Tending the flame: Personality, self-actualisation and the Olympic journey

Dissertation submitted by
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This thesis is presented for the degree of
Doctor of Philosophy of Murdoch University
2005
I declare that this thesis is my own account of my research and contains as its main content work which has not previously been submitted for a degree at any tertiary education institution.

Corinne Reid

This thesis has been submitted to MyDropBox plagiarism software and was graded at the highest level - 'Authentic'.
Abstract

Pierre de Coubertin (1863-1937), father of the modern Olympics believed that sport was about 'making men', a test of 'arête' or virtue, the ability to make the most of your physical gifts through will, wisdom, courage, self-control, and through moral maturity as evidenced in the notion of fair play. He believed that Olympism was primarily a forum to demonstrate characterological excellence rather than physical and that it offered the opportunity for others to observe the qualities that accompanied greatness in men. The aim of this thesis is to take up this opportunity, to explore the personal characteristics, more specifically, the personalities, that enable those who achieve this highest mantle of sporting excellence and which differentiate them from the many others identified as having the potential to do so. What has emerged through triangulation of data from several studies of Olympians and potential Olympians, using both quantitative and qualitative methodologies, speaks to both personality structure and processes. Firstly, many elite sportsmen and women seem to have a personality structure operating in the sporting domain that is quite different from that operating in their non-sporting life – that is, they have a sporting personality and a non-sporting, or life personality – different 'contextual selves'. Secondly, that success at the highest level seems crucially dependent upon the dispositional propensity to survive chronic stress and its acute corollaries. Thirdly, that there is more than one dispositional pathway with the power to ameliorate the potentially debilitating affects of these stressors - indeed there are even characteristics that seem to enable stress to become a formative experience. Two quite different stress-

1 Coubertin was referring to 'men' in the literal sense however throughout this dissertation, gender terms will be used interchangeably except where clearly stated. It is the observation of the author after more than a decade working with Olympians, that gender is not a particularly salient psychological characteristic in this sphere. This is also an impression offered by elite sporting coaches such as Richard Charlesworth, an Olympian himself and coach of female Olympian hockey players for nearly a decade (Charlesworth, 2001).
adaptive forces identified in this series of studies are hardiness (or openness) in one’s approach to the sporting endeavour and mental toughness in the face of pressure or adversity. Both hardiness and mental toughness seem to be related to resilience but each relates differentially to traits such as optimism, commitment and need for control, among others. Mental toughness itself seems to take two forms: for some individuals such stress endurance is driven by a high need for achievement (Type I); for others it is more the result of energy associated with the directed, adaptive, expression of psychological vulnerabilities such as high anxiety (Type II). In some cases such expression may involve conscious or unconscious defense mechanisms to protect the individual from a full awareness of the pressures they are confronting. However, such defenses also seem to constitute an Achilles’ heel once at the elite sporting level. In the absence of hard-won resilience, such psychological vulnerabilities seem to increasingly compromise further achievement. Finally, personality in this population seems to be an emergenic, dynamic force. A significant challenge in adapting to stress seems to be sustaining a balance between the tendency toward growth (or self-actualisation) and the need for recovery (or systemic homeostasis through tension reduction). In seeking to understand the role of the Olympian personality as a complex, dynamic entity, a new framework is presented, one which merges two divergent psychological traditions, trait personality and person-centred personality theories – uniquely drawing together the key structural and process elements of elite sporting personality. Evaluation of this framework is begun. Implications for the practice of psychology in sport are discussed as are the implications for the wider study of human exceptionality.
'I can well remember standing on top of Mount Everest having reached the top of the world in every sense of the term and looking east toward the great unclimbed summit of Makalu. Instinctively my eyes followed up the mighty face of the mountain and I automatically picked out a route by which Makalu could be climbed ... I was still looking for new and exciting challenges'

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( foreword in Gilson, Pratt, Roberts & Weymes(2000))
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To my family, with love and thanks.

Michael, I couldn’t, and wouldn’t have done this without you in my life...
‘Es muss sein’.

Lily, Jack and Rosie - Thank you for giving me ‘perspective’ over the 10 years it took me to complete this project, and for keeping my heart engaged while my head was absent. Mummy will not be working weekends anymore!

Eternal thanks to my parents for endless weeks of babysitting in the final stages and for a lifetime of commitment.... and to my sisters, for giving up their babysitters!

Acknowledgements

I would also like to thank ...

Richard Charlesworth for inviting me to share seven years of living and breathing exceptionality.
Wendy, Herb, Chris, Tricia, Brian and Steve for keeping me sane on many long hockey trips.

The many members of The Australian Women’s Hockey Squads between 1994-2000 including the coaches and support staff who introduced me to the meaning of dedication, the essence of individuality and the power of laughter, and who were so generous in the giving of their time for this project. I hope that I have done you justice.

The Australian Olympians (1948-2004) who participated in this study and gave of their time so freely, and who shared some of the highs but also, courageously, some of the black moments of their careers and their lives.

I would like to thank Mr. John Boulbee for facilitating access to the AIS Athlete Database and Tania Sullivan for facilitating access to the WA Olympic Council members.

Godfrey Barrett-Lennard for introducing new ‘selves’ to me

Sandy, Marjorie, Suzanne and Iain for covering for me at work! And Susan, Jo, Hilary and Martyn for being on hand when needed with red wine, chocolate and a decaf latte.

And last but very far from least, I would like to thank David and Irene, supervisors extraordinaire, for waiting, waiting and waiting some more.... hope it was worth it in the end. Your commitment has been truly appreciated.
Preface

In locating the work that follows in contextualized space, the author’s position in relation to the research undertaken is central. Participant observation is the cardinal feature of this series of studies, particularly in Study 2, which centred upon the Australian Women’s Hockey Team (AWHT). My pre-existing role as team psychologist to the National Women’s Program spanned seven years from 1993-2000 and provided the experience out of which my interest in the area of personality and exceptional achievement germinated. During this period the National team emerged from a disappointing phase of underperformance\(^2\) into their most successful era ever. From 1993-2000, the Hockeyroos as they were known won 198 international matches, drew 25 matches and lost only 30 matches. They also set the record for the longest winning streak of 41 games. Finally, they were repeat gold medalists at the Atlanta and Sydney Olympic Games, Champions Trophy holders and World Cup holders.

During my time with the AWHT, a key clinical observation was of a type of intra-individual consistency in the decision making processes and coping strategies of these exceptional sportswomen, in some cases both on and off the field of play. That is, as I grew more familiar with each individual, I became increasingly aware of trait-like qualities that seemed to permeate each player’s stance in relation to their sport, to psychological intervention, and, in some cases, to their life more broadly. However, in reading the available literature, there seemed to be no conceptual framework that was adequate for interpreting this individualized and complex interplay between personality

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\(^2\) The AWHT were favourites at the Barcelona Olympics but did not qualify for the finals.
and achievement. Most research focused on state based understandings of behaviour. Stable individual differences were, at best, considered at the level of typologies which seemed too gross for idiographic understanding, or at the level of individual traits which similarly overlooked the complex interplay of traits in the behaviour of any given individual. In this sense, the research that follows developed from the inside out. The research questions addressed emerged from reflective practice and hence the investigative process evolved as an integral part of my clinical work. By the time this study began in 1996, I had a well established, full-time role in this team. Thus, the questions asked and the methods used to answer them were more naturalistic and ‘invisible’ to the participants\(^3\), in the sense of not being differentiable from other types of assessments and interventions routinely undertaken. This embedded position provided a rich backdrop against which to interpret and cross-validate responses, minimizing the likelihood of undetected response distortions commonly associated with the presence of a new researcher (participant observer) in a community. However, the dual relationship with participants also posed some ethical dilemmas which are discussed in Study 2.

My role in relation to Studies 1 and 3 is a little more removed from the centre of the action as I have not worked professionally with most of the individual participants. However, as a member of the Australian Olympic support team in 1996 and 2000 I have worked with many Olympians from a range of sporting disciplines and thus seemed to be granted ‘insider status’ in the interviews conducted for Study 3 and had a broad base of understanding from which to interpret the archival data in study one.

