groups and gatherings, is assertive and talkative. |
| Openness | Displays and active imagination, intellectual curiosity, preference for variety and independence of judgement. |
| Agreeableness | Is generally altruistic, sympathetic, eager to help and cooperate. |
| Conscientiousness | Is purposeful, determined, and good at planning and organising tasks. |
| Problem focused coping | Has a relaxed, focused and logical approach to dealing with stress |
| Increased effort and resolve | Concentrates on the next step, tries harder, and takes something positive from stressful situations. |
| Denial | Does not think much about stressful situations, continues on as if nothing is happening. |
| Emphasising the Positive | Emphasises the positive side of stressful situations. |
| Seeking Social Support | Looks for help and discusses the impact of stress. |
| General Emotionality | Takes a chance or acts hastily under stressful conditions. |
| Detachment | Refuse to believe in the stress of situations and shuns contact and discussion related to stress. |
| Win Orientation | Wants to win at all costs; hates losing. |
| Goal Orientation | Wants to perform at the best of own ability and achieve set goals. |
| Competitiveness | Wants to enter competitive sport situations and strive for excellence |
| Trait Anxiety | A measure of the level of cognitive and physiological signs associated with anxiety the player displays. |
| Self Esteem | A measure of self-esteem. |
| Life Orientation | A style of anticipating positive life outcomes (optimism). |

Coaches were supplied with an individual rating sheet for each player (see Appendix 3) in their team and asked to rate how low or high each player was on each dimension on an 11 point scale (0-10). Players received a rating of '0' only if the coach could not provide what they believed to be an accurate rating for any of the particular indices, these ratings were not to be utilised in analysis. The 11 point scale was utilised in deference to full rater versions of each questionnaire due mostly to time constraints on the coaches of each team. Given the clear instructions and definitions of constructs provided by the PhD researcher, the resulting understanding of the coaches, and the availability of support from both the team psychologist and PhD researcher, there was sufficient confidence in collecting reliable and valid data via individual ratings on the 11 point scales.

5.3.2 Coaches' Performance Ratings

In addition to the ratings of the psychological indices, coaches were asked to rate the seasonal performance of every listed player. Coaches for each team received a single rating sheet with the entire seasons playing list detailed. On an 11-point scale (below) the coaches were asked to rate the players' seasonal performance during the 2004 season. A copy of this rating sheet appears in Appendix 4.



5.4 On-field Data Collection

On-field data collection was conducted by an external company (Fair Play, Pty Ltd), a company specialising in sporting data collection, coding, and analysis. The particular program used for Rugby Union data collection is called The *Rugby Analyst* suite. It is an integrated, and flexible tool for the analysis of Rugby Union games, team and player performance. Modules are provided to record the details of the game in a centralised database, store the digitised

video file of the game on storage media such as a portable hard-drive or a DVD, and then instantly view the video of the events of your choice on a computer. Moreover, the comprehensive reporting module links directly into the video viewing facility. The *Rugby Analyst* is based on the system used by seven international teams including the Australian Wallabies. The *Rugby Analyst* provides visual feedback to coaches and players using an easy-to-use interface. Events occurring in rugby games are coded on a player-by-player basis, and can be averaged on a total game basis in order to assess seasonal performance. The on-field performance measures that were coded for the 2004 and 2005 seasons appear below in Table 3.

Table 3: Objective statistics collected during Super 12 seasons

| Statistics collected in 'Attack' | Statistics collected in 'Defence' |
|--|--|
| Total Passes per Game | Average Tackles per Game |
| Poor Passes per Game | Average Missed Tackles per Game |
| Offload (a pass whilst being tackled) | Average No. 1st Tackles per Game |
| Kicks General (effective) | Average No. Assisted Tackles per Game |
| Miss Kicks (ineffective kicks) | Average % First Tackles Made per Game |
| Runs (carrying the ball past the line of scrumage and gaining further territory) | Average % All Tackles Made per Game |
| Pick & Drive (picking up the ball from the ruck and moving forwards) | Dominant Contact Success (defensive player dominant in contact) |
| Over Advantage (crossing advantage line) | Neutral Contact Success (neither player dominant) |
| Line Break (passing through the line defensive line of tacklers) | Passive Contact Success (attacking player gains ground with contact) |
| Break Tackle | Dominant Contact Success (%) |
| Dominant Contact Success (attacking player gains ground with contact) | Ruck Involvement |
| Neutral Contact Success (neither player dominant) | Forced Turnovers |
| Passive Contact Success (defensive player dominant in contact) | Penalties |
| Dominant Contact Success (%) | |
| Ruck/Maul Involvement | |
| Effective Ruck & Maul Involvement | |
| Ineffective Ruck & Maul Involvement | |
| Penalties | |
| Turnover | |
| Errors | |

The collected statistics describe a range of outcomes of the rugby field that cover key areas of offensive and defensive performance: passing; kicking; ball carrying; contact success; ruck/maul; turnovers; errors; and penalties. These indicators are routinely collected by every Australian based Super 12 team, and form the basis of on-field performance reviews post game, and post season. Whilst natural position specific differences occurring between players, these indicators were selected as the most appropriate individual indicators of 'actual' performance that could be collected.

5.5 Statistical Analysis Plan

To test for relationships between the performance and psychological variables included in this study, Pearson product-moment correlation coefficients were planned to be computed using SPSS. The descriptions of correlations were based on the guidelines detailed by Cohen and Cohen (1983). According to these guidelines effect sizes for correlations are as follows: $r \geq 0.10 \leq 0.30$ (classified as weak), $r \geq 0.30 \leq 0.50$ (classified as moderate), and $r \geq 0.50$ (classified as strong).

Multiple regression analyses were selected to investigate the interrelationship and predictive validity of study variables. Only variables that were statistically significantly related to the performance measures were to be utilised in the regressions. Whilst this procedure produces a high number of comparisons, it does allow for a reduction in the error term associated with the regression models. The aim of the regression analyses was in this case to accurately identify predictors of the various measures of performance for the first time, and the amount of variance the constructs predicted accurately, thus the decision was made not to correct for multiple comparisons. Whilst this increases the chance of type-I error, the exploratory nature of the study, and the uniqueness of the outcome variables dictated that this was the best approach to analysis.

5.6 Objectives and Hypotheses for Year 1 Assessment

In light of the literature reviewed in the preceding chapters relating to extant research concerning the various models of sporting performance and measures of general mood, traits, and sport specific measures: a number of objectives and related exploratory hypotheses could be formulated for assessing the predictive efficacy of the selected psychological measures (detailed in this chapter) and the various measures of performance. Specifically, analysis of the 2004 Super 12 season's data aims to assess the predictive efficacy of the players self-reported psychological traits and the

coaches' ratings of their players' psychological traits on the players and coaches rating of seasonal performance, and the on-field statistics. The objectives and hypotheses for the evaluation of the 2004 season are outlined below, with the objectives of the analysis outlining the proposed identification of significantly related constructs with the various measures of performance and their further use in regression models for each performance indicator (i-iii below):

- i. Players' self-rating of performance over the 2004 season
- ii. Coaches' rating of performance
- iii. Objective on-field statistics collected through the 2004 season

5.6.1 Objective 1: Exploration of the Relationship between Self-Rated Psychological Traits and Performance

To determine how the self-ratings of: Emotional Intelligence (Emotional Recognition and Expression; Understanding Emotions; Emotions Direct Cognition; Emotional Management; Emotional Control) as measured by the SUEIT (Palmer & Stough, 2001); Personality (Neuroticism; Extraversion; Openness to Experience; Agreeableness; Conscientiousness) as measured by the NEO FFI (Costa & McCrae, 1992); Coping Strategies (Problem-focused Coping; Increased Effort and Resolve; Denial; Emphasising the Positive; Seeking Social Support; General Emotionality; Detachment) as measured by the WOCS (Madden, et al., 1990); Life Orientation (dispositional optimism) scores as measured by the LOT (Carver & Scheier, 1992); Anxiety as measured by the SCAT (Martens, et al., 1990); Locus of Control (more internal versus external) as measured by the I-E scale (Rotter, 1971); Sporting Orientation (Win Orientation and Goal Orientation) as measured by the SOQ (Gill & Deeter, 1988) relate to the 'ratings' of performance provided by players and coaches:

- i. Players' self-rating of performance over the 2004 season
- ii. Coaches' rating of performance

5.6.2 Objective 2: Exploration of the Relationship between Coaches' Ratings of Players' Psychological Traits and Performance

To determine how the coaches' ratings of the same dimensions of: Emotional Intelligence; Personality; Coping Strategies; Sporting Orientation; Anxiety; Self Esteem; and Life Orientation relate to:

- i. Players' self-rating of performance over the 2004 season
- ii. Coaches' rating of performance

5.6.3 Objective 3: Exploration of the Relationship between Self-Rated Psychological Traits and On-Field Performance

To determine how players' ratings of the dimensions of: Emotional Intelligence; Personality; Coping Strategies; Sporting Orientation; Anxiety; Social Desirability; Locus of Control; Self Esteem; and Life Orientation relate to the objective on-field variables recorded in defence and attacking aspects of rugby union competition.

5.6.4 Objective 4: Exploration of the Relationship between Coaches' Ratings of Players' Psychological Traits and On-Field Performance

To determine how coaches' ratings of the same dimensions of: Emotional Intelligence; Personality; Coping Strategies; Sporting Orientation; Anxiety; Self Esteem; and Life Orientation relate to the objective on-field variables recorded in defence and attacking aspects of rugby union competition.

5.6.5 Objective 5: Predictive Efficacy of Significantly Related Self-Rated Psychological Ratings on Performance Ratings

Dependant on the identification of significantly related sub-scales with the two measures of performance as per Objective 1: the relative predictive efficacy of the self-rated variables will be determined via regression models for each of:

- i. Players' self-rating of performance over the 2004 season
- ii. Coaches' rating of performance

5.6.6 Objective 6: Predictive Efficacy of Significantly Related Coaches' Ratings of Players' Psychological Traits on Performance Ratings

Dependant on the identification of significantly related sub-scales with the two measures of performance as per Objective 2: the relative predictive efficacy of the coaches-rated variables will be determined via regression models for each of:

- i. Players self-rating of performance over the 2004 season
- ii. Coaches rating of performance

5.6.7 Objective 7: Predictive Efficacy of Significantly Related Self-Rated Psychological Ratings on On-Field Performance

Dependant on the identification of significantly related sub-scales with objective on-field variables recorded in defence and attacking aspects of rugby union competition, as per Objective 3: the relative predictive efficacy of the self-ratings of psychological variables will be determined via regression models for each of the on-field statistics.

5.6.8 Objective 8: Predictive Efficacy of Significantly Related Coaches' Ratings of Players' Psychological Traits on On-Field Performance

Dependant on the identification of significantly related coaches' ratings of the players' psychological traits with objective on-field variables recorded in defence and attacking aspects of rugby union competition, as per Objective 4: the relative predictive efficacy of the coaches' ratings of the psychological variables will be determined via regression models for each of the on-field statistics.

5.7 Hypotheses

Considering the review of the literature in previous chapters, some specific hypotheses concerning the role of the measured constructs and player performance could be generated.

5.7.1 Hypothesis 1 – Emotional Intelligence

It is hypothesised that levels of Emotional Intelligence will be positively related to player and coach rated performance.

5.7.2 Hypothesis 2 – Personality

It is hypothesised that levels of Neuroticism would be negatively associated with player and coach rated performance, and that Extraversion, Openness, Agreeableness, and Conscientiousness would be positively related to the performance measures.

5.7.3 Hypothesis 3 – Coping Strategies

It is hypothesised that levels of adaptive coping strategies (Problem-focused, Increased Effort and Resolve, and Seeking Social Support) will be positively related to performance ratings, and that maladaptive coping strategies (Detachment, Denial, and General Emotionality) would be negatively associated with the performance ratings.

5.7.4 Hypothesis 4 – Sporting Orientation

It is hypothesised that levels of Win Orientation and Goal Orientation will be positively related to performance ratings.

5.7.5 Hypothesis 5 – Life Orientation

It is hypothesised that the level of Life Orientation (greater Optimism) would be positively related to performance ratings.

5.7.6 Hypothesis 6 – Trait Anxiety

It is hypothesised that levels of Trait Anxiety would be negatively related to performance ratings.

5.7.7 Hypothesis 7 – Self Esteem

It is hypothesised that the level of Self Esteem would be positively related to performance ratings.

5.7.8 Hypothesis 8 – Locus of Control

It was hypothesised that a more internal Locus of Control would be positively related to performance ratings.

5.8 Exploratory Analysis

The on-field statistics collected for the 2004 Super 12 season reflect a unique set of instances that occur during matches. As this study is the first to use these statistics as outcome measures of performance, no specific hypotheses could be generated. It was, however, expected that positive aspects of performance (i.e., effective kicking, or receipt of penalties) would be related to positively to the adaptive psychological indices and vice versa.

5.9 Conclusion

The preceding chapters of this thesis have provided a brief review of: the history of rugby union; the development of sports psychology as its own discipline; the attempts of researchers over the past 60 years to model psychological aspects of athletes with aim of identifying relationship with

performance; and recent advances in sports and general psychology that will be utilised in the following chapters to determine the predictive efficacy of psychological traits and ratings of the same traits on subjective and objective measures of rugby union seasonal performance. The following two chapters of this thesis present the results concerning the 2004 Super 12 rugby union season. The results are presented in line with the eight objectives detailed in the current chapter, and the eight hypotheses that were generated. These results will be discussed in depth at the end of the corresponding chapters, and will form the basis of study design and analysis for the 2005 Super 12 season, results of which will be presented in Chapter 8 and Chapter 9.

CHAPTER 6: RESULTS - 2004 SUPER 12 SEASON

6 Introduction

In this chapter, the study participants were examined with respect to their self-reported ratings of the psychological indices, coach's ratings of the same psychological indices, and on-field statistics for the 2004 Super 12 season. For all analyses an alpha level of 0.05 was chosen for the detection of significant associations. Bonferroni corrections were not applied to the analyses to ensure that moderate effect sizes were detected.

6.1 Self-Report Analysis

6.1.1 Demographics

Prior to analysis, the demographic variables of age, team, and position, were examined for accuracy of data entry, and missing values. Seventy-five players (82% response rate) completed the self-report questionnaire and provided information concerning their membership of one of the three Australian based Super 12 teams; ACT Brumbies (N = 26 out of 30 contracted players); NSW Waratahs (N = 27 out of 30 contracted players); and QLD Reds (N = 22 out of 31 contracted players). The average age of the players at the time of the survey was 24.77 (SD = 3.36), and the players represented all of the 15 specific on-field positions as detailed in Table 4 below.

Table 4: Frequency and percentage of rugby union positions for 2004

| Position | Frequency | Percentage of sample |
|----------------------|-----------|----------------------|
| 1: Loosehead Prop | 3 | 4.2 |
| 2: Hooker | 8 | 11.1 |
| 3: Tighthead Prop | 5 | 6.9 |
| 4: Second Row | 4 | 5.6 |
| 5: Second Row | 3 | 4.2 |
| 6: Blindside Flanker | 6 | 8.3 |
| 7: Openside Flanker | 4 | 5.6 |
| 8: Number 8 | 6 | 8.3 |
| 9: Scrum Half | 7 | 9.7 |
| 10: Fly Half | 5 | 6.9 |
| 11: Left Wing | 5 | 6.9 |
| 12: Inside Centre | 4 | 5.6 |
| 13: Outside Centre | 5 | 6.9 |
| 14: Right Wing | 4 | 5.6 |
| 15: Fullback | 3 | 4.2 |

*Note: Only 72 players specified a definite position from 1 – 15.

6.2 Objective 1: Exploration of Relationships Between Self-Rated Psychological Traits and Performance

Prior to examination of the relationships between the players' self-rated psychological traits and performance, the data was analysed to identify if any pattern of socially desirable responding was evident. Despite the assurance to players that their results would be kept private, there may have been some motivation by players to present themselves in a more desirable manner on certain measures, or rate their seasonal performance higher. None of the correlations between social desirability and the self-rated traits reached significance, with the greatest amount of overlap occurring with Neuroticism ($r = -0.338$). The correlation between self-rated performance and social desirability also did not reach significance ($r = -0.007$), and as such, there was no need to correct for socially desirable responding for the analyses. The relationship between players' age and the self-reported traits was also examined to assess if age played a role in the development of any of the assessed traits; no significant overlap was observed between age and the

self-reported traits. .

6.2.1 Emotional Intelligence

Emotional Intelligence was assessed using the SUEIT, the average scores for the first three dimensions were somewhat lower (between 10% and 12%) than those reported in the technical manual (Palmer & Stough, 2001) but comparable for the Emotional Management and Emotional Control dimensions. The sub-scale internal reliability were similar to those reported in the technical manual (Palmer & Stough, 2001), and previously reported studies (e.g., Downey, et al., 2006), and appear in Table 5 below along with the means, standard deviation and score ranges for the current sample.

Table 5: Means and standard deviations for Emotional Intelligence subscales - SUEIT

| | <i>M</i> | <i>SD</i> | <i>Range</i> | α |
|------------------------------------|----------|-----------|--------------|----------|
| Emotional Recognition & Expression | 35.03 | 5.08 | 23-48 | 0.70 |
| Understanding Emotions | 71.04 | 6.82 | 58-83 | 0.79 |
| Emotions Direct Cognition | 34.41 | 4.64 | 24-47 | 0.64 |
| Emotional Management | 39.97 | 5.05 | 25-51 | 0.72 |
| Emotional Control | 31.87 | 4.58 | 17-41 | 0.75 |

Scores on the SUEIT measure were then correlated with the two measures of performance. These correlations are presented in Table 6.

Table 6: Hypothesis 1 - Performance and Emotional Intelligence correlations

| Self Ratings | Coaches' Rating of Performance | Self Report Performance |
|---------------------------------------|--------------------------------------|----------------------------|
| Emotional Recognition & Expression | 0.017 | -0.110 |
| Understanding Emotions | 0.042 | 0.151 |
| Emotions Direct Cognition | -0.236 | -0.091 |
| Emotional Management | 0.031 | 0.161 |
| Emotional Control | -0.053 | 0.139 |

It was hypothesised that levels of Emotional Intelligence would be significantly and positively related to the performance measures. None of the self-reported Emotional Intelligence ratings of players were significantly correlated with either measure of performance, and as such were excluded from consideration for the regression models of performance.

6.2.2 Personality

Personality was assessed using the NEO FFI; means, standard deviations, internal reliability, and score range are presented in Table 7 below. The mean scores for Extraversion are significantly higher than the average scores for males. This difference is in line with the suggestion that athletes generally score higher than non-athletes on this measure (Kirkcaldy, 1982). The remaining Personality dimension averages all fell within the normal averages and distribution of males in the general population.

Table 7: Means and standard deviations for Personality – NEO-FFI

| | <i>M</i> | <i>SD</i> | <i>Range</i> | α |
|------------------------|----------|-----------|--------------|----------|
| Neuroticism | 29.73 | 7.28 | 12-49 | 0.84 |
| Extraversion | 43.14 | 5.53 | 28-58 | 0.75 |
| Openness to Experience | 37.22 | 5.13 | 26-51 | 0.62 |
| Agreeableness | 41.30 | 5.67 | 31-57 | 0.75 |
| Conscientiousness | 44.77 | 6.16 | 27-59 | 0.84 |

Scores from the Personality measure were correlated with the two measures of performance to identify if any significant overlap existed between the performance and Personality measures. These correlations appear in Table 8 below.

Table 8: Hypothesis 2 - Performance and Personality correlations

| Self Ratings | Coaches' Rating of Performance | Self Report Performance |
|------------------------|--------------------------------------|----------------------------|
| Neuroticism | 0.029 | -0.197 |
| Extraversion | 0.140 | 0.185 |
| Openness to Experience | -0.166 | 0.097 |
| Agreeableness | -0.057 | -0.105 |
| Conscientiousness | 0.262* | 0.320** |

Note: * = $p < 0.05$; ** = $p < 0.01$, $N = 75$

Significant positive correlations were observed between Conscientiousness and coaches' rating of performance, and self-reported performance. These correlations were the only two to reach significance in contrast to the hypothesis that significant positive relationships would be observed between the performance measures and Extraversion, Openness, Agreeableness and Conscientiousness. The assertion that Neuroticism would be significantly and negatively correlated with performance was also not supported. This suggests that players' ratings of how purposeful, determined, and good at planning and organising tasks they are is related to how they and their coaches view their level of performance of the season.

6.2.3 Coping with Stress

Coping style was assessed with the WOCS. Means, standard deviations, internal reliability, and scores ranges are presented in Table 9 below.

Table 9: Means and standard deviations for Coping with Stress – WOCS

| | <i>M</i> | <i>SD</i> | <i>Range</i> | α |
|----------------------------|----------|-----------|--------------|----------|
| Problem Focused Coping | 10.63 | 2.57 | 2-15 | 0.75 |
| Increased Effort & Resolve | 8.84 | 2.14 | 3-12 | 0.63 |
| Denial | 6.36 | 1.88 | 2-12 | 0.48 |
| Emphasising the Positive | 3.52 | 1.25 | 1-6 | 0.48 |
| Seeking Social Support | 3.37 | 1.34 | 0-6 | 0.59 |
| General Emotionality | 2.61 | 1.05 | 1-5 | 0.60 |
| Detachment | 1.75 | 1.90 | 0-9 | 0.67 |

Scores from the relative endorsement of the use of coping strategies were correlated with the measures of performance in order to assess if the degree of usage of particular coping strategies was significantly related to the self-rated and coaches' ratings of performance measures. They appear in Table 10 below.

Table 10: Performance and Coping correlations

| Self Ratings | Coaches' Rating of Performance | Self Report Performance |
|-------------------------------|--------------------------------------|----------------------------|
| Problem-Focused Coping | 0.058 | 0.145 |
| Increased Effort & Resolve | -0.114 | 0.042 |
| Denial | -0.054 | -0.037 |
| Emphasising the Positive | -0.042 | -0.020 |
| Seeking Social Support | -0.054 | 0.080 |
| General Emotionality | -0.074 | -0.132 |
| Detachment | -0.098 | -0.237 |

None of the correlations between self-rated use of coping styles and the performance ratings reached significance in contrast to the hypothesis that levels of adaptive coping strategies (Problem-focused, Increased Effort and Resolve, and Seeking Social Support) will be positively related to performance ratings, and that maladaptive coping strategies (Detachment, Denial, and General Emotionality) would be negatively associated with the performance ratings.

6.2.4 Life Orientation, Locus of Control, Sporting Orientation, Self Esteem, Social Desirability and Anxiety measures

The means, standard deviations, internal reliability, and score ranges for Life, Win, Goal Orientation, Locus of Control, Self Esteem, Social Desirability and Anxiety are presented in Table 11 below.

Table 11: Means and standard deviations for Win, Goal Orientation, Locus of Control, Self Esteem, Social Desirability and Anxiety

| | <i>M</i> | <i>SD</i> | <i>Range</i> | α |
|---------------------|----------|-----------|--------------|----------|
| Life Orientation | 8.09 | 1.91 | 2-12 | 0.41 |
| Locus of Control | 0.75 | 0.88 | 0-3 | 0.41 |
| Win Orientation | 20.79 | 2.87 | 14-25 | 0.52 |
| Goal Orientation | 13.77 | 1.33 | 9-15 | 0.52 |
| Self Esteem | 6.53 | 1.08 | 2-8 | 0.81 |
| Social Desirability | 17.50 | 2.80 | 9-25 | 0.57 |
| Anxiety | 11.43 | 3.39 | 5-18 | 0.80 |

Scores from the Life, Win, and Goal Orientation, Locus of Control, Self Esteem, Social Desirability and Anxiety were correlated with the measures of performance, and appear in Table 12 below.

Table 12: Performance and Life, Win, and Goal Orientation, Locus of Control, Self Esteem, Social Desirability and Anxiety inter-correlations

| Self Ratings | Coaches' Rating of Performance | Self Report Performance |
|---------------------|--------------------------------|-------------------------|
| Win Orientation | -0.058 | 0.307* |
| Goal Orientation | 0.012 | 0.257* |
| Anxiety | -0.043 | -0.010 |
| Locus of Control | -0.047 | -0.163 |
| Self Esteem | -0.072 | 0.075 |
| Social Desirability | 0.104 | -0.007 |
| Life Orientation | 0.089 | 0.368** |

Note: * = $p < 0.05$; ** = $p < 0.01$, N = 75

Win, Goal and Life Orientation scores were found to correlate significantly with self-rated performance, partially confirming hypotheses 4 and 5. Together these finding suggest that how optimistic, focused on winning, and oriented towards performing at the best of their ability players are, is significantly associated with how well they rated their seasonal performance. Hypotheses 6 – 8 were not supported, with players' ratings of their Self Esteem, Anxiety,

and Locus of Control not being significantly related to either measure of performance.

6.2.5 Summary of Correlational Analyses

Significant relationships were observed between a number of the self-reported indices and the ratings of performance. As per the statistical analysis plan, these sub-scales having demonstrated adequate overlap with the performance ratings were selected as predictors in regression models for the two performance ratings.

6.3 Objective 5: Predictive Efficacy of Significantly Related Self-Rated Psychological ratings on Performance Ratings

6.3.1 Data Screening

SPSS regression statistics were investigated to ensure that no assumptions were violated, for all four regression models that were investigated. Normal probability plots and residual scatterplots confirmed no violations of the normality, linearity or homoscedasticity assumptions. There was no suggestion of multivariate outliers, and tolerance values were all greater than 0.20 and collinearity diagnostics confirmed no problems of multicollinearity.

6.3.2 Coaches' Rating of Performance

The associations between the self-rated variables and coaches' ratings of performance were further explored using coaches' rating of performance as the outcome variable, and the self-rated variables that correlated significantly with that rating as predictors in a regression model detailed in Table 13.

Table 13: Hierarchical regression of self-rated psychological variables on coaches' rating of seasonal performance

| <i>Model summary</i> | | | | | |
|----------------------|----------|-----------------------|----------|-----------|----------|
| | <i>R</i> | <i>R</i> ² | <i>F</i> | <i>df</i> | <i>p</i> |
| 1. Conscientiousness | 0.26 | 0.07 | 4.94 | 1, 67 | .03 |

The model including Conscientiousness scores was significant and explained 7% of the variance in coaches' rating of performance scores.

6.3.3 Self-Rating of Performance

The association between the self-rated variables and self-ratings of performance were further explored using coaches' rating of performance as the outcome variable, and the self-rated variables that correlated significantly with that rating as predictors in a regression model detailed in Table 14.

Table 14: Hierarchical regression of self-rated psychological variables on self rating of performance

| <i>Model summary</i> | | | | | | |
|----------------------|----------|-----------------------|----------|-----------|----------|--------------|
| | <i>R</i> | <i>R</i> ² | <i>F</i> | <i>df</i> | <i>p</i> | ΔR^2 |
| 1. Life Orientation | 0.37 | 0.14 | 10.17 | 1, 65 | .00 | |
| 2. Win Orientation | 0.47 | 0.22 | 9.24 | 2, 64 | .00 | 0.08 |

The model consisting of Life Orientation scores was significant and explained 14% of the variance in self-ratings of performance scores, and the addition of Win Orientation scores explained a further 8% of the variance. Together, Life Orientation and Win Orientation scores accounted for 22% of the variance in players' self-rating of their seasonal performance.

6.4 Objective 5 - Findings

6.4.1 Objective 5 - Coaches' Ratings of Performance

Regression of the significantly related players' self-ratings identified Conscientiousness as the only significant predictor of the respective coaches' ratings of 2004 Super 12 season performance. Self-rated Conscientiousness

predicted a small but significant amount (7%) of the variance associated with the coaches' ratings of performance. People who are high in Conscientiousness are generally reliable, hard-working, disciplined, and strive for achievement (Costa & McRae, 1992). In athletes, higher scores on this personality dimension may be reflected in their attendance at training, attention to physical conditioning, adherence to dietary recommendations, understanding/memorisation of important tactical information distributed by coaches to players. This relationship may in part exist on the basis of what some athletes believe has contributed to their success in the eyes of their coach. Completing training drills, attending gym sessions, paying attention during briefings, and other day-to-day experiences inherent in the elite sportsperson's life are important factors that contribute to performance across a season, or even a career. A high or higher level of Conscientiousness would therefore be an adaptive personality attribute for most athletes, especially at higher or elite competitive levels. This has been observed previously with both male and female athletes possessing higher levels of Conscientiousness than non-athletes (Renfrow & Bolton, 1981).

The effects of lower levels of Conscientiousness relative to other elite athletes may be less obvious once athletes have reached elite status. It may be assumed that to attain an elite status, or compete at that level, that some degree of conscientiousness would have contributed to a sportsperson's development, especially on the physical conditioning side. The dedication or commitment elite athletes have to demonstrate towards their chosen sport in order to be successful is a long-term endeavour that generally begins when athletes are young. This dedication ostensibly manifests through physical development allied with the physical demands of the sport (endurance, muscle size), knowledge of the tactical demands, and understanding of how to win. In the case of rugby, the differences in the morphological characteristics of elite players to lesser players have been documented (Olds, 2001), and these differences also show marginal predictive efficacy when comparing size (pack size/weight) to performance (Quarrie & Wilson, 2000). Whilst these types of physical attributes are necessary for athletes to reach elite levels of competition, they become less predictive of

performance/success when assessed in homogenous environments. This may be similar to the role of Conscientiousness in elite sporting samples. A high level of Conscientiousness may predispose an athlete to making the most out of their abilities (physical or otherwise) related to success in the sport, and may be a prominent trait of successful athletes. As such, if a high degree of Conscientiousness was to be assumed to exist in elite or successful athletes, it may be more informative identify what traits covary with levels of Conscientiousness and ascertain if they too were predictive of performance.

Levels of Conscientiousness have also been previously associated with the achievement orientation and levels of competitiveness characteristics of athletes, which have also been suggested to be important to athletic success. Whilst not a specific outcome measure identified in the statistical analysis plan, examination of the correlation between Sporting Orientation and Conscientiousness reveal significant overlap between Conscientiousness and Goal Orientation scores. Greater levels of Conscientiousness were associated with an orientation geared towards mastering tasks, improving one's own personal skill, or just performing well relative to one's own ability (Gill & Deeter, 1988; Vealey, 1986). Conscientiousness generally manifests through a preference for structure, organisation, and self-motivation towards goal directed behaviour, and as such, this significant overlap is logical considering the sample utilised in this thesis. This aspect of Personality may drive people (athletes) to pursue higher levels of competition and in doing so improve their performance level. This improvement or eventual attainment of 'elite' performance levels may in part be due to the 'goal' directed behaviours associated with a conscientious approach to sporting training, performing, and reviewing of one's performance rather than just purely a result of conscientiousness.

6.4.2 Objective 5 - Self Rating of Performance

Analysis of the significantly related self-ratings and players' self-rating of their seasonal performance produced a regression model including Life Orientation and Win Orientation that predicted 22% of the variance associated with self

ratings of players' seasonal performance. As such, players' ratings of how optimistic (positive life orientation) they are, and how focused they are on winning as an outcome in competition accounted for a significant amount of variance in how they perceived they performed over the 2004 Super 12 season. A general positive outlook on life leads people to expect the best in what they do, and what will happen to them in the future. That higher ratings of success would be predicted by this measure is not surprising, with levels of optimism being previously associated with ratings of success or performance (Carver & Scheier, 2003).