\(^3\) Though of course, all participants gave consent for these assessments to form part of this thesis.
CHAPTER 1

‘Athletae proprium est se ipsum noscere, ducere et vincere’

It is up to the athlete to know, to govern, and to conquer himself.

(Pierre de Coubertin, 1929)

Coubertin’s (1929) reflection provides the frame for this series of studies which were designed to illuminate the role of personality in exceptional sporting achievement. The discussion to follow will contextualise these studies in complementary ways:

(i) Firstly, brief consideration is given to the pivotal context in which the profession of sport personology\(^1\) has emerged – a context influenced by the culture of Olympism as well as the scientific mores of the broader discipline of psychology;

(ii) Sport personology findings will then be re-evaluated in the light of this preliminary discussion. Given the fragmented nature of the discipline, a lines-of-argument synthesis methodology will be employed to help reinterpret the available literature;

(iii) An emergent framework for understanding the role of personality in the lives of elite\(^2\) sportspeople\(^3\) will then be presented;

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1 The term ‘Sports personology’ has been defined by Vealey (1989) as the study of personality theory and research in sport. Others have restricted its use to trait psychology, but in this dissertation the more encompassing definition is adopted reflecting the current state of research in which trait psychology is only one accepted way of understanding personality.

2 The term ‘elite’ is traditionally used in the context of sport to denote ‘world-class or true professional status’ (Cox, 1985, p.37). In this context it is not considered pejorative. In the current study, to be considered ‘elite’, a sportsperson must have competed at the highest level of their sport and their sport must be widely recognised. In the most part, this will mean that they are Olympians, but minimally it will mean that they have competed at a national or international or professional level depending on what level of
(iv) This framework will then be evaluated against the broader metric of modern theories of personality, specifically, the Big 5 trait model and person-centred (more phenomenological) personality theory;

(v) Following this conceptual discussion, an emergent taxonomy of research parameters will be presented to inform the three studies that follow; and finally,

(vi) The current series of studies will be introduced. These three studies utilise planned triangulation in a mixed method (qualitative and quantitative) design, so as to evaluate the proposed personality framework from complementary vantage points.

As in previous studies, it is intended that improved understanding of the role of personality in the Olympian psyche and performance will enrich the theory-practice nexus in sport psychology (Morris & Summers, 2004), and offer practical benefits to elite sportspeople and their coaches (Anderson, Knowles & Gilbourne, 2004; Perry, 2000). Indeed the current research project emerged out of such reflective practice. However, by developing a conceptual framework for understanding the Olympian personality through tapping a theoretical substratum from the parent discipline, it is also intended that this series of studies will contribute to the wider psychological literature on exceptional human achievement.

competition is available in each sport. For example, Australian Rules Football players will be considered elite if they play in the National competition as that is the highest level of this professional sport.

The terms 'sportsmen, sportswomen, sportspeople and sportpersons' will be used in this thesis where the term 'athlete' might be used in other research papers. Following Scott’s (1970) lead, ‘sportsperson’ is preferred to ‘athlete’ as it denotes ‘sporting behaviour’ which encompasses more than just sports performance. Sporting behaviour is more encompassing of mind as well as body characteristics including sportsmanship, sporting ethics, teamwork and many other features of high level sporting life. The term ‘athlete’ will be used to refer to sportspersons competing in track and field events.
PERSONALITY IN ELITE SPORT: PROVIDING A CONTEXT

Olympism

From earliest times, sport at the highest level has been about more than physical superiority. The Olympic creed, introduced in 1896 at the first of the Modern Olympic Games, states that:

'The most important thing in the Olympic Games is not to win but to take part, just as the most important thing in life is not the triumph but the struggle. The essential thing is not to have conquered but to have fought well'.

Even more broadly, the Olympic Games are considered to be a vehicle for peace between nations through the efforts of its ‘warriors’ in competition (International Olympic Committee (hereafter, IOC), 2004). The Olympic ideal, held to be reflected in all Olympians, centres around three pillars, each embodying the notion of ‘character’: the first, mentioned above, competition as derived from the Latin ‘competito’ means to ‘strive together’; the second, fair play, speaks to the centrality of self discipline and is further illuminated by the third, the concept of ‘Arête’ which lies at the heart of ancient Greek philosophy and translates to ‘virtue’ or excellence of character variously defined as ‘wisdom, courage, self-control, justice, honesty, autonomy, humility, benevolence, love, authenticity, compassion, responsibility (and) respectfulness’ (Clifford & Feezell, 1997, p.15). The development of such qualities through sport was, and is, considered by the Olympic movement to be the enabling element in both sporting excellence and world peace, and, in Coubertin’s mind, the raison d’etre of Olympism. Inherent in the Olympic ideal is the notion that personality amongst exceptional sporting achievers is a uniformly
healthy force enabling sporting achievement as well as infusing personal conduct in non-sporting life. While these qualities seem to be the antithesis of some of the doping scandals and legal battles over Olympic selection that have bedeviled recent Olympic Games, there is nevertheless, a belief, enshrined in the Olympic Creed, that success at the highest levels is about psychological characteristics rather than physical characteristics.

**Sport personology**

The focus of modern sport personology is, generally speaking, much narrower than that embodied in the notion of Olympism. Personality profiling, and sport psychology more broadly, is typically harnessed to the sport sciences – these are applied disciplines oriented primarily toward *performance enhancement*. In this context, considerable psychological research has examined the personal characteristics of sportspeople in an effort to better understand the non-physical mechanisms that contribute to optimal physical performance. In modern times the motivation behind such research has been largely practical, specifically:

(i) to assist coaches select promising talent by identifying resilient competitors (e.g. Bloomfield, 1995; Hahn & Gross, 1990); and

(ii) to assist sportsmen and women to enhance their performance through counselling and mental skills training relating to (a) the development of characteristics hypothesised to be central to achieving personal success (Orlick, 2000), and (b) the management of particular traits with hypothesised physiological corollaries
that may impede (or enhance) physical performance (e.g. attentional style c.f. Nideffer, 1978; arousal & anxiety c.f. Jones, 1995).

Unfortunately, with few exceptions, systematic study of the personality of successful sportspeople has made spasmodic progress in the past 50 years despite periodically promising results, leading a generation of researchers to question the utility of personality research in the sporting domain (Aidman, 2004; Morgan, 1980). A glance at the proceedings from the second International Congress of Sport Psychology held in Rome in 1968 (Kenyon & Grogg, 1970) and a recent review of research in sports personology (Aidman & Schofield, 2004) reveals remarkable similarity in the issues of concern: aggression in sport; personality characteristics of the athlete and coach; psychological problems of superior athletes; sport and emotional health; and, perhaps most concerningly, the same methodological problems in the psychodiagnostic investigation of personality. There is even a resurgence of interest in projective testing techniques as a more implicit (less easily falsifiable) alternative for measuring self-concept. Despite this remarkable sense of de ja vu, there is an abundance written on the topic and a chapter devoted to it in every sport psychology textbook, suggesting a persistent interest. Since the decline of Cattelian and Eysenckian psychology however, there has been a lack of theory driving the engine room of sport personology, no comprehensive model or framework guiding programmatic research, nor even competing theories vying actively for attention. Many research findings are presented but little conceptual coalescence has occurred. In many respects each new chapter on the topic is a case of the emperor’s new clothes. After introducing what is an inherently exciting topic, after engaging potential new researchers, the promise of exciting new research opportunities gives way to the

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These are the correct conference proceedings but took two years to publish.
same old studies presented with a valiant attempt to hint at much awaited progress just beyond the horizon. A recent symposium of leaders in the field of sport psychology were told that ‘Despite its intuitive appeal, the overall progress in this area [personality] has been quite disappointing, supporting a ‘skeptical view’ [of the discipline]’ (Aidman, 2004, p.8), and further, that progress has been hindered by an isolationist stance - a reluctance to integrate mainstream psychology into sporting research (Carlstedt, 2004b).

Fortunately there are new conceptual understandings of personality and also of exceptionality to help us move forward. In addition, as a discipline, we have recently developed a broader view of the validity and complementarity of a range of research methodologies both quantitative and qualitative, idiographic and nomothetic (Newman & Benz, 1998), to re-enable this investigative process. As a starting point, a review of what is known is necessary. However, even this poses some challenges as discussed below.

APPROACHING THE REVIEW OF FINDINGS IN A FRAGMENTED DISCIPLINE: METHODOLOGICAL CONSIDERATIONS

In a disciplinary context lacking in conceptual coalescence, and in the absence of an available theoretical framework, a traditional literature review that aggregates and critiques individual research findings in a reductionist manner would be counterproductive, leading to a conclusion that nothing is known (Dixon-Woods, Agarwal, Jones, Young, Sutton, 2005; Suri, 1999). Such an approach is justifiable in the context of a well defined research area where theories are known and techniques
standardised. This is not the case here. Yet in stagnant or fragmented disciplines, ‘issues of rigour in a good research synthesis are as consequential as the primary research study’ (Suri, 1999, p.1; but also Dixon-Woods et.al, 2005; Dunkin, 1996; Glass, McGaw & Smith, 1981). Thus, in the review that follows, a lines-of-argument synthesis approach has been taken to reviewing existing evidence. The core elements of this methodology and the rationale for its use is presented below.

**Lines-of-argument synthesis**

In reviewing findings from existing studies, a lines-of-argument synthesis method, mostly used in the qualitative tradition (Noblit & Hare, 1988) will be adopted in light of the fact that individual studies examined quite different aspects of the same phenomenon in quite different ways. In some cases they do not even identify themselves as being part of the same disciplinary pursuit. In the lines-of-argument method, findings from individual studies are used as ‘pixels’ to get a fuller (more expansive), picture of the phenomenon at hand rather than a more compact (reductionist) one (Suri, 1999). While such an expansive approach is uncommon in the sport psychology literature and runs the risk of the ‘thousand page dilemma’ (Kvale, 1996) its merit should be judged on its timing – in this case, prompted by the notable lack of progress made in this field using reductionist approaches. Indeed, at the recent American Board of Sport Psychology symposium, Aidman (2004) made the point that: ‘If the area of sport personology is to prove its worth, what is needed is rigorous research, beyond the conventional, for more meaningful questions about personality influences in sport and for more sophisticated methods of
answering them' (p.8). Building new structures to help shape future research and practice would seem to be a priority for sport personology and thus, the ensuing consideration of what is known will draw upon this more active and encompassing approach to knowledge synthesis in an attempt to provide a richer bedrock on which to progress.

A lines-of-argument synthesis is also compatible with the method of *strong inference* (Dunnett, 1966; Platt, 1964) in research design which encourages scientific progress through comparisons between a ‘tree of hypotheses’ rather than attempting disconfirmation of a single hypothesis. In his critical review of sport psychology in 1983, Landers called for a greater openness to this approach which he felt would foster great leaps in progress rather than the slow, incremental, ‘wrinkle research’ that he saw about him. A lines-of-argument approach will facilitate the drawing together of disparate conversations in sport personology with wider inter-disciplinary conversations about exceptionality, to form a tree of contextualised questions for consideration.

Finally, a lines-of-argument synthesis is compatible with grounded theory in its focus on theory development and identification of emerging themes through iterative re-consideration of material (Dixon-Wood et. al, 2005; Glaser & Strauss, 1967). In the current literature review and synthesis, this process will involve multi-level comparisons between and within individual published datasets that extend beyond the original accounts or foci. The most salient and powerful themes that best represent the entire dataset are only then linked interpretively to create a holistic account of the phenomenon. *This process is undertaken in the current context in the service of pulling together a disparate
literature that spans multiple levels of explanation and exploration so that it becomes linked interpretively in its account of what is known and not known (Jensen & Allen, 1996; Sandelowski, Docherty & Emden, 1997). Only then is it possible to propose a comprehensive and parsimonious framework for considering personality in elite sport.

This interpretive, inductive process can be contrasted with the quantitative approach to meta-analytic synthesis, in which all studies are considered against a common reductionist metric, effect size. It excludes all studies for which such a calculation is not possible, including all qualitative studies. The aim here however, is to promote better understanding through deep exploration (Suri, 1999) using a process of synthesis rather than reduction. Lines-of-argument synthesis can also be contrasted with other qualitative methods such as reciprocal translational synthesis (Noblit & Hare, 1988) which assumes that the individual reports are addressing similar issues and can be integrated. This is not the case here. Equally unhelpful in the present circumstance, refutational synthesis (Noblit & Hare, 1988) is only useful where opposing or contradictory approaches exist and where the synthesis attempts to explain the refutations using an interpretive approach.

Research review or knowledge review?

In considering a more expansive approach to reviewing what is known, understandings drawn from the research literature can be enriched by a more encompassing knowledge review (also referred to as ‘evidence review’ Dixon-Woods, et.al., 2005), drawing upon
more diverse sources of information, such as the many case studies that form part of the public sporting record. Such inclusiveness of multiple sources, both traditional and non-traditional, can play a particularly important role in embryonic or fragile disciplines. Points of convergence and divergence between formal and informal sources can provide critical guidance toward new possibilities, and even to seeing new relevance in old wisdoms. Thus, when the terms ‘review’, ‘literature review’ or ‘knowledge review and synthesis’ are used in this thesis, they can be taken to refer to consideration and synthesis of relevant research evidence, but also of evidence from the broader public record where such records have been explicitly drawn upon.

Structure of knowledge review and synthesis

The first level of analysis to be considered in this review will be a consideration of historical forces in sport personology so as to more clearly contextualise the terrain which is to follow. This will be followed by: presentation of arguments for re-considering personality as a primary force in sporting achievement; review and synthesis of classical sport personology studies; and, consideration of more modern studies from both the quantitative and qualitative traditions. A new framework will then be presented. At each stage, consideration will be given to contexts and methodologies utilised in these studies as well as interpretation of individual findings.
In accordance with the lines-of-argument methodology, each data analytic iteration in this review is prompted by the posing of, and responding to, emergent questions. To assist the reader in engaging with this author's process, these questions will provide the structure for this review, each question signifying the beginning of a new iteration of the existing data as well as providing the impetus to seek out and incorporate (though not necessarily integrate) newly relevant information. Each iteration will connect with the next through a dynamic and, most importantly, cumulative synthesis of emergent themes as they become apparent, rather than compartmentalised, static summaries of facts relating to each topic. This technique is also differentiated by: the perpetual integration of fresh examples throughout the synthesis to illustrate key points; by the emphasis on interpretive links; and by the continual refinement of emergent questions.

KNOWLEDGE REVIEW AND SYNTHESIS

What features define the historical research landscape in the psychology of personality in sport?

Since the 1950's, a multitude of studies have examined psychological characteristics considered relevant to exceptional sporting performance. Early research focussed on profiling and identifying the 'athletic personality' but met with little success despite most coaches, psychologists and sportspeople agreeing that, intuitively, personality played an important role in elite sporting performance (Hosek & Vanek, 1970; Kroll, 1967; Kroll & Carlson, 1967; Rushall, 1970). A proliferation of studies exploring individual
dispositions followed and included studies of trait anxiety (Hammer, 1970; Jones, 1995), neuroticism, extraversion (Ikegami, 1970), goal orientation (task vs ego; Brawley & Martin, 1995; Garland, Weinberg, Bruya & Jackson, 1988), and attentional style (Nideffer, 1978) to name a few. A notable number of these studies have reported significant correlational or predictive relationships between specific psychological traits and sporting achievement, however, a comparable number have found no such relationship (Hammer, 1970; Miller & Miller, 1985; Rushall, 1970) or have found apparently contradictory relationships (for examples, see Booth, 1958; Johnson, Hutton, Johnson & Granville, 1954; Colley, Roberts & Chipps, 1985; Dowd & Innes, 1981; Egloff & Jan Gruhn, 1996; Eysenck, Nias, & Cox, 1982; Geron, Furst, & Rotstein, 1986; Gill, 2000; Hartman & Rawson, 1992; Weinberg & Gould, 2003).