The observed overlap between the optimism ratings and players' self-rated performance suggests that the tendency to believe that good things will happen in the future (Scheier & Carver, 2001) predicts players' own ratings of their seasonal performance. In a way, rugby players' ratings of their seasonal performance can be interpreted as a 'global' rating of their performance. Interpreting players' ratings of their self-rated performance in light of their ability (players were asked to rate their seasonal performance in regards to their own ability) allows for players at an elite level to rate their own performance objectively. As such, players who have experienced high levels of success (even beyond competing at an elite level) may generally be more optimistic than less successful athletes, or more than players that have not competed or succeeded at the elite level. Examination of the means from the players' ratings of their levels of optimism, suggest they are very optimistic as a group. Whether this orientation is a result or consistent success in life, in rugby, or a precursor to their high degree of success (competing at elite level) is difficult to discern given the nature of the data collection. Examination of the overlap between ratings of players' optimism and other significantly related constructs may provide a clearer explanation of the causality of the identified relationship.

Considerable overlap between Life Orientation and Neuroticism scores ($r = -0.453$) was evident in the inter-correlations of the self-report measures. Whilst this result was not expected, it has been suggested previously that it is difficult to distinguish optimism from Neuroticism (Smith, Pope, Rhodewalt & Poulton,

1989). Neuroticism reflects individual differences in the people's behavioural and cognitive experience of sadness, anxiety, anger and guilt. For example, Smith and colleagues (Smith, et al., 1989) observed in two studies that optimism assessed by the LOT had limited discriminant validity relative to measures of Neuroticism. Their studies were concerned with the relationship between Optimism, Neuroticism, future and current Symptom reporting, and Coping with stress. Their studies identified previously demonstrated significant relationships between optimism assessed by the LOT and levels of concurrent symptom reporting, levels of future symptom reporting, usage of Problem-focused Coping, and use of the passive coping expected from pessimists, but when levels of Neuroticism were controlled for, these relationships were no longer significant (Smith, et al., 1989). In the case of the current findings specific to players' self-rated seasonal performance, it may be that optimism as assessed by the LOT is not related to seasonal performance independent of the levels of Neuroticism.

An alternative explanation for the significant relationship between Optimism rather than Neuroticism with players' self ratings of seasonal performance may lie in the content of the measures. The statements included in the LOT may be less affected by socially desirable responding in this sample, with greater inclination to rate one's self as less neurotic possibly attenuating the strength of the relationship between Neuroticism scores and the self-rated performance metric. Examination of the inter-correlation between levels of Social Desirability and both Neuroticism ($r = -0.338$) and Optimism ($r = 0.207$) reveal that the directionality of the relationships were as expected, but the magnitude of the relationships were noticeably different. The relationship with Neuroticism was the largest observed between the self-rated indices, and possibly reflects the greater desire to portray one's self as emotionally stable.

A desire to win or place high relative to other competitors or opposition was also found to predict a significant proportion of players' self-ratings of their seasonal performance. Win Orientation scores for this sample were very high, suggesting the sample was strongly focused on winning both individual battles against direct opponents, and for their team to win games. This is not

surprising given what is at stake in professional sporting competition. There is a large focus on winning in elite competition, and often large monetary payouts for successful athletes. As competing in elite sport is an athlete's profession, their performance is very important, as it represents how good they are at their profession, and winning is the most obvious reflection of their ability. Ratings of seasonal performance may therefore be predicted by levels of Win Orientation due to the strong link between winning and good performance. A high degree of focus on winning should be strongly linked to how players conceptualise their performance. In this case, performance ostensibly would be evaluated on the basis of the number of team wins for a season. Thus, players in a successful team, would rate their seasonal performance highly if their team performed well on a win-loss basis.

A second facet of Win Orientation, the drive to achieve success (Gill & Deeter, 1988) in comparison to an opponent each week of a season may also contribute to this relationship. If players are focused upon defeating a direct opponent each week, then even when their team loses a game, they may have defeated their direct opponent on the day, thus they could also believe that they performed well outside of the team result. In this way, outperforming one's opponent contributes to a team's performance, but can be individually identified as performing well, irrespective of the games outcome (win or loss).

6.5 Objective 2: Exploration of the Relationship Between Coaches Ratings of Players Psychological Traits and Performance

6.5.1 Coaching Demographics

Prior to analysis, the rater variables were examined for accuracy of data entry, and missing values. All variables were within range, with 89 players having had their psychological indices rated by their coach. The ratings came from one of the three Australian based Super 12 teams; ACT Brumbies (N = 29); NSW Waratahs (N = 30); and QLD Reds (N = 30). The average of the coaches' ratings of all players psychological indices are presented in Table 15 below.

Table 15: Means and standard deviations for coaches' ratings of psychological indices

| | <i>M</i> | <i>SD</i> | <i>Range</i> |
|------------------------------------|----------|-----------|--------------|
| Emotional Recognition & Expression | 5.88 | 2.13 | 1-9 |
| Understanding Emotions | 5.55 | 1.81 | 1-9 |
| Emotions Direct Cognition | 5.75 | 1.60 | 1-9 |
| Emotional Management | 5.75 | 2.05 | 1-9 |
| Emotional Control | 6.08 | 2.11 | 1-9 |
| Neuroticism | 3.04 | 2.17 | 0-8 |
| Extraversion | 5.90 | 2.09 | 0-10 |
| Openness to Experience | 6.76 | 1.95 | 1-10 |
| Agreeableness | 7.16 | 1.70 | 3-10 |
| Conscientiousness | 6.98 | 1.95 | 2-10 |
| Problem Focused Coping | 5.82 | 1.92 | 2-10 |
| Increased Effort & Resolve | 6.85 | 1.45 | 2-10 |
| Denial | 4.63 | 1.85 | 1-9 |
| Emphasising the Positive | 5.83 | 1.65 | 1-9 |
| Seeking Social Support | 6.10 | 1.79 | 2-9 |
| General Emotionality | 3.57 | 2.04 | 1-8 |
| Detachment | 3.04 | 1.76 | 1-9 |
| Anxiety | 3.67 | 2.31 | 0-9 |
| Win Orientation | 7.59 | 1.55 | 2-10 |
| Goal Orientation | 8.49 | 1.37 | 4-10 |
| Self Esteem | 7.76 | 1.88 | 2-10 |

Note: N = 89

6.5.2 Emotional Intelligence

Coaches' ratings for the Emotional Intelligence dimensions were correlated with the two measures of performance and are presented in Table 16 below.

Table 16: Hypothesis 1 - Performance and Emotional Intelligence correlations

| Coach Ratings | Coaches' Rating of Performance | Self Report Performance |
|---------------------------------------|--------------------------------------|----------------------------|
| Emotional Recognition & Expression | 0.349** | 0.144 |
| Understanding Emotions | 0.327** | 0.087 |
| Emotions Direct Cognition | 0.054 | 0.287* |
| Emotional Management | 0.420** | 0.313* |
| Emotional Control | 0.450** | 0.259* |

Note: * = $p < 0.05$; ** = $p < 0.01$, N = 89

It was hypothesised that Emotional Intelligence scores would be significantly and positively related to performance. Significant positive relationships were observed between coaches' ratings of performance and Emotional Recognition and Expression, Understanding Emotions, Emotional Management and Emotional Control. The Emotions Direct Cognition, Emotional Management and Emotional Control dimensions were also significantly related to self-reported performance scores. The significant overlap observed between the performance metrics and the Emotional Intelligence variables suggest that the behaviours observed by coaches that reflect players' ability to express, understand, manage, control and utilise emotional information are significantly associated with how coaches and players viewed their seasonal performance.

6.5.3 Personality

Scores from the Personality sub-scale ratings were correlated with the two measures of performance and appear in Table 17 below.

Table 17: Hypothesis 2 - Performance and Personality correlations

| Coach Ratings | Coaches' Rating of Performance | Self Report Performance |
|------------------------|--------------------------------------|----------------------------|
| Neuroticism | -0.356** | -0.066 |
| Extraversion | -0.026 | 0.015 |
| Openness to Experience | -0.003 | 0.130 |
| Agreeableness | 0.225* | 0.007 |
| Conscientiousness | 0.331** | 0.275 |

Note: * = $p < 0.05$; ** = $p < 0.01$, N = 89

Coaches' ratings of player performance was found to be negatively associated with Neuroticism, and positively and significantly associated with both Agreeableness and Conscientiousness as hypothesised. These results suggest that coaches' observation of players' degree of anxiety, anger, hostility, depression, self-consciousness, impulsiveness and vulnerability was inversely related to how they viewed players' performance. Further to this, coaches' observation of players who displayed behaviours consistent with being altruistic, sympathetic, eager to help and cooperate and being purposeful, determined, and good at planning and organising tasks are positively related to how coaches viewed players' seasonal performance.

6.5.4 Coping with Stress

Scores from the coping strategies measure were correlated with the two measures of performance and appear in Table 18.

Table 18: Hypothesis 3 - Stress Coping Strategies and performance correlations

| Coach Ratings | Coaches' Rating of Performance | Self Report Performance |
|----------------------------|--------------------------------|-------------------------|
| Problem-Focused Coping | 0.343** | 0.161 |
| Increased Effort & Resolve | 0.322** | 0.154 |
| Denial | -0.009 | 0.037 |
| Emphasising the Positive | 0.263* | 0.042 |
| Seeking Social Support | 0.367** | -0.140 |
| General Emotionality | -0.059 | -0.138 |
| Detachment | -0.218* | -0.035 |

Note: * = $p < 0.05$; ** = $p < 0.01$, N = 89

Coaches' ratings of player performance were found to be positively associated with Problem-focused Coping, Increased Effort and Resolve, Emphasising the Positive, Seeking Social Support and negatively associated with Detachment. Coaches' observation of the strategies players use when confronted with stress suggest that players who behave in a relaxed, focused and logical manner when dealing with stressful situations, concentrate on the next step, try harder, and take something positive from stressful situations, emphasises the positive side of stressful situations, or seek help from teammates in stressful situations receive higher seasonal performance ratings. Whereas the refusal to believe in the stress of situations and shunning contact and discussion related to stress was associated with lower seasonal performance ratings from coaches. The significant correlations between the coping strategies and coaches' ratings of performance were as hypothesised, however, the magnitude of the correlations did not reach significance with the self-rating of seasonal performance.

6.5.5 Sporting Orientation, Self Esteem, and Anxiety Ratings

Scores from Win and Goal Orientation, Self Esteem, and Anxiety ratings were correlated with the two measures of performance and are displayed in Table 19.

Table 19: Correlations between performance and Anxiety, Self Esteem, Win and Goal Orientation

| Coach Ratings | Coaches' Rating of Performance | Self Report Performance |
|------------------|--------------------------------|-------------------------|
| Win Orientation | 0.364** | 0.106 |
| Goal Orientation | 0.457** | 0.190 |
| Anxiety | -0.171 | 0.082 |
| Self Esteem | 0.197 | 0.072 |

Note: * = $p < 0.05$; ** = $p < 0.01$, $N = 89$

Coaches' ratings of player performance were found to be positively associated with Win Orientation and Goal Orientation, partially confirming hypothesis 4. As such, players who displayed behaviours consistent with wanting to win at all costs and performing to the best of their ability at all times were also rated higher on their seasonal performance.

6.6 Objective 6: Predictive Efficacy of Significantly Related Coaches' Ratings of Players' Psychological Traits on Performance Ratings

6.6.1 Coaches' Rating of Performance

The association between the coaches' ratings of the psychological indices and coaches' rating of performance were further explored using coaches' rating of performance as the outcome variable, and the self-rated variables that correlated significantly with that rating as predictors in a regression model, which is detailed in Table 20.

Table 20: Hierarchical regression of coaches' rating of psychological variables on coaches' rating of performance

| | Model summary | | | | | |
|----------------------|---------------|-------|-------|-------|-----|--------------|
| | R | R^2 | F | df | p | ΔR^2 |
| 1. Emotional Control | 0.45 | 0.20 | 20.00 | 1, 79 | .00 | |
| 2. Goal Orientation | 0.57 | 0.33 | 19.10 | 2, 78 | .00 | 0.13 |

The model including Emotional Control scores was significant and explained 20% of the variance in coaches' rating of performance scores, and the addition of Goal Orientation scores explained a further 13% of the variance. Together, 33% of the variance in coaches' seasonal ratings of player performance was predicted by ratings of players' ability to control strong emotions, and wanting to perform at the best of their ability and achieve set goals.

6.6.2 Self-Rating of Performance

The association between the coaches' ratings of the psychological indices and players' self-rating of performance were further explored using coaches' rating of performance as the outcome variable, and the self-rated variables that correlated significantly with that rating as predictors in a regression model (Table 21).

Table 21: Hierarchical regression of coaches' rating of psychological variables on players rating of performance

| | <i>Model summary</i> | | | | | |
|------------------------------|----------------------|-----------------------|----------|-----------|----------|--------------|
| | <i>R</i> | <i>R</i> ² | <i>F</i> | <i>df</i> | <i>p</i> | ΔR^2 |
| 1. Emotional Management | 0.31 | 0.10 | 6.54 | 1, 60 | .01 | |
| 2. Emotions Direct Cognition | 0.40 | 0.16 | 5.46 | 2, 59 | .01 | 0.06 |

The model including Emotional Management scores was significant and explained 10% of the variance in players' self-rating of performance, and the addition of Emotions Direct Cognition sub-scale explained a further 6% of the variance. Overall, 16% of the variance in players' self-rating of their seasonal performance was predicted by coaches' ratings of players' ability to utilise emotional information in decision-making and to manage positive and negative emotions both within oneself and others.

6.7 Objective 6 - Findings

6.7.1 Objective 6 - Coaches' Ratings of Performance

When coaches' ratings of players' psychological characteristics were utilised in predicting the coaches' rating of seasonal performance, Emotional Control and Goal Orientation together predicted 33% of the variance of the seasonal rating. Ratings of players' ability to control strong emotions, such as anger, stress, anxiety and frustration and their perceived orientation towards mastering tasks, improving one's own personal skill, or just performing well relative to one's own ability predicted a third of the variance in coaches' seasonal rating of players' performance. Players levels' of Emotional Control were identified anecdotally as being directly related to performance through the interviewing process (see: section 3.6.3). A lack of, or lower levels of Emotional Control were suggested to be linked to giving away unnecessary penalties, being emotionally expressive in a negative manner, and a general loss of focus on the team's performance. This linkage to the anecdotal descriptions of predictors of performance may indicate that the ability to control strong emotions may directly (penalties) affect players' and teams' performance, and also indirectly (negative emotional expression) contribute to performance in regards to how coaches perceive performance/success.

Coaches' ratings of seasonal performance were also found to be predicted by the sporting orientation that is more about mastering tasks, improving one's own personal skill, or just performing well relative to one's own ability rather than the black or white distinction of win versus loss. Goal oriented or directed behaviour could be seen as more adaptive in elite team sporting events, as whilst the overall goal of competing is to 'win', a team effort where all team-mates aim to complete their assigned roles to the best of their ability may be more effective than purely focusing on the outcome. This orientation may also be viewed as more effective by coaches as it translates more widely than focusing on winning in competition, as mastery of tasks or improving can be observed through training, and any improvements that appear on the field.

6.7.2 Objective 6 – Players' Ratings of Performance

The significantly associated coaches' ratings of Emotional Management and Emotions Direct Cognition were found to predict 16% of the variance associated with the players' ratings of their season's performance. Coaches' assessment of players' ability to manage positive and negative emotions within both themselves and others and the extent to which emotions and emotional knowledge are incorporated in decision making and/or problem solving were found to be predictive of a significant proportion of the variance in players rating of their seasonal performance. This regression model suggests that players who demonstrate greater ability in the regulation and adaptive utilisation of emotions to their coaches through their performances would also rate their seasonal performance better.

Previous studies utilising the SUEIT have consistently identified Emotional Management as an important factor predictive of severity of depression (Downey, et al., 2008), life satisfaction (Gannon & Ranzijn, 2005) and leadership style (Gardner & Stough, 2002) when utilising self-reported ratings. In using coaches' ratings of players' mental abilities, this analysis reflects how what coaches observe in their players predicts players' assessment of the performance. As such, how a coach perceives a player's ability to manage and utilise emotions were identified as salient predictors of players' self-rated performance. In regards to the observation of the abilities encompassed by the Emotional Management and Emotions Direct Cognition dimensions of the SUEIT, coaches' ratings would be dependant on observation of behaviours that reflect the ability to consistently maintain a positive disposition and foster positive moods and emotions within themselves and amongst team-mates. That rating of these behaviours predicts self-rated performance of players offers a unique insight into the relationship between players' displays of behaviours and how they relate to their seasonal performance. Interestingly, the behaviours identified as predictors of performance were entirely different to the players' self-reported traits that emerged as predictors of their self-rated performance.

The observable behaviours that would reflect the capabilities relevant to Emotional Management may manifest in two ways, the management of emotions that a player is experiencing, or management of emotions that are affecting their team-mates. These abilities furthermore were acknowledged to be a multi-faceted and an enduring element of performance in the interview process (see: section 3.3.3). For example, players rated higher in this dimension may be more effective in overcoming conflict with team-mates by influencing their moods and emotions. This could manifest through players' ability to maintain a positive disposition when faced with the emotions concurrent with adversity (e.g., a large score deficit at half-time), and or motivate their team-mates with words or actions that produce a more emotionally positive outlook. This could also happen via a single inspirational action on the field, or multiple efforts against strong opposition or circumstances that inspire team-mates or lead to a consolidation of the teams' efforts.

Observable actions that reflect the Emotions Direct Cognition sub-scale of the SUEIT would most saliently be represented by decision-making. This dimension assesses the relative utilisation of emotions in guiding decision-making and our thoughts (Palmer & Stough, 2001). Higher scorers can be regarded as more intuitive, whereas low scorers tend to be more analytical in their decision-making processes. In relation to this sample, making good decisions on the field is very important, with the consequences of throwing a poor pass, committing a foul, or many other actions on the field can have great singular ramifications (e.g., turning the ball over and the opposition scoring a try), and momentum changing or longer lasting effects (e.g., maintaining possession of the ball is very important in rugby union, and turnovers can destroy any momentum and ground position advantage teams have). The suggestion that moods and emotions play a central role in cognitive processes and behaviour, and more specifically, the decisions we make (George, 2000), indicate that the intuitive use of these emotions, may drive people to top performance (Goleman, 1998, Reed-Woodard & Clarke, 2000) and has been identified in organisational psychology literature.

In specific relation to rugby union, the following quote may reflect how important decision-making is for elite level players - "takes the right options now maybe nine out of 10 times" after the final Test against Wales on November 28, 2009 (Matt Giteau talking about Quade Cooper). In a fast moving game, where players such as Matt Giteau and Quade Cooper are having a lot of possession of the ball and having to pass it many times, making good decisions is imperative for theirs and the teams' success. The identified relationship between players' self-rated performance and coaches' rating of their use of emotions in decision-making may suggest that incorporating emotions (or using intuition) on the field aids in the success of the decisions players are making, and in turn relates to their rating of the seasonal performance. An intuitive decision-making style is suggested to allow people to make decisions with incomplete information successfully. In this way, people can make decisions faster, and make them successfully. On the rugby field, being able to sum up a situation quickly, being able to act on possibly incomplete information, and still make a correct decision would clearly be advantageous to players, and distinguishable to coaches.

6.8 Chapter Summary

Elite athletes may be faster, stronger, better at their sports, but are they making the right decisions, coping with stress adaptively, applying themselves to training, controlling the strong emotions they experience in competition? Given the predictive efficacy of self-rated and coaches' rated psychological indices for the two measures of performance, an understanding of the roles of these traits and the behaviours they lead to may help athletes perform better. The results presented in this chapter reflect an attempt to assess the role of anecdotally identified predictors of performance that were explored in the context of established psychological constructs. Measures of these constructs were employed in both self-rated and coaches' rated formats, and were utilised in correlational analyses to identify their relationship to self and coaches' rating of performance (Objectives 1- 4, Chapter 5). Correlational results were utilised in generating regression models for players' self-rating of performance over the 2004 season, and their coach's rating of performance.

This was done in two phases, Objective 5 was to utilise the self-rated variables that significantly related to the two outcome measures as predictors in regression models, and Objective 6 was utilising the significantly related coaches' ratings as predictors of the two outcome measures.

The final two Objectives were to explore the predictive efficacy of the significantly related self ratings (Objective 7) and coaches' ratings (Objective 8) on the on-field statistics collected for the 2004 Super 12 season. These two objectives were to be explored in the following chapter.

CHAPTER 7: EXPLORATORY ANALYSIS OF ON-FIELD PERFORMANCE

7 Introduction

This chapter deals with the exploratory analysis of the on-field data collected from the three Australian based Super 12 teams during the 2004 Super 12 season.

7.1 On-Field Performance Analysis – Attack Statistics

Prior to analysis, the on-field variables were examined for accuracy of data entry, and missing values. Seven of the variables were found to be not normally distributed; total passes, poor passes, general kicks, dominant contact success, penalties, turnovers, and errors. The lack of normal distribution within these variables is most likely a consequence of the nature of the game of rugby union, and the positional specificity. For example, the average passes per game varied from below one (a player who had minimal game time) to an average of above 73 passes per game (a player whose main responsibility is passing). Normality is an important statistical consideration, as such, the non-normally distributed variables were transformed (base 10 logarithmic transformation), such that they could be utilised in analysis (Tabachnick & Fidell, 1996). Of the non-normal variables, only the average number of poor passes and penalties per game could not be transformed successfully, and as such, were excluded from the correlational analysis. All other variables satisfied the requirements of normality, with 31 - 77 players having recorded at least one instance of the various 'attack' statistics during the Super 12 season. The statistics came from all three Australian based Super 12 teams; ACT Brumbies, NSW Waratahs, and QLD Reds. The averages for each player per attack statistic are presented in Table 22 below.

Table 22: Attack statistics averages

| | <i>N</i> | <i>M</i> | <i>SD</i> | <i>Range</i> |
|--|----------|----------|-----------|----------------|
| Total Passes per Game | 72 | 8.55 | 15.19 | 0.30 - 73.70 |
| Poor Passes per Game | 47 | 0.60 | 0.60 | 0.10 – 3.20 |
| Offload | 60 | 0.60 | 0.41 | 0.10 – 2.00 |
| Kicks General | 43 | 2.99 | 3.84 | 0.10 – 18.00 |
| Miss Kicks | 31 | 0.80 | 0.73 | 0.10 – 2.50 |
| Runs | 74 | 6.68 | 3.80 | 1.00 – 22.00 |
| Pick and drive | 49 | 0.91 | 0.97 | 0.10 – 5.00 |
| Over Advantage | 71 | 3.28 | 1.76 | 0.30 – 8.20 |
| Line Break | 51 | 0.65 | 0.52 | 0.10 – 2.80 |
| Break Tackle | 64 | 1.53 | 1.08 | 0.10 – 5.00 |
| Dominant Contact Success | 74 | 4.79 | 2.43 | 0.90 – 13.70 |
| Neutral Contact Success | 59 | 0.55 | 0.37 | 0.10 – 2.50 |
| Pass Contact Success | 55 | 0.39 | 0.28 | 0.10 – 1.50 |
| % of Dominant Contact Success | 77 | 94.69 | 8.42 | 33.30 – 100.00 |
| Ruck/Maul Involvement | 74 | 5.49 | 2.61 | 0.80 – 14.10 |
| Effective Ruck & Maul Involvement | 74 | 17.48 | 11.32 | 0.80 – 43.00 |
| Ineffective Ruck & Maul Involvement | 56 | 0.85 | 0.64 | 0.10 – 2.50 |
| Penalties | 39 | 0.24 | 0.18 | 0.10 – 1.00 |
| Turnovers | 66 | 1.00 | 0.57 | 0.10 – 2.50 |
| Errors | 46 | 0.58 | 0.60 | 0.10 – 2.50 |

The averages for the on-field statistics were correlated with the player self ratings of Emotional Intelligence, Personality, Stress Coping Strategies, Life Orientation, Locus of Control, Sporting Orientation, Self Esteem, Social Desirability and Trait Anxiety to assess whether they could be used as predictors in regression models. Tables detailing these correlation coefficients appear in Appendix 5.

7.2 On-Field Performance Analysis – Defence Statistics

As per the ‘attack’ statistics, prior to analysis, the ‘defence’ on-field variables were examined for accuracy of data entry, and missing values. Six of the

variables were found to be not normally distributed; Missed Tackles per Game, Dominant Contact Success, Neutral Contact Success, Ruck Involvement, Forced Turnovers, and Penalties given away in defence. Again, the lack of normal distribution within these variables is most likely a consequence of the nature of the game of rugby union, and the positional specificity. The non-normally distributed variables were transformed (base 10 logarithmic transformation), such that they could be utilised in analysis (Tabachnick & Fidell, 1996). All other variables satisfied the requirements of normality and 51 - 77 players had recorded at least one instance of the various 'defence' statistics during the Super 12 season. The statistics came from all three Australian based Super 12 teams; ACT Brumbies, NSW Waratahs, and QLD Reds. The averages for each player per defence statistic are presented in Table 23 below.

Table 23: Defence statistics averages

| | <i>N</i> | <i>M</i> | <i>SD</i> | <i>Range</i> |
|-------------------------------|----------|----------|-----------|----------------|
| Tackles Per Game | 74 | 8.56 | 3.52 | 1.80 – 17.00 |
| Missed Tackles Per Game | 67 | 1.11 | 0.54 | 0.10 – 2.30 |
| 1st Tackles Per Game | 74 | 6.00 | 2.45 | 1.50 – 12.00 |
| Assisted Tackles Per Game | 73 | 2.60 | 1.40 | 0.30 – 6.00 |
| % First Tackles Made Per Game | 77 | 84.83 | 10.51 | 33.30 – 100.00 |
| % All Tackles Made Per Game | 77 | 88.51 | 8.28 | 50.00 – 100.00 |
| Dominant Contact Success | 59 | 0.46 | 0.33 | 0.10 – 2.00 |
| Neutral Contact Success | 62 | 0.62 | 0.39 | 0.20 – 2.00 |
| Pass Contact Success | 74 | 5.13 | 2.24 | 1.00 – 10.00 |
| D % | 60 | 7.20 | 5.58 | 1.30 – 33.30 |
| Ruck Involvement | 73 | 3.26 | 2.24 | 0.20 – 10.00 |
| Forced Turnovers | 51 | 0.68 | 0.47 | 0.10 – 2.00 |
| Penalties | 52 | 0.42 | 0.29 | 0.10 – 1.20 |

The averages for the 'Defence' on-field statistics were correlated with the player self ratings of Emotional Intelligence, Personality, Stress Coping Strategies, Life Orientation, Locus of Control, Sporting Orientation, Self Esteem, Social Desirability and Trait Anxiety to assess whether they could be

used as predictors in regression models. Tables detailing these correlation coefficients appear in Appendix 5.

7.3 Objective 7: Predictive Efficacy of Significantly Related Self-Rated Psychological Ratings on On-Field Performance

7.3.1 Attack Based Statistics and Self Rated Psychological Measures

The associations between the 'attack' based statistics and players' self rated psychological indices were further explored using the on-field statistics as the outcome variable and the significantly correlated psychological indices as predictors in hierarchical regression models. Extraversion was found to significantly predict Number of passes [$R^2 = 0.12$: $F(1, 54) = 7.38$, $p = 0.01$]; Openness was found to significantly predict the percentage of Dominant Contact Success ($R^2 = 0.12$: [$F(1, 59) = 7.93$, $p = 0.01$]. Kicks in play was found to be significantly predicted by Denial scores [$R^2 = 0.13$: $F(1, 31) = 4.41$, $p = 0.04$]. Pick and drive was found to be significantly predicted by Life Orientation scores [$R^2 = 0.18$: $F(1, 38) = 8.20$, $p = 0.01$]; involvement in Line Breaks was found to be significantly predicted by levels of Self Esteem [$R^2 = 0.10$: $F(1, 40) = 4.38$, $p = 0.04$]; and the average Number of Runs was found to be significantly predicted by both Seeking Social Support [$R^2 = 0.13$: $F(1, 56) = 8.49$, $p = 0.01$] and Goal Orientation scores [$R^2 = 0.07$: $F(2, 55) = 6.97$, $p = 0.00$]. Dominant Contact Success was found to be significantly predicted by self ratings of the stress coping strategy Increased Effort and Resolve [$R^2 = 0.07$: $F(1, 56) = 4.24$, $p = 0.04$]. Passive Contact Success [$R^2 = 0.25$: $F(1, 41) = 13.54$, $p = 0.00$] and Ruck Involvement [$R^2 = 0.09$: $F(1, 56) = 5.74$, $p = 0.02$] were both found to be significantly predicted by Emphasising the Positive scores. Use of the Denial stress coping strategy was found to significantly predict both Neutral Contact Success [$R^2 = 0.09$: $F(1, 42) = 4.36$, $p = 0.04$]. Effective Ruck/Maul Involvement was found to be significantly predicted by ratings of Goal Orientation [$R^2 = 0.08$: $F(1, 56) = 5.05$, $p = 0.03$], whereas, Ineffective Ruck/Maul Involvement was significantly predicted by both Seeking Social Support scores [$R^2 = 0.11$: $F(1, 44) = 5.28$, $p = 0.03$] and levels of Social Desirability [$R^2 = 0.11$: $F(2, 43) = 5.89$, $p = 0.01$].

7.3.2 Objective 7: Findings From Attack Based Statistics and Self Rated Psychological Measures

In regards to the 'attack' based statistics, a number of significant regression models were generated from the significantly related self ratings with the on-field statistics. Extraversion was found to significantly predict Number of passes, suggesting that differences in the average amount of passes thrown by players is related to levels of Extraversion. Backs generally throw more passes than forwards (Quarrie, et al., 1996), and for a pass to be successful, these players need to attract the attention of their team-mates. Further to this, backs need to attract the attention of other players to receive the ball, thus being more assertive and talkative when on the field may account for the relationship between Extraversion and the average number of passes thrown per game.

The percentage of Dominant Contact Success was predicted by levels of Openness. In attack, dominant contact success refers to when the attacking player gains ground with contact; a higher percentage of this reflects a player's territorial dominance over his direct opposition. In a game where field position is very important, the degree of success that players have in confronting the opposition's line in attempting to gain territory is a very important indicator of success. Obviously, if a team moves easily and quickly towards their touch line, they can score a try, and turn the contact success directly into points. Or in more closely fought contests where territorial gain is slow or difficult, the success may translate into being able to kick for a field goal from a lesser distance from the try line. Greater levels of Openness may predict this greater dominance in contact through higher scorers' greater preference for variety (Costa & McCrae, 1992), which could manifest in altering one's approach to contact in ways to achieve dominance.

Kicks in play were found to be significantly predicted by self-ratings of the Denial stress coping strategy, lesser use of this strategy was associated with producing more kicks in play. Kicks in play refers to effective kicks, and these

successful kicks were predicted by the stress coping strategy that is predicated on ignoring the presence of a stressor and denying that it is affecting them. In rugby union, kicks can be used in two ways, a long positional kick, that requires creativity and accuracy to avoid the fullback for as long as possible or to find touch. The second type of kick involves a short chipping of the ball over the defensive line, or kicking it through the line such that a team-mate can run onto the ball and collect behind the defensive line. These two types of kicks may separately contribute to this significant regression model. Players may look for the support of their team-mates in times of stress and kick the ball through or over the scrum line in the hope their team-mates can run onto the ball and gain territory or score rather than denying the presence or affect of stress.

Pick and drive was found to be significantly predicted by Life Orientation scores. The pick and drive statistic involves a player picking up the ball from the ruck and moving forwards. This on-field action was predicted significantly by players degree of dispositional optimism. The decision to undertake a pick and drive when the ball is secured in the ruck is somewhat risky decision, as the ball can be 'knocked on', and by picking it up, the momentum of the ruck is stalled. As such, players who more often choose to engage in a pick and drive may be suggested to be more optimistic due to the inherent risk involved in picking the ball out of the ruck.

Involvement in Line Breaks was found to be significantly predicted by self-rated levels of Self Esteem. A Line Break is deemed to occur when a player passes through the defensive line of tacklers. This effort often results in substantial territorial gain or a score, and is therefore an important indicator of success, and one that does not occur frequently. Players with high self esteem have a higher global value judgement of their aptitude or accomplishments. Though whether achieving success leads to high self esteem, or high self esteem leads to greater performance, in this case the number of Line Breaks achieved, is difficult to determine.

The average Number of Runs was found to be significantly predicted by both Seeking Social Support and Goal Orientation scores. Runs were defined as carrying the ball towards and past the line of scrimmage and gaining further territory, irrespective of whether the possession ended in a tackle or a pass. In this way, these two ends to a run could be seen as explanatory for the relationships observed. As engagement in Seeking Social Support as a stress coping strategy could be likened to passing the ball to a team-mate who is running in support when under pressure during the course of a game of rugby. This type of coping strategy has previously been found to be associated with better outcomes following performance slumps in a variety of team sports including rugby union (Prapavessis, et al., 2003), and is considered an adaptive strategy when dealing with stress in a competitive sporting environment. A goal oriented approach to sporting orientation refers to a players' focus on mastering tasks, improving their personal skill, or just performing well relative to one's own ability (Gill & Deeter, 1988). A consistent goal in rugby union is to run the ball towards the defensive line in the hope of gaining territory, attempts to achieve the omnipresent goal of gaining territory with each possession may be reflected in the goal oriented sporting orientation.

Dominant Contact Success was found to be significantly predicted by self ratings of the stress coping strategy Increased Effort and Resolve. As discussed earlier, Dominant Contact Success in attack refers to when the attacking player gains ground when making contact with player(s) in the defensive line. It would be inconceivable for players to be 100% dominant in their contact with the opposition line for an entire season, let alone in a single game. Further to this, players suffering setbacks in attempting to gain ground will have to repeat their attempts during games, and usage of the Increased Effort and Resolve stress coping strategy may facilitate more dominance in contact situations. This type of coping strategy refers to when people are faced with a stressful moment or situation. They concentrate on the next step, and attempt to try harder to overcome the situation. Again, this type of coping strategy has previously been identified as a more adaptive strategy when dealing with stressful situations in team sports (Madden, et al., 1990).

Passive Contact Success in attack refers to when the defensive player is dominant in contact. This negative outcome for players when attacking was predicted by the stress coping strategy that relies on identifying the positive side of stressful situations. This strategy is considered an emotion-focused strategy (Madden, et al., 1990), which is generally considered less adaptive in stressful situations, as it is just an emotional reaction to a stressor, rather than an actual attempt to reduce the impact of the stressor. It has been suggested that some degree of usage of this emotion-focused strategies may facilitate usage of problem-focused coping following the possible initial reaction of emphasising the positive of the stressful situation (Folkman & Lazarus, 1985). As such, after an initial failure in contact, this positive emotion-focused coping strategy may allow players to remain positive and possibly use a more problem-focused strategy, such as increased effort and resolve which was found to be related to Dominant Contact Success in this study.

Ruck/Maul Involvement was also found to be significantly predicted by Emphasising the Positive scores. Rucks (see section 2.3.5) and the mauls (see section 2.3.6) are important features of any rugby union game; each being potent means to score a try. Although often associated with one another, they differ due to the position of the ball at the start. In a ruck the ball starts on the ground, whereas in a maul the ball begins in the hands of a player. The ubiquitous nature of these features of rugby and the importance of successful involvement in and positive outcomes of ruck/mauls may account for the predictive effect of Emphasising the Positive scores. With the relative success of ruck/mauls varying greatly, players have to remain positive about the resulting effect of the ruck/maul, as the situation will repeat itself many times in a game, and players need to apply themselves equally well in each situation to gain territory for their team and avoid penalisation.

Use of the Denial stress coping strategy was found to significantly predict Neutral Contact Success. The Denial stress coping strategy is generally considered maladaptive as it reflects people not thinking much about stressful situations, and just continuing on as if nothing stressful or bad is happening (Prapavessis, et al., 2003). This strategy was found to predict Neutral Contact

Success, when neither player is dominant in a contact situation. As rugby union is a game of possession and field position, the use of a Denial strategy when not gaining ground when making contact would be maladaptive, as the purpose of contact is to make ground, and denying that not making ground is important would be unhelpful for the attacking side. For a player to deny that anything is wrong in this case would again be a maladaptive way to deal with the stress of this occurrence, as team-mates would expect a reaction or effort to gain ground next time.

Effective Ruck/Maul Involvement was found to be significantly predicted by ratings of Goal Orientation, whereas, Ineffective Ruck/Maul Involvement was significantly predicted by both Seeking Social Support and Social Desirability self-ratings. Being goal oriented, a player's focus is on mastering tasks, improving their personal skill, or just performing well relative to one's own ability (Roberts & Balague, 1989). This type of orientation may be predictive of Effective Ruck/Maul involvement due to the rules players must obey to take part in a ruck/maul. They include: all players taking part in the ruck/maul must keep their heads and shoulders above their hips; no player is allowed to jump on top of the ruck/maul; no player should enter from an off-side position (off-side line is marked by the backmost foot of the team-mate positioned furthest back of the ruck or maul. A player is only allowed to join a ruck or maul from behind this line); no player should throw the ball back into the ruck/maul. As such, a player whose overarching aim in competing in ruck/maul situations is to abide by these rules would ostensibly be involved in more 'effective' ruck/mauls.

Ineffective Ruck/Maul Involvement was significantly predicted by both Seeking Social Support and Social Desirability in contrast to the Effective Ruck/Maul involvement model. Higher levels of reported usage of the Seeking Social Support coping strategy were predictive of this negative ruck/maul outcome. At first this is a somewhat strange result, considering the adaptive nature of this strategy. Examination of the significant correlations between this strategy and the ineffective and effective ruck/maul involvement show that significant relationships exist with both. This result could therefore be interpreted through

the nature of ruck/maul situations, where a number of team-mates are involved, and the stress of this situation may produce discussion between team-mates concerning the outcome of ruck/mauls. This interaction between team-mates may account for the predictive nature of Seeking Social Support scores when looking at ineffective involvement, as the adaptive nature of the strategy may help overcome what is 'ineffective' about players involvement. Levels of Social Desirability were negatively associated with Ineffective Ruck/Maul involvement, suggesting that players who were less able to present themselves in a desirable (e.g., Confident or in control) were more likely to be ineffective in their ruck/maul involvement. This relationship may in part be generated through players' adherence to the rules that govern ruck/maul involvement, with players having to present their involvement to the referee as entirely legal, even if it is not entirely legal.

7.4 Objective 8: Predictive Efficacy of Significantly Related Coaches' Ratings of Players' Psychological Ratings on On-Field Performance

7.4.1 *Attack Based Statistics and Coaches' Rated Psychological Measures*

The averages for the on-field statistics were correlated with the coaches' ratings of Emotional Intelligence, Personality, Stress Coping Strategies, Sporting Orientation, Self Esteem, and Trait Anxiety to assess whether they could be used as predictors in regression models. Tables detailing these correlation coefficients appear in Appendix 6. These associations were further explored using the on-field statistics as the outcome variable and the significantly correlated coaches' ratings of the psychological indices as predictors in hierarchical regression models. Coaches' ratings of players' levels of Emotional Control were found to significantly predict the average number of times players crossed Over Advantage [$R^2 = 0.16$: $F(1, 68) = 6.73$, $p = 0.01$]. Ratings of players' levels of Self Esteem were found to significantly predict Effective Ruck/Maul involvement [$R^2 = 0.10$: $F(1, 70) = 7.50$, $p = 0.00$], the average number of Line Breaks [$R^2 = 0.08$: $F(1, 49) = 4.37$, $p = 0.04$] and the

average number of Turnovers committed [$R^2 = 0.10$: $F(1, 63) = 7.27$, $p = 0.01$].

7.4.2 Objective 8: Findings From Attack Based Statistics and Coaches Ratings of Psychological Measures

In regards to the coaches' ratings of players' psychological attributes and their on-field performance, ratings of Emotional Control were found to significantly predict the average number of times players crossed Over Advantage.

Emotional Control refers to the Emotional Intelligence facet that relates to how effectively people control strong emotional states such as anger, stress, anxiety and frustration (Palmer & Stough, 2001). Higher levels of Emotional Control contributed to greater instances of crossing the advantage line. This suggests players who are able to keep their strong emotions in check, were able to run with the ball towards the opposition defensive line and gain ground more effectively than those players who had trouble controlling their anger or frustration experienced during games.

Ratings of players' levels of Self Esteem were found to significantly predict Effective Ruck/Maul involvement and the average number of Turnovers committed, although these relationships were not in the expected direction. Higher levels of Self Esteem were related to the number of Turnovers committed by players, and to lower levels of Effective Ruck/Maul Involvement. It would be expected that players who demonstrate behaviours consistent with higher self esteem to their coaches would be more successful on the field, rather than committing greater numbers of turnovers and being less effective in a ruck/maul situation. This difficulty in interpretation may also be affected by the accuracy of the coaches' ratings of this particular dimension, or the high positive bias in ratings. Athletes are consistently found to report higher levels of self esteem (Fletcher, et al., 2003; McHale, et al., 2005), especially on global measures, most often attributed to higher scores on items addressing physical capabilities. Levels of self esteem or average tone of self-feeling (James, 1890) are generally seen as a person's self esteem, or own self worth, that they convey to their peers and the world. In this way, accuracy

of rating people's self esteem should be relatively high as people directly display behaviours consistent with their level of self esteem. Coaches' ratings of 'trait' or seasonal levels of self esteem may be affected by observation of 'state' levels, where a player's lower mood after a loss or poor game may overly impact coaches' ratings of global levels of self esteem measured here.

7.5 Objective 7: Predictive Efficacy of Significantly Related Self-Rated Psychological Ratings on On-Field Performance

7.5.1 Defence Based Statistics and Self Rated Psychological Measures

The associations between the 'defence' based statistics and players' self ratings of the psychological indices were further explored using the on field statistics as the outcome variable and the significantly correlated psychological indices as predictors in hierarchical regression models. The average number of Missed Tackles was significantly predicted by self ratings of levels of General Emotionality [$R^2 = 0.16$: $F(1, 51) = 9.40$, $p = 0.00$]. Dominant Contact Success was significantly predicted by levels of Denial [$R^2 = 0.10$: $F(1, 47) = 5.38$, $p = 0.03$], whereas Neutral Contact Success was significantly predicted by levels of Extraversion [$R^2 = 0.12$: $F(1, 49) = 6.58$, $p = 0.01$]. The Percentage of Dominant Contact Success was significantly predicted by scores for Locus of Control [$R^2 = 0.09$: $F(1, 45) = 4.59$, $p = 0.04$]. The average number of Forced Turnovers produced by players was significantly predicted by Goal Orientation [$R^2 = 0.13$: $F(1, 41) = 6.06$, $p = 0.02$] ratings. The number of Penalties given away in Defence was significantly predicted by self ratings of Seeking Social Support [$R^2 = 0.21$: $F(1, 41) = 10.81$, $p = 0.00$] and Win Orientation [$R^2 = 0.09$: $F(2, 40) = 8.55$, $p = 0.00$].

7.5.2 Objective 7: Findings From Defence Based Statistics and Self Rated Psychological Measures

In regards to the 'defence' based statistics, a number of significant regression models were generated from the significantly related coaches' ratings and

self-ratings with the on-field statistics. In regards to the players' self ratings, the average number of Missed Tackles was significantly predicted by self ratings of levels of General Emotionality. A team's defensive line is constantly under attack from an opposition whose main objective is to make ground, whether by in small increments by running with the ball in to the defensive line, or in larger amounts by getting passed a tackler. This constant pressure on the line would ostensibly require team members to utilise various strategies to cope with the constant stress. In this case, use of the General Emotionality stress coping strategy was predictive of players missing tackles. This maladaptive coping strategy is characterised by making hasty decisions on the basis of negative emotional information (Madden, et al., 1989). In a tackling sense, this decision may be to only tackle with one hand, or not to fully complete a tackle, thus leading to a player breaking or moving on as a result of a poor tackling technique.

Dominant Contact Success was significantly predicted by levels of Denial, whereas Neutral Contact Success was significantly predicted by levels of Extraversion. Lower levels of the use of the Denial stress coping strategy were predictive of players in the defensive line being dominant in contact with attacking players, essentially this reflects players' ability to stop the opposition gaining territory. Denying that anything is wrong or stressful when an attacking player is dominant in contact would not be adaptive for individual players or the defensive team, as not acknowledging that a loss of ground is important, or altering one's behaviour to attenuate the lack of contact success would allow the opposition to continue gaining ground. Interestingly, lower levels of Extraversion were related to greater levels of Neutral Contact Success, where neither the defensive or attacking players are dominant. Players assessed in this study reported noticeable high levels of Extraversion, which is not uncommon in male elite sporting athletes (Kirkcaldy, 1982). In defence, holding the line so that the attacking team does not gain any territory is a reasonably positive outcome for the defensive line, and far less common than Passive Contact Success. This relationship may in part be explained by the facet of Extraversion, assertiveness (Costa & McCrae, 1992), which may manifest in players' ability to be physically assertive when confronted with an

attacking player's contact. The Percentage of Dominant Contact Success was significantly predicted by scores for Locus of Control, with players who believed they were more in control (internal locus of control) being more dominant in their contact with attacking players. These players would believe that any alteration in their actions or technique in trying to stop the advance of the attacking team would have an effect their relative success in contact situations, rather than attributing success or failure in contact situations to their opposition or other external forces.

The average number of Forced Turnovers produced by players was significantly predicted by Goal Orientation ratings. Higher levels of goal oriented behaviour were related to the production of turnovers in defence. Being goal oriented, a player's focus is on mastering tasks, improving their personal skill, or just performing well relative to one's own ability (Roberts & Balague, 1989). This type of orientation may be predictive of producing turnovers in defence, as it may drive players to compete at each breakdown to the best of their ability. Consistently competing at the breakdown at this high level may then produce the possible chance to turn the ball over from the opposition through the pressure of high quality and legal attempts to stop the opposition gaining ground, and attempting to regain possession of the ball.

The number of penalties given away in defence was significantly predicted by self-ratings of Seeking Social Support and Win Orientation. Positive associations between both these self-rated indices were identified with giving away penalties in defence. Giving away penalties in defence can lead to the attacking team kicking for a field goal, kicking for touch to gain ground, feeding the ball into a scrum, or a unhindered re-start to play. In all games, penalties are very important indicators of performance, with teams who commit fewer infringements generally winning the game. Penalties can be seen as an illegal act by one player, which affects the entire team. Players who may rely on help from team-mates to reduce the effects of stress and focus strongly on winning were found to commit more penalties in defence. Both these indices would generally be regarded as adaptive on the whole, in this case, an 'over reliance' on others to deal with the stress of competition, or

overly focusing on winning whilst in defence may account for the increased likelihood of committing a foul in defence resulting in penalisation. It may be suggested that when in defence, players need to focus on their role in the defensive line, and not be looking for help, or relying on it for the successful outcome of defensive plays. Under stress from the attacking team, a player should be attempting to think through how to stop their direct opposition gaining ground, or making good tackles. In this way, focusing on their role, and not looking for help from team-mates is suggested to be a more adaptive technique for not giving away penalties in defence.

7.6 Objective 8: Predictive Efficacy of Significantly Related Coaches' Ratings of Players' Psychological Ratings on On-Field Performance

7.6.1 Defence Based Statistics and Coaches Rated Psychological Measures

The averages for the 'defence' on-field statistics were correlated with the coaches' ratings of Emotional Intelligence, Personality, Stress Coping Strategies, Sporting Orientation, Self Esteem, and Trait Anxiety to assess whether they could be used as predictors in regression models. Coaches' ratings of Trait Anxiety levels of players were found to significantly predict both the averages of 1st Tackles made per game [$R^2 = 0.09$: $F(1, 70) = 7.26$, $p = 0.01$] and the Percentage of 1st Tackles made [$R^2 = 0.07$: $F(1, 72) = 5.02$, $p = 0.03$]. Passive Contact Success was found to be significantly predicted by both Trait Anxiety ratings [$R^2 = 0.11$: $F(1, 70) = 8.19$, $p = 0.01$] and ratings of the use of the Denial stress coping strategy [$R^2 = 0.05$: $F(2, 69) = 6.67$, $p = 0.00$].

7.6.2 Objective 8: Findings From Defence Based Statistics and Coaches' Ratings of Psychological Measures

Trait anxiety levels of players were found to significantly predict both the averages of 1st Tackles made per game and the Percentage of 1st Tackles

made. These regressions were a result of the negative relationship that existed between ratings of players 'trait' levels of anxiety as rated by their coaches. Players who displayed lower levels of anxiety, were found to attempt more and make (be successful) more 1st Tackles per game. Players who display higher levels of anxiety generally may be less inclined to be the first player to tackle the ball carrying opposition player, possibly due to the anxiety concerned with the success of this endeavour. Further to this, higher anxiety may contribute to less confident attempts in being first player involved in a tackle, which may in turn result in a less successful tackle. A high degree of inter-individual differences exist between people's trait levels of anxiety (Hanin, 2000). Differences in 'state' levels of anxiety from 'trait' levels may be more indicative of performance, than assessment of trait levels alone. In the case of coaches' ratings of anxiety, this result may be in part driven by coaches' observation of players who were 'more' affected by anxiety levels (or seemed affected by anxiety) during competition during the 2004 season.

Passive Contact Success was found to be significantly predicted by both Trait Anxiety ratings and ratings of the use of the Denial stress coping strategy. Lower ratings of both these indices were associated with players losing ground to the attacking player in contact situations. Ratings of these indices by coaches may reflect two possible observations by coaches of players' involvement in contact situations. They may observe that players who look, or have displayed anxious behavioural or cognitive signs, may approach a contact situation with reticence, and therefore lose ground to the attacking player. Another aspect of this observation may be that some players who lose ground to the opposition do not alter their approach to contact situations, insomuch as denying that anything is wrong in their approach to contact situations and the resulting loss in territory.

7.7 Summary of 2004 On-field Results

The third aspect of performance assessed for the 2004 Super 12 season was the on-field statistics. The relationship to coaches' rating and self ratings of the players' psychological indices were examined. On-field data was collected

and analysed for both the attacking and defensive aspects of rugby union. The same statistical process was followed as utilised earlier to predict rated performance, such that salient predictors of performance could be identified across the different measures of performance. Given the nature of rugby, a wide variation in the occurrence and averages of the various performance indicators vary greatly. Some of these differences are more due to positional specificity, with 'backs' passing the ball more often than forwards, and some differences due to the how often the particular instances happen in games as a whole (e.g., missed tackles or penalties). As such, the results were discussed in light of the possible psychological characteristics of players in particular positions and how that leads to magnitude differences. Further to this, behaviours that may contribute to directly to the occurrence of some statistics were postulated.

Objectives 7 and 8 form the basis of the discussion of the results, where tentative explanations for the associations and resulting regression models have been posited. Given these results are the first of their kind, the results were treated as exploratory, and the discussion should be considered similarly. The following two chapters present an essentially identical set of data, collected from the 2005 Super 12 season. The measures of Self Esteem, Life Orientation, Social Desirability, and Locus of Control were removed from both player and coach assessments due to their low internal reliability and lack of predictive validity across the 2004 season's data analysis. Data analysis will also follow the same technique as outlined in Chapter 5 with the hope that any consistencies or inconsistencies in the predictive efficacy of the selected constructs will lead to greater understanding of their role.

CHAPTER 8: RESULTS - 2005 SUPER 12 SEASON

8 Introduction

In this chapter, the study participants are examined with respect to their self-reported ratings of the psychological indices, coaches' ratings of the same psychological indices, and on-field statistics for the 2005 Super 12 season. The selection of the psychological variables used in this second year of the assessment of the psychological predictors of rugby union player performance is based upon the findings detailed in Chapter 6 and Chapter 7. The measures of Self Esteem, Life Orientation, Social Desirability, and Locus of Control were removed from both player and coach assessments due to their low internal reliability and lack of predictive validity across the 2004 season's data analysis. The assessments of Emotional Intelligence, Personality, Coping Strategies and Sporting Orientation were maintained. For all analyses an alpha level of 0.05 was chosen for the detection of significant associations. Bonferroni corrections were not applied to the analyses to ensure that moderate effect sizes were detected.

8.1 Hypotheses for 2005 Season

Given the results detailed in the previous two chapters, and the review of the literature that informed the first set of objectives and hypotheses, a second set of hypotheses could be generated for the 2005 Super 12 season data collection.

8.1.1 Hypothesis 1 – Emotional Intelligence

It is hypothesised that levels of Emotional Intelligence will be positively related to player and coach rated performance.

8.1.2 Hypothesis 2 – Personality

It is hypothesised that levels of Neuroticism would be negatively associated with player and coach rated performance, and that Extraversion, Openness, Agreeableness, and Conscientiousness would be positively related to the performance measures.

8.1.3 Hypothesis 3 – Coping Strategies

It is hypothesised that levels of adaptive coping strategies (Problem-focused, Increased Effort and Resolve, and Seeking Social Support) will be positively related to performance ratings, and that maladaptive coping strategies (Detachment, Denial, and General Emotionality) would be negatively associated with the performance ratings.

8.1.4 Hypothesis 4 – Sporting Orientation

It is hypothesised that levels of Competitiveness, Win Orientation and Goal Orientation will be positively related to performance ratings.

8.2 Self-Report Analysis

8.2.1 Demographics

Prior to analysis, the demographic variables of age, team, position, were examined for accuracy of data entry, and missing values. All variables were within range, with 89 players having completed the self-report questionnaire and providing information concerning their membership of one of the three Australian based Super 12 teams; ACT Brumbies (N = 37); NSW Waratahs (N = 23); and QLD Reds (N = 28). The average age of the players at the time of the survey was 23.91 (SD = 3.55), and the players represented all of the 15 specific on-field positions as detailed in Table 24 below.

Table 24: Frequency and percentage of rugby union positions for 2005

| Position | Frequency | Percentage of sample |
|----------------------|-----------|----------------------|
| 1: Loosehead Prop | 5 | 4.2 |
| 2: Hooker | 8 | 6.7 |
| 3: Tighthead Prop | 5 | 4.2 |
| 4: Second Row | 9 | 7.5 |
| 5: Second Row | 4 | 3.3 |
| 6: Blindside Flanker | 5 | 4.2 |
| 7: Openside Flanker | 6 | 5.0 |
| 8: Number 8 | 3 | 2.5 |
| 9: Scrum Half | 8 | 6.7 |
| 10: Fly Half | 8 | 6.7 |
| 11: Left Wing | 7 | 5.8 |
| 12: Inside Centre | 6 | 5.0 |
| 13: Outside Centre | 6 | 5.0 |
| 14: Right Wing | 3 | 2.5 |
| 15: Fullback | 5 | 4.3 |

*Note: Only 88 players specified a definite position from 1 – 15.

8.3 Objective 1: Exploration of Relationships Between Self-Rated Psychological Traits and Performance

8.3.1 Emotional Intelligence

Emotional Intelligence was assessed using the SUEIT, all variables were within range, and means and standard deviations were similar to those reported figures in Chapter 5 and somewhat lower than reported in the technical manual and previously reported studies (Downey, et al., 2006), and are presented in Table 25 below.

Table 25: Means and standard deviations for Emotional Intelligence sub-scales

| | <i>M</i> | <i>SD</i> | <i>Range</i> | <i>α</i> |
|------------------------------------|----------|-----------|--------------|----------|
| Emotional Recognition & Expression | 35.73 | 5.52 | 21-55 | 0.77 |
| Understanding Emotions | 70.34 | 8.00 | 53-96 | 0.83 |
| Emotions Direct Cognition | 34.90 | 5.12 | 22-44 | 0.71 |
| Emotional Management | 38.70 | 5.48 | 25-56 | 0.75 |
| Emotional Control | 30.72 | 4.52 | 21-55 | 0.73 |

Scores on the Emotional Intelligence measure were correlated with the measures of performance. These correlations are presented in Table 26.

Table 26: Hypothesis 1 - Performance and Emotional Intelligence correlations

| Self Ratings | Coaches Rating of Performance | Self Report Performance |
|---------------------------------------|-------------------------------------|----------------------------|
| Emotional Recognition & Expression | 0.366** | 0.237* |
| Understanding Emotions | 0.341** | 0.234* |
| Emotions Direct Cognition | -0.172 | 0.021 |
| Emotional Management | 0.181 | 0.200 |
| Emotional Control | 0.265* | 0.357** |

Note: * = $p < 0.05$; ** = $p < 0.01$, N = 78 - 82

The Emotional Recognition and Expression, Understanding Emotions and Emotional Control dimensions of the SUEIT correlated positively and significantly with each performance rating in line with hypothesis 1. These correlations suggest that players' ratings of their ability to identify, express, understand and control emotions is linked to how they rate their seasonal performance and their coaches' ratings of their performance.

8.3.2 Personality

Personality was assessed using the NEO FFI; means, standard deviations, internal reliability, and range of scores are presented in Table 27 below. As with the 2004 self-rated personality scores, the sample scored in the average area of the normal population for all sub-scales except Extraversion, which scores were noticeably higher than the general population.

Table 27: Means and standard deviations for Personality – NEO-FFI

| | <i>M</i> | <i>SD</i> | <i>Range</i> | α |
|------------------------|----------|-----------|--------------|----------|
| Neuroticism | 30.23 | 6.09 | 13-44 | 0.89 |
| Extraversion | 42.95 | 4.62 | 32-57 | 0.90 |
| Openness to Experience | 36.68 | 7.44 | 122-172 | 0.96 |
| Agreeableness | 43.70 | 4.57 | 32-55 | 0.89 |
| Conscientiousness | 43.36 | 5.56 | 29-57 | 0.89 |

Scores from the personality measure were correlated with the two measures of performance and appear in Table 28.

Table 28: Hypothesis 2 - Performance and Personality correlations

| | Coaches Rating of Performance | Self Report Performance |
|------------------------|-------------------------------------|----------------------------|
| Neuroticism | -0.248* | -0.317** |
| Extraversion | 0.303** | 0.265 |
| Openness to Experience | 0.159 | 0.093 |
| Agreeableness | 0.002 | 0.244* |
| Conscientiousness | 0.256* | 0.230* |

Note: * = $p < 0.05$; ** = $p < 0.01$, $N = 78 - 82$

Correlations between the performance ratings and personality indices were generally positive, with Extraversion significantly correlating with coaches' rating of performance; Agreeableness significantly correlated with self-reported performance; and Conscientiousness significantly and positively correlated with both performance ratings. Contrastingly, significant negative overlap was observed between Neuroticism self-ratings and performance ratings. This pattern of results is somewhat different to the results presented in Chapter 6, with the relationships between the performance measures being more strongly positive with Extraversion scores and more strongly negative with Neuroticism in particular.

8.3.3 Coping with Stress

Coping style was assessed with the WOCS; means, standard deviations, internal reliability, range and number of items are presented in Table 29 below.

Table 29: Means and standard deviations for Coping with Stress – WOCS

| | <i>M</i> | <i>SD</i> | <i>Range</i> | α |
|----------------------------|----------|-----------|--------------|----------|
| Problem Focused Coping | 12.45 | 2.40 | 6-18 | 0.67 |
| Increased Effort & Resolve | 10.58 | 1.99 | 5-15 | 0.51 |
| Denial | 7.42 | 2.14 | 2-12 | 0.41 |
| Emphasising the Positive | 3.61 | 1.33 | 1-6 | 0.54 |
| Seeking Social Support | 5.21 | 1.59 | 2-9 | 0.53 |
| General Emotionality | 4.26 | 1.62 | 1-9 | 0.57 |
| Detachment | 4.43 | 2.79 | 0-11 | 0.69 |
| Wishful Thinking | 4.14 | 1.68 | 0-8 | 0.45 |

Scores from the Coping measure were correlated with the two measures of performance and are reported in Table 30 below.

Table 30: Hypothesis 3 - Performance and Stress Coping Strategy correlations

| Self Ratings | Coaches Rating of Performance | Self Report Performance |
|-------------------------------|-------------------------------------|----------------------------|
| Problem-Focused Coping | 0.212 | 0.284* |
| Increased Effort & Resolve | 0.195 | 0.192 |
| Denial | -0.190 | -0.154 |
| Emphasising the Positive | -0.046 | -0.103 |
| Seeking Social Support | -0.129 | 0.146 |
| General Emotionality | -0.049 | -0.151 |
| Detachment | -0.212 | -0.230* |
| Wishful Thinking | 0.104 | -0.192 |

Note: * = $p < 0.05$; ** = $p < 0.01$, $N = 78 - 82$

Significant positive relationships were observed with Problem-Focused Coping with self-ratings of one's own performance. The Detachment coping strategy was also significantly correlated negatively with players' self-rated performance scores. Together these findings suggest that players who utilise relaxed, focused and logical approach to dealing with stressful situations rather than refusing to believe in the stress of situations and shunning contact and discussion related to stress rated their performance higher for the season.

8.3.4 Win Orientation, Goal Orientation and Competitiveness

The means, standard deviations, internal reliability, and range of scores for Win, Goal Orientation, and Competitiveness are presented in Table 31 below.

Table 31: Means and standard deviations for Competitiveness, Win and Goal Orientation

| | <i>M</i> | <i>SD</i> | <i>Range</i> | α |
|------------------|----------|-----------|--------------|----------|
| Win Orientation | 21.71 | 3.03 | 12-26 | 0.70 |
| Goal Orientation | 18.09 | 1.35 | 15-22 | 0.81 |
| Competitiveness | 18.30 | 6.44 | 13-48 | 0.93 |

Scores from the Competitiveness, Win, and Goal Orientations were correlated with the measures of performance and appear in Table 32 below.

Table 32: Hypothesis 4 - Sporting Orientation and performance correlations

| Self Ratings | Coaches Rating of Performance | Self Report Performance |
|------------------|-------------------------------------|----------------------------|
| Win Orientation | 0.022 | 0.116 |
| Goal Orientation | 0.316** | 0.285* |
| Competitiveness | 0.335** | 0.298** |

Note: * = $p < 0.05$; ** = $p < 0.01$, $N = 78 - 82$

Goal Orientation and Competitiveness were found to be significantly and positively related to both the coaches' and players' ratings of seasonal performance. Players who rated themselves as wanting to perform at the best

of own ability and achieve set goals and be competitive in all aspects of their play also received higher ratings for both performance measures.

8.3.5 Summary of Correlational Analyses

Significant relationships were observed between a number of the self-reported indices and the two ratings of performance. As per the statistical analysis plan, these sub-scales having demonstrated adequate overlap with the performance ratings were selected as predictors in regression models for the two ratings. A number of these significant relationships observed in this chapter were identified as similar to those presented in Chapter 6, suggesting that some continuity existed in the relationship to performance with the psychological qualities of the rugby union players assessed.