The inability to find a specific ‘athletic personality’ led researchers to consider the elements that differentiate sports from each other and perhaps differentiate those individuals that choose to participate in them. The literature reflected this shift of focus with a preponderance of sport-specific studies that reported varying degrees of success in identifying particular psychological traits associated with participation and/or success in particular sports such as basketball (Evans & Quarterman, 1983), hockey (Williams & Parkin, 1980), ice hockey (Bird, 1971), American football (Daus, Wilson & Freeman, 1986; Schurr, Ruble, Nisbet & Wallace, 1984), rowing (Morgan & Johnson, 1978), and endurance sports (Egloff & Jan Gruhn, 1996). While these studies have in some cases been useful on an applied (clinical), sport-specific (often task-specific) basis, it has been

5 The term ‘disposition’ is traditionally used to refer to stable characteristics or traits and will be so used throughout this thesis (Pervin, 1993)
noted by Vealey (1992) that they lack the broader theoretical, conceptual or empirical underpinning to allow more comprehensive and broadly applicable predictions to be made about other sports or even about other positions within the same sport, not to mention other fields of human endeavour. These limitations and claims of ‘rampant empiricism’ (Landers, 1983, p.137), led to a consequent move away from the seemingly insurmountable problems inherent in theory driven personality research to a focus on mental skills training and an interactionist perspective oriented more toward understanding situational demands (Aidman & Schofield, 2004; Landers, 1983).

What followed were studies of state-based psychological influences with the hope that this would make investigation of traits redundant (Vealey, 1989). However, psychological models of sporting performance which are founded on state-based characteristics, such as mood and emotion, or psychological ‘skills’, such as goal setting and arousal control, have also had variable success in predicting performance in anything other than narrowly defined sporting domains (Rowley, Landers, Kyllo & Etnier, et al., 1995; Terry, 2004) and include incompatible conceptualisations of what is relevant along with problematic methodology (Beedie, Terry & Lane, 2000; Terry, 2004). Results are generally poorest in more complex sporting domains such as those involving interactive or ‘open’ skills, sports of long duration, and team sports (Beedie, et.al., 2000; Craighead, Privette, Vallianos & Byrkit, 1986; Fogarty, 1995; Miller & Miller, 1985; Terry, 1995). These more complex sports are least reliant on singular motor aptitudes and therefore, arguably, performance in these sports may be more highly mediated by the enduring personality characteristics of the individual. In the past decade, meta-analytic studies
have been less than encouraging in terms of the contribution made by state-based psychological research in sport. Le Unes & Burger (2000), Prapavessis (2000), Renger (1993), Rowley, Landers, Kyllo & Etnier (1995) & Terry (1995) re-visited the multitude of studies involving the ubiquitous Profile of Mood States (POMS) assessment instrument for example, and concluded that there are still significant methodological and conceptual issues to be addressed and that the associated ‘iceberg profile’ captures less than one percent of variance in performance outcome. Studies of Hanin’s (1980, 1995) popular Individual Zones of Optimal Functioning (IZOF) have also claimed some success in accounting for performance variation within an individual but less in discriminating athletes of different levels of achievement and the IZOF has been criticised for lacking clear operationalisation (Carlstedt, 2004b) and a theoretical framework (Jones, 1995; Swain, 1992).

In sum, whilst providing constructive input to the field, particularly in informing mental skills training, state-based investigations have not fulfilled the hope of some researchers that they might make the investigation of more global dispositions or traits redundant. More recently, a subtle re-incorporation of personality into the study of psychological factors in sport reflects the frustration of researchers in finding credible, stand-alone state-based answers. However, in many instances this re-integration has occurred in a less than considered way. In articles published in the past decade, there have been notably few attempts for example, to clearly define and operationalise terms, or differentiate what is meant by a personality trait or psychological state, resulting in methodological and conceptual dilution. Rather, there has been slippage in the discussion of trait- and state-
based characteristics in the literature as if they are interchangeable. Both researchers and practitioners have variably classified state-based measures such as the POMS and the associated ‘iceberg profile’ as relating to personality (Petrie & Perna, 2004) or mood (Morgan, Brown, Raglin, O'Connor & Ellickson, 1987). In the latter case some researchers have spoken of the need for baselines to be established for each individual against which situational POMS might be interpreted (Berglund & Safstrom, 1994) – in essence, they are requesting a trait referenced interpretation of mood.

In the mental skills literature, there have been similarly few attempts to consider the differences, in nature or efficacy, between learned psychological responses to stressors (such as those taught in mental skills programs) and those that are naturally occurring or emergent extensions of our disposition driven interactions with our environment. While there has, for example, been recent recognition that the coping responses described by Olympic medallists may differ from those of non-medallists not in type but in \textit{automaticity} of response (Gould, Eklund & Jackson, 1993), this has been interpreted merely as an over learning or practice effect (Richards, 2004). An alternate and arguably more elegant hypothesis is that these automatic responses are different in nature, that they are personality-derived rather than the result of explicit attempts to \textit{learn} to cope (i.e. be taught to cope), and thus are integrated at a much deeper, more automated level in our psyche. Minimally, we could consider the possibility that the automated responses, if taught, become automated more quickly because they are consonant with existing personality tendencies. This possibility was recently addressed by Carlstedt (2004b) who suggested that mental skills training programs have been applied in an unthinking fashion.
and that understanding a sportsperson’s dispositional style can help us better target appropriate mental skills. He presented preliminary evidence to suggest, for example, that individuals high in hypnotic propensity will be more responsive to imagery based mental skills training than rationality based cognitive therapies but points out that most elite sportspeople have low hypnotic susceptibility which would suggest that the ubiquitous mental imagery training may not be optimal for them. Individuals with a repressive coping style (avoiders or skeptics) on the other hand might be more responsive to biofeedback training in which objective data are presented rather than interventions that focus on self-generated imagery or self-talk. This conclusion helps make sense of at least some of the contradictory findings in the literature relating to the efficacy of mental skills training (see Lavallee, Thatcher & Jones, 2004; Morris, 2004, for reviews discussing various mental skills intervention approaches).

Carlstedt’s (2004b) model is also a more encouraging development insofar as it explicitly integrates both state and trait influences on sporting performance. Other explanatory models in the recent literature which also do so include Mellalieu’s (2003) adapted model of stress in sporting performance, Vealey’s (2001) sport confidence model, Richards’ (2004) model of appraisal, coping and emotion and Andersen & William’s (1988) stress-injury model. These examples herald renewed interest in a relationship that was largely submerged as the two sub-disciplines were cleaved apart in the late 1970’s and vied for control within the discipline (Landers, 1983; see also Marchant and Morris, 2004). In each example above, renewed consideration is given to the supporting, if not central role, of traits, including their impact on:
perceiving and appraising demands in the environment;
psychophysiological responses in stressful situations;
emotional control and regulation; and
coping when faced with a challenging situation.

Cerin, Szabo, Hunt & Williams' (2000) model of stress adapted by Mellalieu (2003) is reproduced in Figure 1.1 as an exemplar of the current standing of personality in the performance enhancement literature.

![Figure 1.1: Mellalieu's (2003) adaptation of Cerin et al's (2000) interactional model of stress as applied to sport](image)

That personality relates to the core construct of interest (in this case stress) is acknowledged by these authors, though it is presented as far from a central feature of the model. Moreover, the nature of the relationship between personality and other key
constructs (such as mood and attentional processes in this case) is covered in a rudimentary manner. Nevertheless, this constitutes a useful starting point.