8.4 Objective 5: Predictive Efficacy of Significantly Related Self-Rated Psychological ratings on Performance Ratings

8.4.1 Data Screening

SPSS regression statistics were investigated to ensure that no assumptions were violated, for all four regression models that were investigated. Normal probability plots and residual scatter plots confirmed no violations of the normality, linearity or homoscedasticity assumptions. There was no suggestion of multivariate outliers, and tolerance values were all greater than 0.20 and collinearity diagnostics confirmed no problems of multicollinearity.

8.4.2 Coaches Rating of Performance

The associations between the players' self-rated variables and coaches' ratings of performance were further explored using coaches rating of performance as the outcome variable and the self-rated variables that correlated significantly with performance as predictors in a regression model and are presented in Table 33 below.

Table 33: Hierarchical regression of self-rated psychological variables on coaches' rating of seasonal performance

| <i>Model summary</i> | | | | | | |
|---------------------------------------|----------|-----------------------|----------|-----------|----------|--------------|
| | <i>R</i> | <i>R</i> ² | <i>F</i> | <i>df</i> | <i>p</i> | ΔR^2 |
| 1. Emotional Recognition & Expression | 0.37 | 0.13 | 11.93 | 1, 77 | .00 | |
| 2. Competitiveness | 0.50 | 0.25 | 12.57 | 2, 76 | .00 | 0.12 |

The model including Emotional Recognition and Expression explained 13% of the variance in coaches rating of performance scores, with the addition of Competitiveness explaining a further 12% of the variance.

8.4.3 Self-Rating of Performance

The association between the self-rated variables and self-rating of performance were further explored using self-rating of performance as the outcome variable, and the self-rated variables that correlated significantly with it as predictors in a regression model (Table 34).

Table 34: Hierarchical regression of self-rated psychological variables on self rating of performance

| <i>Model summary</i> | | | | | | |
|----------------------|----------|-----------------------|----------|-----------|----------|--------------|
| | <i>R</i> | <i>R</i> ² | <i>F</i> | <i>df</i> | <i>p</i> | ΔR^2 |
| 1. Emotional Control | 0.36 | 0.13 | 11.09 | 1, 76 | .00 | |
| 2. Goal Orientation | 0.43 | 0.18 | 8.37 | 2, 75 | .00 | 0.05 |

The model including Emotional Control scores was significant and explained 13% of the variance in self-ratings of performance scores, and the addition of Goal Orientation scores explained a further 5% of the variance.

8.5 Objective 5 - Findings

8.5.1 Coaches' Rating of Performance

Regression of the significantly related self-ratings identified Emotional Recognition and Expression (13%) and Competitiveness (a further 12%) as significant predictors of coaches' rating of performance scores for the 2005

Super 12 season. Players' self-rating of their ability to identify their own feelings and emotional states, and to express these inner feelings to others as well as their degree of competitive motivation to be involved in sporting competition were predictive of 25% of the variance associated with their coaches' ratings of their performance for the 2005 season. The ability to understand internal emotions, emotional states, and moods and what causes these emotions/moods, allows people to understand how they affect thought patterns and the behaviours that follow from the experience of emotions/moods. This ability to express or communicate emotions to others is also important in developing trust and inter-personal relationships, seeking assistance from others and feeling that others are recognising internal states as well as helping with problems. This occurs with accurately conveyed body language and tone of voice to peers that are consistent with the emotional state that is being experienced.

Effective communication was identified in the interview process (see section 3.4.1) as integral to success in rugby, and the accurate communication of the emotional state of players is an important facet of this process. Players were suggested to need to be good communicators and these skills were identified as critical to success on and off the field. Off the field, players need to be able to communicate in a genuine manner, as the accurate expression of emotions has been shown to engender trust between individuals (Stough, et al., 2009). Knowing what emotion to express to others can also have a large impact on how peers react to the information being conveyed. If a person realises that they are experiencing negative emotions, like anger or sadness, it may not be appropriate for them to deliver an inspiring speech or critique of team-mates performances. Negative emotional displays have previously been found to negatively affect the effectiveness of leaders in business (Lewis, 2000), and similarly, expression of negative emotions to team-mates may reduce the effectiveness of interactions off the field of play. Getting to know players off the field was identified as important in developing a good relationship, so players felt comfortable together, be able to empathise with each other, and develop mutual trust. Further to this, off-field interactions form the basis of players' relationships, and if these relationships are ineffective or produce

lower trust for example, on-field communication should also be ineffective. On-field, players need to be able to communicate effectively, and trust or believe in their team-mates to complete their roles in competition to the best of their ability.

Players' ratings of their sporting orientation towards Competitiveness, which is the desire of athletes to enter competitive sport situations and strive for excellence, also predicted a significant proportion of their coaches' ratings of seasonal performance. Unsurprisingly, players' ratings of their levels of Competitiveness were very high, consistent with previous findings that athletes and more so elite athletes display higher levels of competitiveness than non-athletes (Gill & Deeter, 1988). Players who reported greater levels of competitive orientation in their approach to rugby were rated by their coaches as having performed better for the 2005 season. The drive to compete, or be competitive in sporting situations should be a constant consideration for rugby union players, who are constantly faced with direct opposition, who in attack or defence are attempting to gain ground against them. Being highly motivated to compete at a high level against all direct opponents, and bringing this orientation to every game, or every training session, would produce observable behaviours and performances that coaches would assess as producing greater performance. For example, a player who confronts every contact situation in defence or attack with equal vigour and determination to gain (or prohibit loss of) ground, would appear to the coach as providing strong competition and a valuable role for the team, even when confronted by possibly superior opposition.

8.5.2 Objective 5 - Self Rating of Performance

Self-ratings of Emotional Control scores was significant and explained 13% of the variance in self-ratings of performance scores, and the addition of Goal Orientation scores explained a further 5% of the variance the in self-rated assessment of players' 2005 seasonal performance. Players who rated themselves higher in the ability to control strong emotions like anger or despair, and reported having an orientation focused on mastering tasks,

improving one's own personal skill, or just performing well relative to one's own ability also reported having performed better throughout the 2005 Super 12 season. Throughout the interview process (see section 3.3.3), players' ability to maintain composure, or display a high degree of Emotional Control was reported as an important factor in performance. In the previous chapter, coaches' ratings of players Emotional Control were found to be a significant predictor of coaches' ratings of seasonal performance. This is an interesting pattern of results, particularly considering that Emotional Control has been identified as a statistically significant predictor of two (self and coach) of the rated performance measures. The self-ratings and coaches' ratings of this capacity have also been found to be predictive of on-field performance metrics.

Players' ratings of their level of Emotional Control and its connection to their self-ratings of performance are possibly due to the lack of strong emotional reactions to poor performance, or being defeated by a direct opponent, to which higher ratings of performance should be linked. Players should be less likely to react to situations strongly and negatively when their performance is better, but players with lesser Emotional Control may experience anger or other strong feelings more easily on-field, adversely affecting their performance. Whereas, the frustration of being beaten by a direct opponent may become too much for a player with lower Emotional Control, and contribute further to their poorer performance. As such, players who experienced being angry, frustrated or disappointed with their performance would logically rate their performance lower.

8.6 Objective 2: Exploration of the Relationship Between Coaches' Ratings of Players' Psychological Traits and Performance

8.6.1 Coaching Demographics

Prior to analysis, the rater variables were examined for accuracy of data entry, and missing values. All variables were within range, with 113 players having had their psychological indices rated by their coach. The ratings came from

one of the three Australian based Super 12 teams; ACT Brumbies (N = 39); NSW Waratahs (N = 38); and QLD Reds (N = 36). The average of the coaches' ratings of all players' psychological indices are presented in Table 35 below.

Table 35: Means and standard deviations for coaches' ratings of psychological indices

| | <i>M</i> | <i>SD</i> | <i>Range</i> |
|------------------------------------|----------|-----------|--------------|
| Emotional Recognition & Expression | 5.64 | 1.99 | 1-9 |
| Understanding Emotions | 5.13 | 1.88 | 1-9 |
| Emotions Direct Cognition | 5.84 | 1.90 | 2-10 |
| Emotional Management | 4.92 | 2.18 | 0-9 |
| Emotional Control | 5.52 | 2.27 | 1-9 |
| Neuroticism | 4.18 | 2.16 | 0-9 |
| Extraversion | 5.92 | 1.99 | 1-10 |
| Openness to Experience | 6.18 | 1.86 | 1-9 |
| Agreeableness | 6.98 | 1.60 | 3-10 |
| Conscientiousness | 6.72 | 1.66 | 2-10 |
| Problem Focused Coping | 5.53 | 1.85 | 1-9 |
| Increased Effort & Resolve | 6.54 | 1.44 | 1-9 |
| Denial | 4.45 | 2.14 | 0-9 |
| Emphasising the Positive | 5.07 | 1.47 | 1-8 |
| Seeking Social Support | 5.90 | 1.75 | 2-9 |
| General Emotionality | 3.65 | 2.11 | 0-8 |
| Detachment | 3.96 | 1.63 | 1-8 |
| Wishful Thinking | 4.62 | 2.10 | 1-9 |
| Win Orientation | 7.11 | 1.58 | 2-10 |
| Goal Orientation | 7.87 | 1.54 | 3-10 |
| Competitiveness | 7.81 | 1.47 | 3-10 |

Note: N = 113

8.6.2 Emotional Intelligence

Coaches' ratings for the Emotional Intelligence measure were correlated with the two measures of performance. These correlations are presented in Table 36.

Table 36: Hypothesis 1 - Performance and Emotional Intelligence correlations

| Coach Ratings | Coaches' Rating of Performance | Self Report Performance |
|---------------------------------------|--------------------------------------|----------------------------|
| Emotional Recognition & Expression | 0.426** | 0.338** |
| Understanding Emotions | 0.284** | 0.217 |
| Emotions Direct Cognition | 0.246 | 0.226 |
| Emotional Management | 0.301** | 0.205 |
| Emotional Control | 0.177 | 0.198 |

Note: * = $p < 0.05$; ** = $p < 0.01$, N = 73 -105

Significant positive relationships were observed between Understanding Emotions and Emotional Management with coaches' rating of performance. Emotional Recognition and Expression correlated significantly and positively with both measures of performance, partially confirming hypothesis 1. The significant overlap observed between the performance metrics and the Emotional Intelligence variables suggest that the behaviours observed by coaches that reflect players' ability to express, understand, manage, and control emotions is significantly associated with how coaches and players viewed their seasonal performance.

8.6.3 Personality

Scores from the Personality ratings were correlated with the two measures of performance to identify if any significant overlap would be observed, and are presented in Table 37.

Table 37: Hypothesis 2 - Performance and Personality correlations

| Coach Ratings | Coaches' Rating of Performance | Self Report Performance |
|------------------------|--------------------------------------|----------------------------|
| Neuroticism | -0.060 | -0.043 |
| Extraversion | 0.289** | 0.184 |
| Openness to Experience | 0.366** | 0.195 |
| Agreeableness | 0.146 | -0.042 |
| Conscientiousness | 0.444** | 0.159 |

Note: * = $p < 0.05$; ** = $p < 0.01$, N = 74 - 104

Extraversion, Openness to Experience and Conscientiousness ratings all significantly and positively correlated with the coaches' rating of performance. These significant correlations were in the hypothesised direction, as were the correlations with the self-reported performance metric, although these correlations did not reach significance. The significant overlap between these personality ratings and the coaches' ratings of performance suggest that players who displayed behaviours consistent with being outgoing, sociable, an active imagination, intellectual curiosity, and was purposeful, determined, and good at planning performed better according to their coaches in the 2005 season.

8.6.4 Coping with Stress

Scores from the Coping measure were correlated with the two measures of performance (Table 38) to identify if any significant overlap existed between the ratings of engagement in particular strategies to deal with stress and performance.

Table 38: Hypothesis 3 - Performance and Stress Coping Strategies correlations

| Coach Ratings | Coaches' Rating of Performance | Self Report Performance |
|----------------------------|--------------------------------|-------------------------|
| Problem-Focused Coping | 0.578** | 0.230* |
| Increased Effort & Resolve | 0.407** | 0.178 |
| Denial | -0.200* | -0.156 |
| Emphasising the Positive | 0.242* | 0.110 |
| Seeking Social Support | 0.300** | 0.016 |
| General Emotionality | 0.082 | -0.040 |
| Detachment | -0.263** | -0.150 |
| Wishful Thinking | -0.336** | -0.251* |

Note: * = $p < 0.05$; ** = $p < 0.01$, N = 74 - 104

Coaches' ratings of player performance were found to be positively associated with ratings of Problem-Focused Coping, Increased Effort and Resolve, Emphasising the Positive, Seeking Social Support and negatively associated with the Denial, Detachment and Wishful Thinking coping strategies. Players who displayed behaviours consistent with using more relaxed, focused and logical approach to dealing with stressful situations, sought help from their team-mates, and increased their efforts when faced with stressful situations were observed by coaches to have performed better in the 2005 season than players who acted hastily under stressful conditions or refused to acknowledge the existence of stress. Players' self-rating of their performance was found to be positively and significantly related to ratings of Problem-Focused Coping and negatively and significantly with Wishful Thinking. Again this showed that observation of more adaptive coping strategies that address the problem, rather than hoping it would resolve itself were linked to greater ratings of performance.

8.6.5 Sporting Orientation Ratings

Scores from the Sporting Orientation dimensions were correlated with the two measures of performance and are presented in Table 39.

Table 39: Hypothesis 4 - Sporting Orientation and Performance Correlations

| Coach Ratings | Coaches' Rating of Performance | Self Report Performance |
|------------------|--------------------------------------|----------------------------|
| Win Orientation | 0.407** | 0.035 |
| Goal Orientation | 0.340** | -0.009 |
| Competitiveness | 0.368** | 0.072 |

Note: * = $p < 0.05$; ** = $p < 0.01$, $N = 74 - 104$

The three Sporting Orientation ratings were positively and significantly related to the coaches' ratings of performance. Coaches' observation of players' behaviours being consistent with being strongly competitive, focused on winning and attempting to achieve set goals was linked to provision of higher ratings of seasonal performance.

8.7 Objective 6: Predictive Efficacy of Significantly Related Coaches' Ratings of Players' Psychological Traits on Performance Ratings

8.7.1 Coaches Rating of Performance

The associations between the coaches' ratings of the psychological indices and coaches' ratings of performance were further explored using the coaches' rating of performance as the outcome variable, and the self-rated variables that correlated significantly with each performance indice as predictors in a regression model (Table 40).

Table 40: Hierarchical regression of coaches' rating of psychological variables on coaches' rating of performance

| | <i>Model summary</i> | | | | |
|--------------------------|----------------------|-----------------------|----------|-----------|----------|
| | <i>R</i> | <i>R</i> ² | <i>F</i> | <i>df</i> | <i>p</i> |
| 1.Problem-Focused Coping | 0.58 | 0.33 | 49.60 | 1, 99 | .00 |

The model including Problem-Focused Coping scores was significant and explained 33% of the variance in coaches' rating of performance scores.

8.7.2 Self-Rating of Performance

The association between the coaches' ratings of the psychological indices and players' self-rating of performance were further explored using coaches' rating of performance as the outcome variable, and the self-rated variables that correlated significantly with that subject as predictors in a regression model (Table 41).

Table 41: Hierarchical regression of coaches' rating of psychological variables on players' rating of performance

| | <i>Model summary</i> | | | | |
|---------------------------------------|----------------------|-----------------------|----------|-----------|----------|
| | <i>R</i> | <i>R</i> ² | <i>F</i> | <i>df</i> | <i>p</i> |
| 1. Emotional Recognition & Expression | 0.34 | 0.12 | 9.38 | 1, 72 | .00 |

The model including Emotional Recognition and Expression scores was significant and explained 12% of the variance in players' self-rating of performance.

8.8 Objective 6 - Findings

8.8.1 Objective 6 - Coaches' Ratings of Performance

Analysis of the significantly related coaches' ratings and their rating of players' performance identified that Problem-Focused Coping scores predicted 33% of the variance associated with coaches' rating of performance scores. Ratings of players' ability to think through stressful situations in a relaxed, focused and logical manner were predictive of a third of the variance in coaches' ratings of players' seasonal performance. The ability to perform under pressure, and be adaptable when faced with pressure was identified during the interview process as integral to success (see section 3.4.5). It was noted that players needed to be able to rebound quickly, not be adversely affected by emotions and focus energy on current events when confronted with stressful moments during games. In this way, use of problem-focused strategies that directly relate to dealing with the stressor, were favoured above emotion-focused strategies that deny the impact of stress, or indirectly address the stressor via

acting hastily and not seeking help or consultation from others. Use of a problem-focused approach involves coming up with a plan to deal with or solve the cause of stress, as such it infers an understanding of what is causing the stress, and what sort of action would solve the problem. During competition, dealing with stressful situations caused by competition, or opponents in a problem-focused manner, might translate into not letting an opponent get on top despite early dominance and consequently not letting team members down by altering their actions to deal with the stress caused by the contest, or being beaten by a direct opponent.

The existence of a positive relationship between the coaches' ratings of the use of Problem-focused coping strategies and the coaches' ratings of seasonal performance most likely reflect the ability of players to compete successfully under the inherent stress of Super 12 competition. Players' ability to maintain a high (normal) level of proficiency during games when faced with heterogeneously strong opposition (as is the norm for elite competition) in the eyes of their coaches' appears to be predicated on appearing to cope adaptively when under stress. This relationship may be further reflected in the existence of significant relationships between on-field statistics and ratings (self and coach) of utilisation of problem-focused coping strategies. In contrast, appearing to be overly negative emotionally, or unwilling or able to alter one's behaviour or technique in losing competitive situations may appear to coaches as performing poorly when faced with the stress of competition. Given that coping is considered to be a dynamic process (Folkman, et al., 1986), with utilisation of various strategies (problem and emotion focused) varying by degree use, rather than as a nominal choices, this relationship should reflect a preponderance of usage of problem-focused strategies by more successful players and vice versa.

8.8.2 Objective 6 – Players' Ratings of Performance

The regression model concerning players' self rating of their performance was significant, with coaches' ratings of Emotional Recognition and Expression scores explaining 12% of the variance in players' self-rating of performance.

Players who rated their performance higher for the 2005 season were also rated as being more able to identify the emotions they are experiencing, and better in their ability to express those emotions accurately. Higher ratings of this competency reflect those people who are particularly conscious of their emotions and who tend to freely express emotions. Players' ratings of their level of Emotional Recognition and Expression were found to predict a significant proportion of coaches' ratings of their 2005 Super 12 performance. Greater ability to perceive and express emotions contributes to how effectively people respond to one's emotions; and their communication of feelings to others; and therefore how accurately emotional dispositions are construed (e.g., genuineness, warmth, trustworthiness). This relationship may exist due to the players who have performed well over the season expressing positive emotions around their team and to their coaches, and this behaviour being interpreted by coaches as being greater due to the expression of these positive or adaptive emotions during times of better performance. Similarly, players may withdraw, or express negative emotions during or after poor performance that may contribute to a lower rating from their coach.

Expression of negative emotions on-field was identified as damaging to performance, though were logically considered an aspect of Emotional Control. As the dimensions of Emotional Intelligence have been demonstrated previously to have a degree of overlap (Palmer & Stough, 2001) and develop from the more basic abilities (Emotional Recognition and Expression) to the more complex abilities (Emotional Management and Control), the recognising and expression of emotions, whether positive or negative, is a basic and necessary component of the other abilities encompassed by the more complex Emotional Intelligence abilities. This overlap can be observed in the inter-correlation between players' ratings of their levels of Emotional Intelligence, with levels of Emotional Recognition and Expression and both Emotional Management and Emotional Control. The recognition of emotions is especially important when attempting to manage positive and negative emotions, or control stronger emotions. As management and control of emotions would be more adaptive if they are recognised accurately, and expressed in an appropriate manner. In contrast, exhibiting high levels of

control and low levels of recognition and expression concurrently may result in inexpressive responses to all situations, and inward confusion concerning the nature of the emotions.

8.9 Findings Summary

Data collected from the 2005 Super 12 season was analysed in the same fashion as the data presented in Chapter 6. Several consistencies were identified between the self-rated and coaches ratings of the players' psychological indices that predicted the subjective measures of performance. The results presented in this chapter further reflect the attempt to assess the role of anecdotally identified predictors of performance that were explored in the context of established psychological constructs. In regards to the subjective ratings of performance, regression models utilising significantly related constructs accounted for between 12% and 33% of the subjective ratings variance. These results suggest that the psychological indices used in both the analyses detailed in this chapter and the previous two results chapters are salient predictors of performance at the elite level of rugby union. The following chapter presents the second attempt to predict on-field statistics collected from the Australian based Super 12 sides with the same self and coach rated psychological indices utilised in this chapter.

CHAPTER 9: ANALYSIS OF 2005 SEASON ON-FIELD PERFORMANCE

9 Introduction

This chapter deals with the analysis of the second year collected on-field data from the three Australian based Super 12 teams during the 2005 Super 12 season. As with the results presented in the previous chapter, only self and coach ratings of the following constructs were assessed: Emotional Intelligence, Personality, Stress Coping Strategies, and Sporting Orientation.

9.1 On-Field Performance Analysis – Attack Statistics

Prior to analysis, the on-field variables were examined for accuracy of data entry, and missing values. Five of the variables were found to be not normally distributed; Total Passes per Game, Percentage of Dominant Contact Success, Ruck/Maul Involvement, Effective Ruck/Maul Involvement, and Miss Kicks. Again, the lack of normal distribution within these variables is most likely a consequence of the nature of the game of rugby union, and the positional specificity. The non-normally distributed variables were transformed (base 10 logarithmic transformation for Total Passes, Percentage of Dominant Contact Success, and Effective Ruck/Maul Involvement and square root transformation for Miss Kicks and Ruck/Maul Involvement), such that they could be utilised in analysis (Tabachnick & Fidell, 1996). All other variables satisfied the requirements of normality and 41 - 87 players having recorded at least one instance of the various 'attack' statistics during the Super 12 season. The statistics came from all three Australian based Super 12 teams; ACT Brumbies, NSW Waratahs, and QLD Reds. The average for each player, per attack statistic is presented in Table 42 below.

Table 42: Attack statistics averages

| | <i>N</i> | <i>M</i> | <i>SD</i> | <i>Range</i> |
|---|----------|----------|-----------|----------------|
| Total Passes per Game | 83 | 10.27 | 17.21 | 0.30 – 66.00 |
| Poor Passes per Game | 61 | 0.60 | 0.49 | 0.10 – 2.50 |
| Offload | 67 | 0.66 | 0.43 | 0.10 – 1.70 |
| Kicks General | 53 | 2.74 | 3.33 | 0.10 – 13.10 |
| Miss Kicks | 41 | 0.91 | 0.85 | 0.10 – 3.80 |
| Runs | 84 | 6.76 | 3.42 | 0.30 – 15.00 |
| Pick and drive | 56 | 0.60 | 0.52 | 0.10 – 2.20 |
| Over Advantage | 82 | 2.88 | 1.45 | 0.40 – 6.00 |
| Line Break | 62 | 0.73 | 0.48 | 0.10 – 6.00 |
| Break Tackle | 73 | 1.87 | 1.51 | 0.10 – 8.30 |
| Dominant Contact Success | 84 | 4.86 | 2.56 | 0.70 – 12.00 |
| Neutral Contact Success | 73 | 0.68 | 0.51 | 0.10 – 3.00 |
| Pass Contact Success | 61 | 0.53 | 0.44 | 0.10 – 3.00 |
| Percent of Dominant Contact Success (%) | 87 | 94.82 | 5.41 | 77.30 – 100.00 |
| Ruck/Maul Involvement | 84 | 5.45 | 2.76 | 0.90 – 15.00 |
| Effective Ruck & Maul Involvement | 84 | 15.92 | 9.88 | 0.80 – 41.00 |
| Ineffective Ruck & Maul Involvement | 66 | 1.44 | 1.37 | 0.10 – 6.30 |
| Penalties | 53 | 0.25 | 0.17 | 0.10 – 1.00 |
| Turnovers | 78 | 1.18 | 0.74 | 0.30 – 3.30 |
| Errors | 58 | 0.67 | 0.62 | 0.10 – 2.80 |

The averages for the on-field statistics were correlated with the player self ratings of Emotional Intelligence, Personality, Stress Coping Strategies, and Sporting Orientation to assess whether they could be used as predictors in regression models. Tables detailing these correlation coefficients appear in Appendix 6.

9.1.1 On-Field Performance Analysis – Defence Statistics

As per the ‘attack’ statistics, prior to analysis, the ‘defence’ on-field variables were examined for accuracy of data entry, and missing values. Five of the variables were found to be not normally distributed; average missed tackles, percentage of 1st tackles made, percentage of all tackles made, neutral contact success, and penalties. The lack of normal distribution within these

variables was attributed to the nature of the game of rugby union, and the positional specificity. Of the non-normal variables, neutral contact success and penalties per game could not be transformed successfully, and as such, were excluded from the correlational analysis. The non-normally distributed variables were transformed (base 10 logarithmic transformation) such that they could be utilised in analysis (Tabachnick & Fidell, 1996). All other variables satisfied the requirements of normality and 52 - 86 players having recorded at least one instance of the various 'defence' statistics during the Super 12 season. The statistics came from all three Australian based Super 12 teams; ACT Brumbies, NSW Waratahs, and QLD Reds. The average for each player per defence statistic is presented in Table 43 below.

Table 43: Defence statistics averages

| | <i>N</i> | <i>M</i> | <i>SD</i> | <i>Range</i> |
|-------------------------------|----------|----------|-----------|----------------|
| Tackles Per Game | 84 | 8.24 | 3.81 | 1.50 – 27.00 |
| Missed Tackles Per Game | 83 | 1.33 | 0.83 | 0.30 – 4.50 |
| 1st Tackles Per Game | 84 | 5.58 | 2.55 | 1.00 – 16.00 |
| Assisted Tackles Per Game | 84 | 2.67 | 1.66 | 0.30 – 11.00 |
| % First Tackles Made Per Game | 85 | 80.25 | 10.17 | 40.00 – 100.00 |
| % All Tackles Made Per Game | 86 | 85.56 | 8.17 | 50.00 – 100.00 |
| Dominant Contact Success | 66 | 0.52 | 0.43 | 0.10 – 2.50 |
| Neutral Contact Success | 71 | 0.61 | 0.34 | 0.10 – 1.70 |
| Pass Contact Success | 84 | 4.66 | 2.42 | 1.00 – 15.00 |
| D % | 66 | 7.87 | 5.88 | 1.20 – 29.40 |
| Ruck Involvement | 81 | 2.97 | 1.97 | 0.40 – 10.00 |
| Forced Turnovers | 67 | 0.74 | 0.64 | 0.10 – 3.00 |
| Penalties | 52 | 0.45 | 3.81 | 0.10 – 3.00 |

The averages for the 'defence' on field statistics were correlated with the player self ratings of Emotional Intelligence, Personality, Stress Coping Strategies, and Sporting Orientation, to assess whether they could be used as predictors in regression models. Tables detailing these correlation coefficients appear in Appendix 7.

9.2 Objective 7: Predictive Efficacy of Significantly Related Self-Rated Psychological Ratings on On-Field Performance

9.2.1 Attack Based Statistics and Self Rated Psychological Measures

These associations were further explored using the on field statistics as the outcome variable and the significantly correlated psychological indices as predictors in hierarchical regression models. Competitiveness was found to significantly predict Offload [$R^2 = 0.12$: $F(1, 49) = 6.61$, $p = 0.01$]. Kicks in play were found to be significantly predicted by Seeking Social Support [$R^2 = 0.10$: $F(1, 38) = 4.27$, $p = 0.05$]. Effective Ruck/Maul Involvement was found to be significantly predicted by ratings of Emphasising the Positive [$R^2 = 0.08$: $F(1, 62) = 5.40$, $p = 0.02$], whereas, Ineffective Ruck/Maul Involvement was significantly predicted by Understanding Emotions scores [$R^2 = 0.08$: $F(1, 48) = 4.17$, $p = 0.05$].

9.2.2 Objective 7: Findings From Attack Based Statistics and Self Rated Psychological Measures

Competitiveness was found to significantly predict the average number of times players offloaded the ball whilst being tackled. Greater levels of Competitiveness were associated with offloading the ball more often during tackles, suggesting this competitive orientation affects players' reactions to tackles. The greater offloading of the ball in the tackle for more competitively oriented players may reflect a type of refusal to give up when tackled, so that rather than 'giving up' and going to ground, a more competitive player may choose to keep the ball alive by offloading it in the tackle.

Kicks in play were found to be significantly predicted by players' ratings of how often they utilised the Seeking Social Support stress coping strategy. Greater numbers of kicks in general play were associated with lower usage of the Seeking Social Support strategy, which suggests that in times of stress when in possession of the ball, that these players will kick the ball towards opposition territory, rather than look for support from their team-mates.

Effective Ruck/Maul Involvement was found to be significantly predicted by self-ratings of Emphasising the Positive, although this relationship was negative, suggesting that emphasising the positive side of stressful ruck/maul situations whilst involved would not contribute to the efficacy of their involvement. In contrast, Ineffective Ruck/Maul Involvement was significantly predicted by Understanding Emotions scores negative relationship, suggesting that players who are less able to identify and understand the emotions of others and how they affect their surroundings engage in less effective attempts to involve themselves in rucks and mauls. This may occur as lower scoring players may not interpret emotional cues from their teammates involved in a ruck or maul, and either involve themselves in a unsuccessful manner when needed, or be unhelpful when involving themselves unnecessarily.

9.3 Objective 8: Predictive Efficacy of Significantly Related Coaches' Ratings of Players' Psychological Ratings on On-Field Performance

9.3.1 Attack Based Statistics and Coaches' Rated Psychological Measures

The averages for the on-field statistics were correlated with the coaches' ratings of Emotional Intelligence, Personality, Stress Coping Strategies, and Sporting Orientation to assess whether they could be used as predictors in regression models. Tables detailing these correlation coefficients appear in Appendix 8. These associations were further explored using the on field statistics as the outcome variable and the significantly correlated coaches' ratings of the psychological indices as predictors in hierarchical regression models. Coaches' ratings of players levels of Emotions Direct Cognition were found to significantly predict: the average number of times players crossed Over Advantage [$R^2 = 0.09$: $F(1, 76) = 7.79$, $p = 0.01$]; the average number of Broken Tackles [$R^2 = 0.13$: $F(1, 68) = 10.56$, $p = 0.00$]; and Dominant Contact Success [$R^2 = 0.06$: $F(1, 78) = 5.13$, $p = 0.03$]. Ratings of players' levels of

Openness were found to significantly predict Ineffective Ruck/Maul involvement [$R^2 = 0.07$: $F(1, 61) = 4.65$, $p = 0.04$], whereas, Ruck/Maul involvement was predicted by Win Orientation [$R^2 = 0.05$: $F(1, 78) = 4.21$, $p = 0.05$]. The average number of Line Breaks was significantly predicted by coaches' ratings of Conscientiousness [$R^2 = 0.10$: $F(1, 58) = 6.65$, $p = 0.01$] and ratings of General Emotionality were found to significantly predict the percentage of Dominant Contact Success [$R^2 = 0.08$: $F(1, 80) = 6.78$, $p = 0.01$]. Ratings of players' use of the General Emotionality [$R^2 = 0.18$: $F(1, 36) = 7.79$, $p = 0.01$] stress coping strategy were found to significantly predict the average number of Miss Kicks. The average number of Pick and Drives per game were significantly predicted by ratings of Emphasising the Positive [$R^2 = 0.14$: $F(1, 51) = 8.21$, $p = 0.01$] and Denial [$R^2 = 0.15$: $F(2, 50) = 10.00$, $p = 0.00$] together accounting for 29% of the variance in the Pick and Drive statistic.

9.3.2 Objective 8: Findings From Attack Based Statistics and Coaches' Ratings of Psychological Measures

Coaches' ratings of players' levels of Emotions Direct Cognition were found to significantly predict: the average number of times players crossed Over Advantage, the average number of Broken Tackles, and Dominant Contact Success. These indicators all relate to when players carry the ball in to the opposition line and the degree of success they experience. The greater incorporation of emotions and emotional knowledge in decision-making or problem solving can be likened to an intuitive approach to decision-making (Downey, et al., 2006). Intuitive decision-making on the sporting field can be adaptive when players can make good decisions on how to act in a situation on the basis of limited information. In this way, when a player pays more attention to how they feel about a situation that arises on the field, they may in fact be recalling emotional information they experienced in similar situations previously. Intuition has been described as the capacity to sense messages from our internal store of emotional memory – our own reservoir of wisdom of judgment (Chapman, 2000). Intuitive decision-making by rugby players may take the form of deciding quickly to attack a player (or players) in the

defensive line on a particular angle that may enable them to be more dominant in contact, cross the advantage line, or even break the tackle of the defensive player.

Ratings of players' levels of Openness were found to significantly predict Ineffective Ruck/Maul involvement, with lower levels of Openness being associated with Ineffective Ruck/Maul involvement. People who are lower in Openness could be described as inflexible, myopic, non-creative, or narrow-minded (Costa & McCrae, 1992). In this way, when faced with a ruck or maul situation, players who are inflexible in their approach may not provide effective involvement due to their lack of flexible thinking that may be necessary to involve themselves effectively in the ruck or maul. Pure involvement in rucks and mauls was predicted by Win Orientation, with greater involvement being associated with a higher degree of win oriented motivation. Involvement in greater numbers of rucks and mauls is probably driven by the players' desire to win or place highly relative to other competitors or opposition, and involvement in these situations would ostensibly be driven by their desire to maintain possession of the ball in these pivotal situations.

Ratings of players' use of the General Emotionality coping strategy was found to significantly predict the percentage of Dominant Contact Success, with lower usage of this maladaptive coping strategy being associated with greater percentage of being dominant in contact situations. As such, players who were rated as less inclined to take a chance or act hastily under stressful conditions, were more likely to be dominant in contact situations. Being overly emotional or acting hastily in a contact situation may contribute to a decrement in technique, thus reducing the player's efficacy in contact situations. In contrast, greater usage of the General Emotionality stress coping strategy was found to significantly predict the average number of Miss Kicks. This model possibly reflects players kicking in a more risky manner, and players kicking the ball when being overly emotional in the face of stress, rather than utilising a more problem-focused approach. Together, these two models illustrate how acting hastily under stressful conditions in rugby union

can be particularly maladaptive, and that these behaviours are readily observable by coaches.

The average number of Pick and Drives per game was significantly predicted by ratings of Emphasising the Positive and Denial, with greater number of Pick and Drives being positively associated with Emphasising the Positive scores, and negatively with use of the Denial coping strategy. A pick and drive involves picking up the ball from the ruck and moving forwards, decision to undertake a pick and drive when the ball is secured in the ruck is somewhat risky decision, as the ball can be 'knocked on', and by picking it up, the momentum of the ruck is stalled. The greater ratings of emphasising the positive side of a stressful situation and lesser denial of the stress of the situation prediction may lie in coaches' observation of their players' approach to the ruck/maul situation. Players who were able to successfully perform a pick and drive may also present themselves as aware of the nature of the stressful situation (the ruck or maul in this case) and be able to act appropriately by picking the ball up altering the situation through the drive.

9.4 Objective 7: Predictive Efficacy of Significantly Related Self-Rated Psychological Ratings on On-Field Performance

9.4.1 Defence Based Statistics and Self Rated Psychological Measures

These associations were further explored using the on-field statistics as the outcome variable and the significantly correlated psychological indices as predictors in hierarchical regression models. The average number of Missed Tackles was significantly predicted by self ratings of Goal Orientation [$R^2 = 0.09$: $F(1, 61) = 5.71$, $p = 0.02$], as was the Percentage of All Tackles made [$R^2 = 0.09$: $F(1, 63) = 6.38$, $p = 0.01$]. The average number of tackles made per game was predicted by self-ratings of both General Emotionality [$R^2 = 0.12$: $F(1, 62) = 8.67$, $p = 0.01$] and Agreeableness [$R^2 = 0.06$: $F(2, 61) = 6.80$, $p = 0.00$] together accounting for 18% of the variance of the average number of tackles made per game. The number of 1st Tackles made was significantly predicted by both Agreeableness [$R^2 = 0.12$: $F(1, 62) = 8.51$, $p = 0.02$] and

General Emotionality [$R^2 = 0.07$: $F(2, 61) = 6.99$, $p = 0.00$], together accounting for 19% of the variance in the number of 1st tackles made. Self-ratings of Understanding Emotions were found to predict: Dominant Contact Success [$R^2 = 0.17$: $F(1, 46) = 9.55$, $p = 0.00$] and Percentage of Dominant Contact Success [$R^2 = 0.24$: $F(1, 46) = 14.53$, $p = 0.00$]. Ratings of the use of Emphasising the Positive coping strategies was found to predict Ruck Involvement [$R^2 = 0.08$: $F(1, 60) = 5.20$, $p = 0.03$]. The average number of Forced Turnovers produced by players was significantly predicted by both Competitiveness [$R^2 = 0.19$: $F(1, 52) = 12.42$, $p = 0.00$] and Agreeableness [$R^2 = 0.07$: $F(2, 51) = 8.93$, $p = 0.00$] ratings that together accounted for 26% of the variance in Forced Turnovers.

9.4.2 Objective 7: Findings From Defence Based Statistics and Self Rated Psychological Measures

The average number of Missed Tackles was significantly predicted by self ratings of Goal Orientation as was the Percentage of All Tackles made. Players' self-ratings of their levels of Goal Orientation were positively related to the amount of tackles made, and negatively related to the number of missed tackles. Together, these two regression models suggest that goal directed behaviour focused towards performing to the best of their ability in regards to tackling, would be reflected in players tackling to the best of their ability and these tackles being successful more often.

The average number of tackles made per game and the number of 1st Tackles made was predicted by self-ratings of both General Emotionality (negatively) and Agreeableness (positively). In both cases, lower usage of the General Emotionality stress coping strategy and higher levels of Agreeableness were associated with making more first and assisted tackles per game. Acting hastily or taking a chance when tackling may involve less appropriate tackling technique, and may contribute to less successful tackling attempts. Higher levels of Agreeableness may contribute to the involvement in more 1st and assisted tackles as greater Agreeableness is reflected in behaving in an altruistic, sympathetic, and cooperative manner. Greater Agreeableness may

drive players to help their team-mates in defence by taking on the tackling responsibility, and also through involving themselves in tackles into which their team-mates have entered.

Self-ratings of Understanding Emotions were found to predict: Dominant Contact Success, Neutral Contact Success, and the Percentage of Dominant Contact Success. In these three cases, lower self-ratings of the ability to understand the emotions of others was associated with being dominant (gaining ground), or not losing ground more often in defence. Lower scores on this Emotional Intelligence dimension typically characterise those who are less conscious of the emotions of others and who tend not to pay attention to emotions. A lack of attention paid to the opposition player may in this case be adaptive, with strong approach to contact situations not being affected by observation of positive or negative emotions being exhibited by the player approaching them.

Ratings of the use of Emphasising the Positive coping strategies were found to predict Ruck Involvement, with greater number of average ruck involvements being associated with lesser usage of the Emphasising the Positive stress coping strategy. Whilst the Emphasising the Positive is a somewhat more adaptive stress coping strategy, in that people can utilise the positive emotional outcome of the situation to generate more problem-focused attempts in reducing the impact of the stressor. Involvement in a ruck in defence requires players to apply themselves diligently in each situation as to reduce any gain territory for the opposition and avoid penalisation. As such, players should approach this instance in a more problem-focused manner, rather than just considering the positives of the situation.

9.5 Objective 8: Predictive Efficacy of Significantly Related Coaches' Ratings of Players' Psychological Ratings on On-Field Performance

9.5.1 Defence Based Statistics and Coaches' Rated Psychological Measures

The averages for the 'defence' on-field statistics were correlated with the coaches' ratings of Emotional Intelligence, Personality, Stress Coping Strategies, and Sporting Orientation to assess whether they could be used as predictors in regression models. Coaches' ratings of Win Orientation levels of players were found to significantly predict the average number of 1st Tackles made per game [$R^2 = 0.10$: $F(1, 78) = 8.93$, $p = 0.00$], whereas, the number of Missed Tackles was significantly predicted by ratings of players' use of the General Emotionality [$R^2 = 0.07$: $F(1, 77) = 5.60$, $p = 0.02$] coping strategy. Coach ratings of both Win Orientation [$R^2 = 0.09$: $F(1, 78) = 7.69$, $p = 0.01$] and Extraversion [$R^2 = 0.05$: $F(2, 78) = 6.17$, $p = 0.00$] significantly predicted 14% of the variance of the Average Number of Tackles per game. The average percentage of All Tackles Made was significantly predicted by both the ratings of Competitiveness [$R^2 = 0.09$: $F(1, 79) = 7.71$, $p = 0.01$] and Emotions Direct Cognition [$R^2 = 0.05$: $F(2, 78) = 6.38$, $p = 0.01$], together accounting for 14% of the variance in the percentage of All Tackles Made. The average percentage of First Tackles made was significantly predicted by Competitiveness ratings [$R^2 = 0.11$: $F(1, 79) = 10.17$, $p = 0.00$]. Passive Contact Success was found to be significantly predicted by both Emotional Management ratings [$R^2 = 0.09$: $F(1, 78) = 8.08$, $p = 0.01$] and ratings of Win Orientation [$R^2 = 0.08$: $F(2, 77) = 7.71$, $p = 0.00$], together accounting for 17% of the variance in Passive Contact Success. Percentage of Dominant Contact Success was predicted by Coaches' ratings of Emotional Recognition and Expression [$R^2 = 0.08$: $F(1, 60) = 5.09$, $p = 0.03$].

9.5.2 Objective 8: Findings From Defence Based Statistics and Coaches' Ratings of Psychological Measures

Coaches' ratings of Win Orientation levels of players was found to significantly predict the average number of 1st Tackles made per game, with a greater orientation towards the win being related to being the first player involved in a tackle. Whereas, the number of Missed Tackles was significantly predicted by ratings of players' use of the General Emotionality coping strategy, with greater use of this emotion-focused strategy typified by acting hastily contributing to a greater number of missed tackles over the 2005 Super 12 season. Coaches ratings of Win Orientation are most likely linked to the number of 1st tackles made by players through the observation that players who are making these first tackles are strongly focused on the aspects of the game that contribute directly to winning. Coaches' ratings of both Win Orientation and Extraversion significantly predicted the Average Number of Tackles per game, with greater levels of Extraversion and Win Orientation contributing to higher numbers of tackles made. The connection between making tackles and Win Orientation is similar to that of the significant prediction of the number of 1st tackles made, with the drive for the win probably pushing players to make more tackles. Extraverts are generally assertive (Costa & McCrae, 2008), and the tackle can be one of rugby's most assertive acts, with the physical manhandling of an opposition player.

The average percentage of All Tackles Made was significantly predicted by both the ratings of Competitiveness and Emotions Direct Cognition; these dimensions were associated positively with the percentage of tackles made by players throughout the 2005 Super 12 season. Higher levels of Competitiveness present as a drive to perform at one's best throughout competitive situations. Bringing this orientation to every game, or even training session, would produce observable behaviours and performances that coaches would assess as producing greater performance, and as such have been identified previously in this thesis as a predictor of coaches' performance ratings (see: section 6.7.2). Putting in one's best effort into every

tackle would be an easily observable behaviour for coaches to identify, with decrements in effort leading to missed tackles.

The average percentage of First Tackles made was significantly predicted by both Competitiveness ratings, with higher levels of Competitiveness and the predicting a significant proportion of the average number of first tackles made by players in the 2005 Super 12 season. A competitive orientation may drive players to want to be the first involved in a tackle, such that they are motivated to approach the ball carrier first and lay the first tackle, rather than assisting team-mates when joining a tackle. Making a high amount of these tackles provides a great advantage for teams, as missed tackles can lead to greater territory gained by the opposition, or in worse cases, the scoring of a try.

Passive Contact Success was found to be significantly predicted by both Emotional Management ratings and ratings of Win Orientation, with both self-ratings being positively associated with involvement in contact situations where the approaching attacking player is dominant. Whilst at first this regression model including Win Orientation and Emotional Management as significant predictors of a more negative on-field outcome, the involvement in these situations, rather than the outcome, may be more responsible for the relationship. The drive to win at all costs may promote involvement in contact situations in defence, irrespective of the relative dominance of players. Greater levels of Emotional Management may also contribute to this relationship through players who score higher being more resilient emotionally to this common setback.

Percentage of Dominant Contact Success was predicted by coaches' ratings of Emotional Recognition and Expression, with lower ratings of recognition and expression being associated with being dominant in contact situations. Coaches' ratings of this aspect of Emotional Intelligence may more strongly reflect the expression aspect, with players who are expressing greater amounts of emotion (most likely negative emotional reactions) as a result of not being dominant in contact situations. In contrast, players who express less

negative emotional reactions during contact situations, or appear in control of their emotions to coaches may also have been more dominant in contact situations.

9.6 Summary of 2005 Results

The aim of the preceding analyses was to identify whether the measurement of self ratings of psychological indices and coaches' ratings of the same psychological constructs could be used to predict on-field performance statistics from the 2005 Super 12 rugby union season. Following the previous chapters analysis concerning the 2004 Super 12 rugby season, it was expected that the predictors of performance would remain similar in regards to predictors and magnitude of variance predicted. Whilst this was true in most regards, some important differences did occur. Tellingly, a number of the psychological constructs assessed (in both self and rater forms) showed significant predictive efficacy for the various performance indicators, suggesting that these psychological indices are important contributors to rugby union player performance.

CHAPTER 10: GENERAL DISCUSSION, LIMITATIONS AND FUTURE DIRECTIONS

10 General Discussion

Over the course of two complete Super 12 rugby union seasons, self-reported and coaches' rated psychological attributes of elite Australian rugby union players were collected. The collection of this information was based upon anecdotal reports of the psychological attributes of successful rugby union player performance from the interview process detailed in Chapter 3. This information was utilised in a series of regression models of subjective and objective performance measures derived from correlational analyses of the relationships between performance and the psychological attributes of the players. Both subjective and objective measures were utilised throughout the data collection process to identify if any consistencies existed between the predictive efficacy of self-rated psychological attributes and coaches' ratings of the same attributes in relation to the subjective and objective performance indices. Further to this, it was possible to observe whether the same psychological attributes of players were predictive of performance over the course of two seasons.

10.1 Coaches' Ratings

Over the two data collection periods, the coaches' ratings of players' attributes that were significant predictors of the subjective performance measures remained consistent. Ratings of players' Emotional Intelligence were significant predictors in seven of the eight regression models over the two years. Ratings of players' usage of a Problem-focused approach when faced with stressful situations were also a significant predictor in three of the regression models. Coaches' observation of the players' ability to identify one's own feelings and emotional states, and the ability to express those inner feelings to others; identify and understand the emotions of others; to incorporate emotions and emotional knowledge into decision-making and/or

problem solving; to manage positive and negative emotions both within oneself and others; and their ability to effectively control strong emotional states experienced such as anger, stress, anxiety and frustration predicted significant amounts of the variance associated with the subjective performance ratings. The presence of Emotional Intelligence variables across the two years of data collection suggests that the abilities encompassed by Emotional Intelligence are integral to elite rugby union performance. This finding suggests that the observation of the emotional capabilities of rugby union players is interlinked with multiple aspects of rugby union performance. Not only were Emotional Intelligence dimensions predictive of the subjective ratings of performance over the data collection phases, they were also found to be predictive of a number of objective (on-field) measures including: penalties, poor passes, and crossing over the advantage line.

Only recently has assessment of athletes' levels of Emotional Intelligence gained attention (Lane, et al., 2009; Meyer & Fletcher, 2007; Stough, et al., 2009). This interest stems from the observed link of Emotional Intelligence and health and performance related variables (Schutte, Malouff, Thorsteinsson, Bhullar & Rooke, 2007; Van Rooy & Viswesvaran, 2004). It has also been suggested that assessment of Emotional Intelligence may fill an important gap in the understanding of the emotional experience of sporting involvement, and how moderating and appropriately expressing the experience of emotions can facilitate performance (Vallerand, 1983). Previous sporting research has focused on one aspect of emotion, such as optimal levels of arousal (e.g., the IZOF model: Hanin, 2000) or balance between positive and negative emotions, which means that while each individual theory adds to our understanding, there is no one particular model that can be used to explain the complete relationship between the full range of our emotions and sporting performance (D'Urso, et al., 2002). The findings of the current thesis suggest that assessment of how athletes experience, express, understand, utilise, manage and control emotions is of value in predicting their performance. It is therefore important that athletes learn how to recognise their emotions, express them appropriately and manage them effectively (Botterill & Brown, 2002). As such, Emotional Intelligence is a useful broad

measure of the emotional competency of elite athletes that can be measured alongside performance.

The importance of dealing adaptively with emotions was further reflected in the presence of Problem-focused coping in performance regression models along with the Emotional Intelligence variables. Problem-focused coping strategies aim to directly deal with stressors, rather than reacting emotionally to stressors. A Problem-focused approach involves coming up with a plan to deal with or solve the cause of stress, as such it infers an understanding of what is causing the stress, and what sort of action would solve the problem. Coaches' ratings of how players deal with the stress of rugby were also significantly associated with a number of on-field statistics over the two data collection periods. Players' ability to maintain a high (normal) level of proficiency during games when faced with strong opposition (as is the norm for elite competition) in the eyes of their coaches appears to be predicated on appearing to cope adaptively when under stress. In contrast, being overly negative emotionally, or unwilling or able to alter one's behaviour or technique in losing competitive situations was found to be predictive of negative outcomes in the objective statistics. These emotion-focused coping strategies are more concerned with attending to the negative emotions that are induced in the stress and coping process. The General Emotionality coping strategy particularly was found to be predictive of a number of the objective statistics, with the relationship between the on-field statistics and General Emotionality being negative. This strategy is typified by reacting quickly and taking risky options in the face of a stressor (Madden, et al., 1987). This type of strategy is contrary to the Problem-focused approach that was consistently implicated in better seasonal performance across the data collection.

Given that coping is considered to be a dynamic process (Lazarus & Folkman, 1986), with the utilisation of strategies varying by degree of use, the presence of Problem-focused coping in the performance regressions reflect a preponderance of usage of Problem-focused strategies by more successful players (and more positive objective outcomes) and the negative outcomes associated with General Emotionality reflect the maladaptive effect of

emotion-focused coping in elite competition.

10.2 Self Ratings

Over the two data collection periods, players' self-ratings of their psychological attributes that were significant predictors of the subjective performance measures were less consistent year to year than the coaches' ratings. Having said this, 4 of the 5 dimensions of Emotional Intelligence that were assessed were identified as significant predictors of the performance measures and the three Sporting Orientations were also significant predictors. That the self-rated Emotional Intelligence dimensions were implicated in the regression models for performance is encouraging evidence for the utility of Emotional Intelligence testing in elite athletes. In the only previously published study utilising the same measure of Emotional Intelligence, self-ratings of basketball players' Emotional Intelligence were found to significantly relate to a number of defensive and offensive performance statistics (Stough, et al., 2009).

The current findings have extended upon this notion that the Emotional Intelligence capabilities of sportspeople is related to their objective performance by additionally assessing subjective performance ratings, and observing that they too are related to Emotional Intelligence competencies. It has been suggested that the competencies underpinning Emotional Intelligence, enable people to demonstrate intelligent use of their emotions in managing themselves and working effectively with others, and in a team-based elite sports the ability of team-mates to work together towards a common goal is of paramount importance. What makes this finding more attractive is that, unlike traditional models of intelligence and personality, it has been demonstrated that an individual can improve their Emotional Intelligence through focused development programs (Hansen, Gardner & Stough, 2009). Given that the athletes involved in this thesis reported below average levels of Emotional Intelligence, this advocates the use of development programs within this population. Whether incremental improvement in levels of Emotional Intelligence would directly influence

performance on the field would need to be quantified in a intervention based study, but having observed the predictive efficacy of Emotional Intelligence dimensions on both subjective and objective measures of performance in this population, it would suggest that even providing athletes with an awareness of the pervasiveness of Emotional Intelligence and the behaviours that relate to their performance would be of benefit.

The Sporting Orientation measures of Competitiveness, Goal and Win Orientation were also found to be consistent predictors of subjective and objective performance across the two Super 12 seasons. Competitiveness is the desire of athletes to enter competitive sport situations and strive for excellence, Win Orientation refers to an athlete's drive and direct focus on winning at any cost, and Goal Orientation relates to players focusing on completing goals, mastering tasks, improving one's own personal skill, or just performing well relative to one's own ability. In essence, each of these orientations reflects behaviours that players and coaches would see as adaptive in regards to successful performance at the elite level. The players who completed the self assessments of their orientation rated themselves highly in these three aspects, a not uncommon finding in elite athlete research (Biddle, 2001). The relative value of these self-ratings is evident in their consistent appearance as significant predictors of positive outcomes of on-field statistics. These attributes were found to be predictive of the numbers of runs made, penalties, missed tackles, and forced turnovers for example. This suggests that players who are more win, goal, and competitively oriented are statistically performing well, as well as performing better according to their self-ratings of and coaches' ratings of seasonal performance.

10.3 Limitations

A number of limitations were identified during the course of conducting the current thesis. These limitations fell into four categories, the efficacy of players' ratings of their 'trait' psychological indices, the accuracy of coaches' ratings of their players' psychological indices, the fidelity of the rated performance measures, and the utility of the seasonal averages of players'

on-field performance metrics. The findings of the current thesis are derived from a very specific population, with the study design and data collection efforts being limited by access to the study population, and by the types of data that could be collected. Whilst the data collected in the three phases detailed through chapters three through nine reflect a unique attempt to address the role of elite rugby unions players' psychological attributes and how they relate to performance, some limitations in the data collection were unavoidable.

10.3.1 Trait Profiling of Players' Psychological Indices

Access to elite sportspeople for researchers is a constant challenge in sports psychology. This challenge was especially evident in the design of the data collection phases of this thesis. With the aim of assessing the psychological attributes of all contracted Australian based professional rugby union players, a number of considerations had to be made; access to players, the amount of time players could commit to assessment, how these assessments could be utilised in predicting performance, and what were appropriate performance measures. Inherent problems exist in utilising assessment of the 'trait' aspects of elite sportspeople as predictors of performance. Self-rating questionnaires depend on the respondent being able to accurately rate themselves on the assessments provided, accurate answering of items is especially important when the data collection is a singular event. Assessment of 'traits' provide information on the characteristic way in which an individual perceives, feels, believes, or acts. Whilst this information provides a good indication of how someone will generally act, or portray themselves, it cannot account for instances where a person acts out of character, whether as a result of external or internal influences. Previously, assessment of 'trait' attributes has been limited to identifying whether differences exist between sports people of various levels and in comparison to non-sportspeople. Whilst this information has helped to clarify the 'trait' differences between various groups, their variable relationship with these measures and performance has not been widely examined. A wide range of research exists concerning the role of 'state' aspects of moods, with the information garnered from in-

competition moods being able to be modelled to directly reflect any changes during competition. Whilst it was not feasible to individually assess state attributes of approximately 90 players per year over an entire season with games played in three countries, the study is still limited due to the lack of ability to collect state data during all matches. As with players' performance, their moods have been previously shown to vary and directly affect performance across a game (and shorter periods). Whilst 'trait' data provides a good indication of how people will react to situations across time, some variance obviously exists between individual situations in how their mood changes, how they react, and how they perform.

A further possible limitation in the use of self-ratings of traits is the possibility of socially desirable responding. Whilst players were informed that their individual responses would be kept private, the possibility still exists that players may alter their responses to some items in order to present themselves in a way they would like to be perceived. A measure of social desirability was included in the first year of data collection, with no obvious patterns of socially desirable responding emerging. For example, the greatest amount of overlap occurred between social desirability scores and Neuroticism ($r = -0.338$) scores, which may suggest that rugby union players sampled would like to be considered more calm, secure, and self-satisfied versus being anxious, insecure, and self-pitying (Costa & McCrae, 1992). No consistent pattern of response bias occurred across the remaining psychological attributes, although it is impossible to totally rule out sporadic response bias from individuals through analysis of the entire sample.

10.3.2 Coaches' Ratings of Players Psychological Indices

The accuracy of coaches' ratings of multiple players' psychological make-up is another possible limitation to the findings of the current utilising these ratings. A number of factors could contribute to inaccurate ratings, including the strength of the relationship between coach and player; the coaches' understanding of the behaviours that reflect the degree of the variables assessed; and the possible assumption by coaches that players who perform

better also possess more adaptive psychological attributes and therefore rate them higher.

Organisational psychology has long utilised peer supervisor ratings for various measures of employee attributes. Studies have noted that these ratings often only correlate with self-ratings at a low to moderate level (e.g., Conway & Huffcutt (1997) identified a 0.22 correlation between self and supervisor ratings for job performance in a meta-analysis). Peer ratings generally have been found to correlate higher with self-ratings, with this greater association being attributed to the closeness of peer relationships versus that with supervisors. In regards to the relationship between the coaches' ratings and players' self-ratings of the same constructs, for the five Emotional Intelligence sub-scales the correlations between the two rating types ranged from 0.25 to 0.44, suggesting the two rating formats shared a reasonable amount of variance. As such, future studies could incorporate the use of multiple ratings of players attributes to identify any inaccuracy of ratings.

Accuracy of the ratings of players' attributes would also be dependant on the quality of the relationship between coach and player. This relationship would depend on the length of the relationship, the amount of time each player spends with their coach, and the ability of the coach to recall instances where players displayed behaviours specific to the attributes assessed in the current thesis. Whilst all coaches were provided with definitions of each attribute that was assessed, along with behaviours that players would demonstrate, some inaccuracy in ratings may still exist due to how players and coaches interact.

10.3.3 The Fidelity of Rated Performance Measures

Self-ratings and coaches' ratings of seasonal performance were utilised in this thesis to model performance across two seasons of elite rugby union. These two rating scales were administered in a single-response format, where both the coach and player had to rate their seasonal performance out of 10 for the two seasons. Again, the driving force behind selecting a singular rating of each player's performance was the time available for player and coach

testing. The use of the 10-point rating scale for both ratings allowed direct comparison of the seasonal performance ratings and the self and rated predictors, ostensibly identifying what aspects of players' psychological attributes contributed to the two different performance conceptualisations. The inherent limitation in a singular performance rating for both coaches and players is again the inability to track individual game performance, game performances over time (form), and to be able to compare an 'average' or expected performance for individual games. Success and failure have been described as the psychological state generated from the interpretation of an outcome (Maehr & Nicholls, 1980) as such; success can be interpreted as performing well against an opponent, even if the team loses.

Whilst coaches would be expected to have a good understanding of their players' seasonal performance, how well players performed over a season could also be affected by how successful their team as a whole was for the season. Coaches may be motivated to rate players who were part of a successful team higher than coaches of less successful teams. Further to this, the players who are being coached are of elite ability, and as such, are expected to perform at very high levels, even in comparison to their elite opposition. This high level of performance may limit the generalisations of the findings to athletes of lesser ability, as the differences in performance levels of elite players may be more due to psychological aspects, whereas, less 'elite' competitors' performance may be more affected by their physical and skill levels.

10.3.4 The Utility of Seasonal On-field Performance Metrics

A number of possible limitations in the fidelity of on-field data may exist: with the data being utilised being a seasonal average per player, and as such, cannot reflect the variability of game-to-game performance. Further to this, defining success using through the use of objective statistics can be problematic as the resulting statistics can be interpreted as higher or lower in quality given the ability of the player being assessed and the opposition confronted. When players on both sides are evenly matched, players have

been observed to attribute relative success to their perceived effort (McAuley & Tammen, 1989).

A second limitation of the statistics collected relates to bias in the role specific nature of rugby union. With obvious differences between backs and forwards existing in their role for example, the relationships between trait measures and position specific objective statistics (e.g., number of passes) may be attenuated or exaggerated due to the imbalance of the occurrence of the objective statistics between players of different positions. A further issue with the number of instances that each or any player engages in an activity is numerical, with some players not engaging in particular activities once throughout a season. As a result, despite sampling the entire population of Australian based elite rugby union players from the Super 12 competition, some statistical comparisons were conducted with less than ideal degrees of freedom. For example, only 41 players produced a 'Missed Kick' during the 2005 season, whilst it is not surprising that only approximately half of players kicked the ball poorly (as a function of role), the dependability of the result of these regressions is questionable. Analysis of the objective statistics was exploratory in nature, with self and coach ratings of player attributes accounting for some small but significant amounts of variance in on-field statistics. They are somewhat limited in their functional applicability due to the relatively small variance accounted for, but given that the attributes that predict the subjective performance scores also predicted the objective measures, these objective results as a whole point to an overall contribution of these measures to overall performance.

10.4 Future Directions

In regards to assessment of the attributes of sportspeople, future studies in this area should attempt to incorporate state and trait assessments of athlete attributes that have been shown to have predictive efficacy in individual and multiple sports. These assessments should be utilised in a multi-administration method, with state assessments administered as close to competitive performance as possible as to increase the accuracy of recall,

and to closely align any performance decrements with changes in state indices. If athlete performance is to be assessed over a season, or any extended period of time: trait assessments could be administered at multiple testing points (e.g., at the beginning of a season, mid-season, and at the completion of the season). Multiple assessments of trait attributes can control for any inaccuracy within ratings, point to any unexpected changes in players' behaviours that may affect their performance, and offer a measure of reliability over time for the measures.

In regards to performance assessment, objective and subjective assessments of performance are both necessary to complete the full picture of performance, especially within the elite sporting context. Objective statistics collected on a match-to-match basis can vary in their relative sensitivity in accurately reflecting player performance. For example, a player can complete 59 of 60 passes to their team-mates, but the one incomplete pass may be intercepted by the opposition and directly result in a try (which may be the difference between the two teams for that match). Whilst the player has completed a very high number of passes, and as such seem to suggest a high level of performance without context, this singular error would more likely result in the player rating their own performance lower than the statistics would suggest. This contextual relevance of players' ratings of their performance and their coaches' ratings of performance points to the utility of employing these types of ratings following individual performances, and seasonal performance.

Objective performance assessment also depends on the collection of data being relevant to game outcomes. Whilst the end result of a match (a win or loss) is the only definitive performance outcome for a rugby union team, what plays, processes, or singular instances contribute most strongly to relative success need to be identified and assessed reliably. The number of points scored dictates which team wins a match of rugby union, and the point differential somewhat indicates magnitude of the win. The number of points scored, and the points differential between teams can also be misleading as indicators of performance, with teams of mismatched skill level (or evenly

matched teams), individual player performance (e.g., a player kicking more accurately for field goals), weather conditions, and team tactics all possibly contribute to the numbers of points scored in individual games or over a season. As such, not only do objective statistics need to reflect relevant outcomes (e.g., penalties or time in possession), statistical weighting of certain objective statistics may be necessary to compare match outcomes.