Transactional understandings of personality from mainstream psychology have also been brought to bear in this literature. Shoda, Mischel & Wright's (1994) cognitive-affective theory of personality, for example, has been considered in relation to coping style to suggest that inter-situational behavioural consistency is more visible if situations are grouped according to their psychological meaning to the individual rather than by any putative environmental distinctions such as on-field vs. off-field behaviour (Richards, 2004). Further, Lazarus' (2000) Cognitive Motivational Relational Theory has been applied to consideration of how athletes control emotion in sport with a similar focus on appraisal of situational relevance (threat) and perceived coping resources. Each element of this process is seen as responsive to dispositional and experiential factors (Marchant & Morris, 2004; Uphill & Jones, 2004). Both theories have gone some way toward explaining observations of apparent variability in behavioural responses that have historically underpinned criticisms directed at sport personality (Richards, 2004).

Synthesis

So, the wheel has turned full-circle with a recent resurgence of interest in dispositional characteristics in sport (Aidman & Schofield, 2004). What once seemed like a remorseless shift from trait-based to state-based interpretations of achievement behaviour seems to have mellowed into a tentative courting between these two sub-disciplines. In
terms of the psychology of personality, this re-integration brings with it a renewed and focal appreciation of the complexities of trait expression, particularly the importance of better understanding the psychological features of situations. However, it is still largely the case that personality research in the sporting domain, rather than driving our exploration of achievement at the highest levels, is progressed (or at least kept alive) incidentally by the waves emanating from consideration of more transient psychological characteristics such as emotion or mood.

**Why consider personality again as a primary force?**

"Racing at the Olympic level means taking up the personal challenge to be tougher mentally than everyone else, to train longer, to work harder. It is forcing the mind's will on the body when the body cannot give anymore. The personal challenge means that when two athletes find themselves evenly matched in the race, the one who can stand pain more wins"

Canadian Rowing team (n.d.)

The above quote ably illustrates the multifaceted enduring psychological demands on an elite sportsperson that exist in addition to the in-situ acute psychological demands necessary to achieve optimal performance under conditions of close competition. If we accept that personality exists per se as some kind of pervasive force, then it is difficult to imagine how it would not have a profound impact on this life-consuming endeavour. Indeed, as a sportsperson moves into the upper echelons of their craft, sport becomes *the* predominant life context, often to the exclusion of other formerly important contexts such as career, study and even personal relationships. However, it is primarily the confluence of several other factors that beckons a re-examination of the impact of personality on
performance. Each of these five factors are introduced below but will be discussed in more detail as the review unfolds:

Firstly, psychology more broadly has embraced new understandings of personality encapsulated in:

a. The ‘Big 5’ trait conceptualisation of personality put forward by Costa & McCrae (1993) and advanced with the seminal work of Matthews & Deary (1998). More than just providing a new and common language for researchers in describing what the core traits are likely to be, they have drawn upon advances in behaviour-genetics research to provide clearer understandings of why, but most importantly, how, we might expect personality to contribute to chronic patterns of behaviour, including high achievement.

b. The person-centred approach to personality, which emphasises humans as organisms defined by an innate actualising (growth and development) tendency (Rogers, 1961). This notion of self-actualisation as an open and engaged stance toward life, has the potential to contribute directly to conversations about the pursuit of sporting excellence. The person-centred framework also emphasises that significant life contexts and relationships are integral to the maturation and expression of personality. Barrett-Lennard (2003, 2005) proposes that individuals undergo dispositional adaptation to a significant life context through the development of ‘contextual selves’. By introducing such dynamic concepts, the person-centred approach provides a bridge between understanding personality structure and personality process.
Secondly, while classic studies have been conducted to explore factors contributing to the early development of talent in sportspeople (e.g. Bloom’s (1985) study), there are features of elite sports participation that are not yet adequately explained and which seem to manifest in enduring, repetitive patterns of behaviour including over and under achievement (Karp, 2000), over and under training (Rushall, 1989), and the appearance of enduring psychological disorders such as anorexia and bulimia (Bond, 2000; Sundgot-Borgen, 1994). The demands of sport also change at the elite level. Many talented sportspeople do not successfully make the transition from a pastime in which competitive participation is the primary activity, to a professional activity in which training and preparation is a full-time occupation, and competition is relatively infrequent (Cote, Baker & Abernethy, 2003; Helsen, Hodges, van Winkel & Starkes, 2000). Yet we understand little about how successful transition relates to the pre-existing personality of the individual or about the maturation of the personality as a consequence of this transition, particularly in relation to the development of an athletic identity, that is, a strong sense of affiliation with the role of sportsperson (Brewer, 1993). What we do know is that when a sportsperson leaves the sporting arena and makes the transition to retirement, there are well documented psychological risks surrounding the removal of a core element of their personal identity. Implicit in this is the reality that sporting life and sporting identity has been integrated at the fundamental level of core character (Fortunato, 1998; Fortunato & Marchant, 1999; Grove, Lavalle & Gordon, 1997; Lavalle & Wylleman, 2000). Finally, self management proves chronically difficult for some sportspeople even at the peak of their careers. There are many well-publicised
incidents of elite sportspeople conducting themselves in a dubious manner including serious incidents of physical assault on the field of play as well as physical assault off the field, drug use, alcohol addiction and even sexual assault. Repetitive on-field misconduct can significantly impede a player’s career. Misconduct off the field can have even broader ramifications. The combination of both can be catastrophic as summed up in an article about Martin Pike, an Australian Rules Football League (AFL) player. The journalist cites a long history of on-field aggression, poor training effort, repeated breaking of club rules and a ‘long list of off-field indiscretions’ including allegations of assault, drinking problems and drink-driving convictions. He concluded that this exceptional player was ‘born to do two things: test life’s boundaries to the extreme and play exhilarating football at the highest level’ (Sunday Times, Western Australia, Tues Oct 3, 2004, p.88). These are significant features of clinical reality for practitioners working with elite sportspeople.

Thirdly, theoretical and methodological shifts have occurred in sport psychology and psychology more generally, that can support novel discussions on the role of personality in exceptional achievement. New and productive attention has been given to the expertise model in sport psychology (Starkes & Ericsson, 2003) which has highlighted the under utilisation of other relevant models from the parent discipline (Carlstedt, 2004b). Theories relating to human potential and high achievement more broadly seem to be pertinent but are, as yet, largely unconsidered. One such example which will be considered in this review, is a new understanding of exceptional human achievement emerging from the behaviour-genetics literature (Lykken, McGue, Tellegen & Bouchard,
1992). New methodologies have also emerged, particularly qualitative approaches that are increasingly recognised as promising in their own right rather than as handmaiden to quantitative methodologies (Newman & Benz, 1998). This has expanded the horizon for sport psychology considerably, particularly at the elite level where research is necessarily confined to small samples from a unique population and where small differences in performance can have enormous consequences. In many sports the difference between winning and losing is measured in milliseconds. In such circumstances microanalytic techniques are valuable. In this knowledge review and synthesis, consideration will be given to large scale, questionnaire based profiling studies and smaller scale interview-based profiling studies. The perspective of practitioners, coaches and significant others (such as parents) will be considered as relevant knowledge, in addition to the voices of Olympians themselves. Such a broad definition of 'evidence' is appropriate in a context where access to the population is difficult and where lessons from outside the population may not apply. Moreover, this is a discipline where intervention is very much a collaborative endeavour between practitioner and sportsperson, and thus, the phenomenological understanding of personality and its impact is important (Aidman & Schofield, 2004). Triangulating data drawn from both qualitative and quantitative traditions also utilises the strengths of each approach and improves possibilities for enriching our understanding of this difficult to access population (Biddle, Markland, Gilbourne, Chatzisarantis & Sparkes, 2001; Maxwell, 2004; Newman & Benz, 1998; Tashakkori & Teddlie, 1998; Wenger, 1999). Asking traditional questions from different perspectives offers new avenues to the discipline. Asking different questions also
demands the flexibility to embrace different approaches (Aidman, 2004; Tashakkori & Teddlie, 1998).