10.5 Conclusion

The overall aim of the current thesis was to identify psychological predictors of elite rugby union player performance. A number of research aims were identified and examined throughout this thesis. The overall aim of study 1 was to identify through an interview process, psychological drivers of elite rugby union player performance. This was done as a gap in the literature was identified concerning how the psychological attributes of elite rugby union players relate to actual on-field performance. The interview results revealed five strong themes that were purported to relate to elite rugby union player performance: effective communication; inspires and motivates team mates; effectively controls emotions; responsibility; and being adaptable when under pressure. These themes were converted into measurable 'trait' constructs that were administered in self-rated and coaches rating formats over the course of two complete Super 12 rugby seasons. Both rating types of the constructs were correlated with self-rated and coach rated seasonal performance and with a number of on-field statistics, and significantly related indices were utilised in regression models to ascertain the amount of variance accounted for by the psychological indices.

Over the course of the two seasons' data collection and subsequent analysis, three of the constructs utilised were found to be predictive of the three measures of performance. Ratings of players' levels of Emotional Intelligence, Sporting Orientation, and the strategies they utilise to overcome stress were consistently identified as significant predictors of both rated (self and coach) and objective (on-field) measures of performance. Overall these results highlight the importance of three aspects of elite rugby union player

performance: 1) How they approach competition; 2) How they deal with emotional information; 3) How they deal with the inherent stress of elite competition. The results suggest that players' approach to competition needs to be strongly focused on winning, focused on completing set goals and performing to the best of their ability, and be strongly motivated to enter competitive sport situations and strive for excellence. Further to this, players' ability to express, understand, manage, control and utilise emotional information was found to be intrinsically linked to player performance. These facets, and the behaviours that exemplify them, were predictive of the three measured performance indicators, suggesting that the competencies encompassed by Emotional Intelligence are strongly related to elite rugby union player performance. Players' ability to utilise adaptive strategies when faced with stress during competition, rather than maladaptive strategies was predictive of players' ability to perform well against strong opposition over the two seasons' data collection. Strategies focused upon dealing directly with the cause of stress, rather than being negatively emotionally reactive to it were more predictive of better performance under the stresses of elite competition. Finally, this thesis has made a significant empirical contribution to this area of research by demonstrating the link between 'trait' psychological variables and subjective and objective measures of sporting performance within the elite rugby union domain. These results highlight the importance of the assessment of psychological attributes of elite sportspeople, and point to the possible utility of focused development or education programs concerning players' psychological attributes to improve sporting performance.

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LIST OF APPENDICES

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APPENDIX 1

SWINBURNE UNIVERSITY OF TECHNOLOGY

FORM OF DISCLOSURE AND INFORMED CONSENT



Project Title: The Psychological Determinants of Performance

Investigators: Prof. Con Stough & Luke Downey

Project Description: In recent years Australia has regarded itself as a world leader both on and off the rugby field. Notwithstanding the significant contribution elite player development programs and coaches have had on this outcome a significant contributor has been the quality of players that have filled the national teams over recent years. Great teams are built not only around highly athletic and skilled individuals but also around men that can provide an example that others will follow. Australian rugby has been fortunate to have some of the great leaders of the game in recent years. Strong leadership has been said to have been the foundation of both the 1991 and 1999 Rugby World Cup victories. Despite these successes, there is a constant need for talent identification and player development to ensure future success. The purpose of this study is to assess what drives elite rugby union players on-field performance. To do this we invite you to participate in a research study being conducted by Swinburne University and the Australian Rugby Union (ARU). Your team **will NOT** receive your individual data from this project. To protect your confidentiality, Swinburne University has agreed to present only aggregated findings to the ARU. The questions are mainly presented in multiple-choice format and should take between 45 to 60 minutes to complete. Please answer them as honestly as possible. Your first reaction is usually the best one. If you do participate we will also need to marry up your questionnaire scores with your on-field performance data so we seek your permission to do this. Your information will be kept by us in a confidential manner and will be de-identified once your questionnaire data and performance data have been collated.

Your participation in this study is completely voluntary and you are free to withdraw at any time. Retain this page for your information and please check whether you have answered all the items before returning your questionnaire.

If you have any questions regarding this study, please contact either Luke Downey (03 9214 5781) at Swinburne University, or if you would like to contact the Chief Investigator, his details are:

Professor Con Stough (03 9214 8167)
Director of the Organisational Psychology Research Unit and Professor in
Cognitive Neuroscience

In the event that you have any complaints about the way this study has been conducted, or have received a response that did not satisfy you, please write to:

The Chair, Professor Kerry Pratt,
Swinburne University Human Research Ethics Committee
PO Box 218 Hawthorn
VIC 3122

*Ihave read
(or, as appropriate, have had read to me) and understood the information
above. Any questions I have asked have been answered to my satisfaction.*

*I agree to participate in this activity, realising that I may withdraw at any
time. I agree that research data collected for the study may be published or
provided to other researchers on the condition that anonymity is preserved
and that I cannot be identified.*

NAME OF PARTICIPANT

SIGNATUREDATE.....

NAME/S OF PRINCIPAL INVESTIGATOR/S.....

SIGNATUREDATE.....

SIGNATUREDATE.....



SWINBURNE
UNIVERSITY OF
TECHNOLOGY

Swinburne University of Technology

Human Research Ethics Committee Certificate of Approval

Project Title: The Psychological Determinants of Performance

HREC Register No.: 05/19

Chief Investigator: Stough, Prof Con

Other Investigators: Mr Luke Downey

For period from: 06-Oct-05 To: 31-Dec-06

Approved for (max): 120 male participants
and 0 female participants

Approval is granted subject to the following conditions:

Researchers are required to immediately report anything which might warrant review of ethical approval of the protocol, including: (a) serious or unexpected adverse effects on participants; (b) proposed changes in the protocol; and (c) unforeseen events that might affect continued ethical acceptability of the project. If the research project is discontinued before the expected date of completion researchers must inform the HREC

A progress report must be submitted annually.

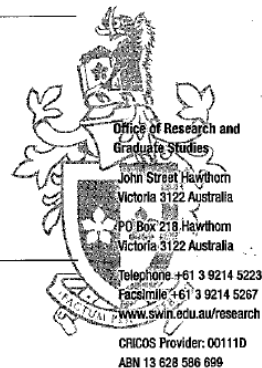
A final report must be submitted at the conclusion of the project.

Special Conditions as indicated below.

Professor K. Pratt

Chair, Human Research Ethics Committee

Thursday, 6 October 2005



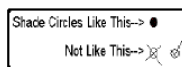
APPENDIX 2



First name

Surname

Age



Please answer each question on this form. Print information in the boxes provided. Please answer questions with 'bubbles' by completely filling in the bubble that corresponds with your answer.

Super 12 Club

☐ ACT Brumbies ☐ NSW Waratahs ☐ QLD Reds

Seasons at current Super 12 club (including 2004)

Have you played for another Super 12 team previously?

☐ Yes
☐ No

If you answered 'Yes' to the previous question, which club did you play for?

☐ ACT Brumbies ☐ NSW Waratahs ☐ QLD Reds

How many seasons did you play with this club?

What was your 'main' position in 2003?

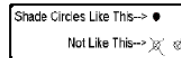
- ☐ 1: Loosehead Prop ☐ 9: Scrum Half
☐ 2: Hooker ☐ 10: Fly Half
☐ 3: Tighthead Prop ☐ 11: Left Wing
☐ 4: Second Row ☐ 12: Inside Centre
☐ 5: Second Row ☐ 13: Outside Centre
☐ 6: Blindside Flanker ☐ 14: Right Wing
☐ 7: Openside Flanker ☐ 15: Fullback
☐ 8: Number 8

What is your 'main' position in 2004?

- ☐ 1: Loosehead Prop ☐ 9: Scrum Half
☐ 2: Hooker ☐ 10: Fly Half
☐ 3: Tighthead Prop ☐ 11: Left Wing
☐ 4: Second Row ☐ 12: Inside Centre
☐ 5: Second Row ☐ 13: Outside Centre
☐ 6: Blindside Flanker ☐ 14: Right Wing
☐ 7: Openside Flanker ☐ 15: Fullback
☐ 8: Number 8



If you make a mistake simply cross it out and fill in the correct response!

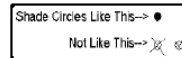


Below are the series of statements, please fill in the circle containing the number that is most indicative of the way you **typically** think, feel and act.

| | Never 1 | Seldom 2 | Sometimes 3 | Usually 4 | Always 5 |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 3. Examination of feelings is useful in solving problems. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4. When I'm anxious I can remain focused on what I am doing. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. I can tell whether others like each other or not. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. When I'm under stress, I tend to get irritated by those around me. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. I find it difficult to talk about my feelings with others. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. I find it hard to determine how others are feeling from their body language alone. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9. Difficult situations elicit emotions in me that I find hard to overcome. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 10. Others find it easy to pick-up on how I am feeling. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 11. I find it difficult to keep from getting stressed-out when I am under a lot of pressure. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 12. My moods and emotions help me generate new ideas. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 13. I can tell how others feel by the tone in their voice. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 14. When I am anxious, I find it difficult to express this to others. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 15. I find it easy to influence the moods and emotions of those around me. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 16. I don't easily pick-up on the emotional overtones of the environment I'm in. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 17. I can tell when others are trying to hide their true feelings. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 18. I try not to let my emotions guide me when problem solving. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 19. I find it easy to control my anger. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 20. I can describe my feelings on an issue to others. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 21. I don't think it's a good idea to use emotions to guide my decision making. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 22. I find it hard to identify if somebody is upset without them telling me. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 23. I find it hard to get people to cooperate with each other. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 24. I come-up with new ideas using rational thoughts rather than my moods and emotions. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 25. I find it hard to concentrate on a task when I'm really excited about something. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 26. I can portray how I am feeling to others through my body language. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 27. I find it hard to determine friendships between people I don't know well. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 28. I overcome conflict with others by influencing their moods and emotions. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 29. I watch the way people react to things when I'm trying to build rapport with them. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 30. My problem solving is based on sound reasoning rather than feelings. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 31. I find it difficult to think clearly when I'm feeling anxious about something. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 32. I have trouble finding the right words to express how I feel. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 33. I find it difficult to get others excited about things. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 34. I can pick-up on the emotional 'overtone' of a discussion. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 35. I attend to my feelings on a matter when making important decisions. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |




If you make a mistake simply cross it out and fill in the correct response!




Below are the series of statements, please fill in the circle containing the number that is most indicative of the way you **typically** think, feel and act.

Never
Seldom
Sometimes
Usually
Always
1 2 3 4 5

- | | |
|--|-----------|
| 3. Examination of feelings is useful in solving problems. | 1 2 3 4 5 |
| 4. When I'm anxious I can remain focused on what I am doing. | 1 2 3 4 5 |
| 5. I can tell whether others like each other or not. | 1 2 3 4 5 |
| 6. When I'm under stress, I tend to get irritated by those around me. | 1 2 3 4 5 |
| 7. I find it difficult to talk about my feelings with others. | 1 2 3 4 5 |
| 8. I find it hard to determine how others are feeling from their body language alone. | 1 2 3 4 5 |
| 9. Difficult situations elicit emotions in me that I find hard to overcome. | 1 2 3 4 5 |
| 10. Others find it easy to pick-up on how I am feeling. | 1 2 3 4 5 |
| 11. I find it difficult to keep from getting stressed-out when I am under a lot of pressure. | 1 2 3 4 5 |
| 12. My moods and emotions help me generate new ideas. | 1 2 3 4 5 |
| 13. I can tell how others feel by the tone in their voice. | 1 2 3 4 5 |
| 14. When I am anxious, I find it difficult to express this to others. | 1 2 3 4 5 |
| 15. I find it easy to influence the moods and emotions of those around me. | 1 2 3 4 5 |
| 16. I don't easily pick-up on the emotional overtones of the environment I'm in. | 1 2 3 4 5 |
| 17. I can tell when others are trying to hide their true feelings. | 1 2 3 4 5 |
| 18. I try not to let my emotions guide me when problem solving. | 1 2 3 4 5 |
| 19. I find it easy to control my anger. | 1 2 3 4 5 |
| 20. I can describe my feelings on an issue to others. | 1 2 3 4 5 |
| 21. I don't think it's a good idea to use emotions to guide my decision making. | 1 2 3 4 5 |
| 22. I find it hard to identify if somebody is upset without them telling me. | 1 2 3 4 5 |
| 23. I find it hard to get people to cooperate with each other. | 1 2 3 4 5 |
| 24. I come-up with new ideas using rational thoughts rather than my moods and emotions. | 1 2 3 4 5 |
| 25. I find it hard to concentrate on a task when I'm really excited about something. | 1 2 3 4 5 |
| 26. I can portray how I am feeling to others through my body language. | 1 2 3 4 5 |
| 27. I find it hard to determine friendships between people I don't know well. | 1 2 3 4 5 |
| 28. I overcome conflict with others by influencing their moods and emotions. | 1 2 3 4 5 |
| 29. I watch the way people react to things when I'm trying to build rapport with them. | 1 2 3 4 5 |
| 30. My problem solving is based on sound reasoning rather than feelings. | 1 2 3 4 5 |
| 31. I find it difficult to think clearly when I'm feeling anxious about something. | 1 2 3 4 5 |
| 32. I have trouble finding the right words to express how I feel. | 1 2 3 4 5 |
| 33. I find it difficult to get others excited about things. | 1 2 3 4 5 |
| 34. I can pick-up on the emotional 'overtone' of a discussion. | 1 2 3 4 5 |
| 35. I attend to my feelings on a matter when making important decisions. | 1 2 3 4 5 |



29024



If you make a mistake simply cross it out and fill in the correct response!

Shade Circles Like This--> ●
 Not Like This--> ✕

Below are the series of statements, please fill in the circle containing the number that is most indicative of the way you **typically** think, feel and act.

Never
Seldom
Sometimes
Usually
Always

○ ○ ○ ○ ○

| | |
|---|-----------|
| 36. I overcome anger by thinking through what's causing it. | ○ ○ ○ ○ ○ |
| 37. Others know when I am worried. | ○ ○ ○ ○ ○ |
| 38. I readily understand the reasons why I have upset someone. | ○ ○ ○ ○ ○ |
| 39. I find it hard to reduce anxiety in others. | ○ ○ ○ ○ ○ |
| 40. I weigh-up how I feel about different solutions to problems. | ○ ○ ○ ○ ○ |
| 41. I can be upset and still think clearly. | ○ ○ ○ ○ ○ |
| 42. I find it hard to convey my anxiety to others. | ○ ○ ○ ○ ○ |
| 43. I can determine when a other's emotional reactions are inappropriate. | ○ ○ ○ ○ ○ |
| 44. I find it easy to comfort others when they are upset about something at work. | ○ ○ ○ ○ ○ |
| 45. Other's facial expressions reveal a lot to me about the way they are feeling. | ○ ○ ○ ○ ○ |
| 46. I find it difficult to control strong emotions. | ○ ○ ○ ○ ○ |
| 47. Feelings should be kept at bay when making important decisions. | ○ ○ ○ ○ ○ |
| 48. I readily notice the 'feel' of different environments. | ○ ○ ○ ○ ○ |
| 49. When something gets me down I find it difficult to snap out of it. | ○ ○ ○ ○ ○ |
| 50. I go with my 'feelings' when making important decisions. | ○ ○ ○ ○ ○ |
| 51. I can detect my emotions as I experience them. | ○ ○ ○ ○ ○ |
| 52. When discussing an issue, I find it difficult to tell whether others feel the same way as me. | ○ ○ ○ ○ ○ |
| 53. Thinking about how I felt in certain situations helps me remember them. | ○ ○ ○ ○ ○ |
| 54. I can easily snap out of feeling down. | ○ ○ ○ ○ ○ |
| 55. I find it hard to distinguish my emotions. | ○ ○ ○ ○ ○ |
| 56. I can tell when someone feels the same way as myself about another person without actually discussing it. | ○ ○ ○ ○ ○ |
| 57. I find it difficult to maintain positive moods and emotions when I'm under stress. | ○ ○ ○ ○ ○ |
| 58. When others get worked-up I stay out of their way. | ○ ○ ○ ○ ○ |
| 59. I find it hard to determine exactly how others feel about issues I have with them. | ○ ○ ○ ○ ○ |
| 60. When something goes wrong in my life, I find it difficult to remain positive. | ○ ○ ○ ○ ○ |
| 61. Others can easily tell how I feel. | ○ ○ ○ ○ ○ |
| 62. I try to keep emotions out of my decision making. | ○ ○ ○ ○ ○ |
| 63. I can tell when someone doesn't really like me. | ○ ○ ○ ○ ○ |
| 64. When someone upsets me, I think through what the person has said and find a solution. | ○ ○ ○ ○ ○ |



Instructions

This section contains 60 statements. Read each statement carefully. For each statement fill in the circle that best represents your opinion. Please make sure that your answer is in the correct circle.

Fill in **1** if you strongly disagree or the statement is definitely false.

Fill in **2** if you disagree or the statement is mostly false.

Fill in **3** if you are neutral on the statement, you cannot decide, or the statement is about equally true or false.


Fill in **4** if you agree or the statement is mostly true.

Fill in **5** if you strongly agree or the statement is definitely true.

Shade Circles Like This--> ●
Not Like This--> ⊗

Strongly disagree
Disagree
Neutral
Agree
Strongly agree
1 2 3 4 5

| | |
|--|-----------|
| 65. I am not a worrier | 1 2 3 4 5 |
| 66. I like to have a lot of people around me | 1 2 3 4 5 |
| 67. I don't like to waste my time daydreaming | 1 2 3 4 5 |
| 68. I try to be courteous to everyone I meet | 1 2 3 4 5 |
| 69. I keep my belongings clean and neat | 1 2 3 4 5 |
| 70. I often feel inferior to others | 1 2 3 4 5 |
| 71. I laugh easily | 1 2 3 4 5 |
| 72. Once I find the right way to do something, I stick to it | 1 2 3 4 5 |
| 73. I often get into arguments with my family and co-workers | 1 2 3 4 5 |
| 74. I'm pretty good about pacing myself so as to get things done on time | 1 2 3 4 5 |
| 75. When I'm under a great deal of stress, sometimes I feel like I'm going to pieces | 1 2 3 4 5 |
| 76. I don't consider myself especially "light-hearted" | 1 2 3 4 5 |
| 77. I am intrigued by the patterns I find in art and nature | 1 2 3 4 5 |
| 78. Some people think I'm selfish and egotistical | 1 2 3 4 5 |
| 79. I am not a very methodical person | 1 2 3 4 5 |
| 80. I rarely feel lonely or blue | 1 2 3 4 5 |
| 81. I really enjoy talking to people | 1 2 3 4 5 |
| 82. I believe letting students hear controversial speakers can only confuse and mislead them | 1 2 3 4 5 |
| 83. I would rather cooperate with others than compete with them | 1 2 3 4 5 |
| 84. I try to perform all the tasks assigned to me conscientiously | 1 2 3 4 5 |
| 85. I often feel tense and jittery | 1 2 3 4 5 |
| 86. I like to be where the action is | 1 2 3 4 5 |
| 87. Poetry has little or no effect on me | 1 2 3 4 5 |
| 88. I tend to be cynical and sceptical of other's intentions | 1 2 3 4 5 |
| 89. I have a clear set of goals and work toward them in an orderly fashion | 1 2 3 4 5 |
| 90. Sometimes I feel completely worthless | 1 2 3 4 5 |
| 91. I usually prefer to do things alone | 1 2 3 4 5 |



 29024

Fill in **1** if you strongly disagree or the statement is definitely false.

Fill in **2** if you disagree or the statement is mostly false.

Fill in **3** if you are neutral on the statement, you cannot decide, or the statement is about equally true or false.

Fill in **4** if you agree or the statement is mostly true.

Fill in **5** if you strongly agree or the statement is definitely true.

Shade Circles Like This--> ●
 Not Like This--> ⊗

| | | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|--|-------------------|----------|---------|-------|----------------|
| | | 1 | 2 | 3 | 4 | 5 |
| 92. I often try new and foreign foods | | | | | | |
| 93. I believe that most people will take advantage of you if you let them | | | | | | |
| 94. I waste a lot of time before settling down to work | | | | | | |
| 95. I rarely feel fearful or anxious | | | | | | |
| 96. I often feel as if I am bursting with energy | | | | | | |
| 97. I seldom notice the moods or feelings that different environments produce | | | | | | |
| 98. Most people I know like me | | | | | | |
| 99. I work hard to accomplish my goals | | | | | | |
| 100. I often get angry at the way people treat me | | | | | | |
| 101. I am a cheerful, high-spirited person | | | | | | |
| 102. I believe we should look to our religious authorities for decisions on moral issues | | | | | | |
| 103. Some people think of me as cold and calculating | | | | | | |
| 104. When I make a commitment, I can always be counted on to follow through | | | | | | |
| 105. Too often, when things go wrong, I get discouraged and feel like giving up | | | | | | |
| 106. I am not a cheerful optimist | | | | | | |
| 107. Sometimes when I am reading poetry or looking at a work of art, I feel a chill or wave of excitement | | | | | | |
| 108. I'm hard-headed and tough-minded in my attitudes | | | | | | |
| 109. Sometimes I'm not as dependable or reliable as I should be | | | | | | |
| 110. I am seldom sad or depressed | | | | | | |
| 111. My life is fast-paced | | | | | | |
| 112. I have little interest in speculating on the nature of the universe or the human condition | | | | | | |
| 113. I generally try to be thoughtful and considerate | | | | | | |
| 114. I am a productive person who always gets the job done | | | | | | |
| 115. I often feel helpless and want someone else to solve my problems | | | | | | |
| 116. I am a very active person | | | | | | |
| 117. I have a lot of intellectual curiosity | | | | | | |
| 118. If I don't like people, I let them know it | | | | | | |
| 119. I never seem to be able to get organised | | | | | | |
| 120. At times I have been so ashamed I just wanted to hide | | | | | | |
| 121. I would rather go my own way than be a leader of others | | | | | | |
| 122. I often enjoy playing with theories or abstract ideas | | | | | | |
| 123. If necessary, I am willing to manipulate people | | | | | | |
| 124. I strive for excellence in everything I do | | | | | | |



Instructions

To respond to the statements in this section, you should be thinking about situations in rugby union that make you stressed. Take a few moments and think about the types of stressful situations that you experience on the field.

By "stressful" we mean a situations that are difficult or troubling for you, either because you feel distressed about what is happening, or because you have to use considerable effort to deal with the situations. Before responding to the statements, think about the details of these stressful situations, such as where they happen, who is involved, how you act, and why these situations are important to you.

The series of statements below relate to how people cope with stressful situations in sport. **Read each statement carefully and indicate, by filling in 0, 1, 2, or 3, to what extent you would make use of it in a stressful situation.**


Key: 0 = Does not apply or not used 1 = Used somewhat
2 = Used quite a bit 3 = Used a great deal

Please try to respond to every question.

As you respond to each of the statements, please keep thinking about the stressful situations you experience playing rugby union.

Does not apply or not used
Used somewhat
Used quite a bit
Used a great deal

| | | | | |
|--|-----------------------|-----------------------|-----------------------|-----------------------|
| 125. Just concentrate on what I have to do next - the next step | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 126. I try to analyse the problem in order to understand it | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 127. Try to get something positive from the situation | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 128. Go on as if nothing is happening | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 129. Look for the silver lining, so to speak; try to look on the bright side of things | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 130. I am inspired to do something creative | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 131. Try harder | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 132. I'm making a plan of action and following it | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 133. Talk to someone who can do something concrete about the problem | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 134. Take a bigger chance to do something risky | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 135. I try not to act too hastily or follow my first hunch | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 136. Maintain my pride and keep my cool | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 137. I avoid other players | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 138. Don't let it get to me; refuse to think too much about it | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 139. Keep others from knowing how I feel | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 140. Stand my ground and fight harder | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 141. Refuse to believe it's happening | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 142. Make a promise to myself that things will be different next time | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 143. Come up with a couple of different solutions to the problem | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 144. I look for help | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 145. I prepare myself mentally | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 146. I go over in my mind how I will change my play | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 147. I remind myself how much worse my play can be | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |



29024

Instructions

Read each statement below, decide if you "Rarely", "Sometimes" or "Often" feel this way when competing in your sport, fill in the appropriate circle to indicate your response.

| | Rarely <input type="radio"/> | Sometimes <input type="radio"/> | Often <input type="radio"/> |
|---|---------------------------------|------------------------------------|--------------------------------|
| 148. Before I compete I feel uneasy | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 149. Before I compete I worry about not performing well | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 150. When I compete I worry about making mistakes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 151. Before I compete I am calm | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 152. Just before competing, I notice my heart beats faster than usual | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 153. Before I compete I feel relaxed | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 154. Before I compete I am nervous | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Shade Circles Like This--> ●

Not Like This--> ○


Instructions

The following statements describe reactions to sporting situations. We want to know how you usually feel about sports and competition. Read each statement and fill in the circle that indicates how much you agree or disagree with each statement on the scale:

Key: 1 = Strongly Agree
 2 = Slightly Agree
 3 = Neither Agree nor Disagree
 4 = Slightly Disagree
 5 = Strongly Disagree

There are no right or wrong answers; simply answer as you honestly feel. Do not spend too much time on any one statement. Remember, choose the number that describes how you usually feel about sports and competition.

| | Strongly Agree <input type="radio"/> | Slightly Agree <input type="radio"/> | Neither Agree nor Disagree <input type="radio"/> | Slightly Disagree <input type="radio"/> | Strongly Disagree <input type="radio"/> |
|---|---|---|---|--|--|
| 155. Winning is important | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 156. I set goals for myself when I compete | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 157. Scoring more points than my opponent is very important to me | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 158. I am most competitive when I try to achieve personal goals | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 159. I hate to lose | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 160. The only time I am satisfied is when I win | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 161. Performing to the best of my ability is very important to me | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 162. Losing upsets me | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |



29024

Instructions

Below are two statements dealing with your general feelings about yourself. Read each statement and fill in the circle that indicates how much you agree or disagree with each statement on the scale:

Key: 1 = Strongly Agree
 2 = Agree
 3 = Disagree
 4 = Strongly disagree

| | | Strongly Agree | Agree | Disagree | Strongly Disagree |
|--|--|-----------------------|-----------------------|-----------------------|-----------------------|
| | | 1 | 2 | 3 | 4 |
| 163. On the whole, I am satisfied with myself | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 164. I am able to do things as well as most other people | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Shade Circles Like This--> ●
 Not Like This--> ✕

Instructions

Below are three statements, answer according to your own feelings, rather than how you think 'most people' would answer. Read each statement and fill in the circle that indicates how much you agree or disagree with each statement on the scale:

Key: 1 = I agree a lot
 2 = I agree a little
 3 = I neither agree or disagree
 4 = I disagree a little
 5 = I disagree a lot

| | | I agree a lot | I agree a little | I neither agree or disagree | I disagree a little | I disagree a lot |
|--|--|-----------------------|-----------------------|-----------------------------|-----------------------|-----------------------|
| | | 1 | 2 | 3 | 4 | 5 |
| 165. In uncertain times, I usually expect the best | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 166. I always look on the bright side | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 167. I rarely count on good things happening to me | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Shade Circles Like This--> ●
 Not Like This--> ✕

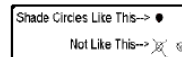


Instructions

The following questions aim to find out the way in which certain important events in our society effect different people. Each item consists of a pair of alternatives lettered **a** or **b**. Please select the one statement from each pair (only one) which you strongly believe to be the case as far as you are concerned. Be sure to select the one you actually believe to be true more than the one you think you should choose or the one you would like to be true. This is a measure of personal belief; obviously there are no right or wrong answers.

Please answer these items carefully but do not spend too much time on any one item. Be sure to find an answer for every choice. Fill in the circle with the letter **a** or **b** which you choose as the statement which is more true.

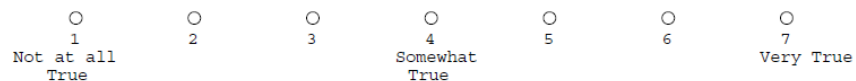
In some instances you may discover that you believe both or neither statements. In such cases, be sure to select the one you more strongly believe to be the case as far as you are concerned. Also try to respond to each item independently when making choices.



168. ☐ (A) Many of the unhappy things in people's lives are partly due to bad luck
☐ (B) People's misfortunes result from the mistakes they make
169. ☐ (A) Becoming a success is a matter of hard work, luck has little or nothing to do with it
☐ (B) Getting a good job depends mainly on being in the right place at the right time
170. ☐ (A) Many times I feel that I have little influence over the things that happen to me
☐ (B) It is impossible for me to believe that chance or luck plays an important part in my life


Instructions

Using the scale below as a guide, shade a number beside each statement to indicate how much you agree with it:



171. My first impressions of people usually turn out to be right ☐ ☐ ☐ ☐ ☐ ☐ ☐
172. I don't care what other people really think of me ☐ ☐ ☐ ☐ ☐ ☐ ☐
173. I am not a safe driver when I exceed the speed limit ☐ ☐ ☐ ☐ ☐ ☐ ☐
174. I am a completely rational person ☐ ☐ ☐ ☐ ☐ ☐ ☐

APPENDIX 4



44207

Listed below are the 30 players from the ACT Brumbies playing list for 2004. Please rate each of these players on the two associated scales. Scale 1 is a rating of each individuals performance in the 2004 Super 12 season, Scale 2 is a rating of each individuals leadership ability as observed by you in the 2004 Super 12 season. Please use the scale below as a guide.