Fourthly, as Ericsson & Smith (1991) point out 'On a priori grounds one can argue that the most parsimonious theoretical account of outstanding performance is in terms of general, predominantly inherited characteristics' (p.4) rather than in terms of a multitude of situation specific interactions that will never be identically repeated. Taking personality as the central axis of investigation, particularly adopting an interactionist stance, offers the unique possibility of integrating understandings of many acute and chronic phenomena, rather than developing endless models to explain behaviour in a myriad of nominal situation types such as injury, retirement, training commitment, competitive anxiety, etc.

Finally, this researcher’s unique opportunity to access personality data and longitudinal performance data on more than 5000 elite sportsmen and women including more than 100 Olympians provided an unparalleled platform from which to address some of the issues outlined above.

**Synthesis**

A staleness and lack of novel theoretical underpinning has bedevilled research in sport personology (Aidman, 2004; Carlstedt, 2004a, 2004b). It would seem that, in light of the
factors outlined above, we need to once again take an exploratory stance, come to the discipline anew, to utilise a range of methodologies and measures to help explore the possible relationships between personality and sporting excellence. Perhaps the first step, in taking a step forward is to look backward with a positive and proactive analytical eye. In so doing, it is important (as argued by Landers (1983)) to take a pre-emptive stance in tackling head on the generic criticisms that have, through endless passive posthoc qualification, resulted in the diminishing, even dismissing, of personality research in sport. Four central accusations are particularly relevant to this study of Olympic personality and will be discussed in turn along with a statement about decisions taken in the current thesis to address these concerns.

1. **Ill-considered overgeneralisation has occurred from the study of non-elite sporting performance to elite sporting performance.** The issue of ecological validity is emerging as one of primary importance in understanding elite sporting performance (Morris, 2004) and will be addressed by methodological design in this study as there is growing consensus that ‘it is doubtful whether [lesser athletes] think, feel or behave like Olympic rowers, professional footballers or big-money golfers and tennis players…’ (Morris & Summers, 2004, p.11). Partly this may reflect the fact that different stages of talent development\(^6\) involve different critical tasks. As has already been mentioned, training, for example, is a core activity at the elite sporting level but often not at pre-elite levels of participation (Morris, 2004). The current study will restrict its focus to Olympians.

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\(^6\) Bloom (1985), in a landmark study of talent development, identified three primary stages of achievement: initiation, development and perfection. Elite sport is largely associated with the third and final stage.
A further argument supporting this decision is equally relevant for those interested in early talent identification as for those interested in facilitating optimal performance in sportspeople competing at the elite level. This argument is centred upon the notion that ‘personality is not the strongest predictor of task performance’ but [that it] can make a difference when other factors such as ability are controlled for’ (Aidman, 2004, p.9). That is, a strong case can be made that the importance of physical ability in differentiating sporting performance is likely to swamp the contribution of any other factor, including personality. Only once individuals are physically matched, is it fruitful to explore the role of psychological factors in successful outcomes. Even when individuals are matched for current physical ability, it might be that one has more physical potential than the other. Once physical potential has been fully realised, psychological factors have the greatest opportunity to impact. For the most capable performers, the realisation of physical potential is likely to occur at the elite level.

In reviewing the available literature then, there is a plausible argument that homogeneity of sampling with regard to ability level ought be considered the hallmark of a good study when investigating the role of personality in sporting achievement – restriction to elite performers being ideal. However, excluding studies involving any non-elite participants would seriously deplete the material available for consideration and would preclude consideration of psychological characteristics that facilitate the transition to elite status. Nevertheless, the limitations of non-elite participants as counterpoints to elite sportspeople are noted. Excluding studies utilizing only college or university level sportsmen and women (and/or lower levels of participation) does seem justified however,
and will mean that some of the most oft-cited papers on personality in sport will be excluded from consideration here, including some of those cited on pages 11-12 and excellent studies such as those by Schurr, Ashley & Joy (1977), and Piedmont, Hill & Blanco (1999). While these studies have made a valuable contribution to the sport psychology literature, it is important that each study in the current review of knowledge is anchored by the participation of a core group of exceptional sportspeople, given that exceptional achievement is the focus of the current thesis. Thus, preference will be given to studies involving Olympians but minimally some participants in each study will be (or must have been) performing at the level of national or international competition (whichever is the highest level in their chosen sport), or be engaged in a full-time career as a professional sportsperson. From this point onward, only literature that clearly and directly involves sportspeople meeting this definition of ‘elite’ will be considered. Nowhere to date, has this information on elite sporting performers been distilled from the gamut of sport personology findings. It is hoped that it will provide clearer direction for future progress.

2. There has been reliance on, or continued reference to, historic studies that have questionable validity. Studies prior to the 1960’s have been roundly criticized for being methodologically dubious, based on personal conviction rather than theory, and invalid in their implications (Kane, 1978; Rushall, 1970a). Kane’s (1970) influential article concluded that ‘the continual consideration of these articles for developing experimental

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7 A conservative approach has been taken here to strengthen validity. Many studies merely describe their sample as ‘competitive’ participants in a given sport which suggests that they do not think level of participation or homogeneity of ability is an important factor. Where it is not possible to verify the level of competition, these studies have been excluded.
approaches invalidates the resulting studies’ (p.158). Many subsequent researchers are apologetic for their reference to such studies or pass general caution as to their veracity but go no further. *Hence, this study will disregard any articles published before 1960.* In so doing it is interesting to note that some of the most comprehensive, theoretically derived and methodologically rigorous studies in the area of personality emerged in the period immediately after. The current review will incorporate works from the 1960’s that still provide some of the clearest signposts for progress, rather than following the modern tradition of reviewing only the past decade of research based on the assumption (which will be shown in this case to be flawed) that relentless progress has been made and that history is subsumed in that progress.

3. *Absence of a comprehensive theory of personality relevant to the elite sporting environment is certainly remarkable and is bemoaned by many researchers.* Despite the passage of more than 30 years, it remains the case that ‘the consideration of a theoretical position to justify the investigation of personality-physical performance relationship is virtually non-existent in the literature’ (Rushall, 1970a, p.157) and is more akin to ‘snooping’ through the results of arbitrary testing (Cox, 1985, p.23). In addition to a lack of agreement about which traits (personality structure) might be relevant to exceptional performance, there is even less agreement as to where (in what contexts) or how personality might impact (personality process). Theories have traditionally focused on possible acute effects on processing of information during the performance of the sport itself (Avila & Parcet, 2001; Nideffer, 1976; Whiting, Hardman, Hendry & Jones, 1973) but there has been increasing awareness of personality’s potential impact on more
enduring factors such as training commitment, the management of pain and fatigue, coping with constant performance assessment, and communication with coaches (Aidman, 2004; Aidman & Schofield 2004; Hemery, 1986; Tenenbaum, Jones, Kitsantis, Sacks & Berwick, 2003). Further there has been a call for longitudinal studies to better explore the unfolding of dispositional influences throughout a sporting career (Aidman, 2004; Morris, 2004). The almost total methodological and conceptual disconnection between the study of personality structure and personality process is not unique to the study of sport. Nevertheless, the current review and knowledge synthesis in this thesis has three aims in this regard:

i. Firstly, an attempt will be made to synthesise at a descriptive level, the particular traits or structures that seem likely to be contributing to exceptional sporting performance.

ii. Secondly, a tentative explanatory framework will be mooted, to synthesise what is known about the role of personality in achievement and the nature of personality processes underpinning the impact of those traits.

iii. Thirdly, a taxonomy of research parameters elucidated by the review will be formalized to facilitate the pursuit of considered theoretical development.

The organisation of a disparate literature at these three levels of explanation will mark a significant move forward in the discipline and will provide a more clearly enunciated context for the ensuing data collection and analysis.