0 1 2 3 4 5 6 7 8 9 10

○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

Very below Below Average Above Very above

average average average average

| Scale 1: Performance over the 2004 Super 12 season. | | Scale 2: Leadership ability 2004 Super 12 season. |
|--|--------------------|--|
| 0 1 2 3 4 5 6 7 8 9 10 | | 0 1 2 3 4 5 6 7 8 9 10 |
| ○○○○○○○○○○○○○ | Mark Bartholomeusz | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Digby Beaumont | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Lenny Beckett | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Luke Burgess | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Mark Chisholm | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Ben Darwin | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Scott Fava | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Owen Finegan | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | David Fitter | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Mark Gerrard | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | David Giffin | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Matt Giteau | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | George Gregan | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Nic Henderson | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Matt Henjak | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Tamaiti Horua | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Stephen Larkham | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Stirling Mortlock | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | David Palavi | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Jeremy Paul | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Clyde Rathbone | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Joe Roff | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Julian Salvi | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Radike Samo | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Guy Shepherdson | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | George Smith | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Jone Tawake | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Henari Veratau | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Joel Wilson | ○○○○○○○○○○○○○ |
| ○○○○○○○○○○○○○ | Bill Young | ○○○○○○○○○○○○○ |

APPENDIX 5

| On-field Performance | Emotional Recognition & Expression | Understanding Emotions | Emotions Direct Cognition | Emotional Management | Emotional Control |
|--|--|---------------------------|---------------------------------|-------------------------|----------------------|
| Total Passes per Game | 0.129 | 0.180 | -0.010 | 0.301* | 0.251 |
| Poor Passes per Game | 0.286 | 0.033 | 0.088 | 0.167 | 0.083 |
| Offload | -0.157 | -0.118 | 0.216 | -0.032 | 0.197 |
| Kicks General | -0.109 | -0.091 | -0.139 | -0.005 | -0.094 |
| Miss Kicks | 0.107 | -0.087 | 0.081 | 0.022 | -0.133 |
| Runs | -0.065 | -0.065 | -0.094 | -0.003 | 0.228 |
| Pick and drive | 0.028 | 0.093 | -0.046 | -0.122 | -0.367* |
| Over Advantage | -0.070 | 0.028 | -0.088 | -0.045 | 0.126 |
| Line Break | -0.240 | 0.010 | -0.088 | -0.136 | -0.088 |
| Break Tackle | 0.008 | -0.138 | 0.109 | -0.107 | 0.047 |
| Dominant Contact Success | -0.015 | -0.077 | -0.066 | -0.101 | 0.143 |
| Neutral Contact Success | -0.089 | 0.210 | -0.004 | 0.088 | 0.242 |
| Pass Contact Success | 0.150 | 0.105 | -0.116 | 0.184 | -0.002 |
| D % | 0.070 | 0.028 | -0.085 | 0.105 | 0.108 |
| Ruck/Maul Involvement | 0.037 | -0.021 | -0.195 | -0.134 | 0.015 |
| Effective Ruck & Maul Involvement | 0.027 | 0.065 | -0.034 | 0.027 | -0.082 |
| Ineffective Ruck & Maul Involvement | 0.162 | 0.226 | 0.121 | 0.090 | -0.010 |
| Penalties | 0.053 | 0.016 | 0.254 | 0.151 | 0.072 |
| Turnovers | -0.114 | 0.169 | -0.078 | 0.000 | -0.034 |
| Errors | -0.079 | -0.048 | -0.039 | 0.137 | 0.019 |

| On-field Performance | Neuroticism | Extroversion | Openness to Experience | Agreeableness | Conscientiousness |
|-------------------------------------|-------------|--------------|------------------------|---------------|-------------------|
| Total Passes per Game | -0.097 | 0.347* | -0.029 | 0.178 | 0.166 |
| Poor Passes per Game | 0.124 | 0.246 | -0.221 | 0.019 | 0.057 |
| Offload | -0.169 | -0.036 | 0.030 | 0.029 | -0.107 |
| Kicks General | 0.183 | 0.030 | -0.461** | -0.033 | -0.081 |
| Miss Kicks | 0.176 | 0.239 | -0.448* | 0.164 | 0.012 |
| Runs | -0.183 | 0.099 | -0.028 | 0.019 | -0.077 |
| Pick and drive | 0.157 | 0.077 | -0.128 | 0.023 | 0.010 |
| Over Advantage | -0.177 | 0.172 | 0.004 | -0.042 | -0.027 |
| Line Break | 0.180 | 0.004 | -0.122 | -0.162 | -0.180 |
| Break Tackle | -0.011 | -0.073 | -0.022 | -0.166 | -0.243 |
| Dominant Contact Success | -0.167 | -0.016 | 0.068 | 0.020 | -0.019 |
| Neutral Contact Success | -0.233 | 0.193 | 0.096 | 0.207 | 0.164 |
| Pass Contact Success | 0.006 | 0.072 | -0.239 | 0.052 | 0.114 |
| D % | -0.041 | 0.160 | 0.344* | -0.129 | -0.020 |
| Ruck/Maul Involvement | -0.097 | -0.032 | 0.014 | 0.009 | 0.052 |
| Effective Ruck & Maul Involvement | 0.052 | -0.155 | 0.139 | 0.045 | 0.194 |
| Ineffective Ruck & Maul Involvement | 0.072 | 0.083 | 0.055 | 0.290 | 0.235 |
| Penalties | 0.023 | 0.277 | 0.022 | 0.213 | 0.134 |
| Turnovers | -0.085 | 0.261 | -0.009 | -0.005 | 0.041 |
| Errors | -0.043 | 0.067 | -0.257 | 0.104 | 0.047 |

| On-field Performance | Problem- focused Coping | Increased Effort & Resolve | Denial | Emphasising the Positive | Seeking Social Support | General Emotionality | Detachment |
|---|-------------------------------|----------------------------------|--------|-----------------------------|------------------------------|-------------------------|------------|
| Total Passes per Game | 0.022 | 0.054 | -0.001 | 0.248 | -0.269* | -0.048 | -0.148 |
| Poor Passes per Game | -0.005 | 0.137 | -0.105 | 0.265 | -0.121 | 0.093 | -0.037 |
| Offload | 0.028 | -0.118 | 0.160 | 0.103 | -0.012 | 0.014 | -0.069 |
| Kicks General | 0.031 | -0.102 | -0.292 | -0.098 | -0.281 | -0.033 | 0.044 |
| Miss Kicks | -0.016 | -0.242 | -0.300 | 0.103 | -0.541** | 0.048 | -0.008 |
| Runs | -0.105 | -0.267* | -0.027 | -0.070 | -0.363** | -0.079 | -0.185 |
| Pick and drive | 0.217 | 0.219 | 0.077 | -0.017 | 0.312 | 0.008 | -0.011 |
| Over Advantage | 0.004 | -0.135 | -0.009 | -0.167 | -0.143 | -0.233 | -0.202 |
| Line Break | -0.011 | -0.024 | 0.163 | -0.023 | -0.003 | -0.215 | 0.010 |
| Break Tackle | -0.133 | -0.228 | -0.068 | -0.043 | -0.120 | 0.070 | -0.058 |
| Dominant Contact Success | -0.104 | -0.277* | -0.101 | -0.220 | -0.251 | -0.183 | -0.219 |
| Neutral Contact Success | 0.133 | 0.187 | 0.307* | 0.183 | -0.106 | -0.033 | -0.087 |
| Pass Contact Success | 0.237 | 0.232 | 0.214 | 0.498** | -0.215 | 0.218 | -0.032 |
| D % | 0.018 | -0.172 | -0.081 | 0.030 | 0.119 | -0.022 | -0.116 |
| Ruck/Maul Involvement Effective | -0.056 | -0.155 | -0.194 | -0.305* | -0.167 | -0.175 | -0.153 |
| Ruck & Maul Involvement Ineffective | 0.147 | 0.235 | -0.098 | -0.060 | 0.284* | -0.077 | 0.028 |
| Ruck & Maul Involvement | 0.202 | 0.210 | -0.009 | 0.085 | 0.327* | 0.027 | -0.051 |
| Penalties | 0.031 | -0.052 | -0.133 | 0.040 | -0.203 | -0.213 | 0.081 |
| Turnovers | -0.004 | 0.086 | 0.286* | 0.140 | -0.079 | -0.038 | -0.101 |
| Errors | 0.075 | -0.059 | -0.044 | 0.196 | -0.272 | 0.103 | -0.021 |

| On-field Performance | Win Orientation | Goal Orientation | Anxiety | Locus of Control | Self Esteem | Social Desirability | Life Orientation |
|---|--------------------|---------------------|---------|---------------------|----------------|------------------------|---------------------|
| Total Passes per Game | -0.209 | 0.019 | -0.134 | -0.046 | 0.079 | 0.039 | 0.209 |
| Poor Passes per Game | -0.106 | 0.086 | -0.153 | -0.025 | 0.089 | -0.107 | -0.036 |
| Offload | 0.156 | -0.150 | -0.026 | -0.071 | -0.033 | 0.022 | -0.080 |
| Kicks General | 0.106 | 0.009 | 0.336 | 0.053 | 0.020 | 0.032 | -0.038 |
| Miss Kicks | -0.009 | 0.007 | 0.223 | 0.123 | 0.206 | -0.303 | -0.010 |
| Runs | -0.148 | -0.328* | -0.014 | -0.034 | -0.132 | 0.226 | -0.008 |
| Pick and drive | 0.039 | 0.244 | 0.042 | -0.231 | 0.147 | -0.036 | -0.421** |
| Over Advantage | 0.084 | -0.071 | 0.050 | -0.138 | -0.124 | 0.250 | -0.070 |
| Line Break | 0.293 | 0.113 | 0.301 | -0.039 | -0.314* | 0.096 | -0.028 |
| Break Tackle | -0.034 | -0.121 | 0.159 | 0.048 | -0.278 | 0.016 | -0.137 |
| Dominant Contact | -0.099 | -0.220 | -0.020 | -0.033 | -0.099 | 0.195 | -0.160 |
| Success Neutral Contact | 0.171 | 0.103 | -0.256 | -0.133 | -0.055 | -0.004 | 0.133 |
| Success Pass Contact | 0.060 | 0.285 | -0.027 | -0.163 | -0.002 | -0.179 | -0.029 |
| Success D % | -0.038 | -0.148 | 0.086 | 0.030 | 0.001 | 0.242 | -0.025 |
| Ruck/Maul Involvement Effective | -0.116 | -0.109 | -0.106 | -0.057 | -0.008 | 0.170 | -0.194 |
| Ruck & Maul Involvement Ineffective | 0.123 | 0.288* | 0.085 | 0.010 | 0.173 | -0.215 | -0.207 |
| Ruck & Maul Involvement | -0.070 | 0.245 | 0.049 | 0.025 | 0.254 | -0.292* | 0.090 |
| Penalties | -0.021 | 0.101 | 0.218 | 0.090 | 0.091 | -0.084 | 0.297 |
| Turnovers | 0.127 | 0.083 | 0.162 | 0.079 | -0.066 | 0.032 | 0.125 |
| Errors | 0.092 | -0.046 | 0.078 | 0.015 | 0.038 | -0.167 | 0.100 |

| On-field Performance | Emotional Recognition & Expression | Understanding Emotions | Emotions Direct Cognition | Emotional Management | Emotional Control |
|----------------------------------|--|---------------------------|---------------------------------|-------------------------|----------------------|
| Tackles Per Game | -0.026 | -0.093 | -0.180 | 0.006 | -0.015 |
| Missed Tackles Per Game | -0.225 | -0.074 | 0.024 | -0.005 | 0.041 |
| 1st Tackles Per Game | -0.002 | -0.137 | -0.158 | 0.013 | 0.036 |
| Assisted Tackles Per Game | -0.054 | 0.013 | -0.181 | 0.011 | -0.076 |
| % First Tackles Made Per Game | 0.064 | 0.068 | -0.064 | 0.014 | 0.011 |
| % All Tackles Made Per Game | 0.047 | 0.066 | -0.078 | -0.009 | -0.005 |
| Dominant Contact Success | -0.115 | -0.137 | -0.151 | -0.154 | -0.177 |
| Neutral Contact Success | -0.115 | -0.147 | 0.094 | -0.105 | -0.121 |
| Pass Contact Success | 0.057 | -0.093 | -0.146 | 0.065 | 0.069 |
| D % | -0.174 | 0.018 | -0.253 | -0.099 | -0.025 |
| Ruck Involvement | -0.002 | -0.064 | -0.081 | 0.006 | 0.013 |
| Forced Turnovers | -0.013 | -0.204 | -0.073 | -0.296 | -0.378* |
| Penalties | 0.020 | -0.206 | 0.163 | -0.166 | -0.026 |

| On-field Performance | Neuroticism | Extroversion | Openness to Experience | Agreeableness | Conscientiousness |
|-------------------------------|-------------|--------------|------------------------|---------------|-------------------|
| Tackles Per Game | -0.080 | -0.185 | 0.112 | 0.101 | -0.026 |
| Missed Tackles Per Game | -0.151 | 0.088 | 0.028 | 0.205 | 0.000 |
| 1st Tackles Per Game | -0.099 | -0.152 | 0.123 | 0.200 | -0.039 |
| Assisted Tackles Per Game | -0.060 | -0.163 | 0.087 | -0.058 | 0.065 |
| % First Tackles Made Per Game | 0.089 | 0.051 | 0.111 | -0.022 | 0.141 |
| % All Tackles Made Per Game | 0.089 | 0.016 | 0.115 | -0.043 | 0.135 |
| Dominant Contact Success | -0.050 | -0.146 | 0.188 | -0.029 | -0.021 |
| Neutral Contact Success | 0.116 | -0.379** | 0.214 | 0.097 | -0.145 |
| Pass Contact Success | -0.111 | -0.077 | 0.052 | 0.227 | 0.004 |
| D % | -0.010 | -0.095 | 0.191 | -0.061 | 0.006 |
| Ruck Involvement | -0.064 | -0.141 | 0.193 | 0.075 | 0.035 |
| Forced Turnovers | 0.286 | -0.267 | -0.006 | -0.172 | -0.142 |
| Penalties | -0.004 | -0.118 | 0.045 | 0.022 | -0.103 |

| On-field Performance | Problem- focused Coping | Increased Effort & Resolve | Denial | Emphasising the Positive | Seeking Social Support | General Emotionality | Detachment |
|--|-------------------------------|----------------------------------|---------|-----------------------------|------------------------------|-------------------------|------------|
| Tackles Per Game | -0.033 | 0.114 | -0.056 | -0.109 | -0.034 | -0.062 | -0.046 |
| Missed Tackles Per Game | -0.101 | 0.034 | -0.013 | -0.091 | -0.007 | -0.324* | -0.242 |
| 1st Tackles Per Game | -0.044 | 0.125 | -0.077 | -0.082 | -0.066 | -0.022 | -0.057 |
| Assisted Tackles Per Game | 0.039 | 0.119 | -0.025 | -0.166 | 0.038 | -0.135 | 0.001 |
| % First Tackles Made Per Game | 0.006 | 0.097 | -0.207 | -0.233 | 0.110 | 0.095 | 0.170 |
| % All Tackles Made Per Game | -0.001 | 0.065 | -0.198 | -0.231 | 0.099 | 0.091 | 0.172 |
| Dominant Contact Success | -0.038 | 0.039 | -0.307* | 0.059 | 0.269 | -0.091 | -0.192 |
| Neutral Contact Success | -0.005 | -0.009 | -0.158 | 0.107 | 0.238 | -0.164 | 0.011 |
| Pass Contact Success | -0.013 | 0.166 | -0.036 | -0.088 | -0.101 | 0.044 | -0.017 |
| D % | 0.088 | 0.003 | -0.264 | -0.026 | 0.077 | 0.067 | -0.132 |
| Ruck Involvement | 0.123 | 0.322 | 0.061 | 0.075 | 0.169 | 0.033 | 0.077 |
| Forced Turnovers | -0.007 | 0.135 | -0.185 | -0.146 | 0.367 | -0.026 | 0.149 |
| Penalties | 0.181 | 0.456** | 0.133 | 0.057 | 0.457** | 0.141 | 0.204 |

| On-field Performance | Win Orientation | Goal Orientation | Anxiety | Locus of Control | Self Esteem | Social Desirability | Life Orientation |
|--|--------------------|---------------------|---------|---------------------|----------------|------------------------|---------------------|
| Tackles Per Game Missed | -0.027 | -0.090 | -0.054 | 0.059 | 0.147 | 0.035 | 0.050 |
| Tackles Per Game | -0.021 | -0.109 | -0.003 | 0.160 | 0.230 | -0.008 | 0.225 |
| 1st Tackles Per Game | -0.130 | -0.188 | -0.123 | 0.049 | 0.150 | 0.069 | 0.088 |
| Assisted Tackles Per Game | 0.159 | 0.095 | 0.056 | 0.037 | 0.100 | -0.011 | -0.039 |
| % First Tackles Made Per Game | 0.095 | 0.092 | -0.079 | -0.135 | 0.072 | 0.127 | -0.136 |
| % All Tackles Made Per Game | 0.113 | 0.101 | -0.047 | -0.118 | 0.063 | 0.117 | -0.151 |
| Dominant Contact | 0.078 | 0.086 | -0.127 | -0.183 | 0.131 | -0.170 | -0.124 |
| Success Neutral Contact | -0.111 | -0.044 | 0.013 | -0.026 | 0.053 | -0.159 | -0.052 |
| Success Pass | -0.128 | -0.180 | -0.103 | 0.080 | 0.154 | 0.096 | 0.105 |
| Contact Success | 0.026 | 0.197 | -0.119 | -0.304* | -0.189 | 0.115 | -0.055 |
| D % | 0.189 | 0.221 | -0.023 | -0.116 | 0.121 | -0.197 | -0.114 |
| Ruck Involvement | 0.229 | 0.372* | 0.163 | -0.215 | 0.032 | -0.282 | -0.134 |
| Forced Turnovers | 0.304* | 0.179 | -0.038 | -0.043 | 0.179 | -0.035 | -0.266 |
| Penalties | | | | | | | |

APPENDIX 6

| On-field Performance | Emotional Recognition & Expression | Understanding Emotions | Emotions Direct Cognition | Emotional Management | Emotional Control |
|--|--|---------------------------|---------------------------------|-------------------------|----------------------|
| Total Passes per Game | 0.055 | 0.013 | 0.003 | -0.126 | -0.159 |
| Poor Passes per Game | -0.293* | -0.299* | -0.210 | -0.346* | -0.394** |
| Offload | 0.008 | 0.092 | -0.153 | 0.055 | 0.025 |
| Kicks General | -0.046 | -0.059 | -0.212 | 0.045 | 0.108 |
| Miss Kicks | -0.173 | -0.131 | -0.290 | -0.083 | -0.062 |
| Runs | 0.205 | 0.222 | -0.098 | 0.098 | 0.185 |
| Pick and drive | -0.143 | 0.017 | -0.213 | 0.186 | 0.213 |
| Over Advantage | 0.045 | 0.116 | -0.214 | 0.184 | 0.300* |
| Line Break | 0.026 | -0.072 | 0.091 | -0.189 | -0.066 |
| Break Tackle | 0.019 | 0.033 | -0.151 | -0.087 | 0.032 |
| Dominant Contact Success | 0.127 | 0.183 | -0.105 | 0.109 | 0.151 |
| Neutral Contact Success | 0.056 | 0.173 | -0.079 | 0.038 | -0.009 |
| Pass Contact Success | 0.013 | 0.045 | -0.110 | -0.145 | -0.102 |
| D % | 0.094 | 0.045 | 0.088 | 0.139 | 0.125 |
| Ruck/Maul Involvement | 0.082 | 0.152 | -0.151 | 0.048 | 0.052 |
| Effective Ruck & Maul Involvement | -0.105 | -0.062 | 0.083 | 0.010 | -0.082 |
| Ineffective Ruck & Maul Involvement | -0.161 | -0.145 | 0.016 | -0.063 | -0.180 |
| Penalties | -0.237 | -0.307 | -0.087 | -0.434** | -0.418** |
| Turnovers | -0.003 | 0.040 | 0.097 | -0.057 | 0.013 |
| Errors | -0.073 | -0.051 | -0.259 | 0.025 | 0.073 |

| On-field Performance | Neuroticism | Extroversion | Openness to Experience | Agreeableness | Conscientiousness |
|-------------------------------------|-------------|--------------|------------------------|---------------|-------------------|
| Total Passes per Game | 0.106 | 0.091 | 0.176 | 0.181 | 0.051 |
| Poor Passes per Game | 0.130 | 0.030 | 0.207 | 0.103 | -0.073 |
| Offload | -0.137 | 0.031 | 0.213 | -0.084 | -0.072 |
| Kicks General | 0.165 | 0.017 | 0.114 | 0.162 | 0.073 |
| Miss Kicks | 0.160 | 0.015 | -0.013 | 0.238 | -0.179 |
| Runs | -0.155 | 0.169 | 0.185 | 0.053 | 0.036 |
| Pick and drive | -0.109 | -0.113 | -0.109 | 0.087 | -0.053 |
| Over Advantage | -0.117 | 0.107 | 0.060 | -0.059 | -0.088 |
| Line Break | -0.021 | -0.010 | 0.120 | -0.025 | -0.078 |
| Break Tackle | -0.041 | -0.031 | -0.047 | -0.043 | -0.209 |
| Dominant Contact Success | -0.095 | 0.084 | 0.010 | -0.061 | -0.037 |
| Neutral Contact Success | 0.109 | -0.058 | -0.159 | 0.188 | -0.139 |
| Pass Contact Success | 0.071 | -0.131 | 0.022 | 0.176 | 0.061 |
| D % | -0.125 | 0.058 | 0.021 | -0.010 | 0.076 |
| Ruck/Maul Involvement | 0.006 | 0.043 | -0.068 | -0.035 | -0.024 |
| Effective Ruck & Maul Involvement | 0.187 | -0.190 | -0.307** | -0.042 | -0.015 |
| Ineffective Ruck & Maul Involvement | 0.122 | -0.211 | -0.229 | -0.034 | 0.052 |
| Penalties | 0.258 | 0.142 | 0.003 | -0.220 | -0.121 |
| Turnovers | -0.104 | 0.205 | 0.264* | -0.205 | 0.085 |
| Errors | 0.027 | -0.042 | 0.234 | 0.332 | 0.113 |

| On-field Performance | Problem- focused Coping | Increased Effort & Resolve | Denial | Emphasising the Positive | Seeking Social Support | General Emotionality | Detachment |
|---|-------------------------------|----------------------------------|--------|-----------------------------|------------------------------|-------------------------|------------|
| Total Passes per Game | 0.215 | 0.131 | -0.160 | 0.020 | -0.076 | 0.202 | 0.126 |
| Poor Passes per Game | 0.079 | 0.020 | -0.063 | -0.059 | -0.089 | 0.319* | 0.178 |
| Offload | -0.014 | 0.052 | 0.105 | 0.123 | -0.109 | 0.131 | -0.161 |
| Kicks General | 0.156 | -0.102 | 0.215 | 0.003 | -0.011 | 0.265 | 0.182 |
| Miss Kicks | -0.129 | -0.165 | 0.230 | -0.061 | 0.025 | 0.259 | 0.174 |
| Runs | 0.209 | 0.179 | 0.067 | 0.163 | 0.064 | 0.202 | -0.160 |
| Pick and drive | -0.098 | 0.105 | 0.278 | 0.135 | 0.075 | 0.019 | -0.069 |
| Over Advantage | 0.009 | 0.021 | 0.270* | 0.137 | 0.038 | 0.183 | -0.125 |
| Line Break | -0.058 | 0.032 | 0.271 | 0.067 | 0.018 | 0.286* | 0.000 |
| Break Tackle | -0.059 | 0.100 | 0.146 | 0.076 | 0.048 | 0.234 | -0.137 |
| Dominant Contact Success | 0.015 | 0.033 | 0.135 | -0.001 | 0.110 | 0.139 | -0.117 |
| Neutral Contact Success | -0.032 | 0.006 | 0.089 | 0.136 | 0.191 | 0.224 | 0.071 |
| Pass Contact Success | -0.029 | 0.026 | 0.002 | -0.063 | 0.162 | 0.156 | 0.180 |
| D % | 0.108 | 0.212 | 0.120 | 0.180 | 0.063 | -0.031 | -0.154 |
| Ruck/Maul Involvement | -0.021 | 0.050 | 0.105 | -0.048 | 0.159 | 0.134 | -0.082 |
| Effective Ruck & Maul Involvement | -0.246* | -0.236* | 0.075 | -0.198 | 0.158 | -0.117 | 0.189 |
| Ineffective Ruck & Maul Involvement | -0.152 | -0.144 | -0.134 | -0.159 | 0.030 | -0.241 | 0.138 |
| Penalties | -0.032 | 0.129 | -0.089 | -0.073 | 0.043 | 0.457* | 0.216 |
| Turnovers | 0.230 | 0.044 | -0.029 | 0.073 | -0.013 | 0.127 | -0.043 |
| Errors | 0.088 | -0.070 | 0.100 | 0.040 | 0.133 | 0.071 | 0.039 |

| On-field Performance | Win Orientation | Goal Orientation | Anxiety | Self Esteem |
|-------------------------------------|-----------------|------------------|---------|-------------|
| Total Passes per Game | 0.094 | 0.131 | -0.142 | 0.128 |
| Poor Passes per Game | 0.201 | 0.119 | -0.062 | 0.152 |
| Offload | 0.067 | 0.060 | -0.102 | 0.187 |
| Kicks General | -0.266 | -0.196 | 0.274 | -0.093 |
| Miss Kicks | -0.221 | -0.139 | 0.279 | -0.104 |
| Runs | 0.148 | 0.155 | -0.085 | 0.166 |
| Pick and drive | 0.015 | -0.020 | -0.020 | -0.148 |
| Over Advantage | 0.066 | 0.028 | 0.023 | -0.006 |
| Line Break | -0.045 | 0.011 | 0.018 | 0.077 |
| Break Tackle | 0.100 | 0.054 | 0.055 | 0.052 |
| Dominant Contact Success | 0.136 | 0.095 | 0.014 | 0.018 |
| Neutral Contact Success | -0.055 | -0.100 | 0.017 | -0.205 |
| Pass Contact Success | -0.020 | -0.084 | -0.015 | -0.081 |
| D % | 0.044 | -0.013 | -0.005 | 0.119 |
| Ruck/Maul Involvement | 0.120 | 0.064 | 0.041 | -0.063 |
| Effective Ruck & Maul Involvement | -0.189 | -0.265* | 0.189 | -0.311* |
| Ineffective Ruck & Maul Involvement | -0.037 | -0.022 | 0.003 | -0.241 |
| Penalties | 0.087 | 0.149 | 0.199 | 0.136 |
| Turnovers | 0.151 | 0.175 | -0.167 | 0.310* |
| Errors | -0.192 | -0.070 | 0.114 | 0.028 |

| On-field Performance | Emotional Recognition & Expression | Understanding Emotions | Emotions Direct Cognition | Emotional Management | Emotional Control |
|----------------------------------|--|---------------------------|---------------------------------|-------------------------|----------------------|
| Tackles Per Game | 0.087 | 0.027 | 0.041 | 0.042 | 0.018 |
| Missed Tackles Per Game | -0.023 | -0.027 | -0.119 | -0.075 | -0.062 |
| 1st Tackles Per Game | 0.137 | 0.065 | 0.047 | 0.069 | 0.062 |
| Assisted Tackles Per Game | -0.024 | -0.037 | -0.010 | 0.001 | -0.040 |
| % First Tackles Made Per Game | 0.073 | 0.045 | 0.020 | 0.094 | 0.101 |
| % All Tackles Made Per Game | 0.053 | 0.031 | 0.027 | 0.097 | 0.093 |
| Dominant Contact Success | -0.252 | -0.162 | 0.232 | -0.193 | -0.206 |
| Neutral Contact Success | -0.180 | -0.093 | 0.157 | -0.045 | -0.086 |
| Pass Contact Success | 0.173 | 0.080 | -0.035 | 0.069 | 0.067 |
| D % | -0.153 | -0.094 | 0.230 | -0.120 | -0.080 |
| Ruck Involvement | -0.032 | 0.042 | 0.026 | 0.003 | -0.017 |
| Forced Turnovers | -0.163 | -0.153 | 0.157 | -0.163 | -0.227 |
| Penalties | -0.193 | -0.187 | -0.201 | -0.112 | -0.199 |

| On-field Performance | Neuroticism | Extroversion | Openness to Experience | Agreeableness | Conscientiousness |
|----------------------------------|-------------|--------------|---------------------------|---------------|-------------------|
| Tackles Per Game | -0.033 | 0.181 | 0.130 | 0.024 | 0.183 |
| Missed Tackles Per Game | 0.027 | 0.041 | 0.045 | -0.239 | -0.024 |
| 1st Tackles Per Game | -0.122 | 0.206 | 0.158 | 0.093 | 0.215 |
| Assisted Tackles Per Game | 0.116 | 0.085 | 0.009 | -0.090 | 0.083 |
| % First Tackles Made Per Game | -0.075 | 0.002 | 0.034 | 0.179 | 0.078 |
| % All Tackles Made Per Game | -0.050 | -0.007 | 0.028 | 0.162 | 0.077 |
| Dominant Contact Success | 0.157 | 0.114 | 0.126 | 0.119 | -0.212 |
| Neutral Contact Success | 0.082 | -0.064 | -0.070 | 0.038 | -0.186 |
| Pass Contact Success | -0.140 | 0.199 | 0.140 | 0.074 | 0.258* |
| D % | 0.083 | 0.004 | 0.082 | 0.027 | -0.218 |
| Ruck Involvement | -0.005 | -0.035 | -0.025 | 0.037 | -0.047 |
| Forced Turnovers | 0.183 | 0.044 | -0.036 | -0.161 | -0.120 |
| Penalties | 0.119 | 0.071 | 0.050 | -0.109 | -0.105 |

| On-field Performance | Problem- focused Coping | Increased Effort & Resolve | Denial | Emphasising the Positive | Seeking Social Support | General Emotionality | Detachment |
|----------------------------------|-------------------------------|----------------------------------|---------|-----------------------------|------------------------------|-------------------------|------------|
| Tackles Per Game | 0.149 | 0.109 | -0.221 | 0.106 | 0.089 | -0.183 | 0.011 |
| Missed Tackles Per Game | 0.042 | 0.086 | -0.181 | 0.021 | -0.147 | -0.124 | -0.008 |
| 1st Tackles Per Game | 0.210 | 0.161 | -0.256* | 0.155 | 0.121 | -0.222 | -0.084 |
| Assisted Tackles Per Game | 0.020 | 0.004 | -0.105 | 0.011 | 0.020 | -0.102 | 0.160 |
| % First Tackles Made Per Game | -0.006 | 0.111 | 0.127 | 0.173 | 0.114 | -0.158 | -0.127 |
| % All Tackles Made Per Game | -0.011 | 0.100 | 0.104 | 0.154 | 0.105 | -0.164 | -0.082 |
| Dominant Contact Success | -0.006 | 0.036 | 0.075 | -0.041 | 0.039 | 0.002 | 0.061 |
| Neutral Contact Success | -0.165 | -0.082 | 0.109 | -0.035 | 0.105 | -0.085 | 0.037 |
| Pass Contact Success | 0.226 | 0.152 | -0.288* | 0.157 | 0.098 | -0.215 | -0.081 |
| D % | -0.189 | 0.056 | 0.221 | -0.063 | -0.075 | 0.201 | 0.204 |
| Ruck Involvement | -0.107 | 0.044 | 0.031 | 0.122 | 0.224 | -0.076 | -0.019 |
| Forced Turnovers | -0.129 | 0.013 | -0.003 | -0.158 | -0.023 | 0.026 | 0.143 |
| Penalties | -0.142 | -0.067 | 0.025 | -0.033 | 0.097 | 0.071 | 0.163 |

| On-field Performance | Win Orientation | Goal Orientation | Anxiety | Self Esteem |
|-------------------------------|-----------------|------------------|----------|-------------|
| Tackles Per Game | 0.089 | 0.102 | -0.213 | 0.042 |
| Missed Tackles Per Game | 0.119 | 0.008 | -0.070 | 0.063 |
| 1st Tackles Per Game | 0.139 | 0.154 | -0.307** | 0.122 |
| Assisted Tackles Per Game | -0.041 | -0.050 | 0.013 | -0.120 |
| % First Tackles Made Per Game | 0.016 | 0.083 | -0.255* | -0.044 |
| % All Tackles Made Per Game | -0.001 | 0.061 | -0.217 | -0.061 |
| Dominant Contact Success | 0.162 | -0.018 | 0.027 | -0.053 |
| Neutral Contact Success | 0.041 | -0.147 | 0.010 | -0.205 |
| Pass Contact Success | 0.096 | 0.156 | -0.324* | 0.138 |
| D % | 0.002 | -0.072 | 0.138 | -0.040 |
| Ruck Involvement | 0.050 | 0.010 | -0.095 | -0.074 |
| Forced Turnovers | 0.091 | 0.109 | 0.062 | -0.016 |
| Penalties | 0.069 | -0.080 | -0.032 | 0.065 |