4. Finally the sports personology literature is replete with loose definitions (in many cases, an absence of definition) of what constitutes a personality trait and how these are
different from motivational styles, mood and emotion. Terry (2004, p.501) helps differentiate the relatively stable, enduring qualities of traits from those of mood and emotion in the following way: Traits are like the climate of a place – weather patterns that repeat over years, moods are like a prevailing weather front that lasts a few hours or days and may or may not be consistent with climatic conditions, and emotions are analogous to brief changes in the weather like a cloud crossing in front of the sun. Traits are generally seen to relate to the fundamental, core qualities of the person, which are generally agreed to be genetically influenced (Matthews & Deary, 1998). Traits are also constructs that we consider to be continuous rather than discrete – we all have less or more of any given trait compared to other people – yet studies often characterise people as ‘types’, suggesting an all-or-none phenomenon. Moreover our personality is manifest as a complex interplay of traits yet the research literature is replete with studies of individual traits studied in isolation. Thus, the inclusion criteria for any given study in this review is that the psychological constructs under investigation are continuous and plausibly stable over time (cf. trait: Matthews & Deary, 1998) even if they are not expressly identified by authors as personality traits. Personality will also be considered to be inherently multidimensional and thus preference will be given to studies adopting a comprehensive profiling approach to investigating personality.

The concept of motivation is also of interest in this study and relates to the energizing force that is harnessed to our attempts to adapt to our environment (Pervin, 1993). The view taken in this thesis is that the concept of motivation derives from consideration of humans as biological systems that are pre-programmed to seek self-regulation to facilitate
In this view, the behavioural impetus of motivation can be considered the resultant force of personality structure and process interacting with our life contexts. Matthews & Deary’s (1998) landmark text on personality traits concludes with the statement that ‘...trait beliefs, rooted in the realities of adaptation, assist the person in finding and integrating meaning in disparate life experiences’ (p.252). That is, personality processes utilise the available building blocks (traits) to respond to life’s most salient adaptation challenges. At its most base level, the drive underpinning such adaptation is considered by many to be the maintenance of equilibrium in the system - to achieve tension reduction through the harnessing of energy to the process of having one’s needs met. However, once a system’s basic survival needs have been met, theorists have proposed that other motives become salient, such as, in the case of sport, achievement motives. Many achievement motives and related theories have been proposed, including goal orientation theory (Duda, 1993, Nicholls, 1984); self-determination (Deci & Ryan, 1985); achievement goal theory (Chi, 2001, 2004); and theories relating to intrinsic and extrinsic motivational forces (Frederick-Recascino & Morris, 2004). All are conceptually derived from Goldstein’s (1939) proposed human tendency toward self-actualisation – purportedly the inherent desire to realise one’s full potential. This is considered by many to be the ultimate life tendency (some call it a drive) of human beings (Maslow, 1971; Rogers, 1963). Self-actualisation theories of motivation suppose that the instinctual drive for personal growth is pursued at the cost of increased tension (inherent in the uncertainty associated with change), which must then be managed (Pervin, 1993; Rogers, 1959). Motivation is also however influenced by things other than personality, such as situations and/or emotional states. In this study, the
focus will be only on dispositional contributions to motivation, and the concept of
motivation will be relevant insofar as it is a source of energy resulting from the many
processes in which personality is engaged when relating to our environment.

What particular personality traits might be expected to define exceptionality in
sport and how might they be related to achievement?

Many voices have contributed to the debate about the nature of traits relevant to high
achievement in sport and the ways in which such traits might translate into exceptional
performance. Coubertin (cited in Clifford & Feezell, 1997, p.117) defined Olympism in
1887 as ‘initiative, daring, decisiveness, the habit of self-reliance and of taking
responsibility for one’s own failures’. In 1918, as ‘the religion of energy, the cultivation
of intense will developed through the practice of manly sports, based on a proper hygiene
of public-spiritedness, surrounded with art and thought’. Since Coubertin’s time,
philosophers, sociologists, and laypeople alike have kept the conversation alive. In this
thesis, the perspectives of Olympians themselves will be considered first followed by that
of researchers in the field of psychology.

Perspectives of elite sportsmen and women

Aidman & Schofield (2004) suggest that the ‘actor’ impression of their own personality
and the role it plays in their life has increasingly been recognised as related to, but
different from, an observer analysis, and thus, should be considered as an independently
important predictor of behaviour. In beginning exploration of the role of personality in sporting achievement then, it seems apposite to start with the perspectives of Olympians, those at the highest echelons of the sporting endeavour. As such, an approach has been taken drawing from the central tenets of the traditions of both psychohistory\(^8\) and historiometry\(^9\) - specifically, that ‘The most efficient way to establish the existence of a pervasive pattern or regularity in human personality is to indicate its presence across a respectable sample of [eminent] cases’ (Simonton, 1986, p.149) - in this case, Olympians.

Two carefully selected published accounts of views expressed by exceptional sportsmen and women have been considered in this knowledge review. The problem inherent in drawing upon a greater number of sources is that most biographies and autobiographies do not ascribe to a particular (comparable) model of questioning or reflection. The opportunity to respond to relevant questions is often dictated less by scientific rigour and more by public (marketing) demand and the skill of the interviewer, author or editor. Thus, for this thesis, the two sources of data selected were:

(i) Bryceson & Herbert’s (1992) series of interviews with 27 elite Australian sportswomen (mostly Olympians). This text was selected because the interviews took a generic, exploratory approach to the question ‘What makes a champion?’ without a particularly psychological orientation – both authors are writers rather than psychologists. This is important because participants were not led toward consideration of personality in exploring the factors that contributed to their

\(^8\) Psychohistory is largely a qualitative endeavour to extract understanding of personality from an eminent case study. However, it is usually undertaken from a Freudian perspective which will not be adopted in this case (Simonton, 2003).

\(^9\) Historiometry is a more quantitative approach drawing upon many eminent case studies but also benefiting from the reflective power offered by historical distance (Simonton, 1984, 2003).
success, yet personality related themes emerged consistently in the process of considering enduring motivations at the elite level and in considering the interface between sport and general life; and

(ii) Heads & Armstrong’s (2000) compilation of comments of elite sportspeople (also mostly Olympians) expressed at a series of meetings for individuals considered to be likely selections for the Sydney 2000 Olympic Games. This text was chosen for gender balance and because their book is based on views expressed during one of the few fora for elite sportspeople where no journalists, sport psychologists or coaches were present, thus enhancing the likelihood of uncensored viewpoints being expressed. Published comments, while thematically selected and organised, are also not restricted to popular or positive vantage points instead addressing issues that could be considered negative, or to reflect vulnerabilities, for example, there is a chapter entitled ‘Nerves, Fears, Doubts’. As with Bryceson & Herbert’s (1992) interviews, these meetings were not designed for the purpose of exploring the role of personality, rather of any factors perceived to be relevant to success in sport.

Inductive thematic re-analysis of these interview data for the current study was informative at several levels. It revealed that, despite the gender homogeneity of the sample, the same core themes were emerging from the sportspeople in Heads & Armstrong’s book as for the sportswomen in Bryceson & Herbert’s (1992) book. For these reasons and given the greater fidelity of Bryceson & Herbert’s (1992) data (i.e. interviews were presented sequentially in a more intact format rather than thematically
edited together), in the next section, preference has been given to presenting illustrative comments from a sample of nine of Bryceson & Herbert’s (1992) 27 interviews. These lead into a discussion of parameters potentially relevant to the investigation of personality in sporting excellence.

The quotations presented in this review are confined to those made by a small number of interviewees so as to give both a comprehensive picture of the interplay of traits within individuals as well as presenting a broad picture representative across individuals. Informed by the methodology of thematic analysis, interview excerpts have largely been presented where they expand the range of relevant themes rather than repeat existing themes (Patton, 1990). Themes and quotes were only presented if (i) they directly or implicitly referred to stable elements of character or personality, and (ii) were common to several interviewees across both texts. Where extended quotes have been condensed to one quote, every care has been taken to maintain context and authenticity.