APPENDIX 7

| On-field Performance | Emotional Recognition & Expression | Understanding Emotions | Emotions Direct Cognition | Emotional Management | Emotional Control |
|--|--|---------------------------|---------------------------------|-------------------------|----------------------|
| Total Passes per Game | 0.221 | 0.104 | 0.140 | 0.117 | 0.048 |
| Poor Passes per Game | 0.202 | 0.084 | 0.279 | 0.146 | 0.001 |
| Offload | 0.056 | -0.103 | 0.304* | -0.146 | -0.152 |
| Kicks General | 0.020 | -0.149 | 0.228 | -0.078 | -0.309 |
| Miss Kicks | 0.027 | -0.141 | 0.244 | -0.035 | -0.227 |
| Runs | 0.094 | -0.019 | -0.024 | 0.222 | 0.043 |
| Pick and drive | 0.191 | -0.143 | 0.073 | 0.028 | -0.273 |
| Over Advantage | 0.007 | -0.137 | -0.022 | 0.038 | -0.066 |
| Line Break | -0.101 | -0.301 | 0.271* | -0.187 | -0.398** |
| Break Tackle | -0.053 | -0.016 | 0.056 | -0.029 | 0.025 |
| Dominant Contact Success | 0.111 | -0.004 | -0.048 | 0.232 | 0.117 |
| Neutral Contact Success | -0.117 | -0.035 | -0.061 | 0.057 | -0.036 |
| Pass Contact Success | 0.166 | 0.080 | 0.254 | 0.143 | -0.048 |
| D % | -0.085 | -0.167 | -0.092 | -0.032 | 0.054 |
| Ruck/Maul Involvement | 0.139 | 0.021 | 0.002 | 0.248* | 0.111 |
| Effective Ruck & Maul Involvement | 0.079 | 0.056 | 0.077 | -0.047 | 0.026 |
| Ineffective Ruck & Maul Involvement | -0.128 | -0.283* | 0.120 | -0.065 | 0.033 |
| Penalties | -0.228 | 0.002 | 0.162 | -0.004 | 0.013 |
| Turnovers | 0.127 | -0.098 | 0.136 | 0.116 | -0.094 |
| Errors | -0.032 | -0.181 | 0.301* | -0.077 | -0.275 |

| On-field Performance | Neuroticism | Extraversion | Openness to Experience | Agreeableness | Conscientiousness |
|-------------------------------------|-------------|--------------|------------------------|---------------|-------------------|
| Total Passes per Game | -0.164 | 0.200 | -0.157 | -0.130 | 0.090 |
| Poor Passes per Game | -0.163 | 0.215 | -0.087 | -0.152 | 0.064 |
| Offload | 0.008 | 0.056 | 0.137 | 0.004 | 0.019 |
| Kicks General | -0.010 | -0.051 | -0.101 | -0.061 | -0.013 |
| Miss Kicks | -0.040 | 0.048 | -0.070 | -0.013 | 0.128 |
| Runs | -0.135 | 0.043 | 0.196 | 0.012 | 0.016 |
| Pick and drive | 0.294 | 0.058 | 0.184 | 0.125 | 0.188 |
| Over Advantage | 0.026 | -0.088 | 0.182 | 0.011 | -0.070 |
| Line Break | 0.139 | -0.207 | -0.071 | -0.036 | -0.311* |
| Break Tackle | -0.025 | 0.010 | 0.056 | -0.044 | 0.071 |
| Dominant Contact Success | -0.063 | 0.095 | 0.261* | 0.117 | 0.073 |
| Neutral Contact Success | -0.010 | 0.087 | -0.053 | 0.012 | 0.089 |
| Pass Contact Success | -0.042 | 0.189 | -0.143 | -0.010 | 0.190 |
| D % | 0.157 | -0.153 | 0.202 | 0.097 | -0.163 |
| Ruck/Maul Involvement | -0.061 | 0.121 | 0.162 | 0.123 | 0.129 |
| Effective Ruck & Maul Involvement | 0.153 | -0.041 | 0.017 | 0.142 | 0.109 |
| Ineffective Ruck & Maul Involvement | 0.073 | 0.103 | -0.185 | 0.010 | 0.030 |
| Penalties | 0.083 | 0.018 | -0.105 | 0.233 | -0.111 |
| Turnovers | -0.043 | 0.019 | 0.034 | -0.046 | -0.068 |
| Errors | 0.071 | -0.031 | -0.079 | -0.240 | -0.028 |

| On-field Performance | Problem-focused Coping | Increased Effort & Resolve | Denial | Emphasising the Positive | Seeking Social Support | General Emotionality | Detachment | Wishful Thinking |
|-------------------------------------|------------------------|----------------------------|--------|--------------------------|------------------------|----------------------|------------|------------------|
| Total Passes per Game | 0.139 | 0.176 | -0.146 | 0.094 | 0.107 | 0.073 | -0.017 | -0.078 |
| Poor Passes per Game | 0.010 | 0.048 | -0.211 | 0.086 | 0.070 | 0.057 | -0.055 | -0.095 |
| Offload | 0.326* | 0.085 | 0.047 | 0.120 | 0.174 | 0.275 | 0.074 | 0.191 |
| Kicks General | -0.130 | -0.138 | -0.121 | 0.231 | -0.318* | -0.151 | -0.145 | -0.014 |
| Miss Kicks | 0.070 | -0.027 | -0.015 | 0.279 | -0.148 | -0.039 | -0.107 | 0.033 |
| Runs | 0.231 | 0.031 | 0.034 | 0.163 | 0.056 | 0.043 | -0.062 | -0.200 |
| Pick and drive | -0.089 | 0.006 | -0.041 | -0.005 | 0.276 | -0.175 | 0.012 | 0.067 |
| Over Advantage | 0.204 | 0.072 | 0.105 | 0.047 | 0.113 | 0.097 | 0.047 | -0.048 |
| Line Break | -0.134 | -0.396* | -0.028 | 0.017 | 0.087 | 0.122 | 0.188 | 0.027 |
| Break Tackle | 0.264* | 0.006 | 0.084 | 0.075 | -0.024 | 0.296* | 0.154 | 0.136 |
| Dominant Contact Success | 0.177 | 0.067 | 0.095 | 0.037 | 0.130 | 0.112 | 0.013 | -0.110 |
| Neutral Contact Success | -0.056 | -0.076 | 0.075 | -0.166 | 0.074 | -0.298* | -0.135 | -0.363* |
| Pass Contact Success | 0.029 | 0.184 | 0.016 | 0.020 | 0.216 | -0.049 | 0.046 | -0.168 |
| D % | 0.097 | 0.061 | 0.183 | -0.048 | 0.152 | 0.188 | 0.057 | 0.004 |
| Ruck/Maul Involvement Effective | 0.058 | 0.023 | 0.033 | -0.073 | 0.111 | -0.047 | -0.091 | -0.211 |
| Ruck & Maul Involvement Ineffective | -0.235 | -0.107 | -0.011 | -0.315* | 0.072 | -0.204 | -0.069 | 0.016 |
| Ruck & Maul Involvement | -0.098 | 0.166 | 0.102 | 0.018 | 0.133 | 0.096 | 0.160 | 0.071 |
| Penalties | -0.253 | -0.178 | 0.031 | -0.163 | -0.149 | -0.131 | 0.081 | 0.112 |
| Turnovers | 0.006 | 0.093 | 0.105 | 0.106 | -0.036 | 0.107 | 0.062 | -0.005 |
| Errors | -0.042 | -0.070 | -0.105 | 0.166 | -0.073 | 0.070 | 0.027 | -0.012 |

| On-field Performance | Win Orientation | Goal Orientation | Competitiveness |
|---|--------------------|---------------------|-----------------|
| Total Passes per Game | -0.160 | 0.112 | 0.055 |
| Poor Passes per Game | -0.181 | -0.054 | 0.042 |
| Offload | 0.098 | 0.191 | 0.345* |
| Kicks General | -0.109 | -0.093 | 0.004 |
| Miss Kicks | -0.358** | 0.026 | -0.140 |
| Runs | 0.082 | -0.009 | 0.171 |
| Pick and drive | 0.099 | -0.079 | -0.144 |
| Over Advantage | 0.139 | 0.151 | 0.220 |
| Line Break | -0.113 | -0.249 | -0.247 |
| Break Tackle | 0.240 | 0.136 | 0.251 |
| Dominant Contact Success | 0.103 | 0.047 | 0.164 |
| Neutral Contact Success | 0.064 | -0.180 | 0.078 |
| Pass Contact Success | -0.180 | -0.155 | -0.178 |
| D % | 0.022 | 0.131 | 0.052 |
| Ruck/Maul Involvement | 0.016 | -0.013 | 0.078 |
| Effective Ruck & Maul Involvement | -0.015 | 0.108 | -0.029 |
| Ineffective Ruck & Maul Involvement | -0.111 | 0.221 | -0.079 |
| Penalties | -0.267 | -0.167 | -0.226 |
| Turnovers | -0.156 | -0.211 | -0.085 |
| Errors | -0.066 | -0.156 | -0.199 |

| On-field Performance | Emotional Recognition & Expression | Understanding Emotions | Emotions Direct Cognition | Emotional Management | Emotional Control |
|----------------------------------|--|---------------------------|---------------------------------|-------------------------|----------------------|
| Tackles Per Game | 0.014 | 0.035 | -0.073 | 0.143 | 0.177 |
| Missed Tackles Per Game | 0.053 | 0.021 | 0.127 | 0.141 | 0.035 |
| 1st Tackles Per Game | -0.053 | -0.016 | -0.067 | 0.150 | 0.177 |
| Assisted Tackles Per Game | 0.119 | 0.105 | -0.059 | 0.096 | 0.131 |
| % First Tackles Made Per Game | 0.077 | 0.109 | -0.024 | 0.058 | 0.194 |
| % All Tackles Made Per Game | 0.116 | 0.132 | -0.052 | 0.047 | 0.206 |
| Dominant Contact Success | -0.324* | -0.415** | 0.184 | -0.255 | -0.280 |
| Neutral Contact Success | -0.066 | -0.309* | 0.087 | -0.128 | -0.088 |
| Pass Contact Success | 0.005 | 0.072 | -0.083 | 0.204 | 0.209 |
| D % | -0.377** | -0.490** | 0.181 | -0.341* | -0.363* |
| Ruck Involvement | 0.109 | -0.017 | 0.020 | 0.031 | -0.007 |
| Forced Turnovers | 0.182 | -0.013 | 0.136 | 0.081 | -0.017 |
| Penalties | -0.144 | 0.014 | -0.353* | 0.029 | -0.002 |

| On-field Performance | Neuroticism | Extraversion | Openness to Experience | Agreeableness | Conscientiousness |
|----------------------------------|-------------|--------------|---------------------------|---------------|-------------------|
| Tackles Per Game | -0.002 | 0.122 | 0.093 | 0.328** | -0.033 |
| Missed Tackles Per Game | -0.044 | 0.176 | 0.087 | 0.010 | -0.120 |
| 1st Tackles Per Game | 0.000 | 0.110 | 0.090 | 0.347** | -0.057 |
| Assisted Tackles Per Game | -0.004 | 0.110 | 0.075 | 0.218 | 0.012 |
| % First Tackles Made Per Game | -0.072 | 0.005 | 0.040 | 0.176 | 0.135 |
| % All Tackles Made Per Game | -0.097 | 0.029 | 0.047 | 0.150 | 0.155 |
| Dominant Contact Success | 0.256 | -0.203 | -0.199 | 0.129 | -0.232 |
| Neutral Contact Success | 0.127 | 0.009 | -0.199 | 0.154 | -0.190 |
| Pass Contact Success | -0.019 | 0.143 | 0.153 | 0.311 | 0.005 |
| D % | 0.242 | -0.261 | -0.299* | 0.066 | -0.189 |
| Ruck Involvement | 0.247 | 0.034 | 0.078 | 0.248 | -0.039 |
| Forced Turnovers | 0.080 | 0.179 | -0.049 | 0.296* | -0.083 |
| Penalties | -0.159 | 0.130 | -0.158 | 0.117 | 0.219 |

| On-field Performance | Fantasy | Aesthetics | Feeling | Action | Ideas | Values |
|----------------------------------|---------|------------|---------|--------|---------|--------|
| Tackles Per Game | 0.088 | 0.083 | 0.089 | 0.147 | -0.129 | -0.018 |
| Missed Tackles Per Game | -0.232 | 0.014 | 0.008 | 0.132 | 0.063 | 0.273* |
| 1st Tackles Per Game | 0.038 | 0.068 | 0.075 | 0.187 | -0.061 | -0.031 |
| Assisted Tackles Per Game | 0.149 | 0.088 | 0.085 | 0.045 | -0.209 | 0.007 |
| % First Tackles Made Per Game | 0.134 | 0.115 | 0.126 | -0.093 | -0.064 | -0.215 |
| % All Tackles Made Per Game | 0.140 | 0.104 | 0.140 | -0.136 | -0.064 | -0.170 |
| Dominant Contact Success | 0.154 | -0.183 | -0.290* | -0.082 | 0.006 | -0.079 |
| Neutral Contact Success | 0.290 | -0.103 | -0.149 | -0.249 | -0.190 | -0.122 |
| Pass Contact Success | -0.021 | 0.114 | 0.169 | 0.258* | -0.050 | -0.028 |
| D % | 0.125 | -0.272 | -0.392* | -0.061 | -0.044 | -0.065 |
| Ruck Involvement | 0.185 | 0.112 | 0.084 | -0.031 | -0.062 | -0.158 |
| Forced Turnovers | -0.037 | 0.051 | -0.215 | 0.120 | -0.056 | -0.037 |
| Penalties | 0.221 | -0.123 | 0.244 | 0.025 | -0.467* | -0.102 |

| On-field Performance | Problem- focused Coping | Increased Effort & Resolve | Denial | Emphasising the Positive | Seeking Social Support | General Emotionality | Detachment | Wishful Thinking |
|--|-------------------------------|----------------------------------|--------|-----------------------------|------------------------------|-------------------------|------------|---------------------|
| Tackles Per Game | -0.119 | -0.097 | -0.023 | -0.114 | 0.027 | -0.350** | -0.180 | -0.075 |
| Missed Tackles Per Game | -0.066 | -0.200 | -0.183 | 0.126 | 0.203 | -0.050 | -0.114 | -0.217 |
| 1st Tackles Per Game | -0.113 | -0.063 | -0.071 | -0.074 | 0.012 | -0.339** | -0.175 | -0.128 |
| Assisted Tackles Per Game | -0.101 | -0.125 | 0.059 | -0.151 | 0.046 | -0.285* | -0.145 | 0.028 |
| % First Tackles Made Per Game | 0.000 | 0.171 | -0.081 | -0.158 | -0.125 | -0.156 | -0.164 | 0.002 |
| % All Tackles Made Per Game | 0.030 | 0.169 | -0.080 | -0.167 | -0.105 | -0.171 | -0.189 | 0.008 |
| Dominant Contact | -0.165 | -0.196 | 0.004 | -0.065 | 0.077 | -0.185 | 0.015 | -0.015 |
| Success Neutral Contact | -0.302* | -0.222 | -0.139 | -0.274* | 0.140 | -0.093 | -0.137 | -0.160 |
| Success Pass Contact | -0.062 | -0.031 | -0.073 | -0.031 | 0.007 | -0.305* | -0.149 | -0.110 |
| Success D % | -0.100 | -0.100 | -0.025 | -0.075 | 0.056 | -0.077 | 0.012 | -0.061 |
| Ruck Involvement | -0.195 | -0.225 | 0.056 | -0.282* | 0.111 | -0.171 | 0.026 | -0.028 |
| Forced Turnovers | -0.278* | -0.107 | -0.148 | -0.016 | 0.034 | -0.139 | -0.051 | -0.052 |
| Penalties | -0.060 | 0.009 | -0.173 | -0.437** | -0.196 | -0.136 | -0.129 | -0.307 |

| On-field Performance | Win Orientation | Goal Orientation | Competitiveness |
|-------------------------------|--------------------|---------------------|-----------------|
| Tackles Per Game | -0.059 | -0.114 | -0.040 |
| Missed Tackles Per Game | -0.052 | -0.294* | -0.023 |
| 1st Tackles Per Game | 0.014 | -0.123 | -0.016 |
| Assisted Tackles Per Game | -0.159 | -0.067 | -0.066 |
| % First Tackles Made Per Game | 0.073 | 0.239 | 0.159 |
| % All Tackles Made Per Game | 0.053 | 0.286* | 0.200 |
| Dominant Contact Success | 0.167 | 0.067 | -0.021 |
| Neutral Contact Success | 0.014 | -0.242 | -0.280* |
| Pass Contact Success | -0.016 | -0.128 | -0.011 |
| D % | 0.243 | 0.125 | 0.023 |
| Ruck Involvement | -0.169 | -0.093 | -0.212 |
| Forced Turnovers | -0.371** | -0.321* | -0.439** |
| Penalties | 0.032 | 0.066 | 0.163 |

APPENDIX 8

| On-field Performance | Emotional Recognition & Expression | Understanding Emotions | Emotions Direct Cognition | Emotional Management | Emotional Control |
|--|--|---------------------------|---------------------------------|-------------------------|----------------------|
| Total Passes per Game | 0.081 | 0.153 | 0.090 | 0.089 | 0.007 |
| Poor Passes per Game | 0.024 | 0.085 | 0.059 | -0.063 | -0.131 |
| Offload | 0.002 | -0.139 | -0.146 | 0.046 | 0.000 |
| Kicks General | 0.289* | 0.054 | 0.197 | -0.046 | 0.046 |
| Miss Kicks | 0.369* | 0.137 | 0.295 | -0.144 | -0.157 |
| Runs | 0.073 | -0.008 | -0.121 | 0.046 | -0.020 |
| Pick and drive | 0.125 | 0.184 | 0.045 | 0.253 | 0.353** |
| Over Advantage | -0.058 | -0.201 | -0.305** | -0.108 | -0.121 |
| Line Break | -0.060 | -0.083 | -0.204 | -0.042 | -0.009 |
| Break Tackle | -0.027 | -0.271* | -0.367** | -0.180 | -0.228 |
| Dominant Contact Success | -0.047 | -0.140 | -0.249* | 0.000 | -0.044 |
| Neutral Contact Success | 0.004 | 0.027 | -0.108 | 0.152 | 0.264* |
| Pass Contact Success | -0.082 | 0.053 | -0.067 | 0.008 | 0.020 |
| D % | -0.096 | -0.185 | -0.192 | 0.026 | 0.036 |
| Ruck/Maul Involvement | -0.010 | -0.038 | -0.134 | -0.021 | -0.009 |
| Effective Ruck & Maul Involvement | -0.023 | 0.018 | 0.028 | 0.015 | 0.013 |
| Ineffective Ruck & Maul Involvement | -0.207 | -0.197 | -0.208 | -0.081 | -0.033 |
| Penalties | 0.007 | 0.018 | -0.095 | 0.087 | -0.078 |
| Turnovers | -0.006 | -0.004 | -0.085 | -0.093 | -0.064 |
| Errors | 0.141 | -0.042 | 0.008 | -0.096 | -0.019 |

| On-field Performance | Neuroticism | Extraversion | Openness to Experience | Agreeableness | Conscientiousness |
|-------------------------------------|-------------|--------------|------------------------|---------------|-------------------|
| Total Passes per Game | 0.073 | 0.176 | 0.112 | 0.146 | 0.159 |
| Poor Passes per Game | 0.025 | 0.002 | 0.112 | 0.188 | 0.046 |
| Offload | -0.125 | -0.017 | -0.058 | -0.029 | -0.049 |
| Kicks General | 0.158 | 0.131 | 0.333* | 0.082 | 0.113 |
| Miss Kicks | 0.261 | 0.118 | 0.385* | 0.133 | 0.195 |
| Runs | -0.040 | 0.099 | 0.029 | 0.071 | -0.084 |
| Pick and drive | -0.332* | -0.049 | 0.138 | 0.358** | 0.332* |
| Over Advantage | -0.048 | -0.094 | -0.120 | 0.047 | -0.138 |
| Line Break | -0.105 | -0.006 | 0.073 | -0.064 | -0.321* |
| Break Tackle | 0.005 | -0.054 | 0.004 | -0.171 | -0.062 |
| Dominant Contact Success | -0.115 | -0.021 | -0.106 | 0.110 | -0.047 |
| Neutral Contact Success | -0.189 | 0.105 | 0.018 | 0.119 | 0.149 |
| Pass Contact Success | 0.051 | 0.119 | 0.028 | 0.105 | -0.065 |
| D % | -0.133 | -0.132 | -0.094 | -0.024 | 0.014 |
| Ruck/Maul Involvement | -0.074 | 0.033 | -0.044 | 0.171 | 0.054 |
| Effective Ruck & Maul Involvement | -0.018 | -0.058 | -0.036 | 0.003 | 0.099 |
| Ineffective Ruck & Maul Involvement | 0.005 | -0.216 | -0.266* | -0.098 | -0.079 |
| Penalties | -0.088 | -0.108 | 0.036 | 0.081 | 0.030 |
| Turnovers | -0.023 | 0.004 | 0.086 | -0.032 | -0.019 |
| Errors | 0.135 | 0.028 | 0.229 | 0.038 | 0.021 |

| On-field Performance | Problem- focused Coping | Increased Effort & Resolve | Denial | Emphasising the Positive | Seeking Social Support | General Emotionality | Detachment |
|---|-------------------------------|----------------------------------|---------|-----------------------------|------------------------------|-------------------------|------------|
| Total Passes per Game | 0.111 | 0.082 | -0.041 | -0.060 | -0.051 | 0.198 | 0.043 |
| Poor Passes per Game | -0.056 | -0.103 | 0.018 | -0.065 | -0.082 | 0.217 | -0.010 |
| Offload | -0.029 | 0.233 | -0.025 | 0.132 | -0.136 | 0.118 | 0.103 |
| Kicks General | 0.173 | 0.117 | 0.204 | 0.223 | 0.033 | 0.336* | 0.238 |
| Miss Kicks | 0.231 | 0.035 | 0.238 | 0.121 | 0.254 | 0.383* | 0.228 |
| Runs | -0.007 | 0.116 | -0.017 | 0.047 | -0.069 | 0.146 | 0.111 |
| Pick and drive | 0.354** | 0.296* | -0.347* | 0.372** | 0.236 | -0.313* | -0.348* |
| Over Advantage | -0.058 | 0.097 | -0.103 | -0.008 | -0.051 | -0.012 | 0.017 |
| Line Break | -0.248 | -0.160 | 0.211 | 0.199 | -0.158 | 0.046 | 0.113 |
| Break Tackle | -0.069 | 0.133 | -0.105 | -0.086 | -0.097 | 0.169 | 0.087 |
| Dominant Contact Success | -0.047 | 0.127 | -0.142 | 0.015 | -0.004 | -0.046 | 0.010 |
| Neutral Contact Success | 0.074 | 0.097 | 0.025 | -0.049 | -0.046 | 0.049 | 0.058 |
| Pass Contact Success | -0.132 | -0.025 | 0.167 | -0.084 | -0.086 | 0.199 | 0.099 |
| D % | -0.024 | 0.083 | -0.135 | 0.203 | 0.115 | -0.280* | -0.031 |
| Ruck/Maul Involvement | 0.044 | 0.144 | -0.121 | -0.045 | 0.034 | 0.017 | -0.001 |
| Effective Ruck & Maul Involvement | 0.048 | 0.082 | -0.131 | -0.055 | 0.119 | -0.206 | -0.143 |
| Ineffective Ruck & Maul Involvement | -0.110 | -0.101 | -0.070 | -0.100 | 0.011 | -0.248 | -0.157 |
| Penalties | -0.091 | -0.156 | 0.115 | -0.037 | -0.040 | -0.059 | -0.136 |
| Turnovers | -0.059 | -0.110 | 0.023 | -0.005 | -0.136 | 0.059 | 0.128 |
| Errors | 0.038 | -0.067 | 0.246 | 0.146 | 0.050 | 0.298 | 0.164 |

| On-field Performance | Win Orientation | Goal Orientation | Competitiveness |
|--|-----------------|------------------|-----------------|
| Total Passes per Game | 0.151 | 0.108 | 0.128 |
| Poor Passes per Game | -0.032 | 0.021 | 0.033 |
| Offload | 0.161 | 0.132 | 0.217 |
| Kicks General | 0.068 | 0.090 | 0.218 |
| Miss Kicks | 0.081 | 0.169 | 0.259 |
| Runs | 0.155 | 0.114 | 0.118 |
| Pick and drive | 0.230 | 0.265 | 0.254 |
| Over Advantage | 0.175 | 0.130 | 0.126 |
| Line Break | -0.211 | -0.122 | -0.147 |
| Break Tackle | 0.079 | 0.147 | 0.173 |
| Dominant Contact Success | 0.158 | 0.146 | 0.104 |
| Neutral Contact Success | 0.061 | 0.057 | 0.049 |
| Pass Contact Success | 0.021 | -0.018 | -0.033 |
| D % | -0.134 | -0.118 | -0.061 |
| Ruck/Maul Involvement | 0.224* | 0.212 | 0.127 |
| Effective Ruck & Maul Involvement | -0.010 | 0.073 | -0.032 |
| Ineffective Ruck & Maul Involvement | -0.139 | -0.066 | -0.084 |
| Penalties | 0.062 | 0.229 | 0.102 |
| Turnovers | -0.082 | -0.089 | 0.067 |
| Errors | -0.079 | -0.001 | 0.128 |

| On-field Performance | Emotional Recognition & Expression | Understanding Emotions | Emotions Direct Cognition | Emotional Management | Emotional Control |
|----------------------------------|--|---------------------------|---------------------------------|-------------------------|----------------------|
| Tackles Per Game | 0.048 | 0.089 | 0.135 | 0.235 | 0.113 |
| Missed Tackles Per Game | 0.048 | 0.033 | 0.006 | -0.073 | -0.084 |
| 1st Tackles Per Game | 0.090 | 0.102 | 0.165 | 0.269* | 0.150 |
| Assisted Tackles Per Game | -0.028 | 0.046 | 0.054 | 0.125 | 0.027 |
| % First Tackles Made Per Game | 0.179 | 0.166 | 0.255* | 0.246* | 0.176 |
| % All Tackles Made Per Game | 0.161 | 0.172 | 0.241* | 0.219* | 0.138 |
| Dominant Contact Success | -0.197 | -0.048 | -0.039 | 0.053 | -0.044 |
| Neutral Contact Success | -0.077 | -0.033 | -0.122 | -0.115 | -0.096 |
| Pass Contact Success | 0.114 | 0.115 | 0.190 | 0.306** | 0.191 |
| D % | -0.280* | -0.061 | -0.132 | -0.049 | -0.095 |
| Ruck Involvement | 0.002 | 0.052 | -0.063 | 0.164 | 0.119 |
| Forced Turnovers | -0.091 | 0.112 | -0.029 | 0.148 | 0.120 |
| Penalties | -0.011 | -0.010 | -0.038 | 0.016 | -0.015 |

| On-field Performance | Neuroticism | Extroversion | Openness to Experience | Agreeableness | Conscientiousness |
|----------------------------------|-------------|--------------|---------------------------|---------------|-------------------|
| Tackles Per Game | 0.084 | 0.250* | 0.086 | 0.161 | 0.172 |
| Missed Tackles Per Game | 0.176 | 0.103 | 0.074 | 0.053 | -0.083 |
| 1st Tackles Per Game | 0.042 | 0.232* | 0.118 | 0.178 | 0.185 |
| Assisted Tackles Per Game | 0.132 | 0.217 | 0.014 | 0.097 | 0.109 |
| % First Tackles Made Per Game | -0.079 | 0.172 | 0.179 | 0.063 | 0.334** |
| % All Tackles Made Per Game | -0.040 | 0.212 | 0.155 | 0.015 | 0.314** |
| Dominant Contact Success | 0.004 | -0.084 | -0.021 | 0.133 | -0.087 |
| Neutral Contact Success | 0.056 | 0.047 | 0.052 | 0.139 | -0.099 |
| Pass Contact Success | 0.003 | 0.232* | 0.117 | 0.163 | 0.215 |
| D % | -0.057 | -0.265* | -0.115 | -0.023 | -0.144 |
| Ruck Involvement | -0.093 | 0.096 | -0.009 | 0.096 | 0.070 |
| Forced Turnovers | -0.162 | 0.068 | -0.039 | 0.050 | -0.025 |
| Penalties | 0.115 | 0.114 | 0.073 | 0.227 | 0.318* |

| On-field Performance | Problem-focused Coping | Increased Effort & Resolve | Denial | Emphasising the Positive | Seeking Social Support | General Emotionality | Detachment |
|-------------------------------|------------------------|----------------------------|--------|--------------------------|------------------------|----------------------|------------|
| Tackles Per Game | 0.140 | 0.232* | 0.049 | 0.040 | 0.060 | 0.110 | 0.140 |
| Missed Tackles Per Game | -0.101 | -0.014 | 0.115 | -0.088 | -0.035 | 0.317** | 0.251* |
| 1st Tackles Per Game | 0.140 | 0.223* | 0.043 | 0.102 | 0.065 | 0.107 | 0.161 |
| Assisted Tackles Per Game | 0.107 | 0.195 | 0.045 | -0.065 | 0.033 | 0.091 | 0.075 |
| % First Tackles Made Per Game | 0.240* | 0.212 | -0.117 | 0.191 | 0.144 | -0.140 | -0.136 |
| % All Tackles Made Per Game | 0.218 | 0.211 | -0.098 | 0.148 | 0.131 | -0.107 | -0.137 |
| Dominant Contact Success | -0.114 | 0.014 | 0.053 | 0.069 | 0.023 | -0.054 | 0.013 |
| Neutral Contact Success | -0.057 | 0.014 | -0.005 | -0.074 | -0.039 | 0.054 | -0.038 |
| Pass Contact Success | 0.170 | 0.227* | 0.059 | 0.124 | 0.074 | 0.109 | 0.168 |
| D % | -0.188 | -0.168 | 0.087 | -0.057 | -0.069 | -0.117 | 0.081 |
| Ruck Involvement | 0.093 | 0.108 | -0.105 | 0.076 | 0.124 | -0.150 | -0.196 |
| Forced Turnovers | 0.061 | 0.034 | 0.197 | 0.102 | -0.137 | -0.004 | -0.004 |
| Penalties | 0.139 | 0.256 | -0.144 | -0.196 | 0.013 | 0.070 | 0.066 |

| On-field Performance | Win Orientation | Goal Orientation | Competitiveness |
|-------------------------------|-----------------|------------------|-----------------|
| Tackles Per Game | 0.300** | 0.248* | 0.165 |
| Missed Tackles Per Game | 0.015 | -0.055 | -0.065 |
| 1st Tackles Per Game | 0.321** | 0.272* | 0.217 |
| Assisted Tackles Per Game | 0.200 | 0.152 | 0.048 |
| % First Tackles Made Per Game | 0.273* | 0.306** | 0.317** |
| % All Tackles Made Per Game | 0.267* | 0.265* | 0.280* |
| Dominant Contact Success | 0.178 | 0.210 | 0.122 |
| Neutral Contact Success | 0.121 | 0.126 | 0.018 |
| Pass Contact Success | 0.287** | 0.234* | 0.204 |
| D % | -0.003 | 0.097 | -0.030 |
| Ruck Involvement | 0.130 | 0.221 | 0.096 |
| Forced Turnovers | 0.178 | 0.128 | 0.052 |
| Penalties | 0.319* | 0.266 | 0.242 |