Quotes are structured under the primary emergent themes, specifically, these themes reflect the salience of particular traits for these elite competitors (see Table 1.1, Column 1: The structure of personality: Comments reflecting core traits). There has been no attempt to formalise the connection between these themes and particular theories of personality as this may prematurely foreclose our conceptualisation of what traits or issues are relevant. It is important at this stage to be open to the possibility that new or unfamiliar traits may be present in this population. What also became apparent in reading these texts, were a number of secondary themes relating to the nature of personality
processes. To preserve the flow for the reader, whilst facilitating contemporaneous illustration of these issues, comments relating to personality processes have been placed in an adjacent column in Table 1.1. Primary and secondary themes will be summarised subsequently. Each quote is sequentially numbered for ease of subsequent reference in the text.

Table 1.1 Emergent themes relating to personality from a re-consideration of Bryceson & Herbert’s (1992) interview data with 27 world-class sportswomen.

<table>
<thead>
<tr>
<th>The structure of personality: Comments reflecting core traits</th>
<th>The nature of personality process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Singular purpose/Delayed gratification:</strong></td>
<td>Disciplined in sport but not in general life – different personality in sporting context?</td>
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<tr>
<td>Q1: ‘Being a serious athlete means that training takes on a different focus in your life...When I look at my life I see that all I do is train...I don’t go out with other friends...I hate being singularly oriented; I’d love to be running around doing different sports, being with all different sorts of friends’. Sharon Stewart (Athletics, Barcelona 400m relay)</td>
<td>Conflicted desires – contributes to more intense commitment?</td>
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<td>Q2: ‘The occupational hazard of being a swimmer is that you don’t have a social life. The way that I justify it is that swimming is a relatively short career and I’ve got all the time in the world afterwards to go partying if I want to’. Linley Frame (Barcelona, Swimmer)</td>
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<tr>
<td><strong>Self-discipline:</strong></td>
<td>Innate trait rather than learned skill?</td>
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<td>Q3: ‘I’ve always been a disciplined person...I don’t think I have missed any sessions that were scheduled’. Sharon Stewart (Athletics, Barcelona 400m relay)</td>
<td>Suggests the emergence of a personality trait</td>
</tr>
<tr>
<td>Q4: ‘Self-discipline comes from how much you want to achieve your goals. I don’t think anyone else can teach it to you – it’s an awakening in you.’ Jenny Donnett (Barcelona, Springboard)</td>
<td>Training as the most personality relevant aspect of sport</td>
</tr>
<tr>
<td>Q5: ‘You just have to do it – the training. There are many times when it’s hard to get up in the morning, especially in winter – it’s just a killer, it really is. But as long as I’ve got direction, I really haven’t got a problem motivating myself’. Rhonda Cator (Barcelona, Badminton)</td>
<td></td>
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<td><strong>Achievement striving:</strong></td>
<td>Suggests realism, insight, self-knowledge.</td>
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<td>Q6: ‘I haven’t got the best talent in the world, but I want to use what talent I have to its very best potential’. Sharon Stewart (Athletics, Barcelona 400m relay)</td>
<td></td>
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<tr>
<td>Question</td>
<td>Optimistic outlook - Personality as compensation for lesser ability</td>
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<td>---------------------------------------------------------------------</td>
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<tr>
<td>Q7: 'I think the desire, the personal desire to do it can motivate anyone to do anything. Everyone's going to want it but the person who wants it more and who's willing to do anything to achieve it, will win...' People said I didn't have any natural talent, I just never let a shuttle hit the floor, just tried for everything.'</td>
<td>Rhonda Cator (Barcelona, Badminton)</td>
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<tr>
<td><strong>Will/Determination:</strong></td>
<td>Recognition of non-sporting benefits</td>
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<tr>
<td>Q8: 'It takes a lot of determination to succeed, but it's worth going after your dream. If you really want it, go for it. It's a lot of hard work and quite a bit of luck as well but its all worth it - the friends you make are special.'</td>
<td>Chris Dobson (Barcelona, Hockey)</td>
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<td>Q9: 'The big thing is to make a decision but then push yourself to do it. I just make sure that what I'm doing is good for me... I don't chicken out.'</td>
<td>Rhonda Cator (Badminton, Barcelona Olympics, Quarter finals in the doubles)</td>
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<tr>
<td><strong>Focussed/Self-absorbed:</strong></td>
<td>Extreme - borders on pathology?</td>
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<tr>
<td>Q10: 'Well, you have to be pretty self-absorbed, so your partner has to put up with that. I went training on our wedding day.'</td>
<td>Sandra Paintin (Biathlon, Winter Olympics, Albertville)</td>
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<tr>
<td>Q11: 'You can't do this unless you enjoy it... you've really got to love doing it because some training sessions are pure agony. You've really got to want to do it for yourself - you can't really be doing it for anyone else, because you're putting yourself through an awful lot.'</td>
<td>Linley Frame (Barcelona, Swimming)</td>
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<td><strong>Anxiety:</strong></td>
<td>Awareness of risk factor, insight into personality</td>
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<tr>
<td>Q12: 'I do get a little bit excited so I have to try and dull that to a certain degree - otherwise I just get too nervous.'</td>
<td>Rhonda Cator (Badminton, Barcelona Olympics, Quarter finals, doubles)</td>
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<tr>
<td>Q13: 'If I'm going to have a good race, I'm normally a bit edgy. It's a worry if I'm too relaxed.'</td>
<td>Sandra Paintin (Biathlon, Winter Olympics, Albertville)</td>
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<tr>
<td><strong>External vs. internal motivation:</strong></td>
<td>Mental skills vs self-knowledge self-efficacy/</td>
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<tr>
<td>Q14: 'I don't need any Ron Barassi big speeches. I've spent a million hours out there, on my own in the cold, thinking about why I'm doing it. I'm already as motivated as I'm going to be, otherwise I wouldn't have trained so hard.'</td>
<td>Sharon Stewart (Athletics, Barcelona 400m relay)</td>
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<td>Q19: 'It's easy to say 'I'll run very well', but what you really, really believe when you look at the other competitors is what counts.'</td>
<td>Sharon Stewart (Athletics, Barcelona 400m relay)</td>
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</tbody>
</table>
| Q15:  | 'I took up martial arts in ’86 and was fanatical about it — I got my black belt in 18 months. I throw myself into things full on — I can’t stand half measures.'  
Danielle Woodward (Barcelona Silver medal Slalom Canoeing) | Suggests negative motivation, oppositional trait, defiance |
| Q16:  | 'I think I keep at it because a lot of people thought I couldn’t do it.'  
Sandra Painin (Biathlon, Winter Olympics, Albertville) |
| Q17:  | 'About two years ago I decided in my own mind that I wanted to go to the Olympics, but I didn’t tell anybody... I was just determined.'  
Sandra Painin (Biathlon, Winter Olympics, Albertville) |
| Q18:  | 'Two years ago I told my mum that I was going to win and she didn’t believe me — that made me much tougher. I knew that I could do it and I had to prove it to her.'  
Jenny Donnett (Springboard, Barcelona) |

| Competitiveness: |
| Q20:  | 'When I was a kid I didn’t like competition. Now I look for it; although I still find competitive sport hard — I see it more as competition against myself — I still don’t like competing against other people so much.'  
Sandra Painin (Biathlon, Winter Olympics, Albertville) |
| Q21:  | 'One thing I really like about slalom canoeing... is that although ultimately you’re competing against somebody, in the race you’re not competing against anyone... I try not to think about the competition. It’s really a challenge to see whether you can get all the 25 gates as quickly and cleanly as you can.'  
Danielle Woodward (Barcelona Silver medal Slalom Canoeing) |
| Q22:  | 'I don’t think winning is everything - not everyone can win... If you know that you have raced to the best of your ability and given everything then you can’t really be upset if you don’t win.'  
Kathy Watt (Barcelona — Gold medal road race, silver medal individual pursuit; subsequently an Olympian in Atlanta 1996) |
| Q23:  | 'Winning is almost everything to me. I’m not much of a casual sailor who goes out for a nice little jaunt around the Bay.'.../  
‘I don’t know what it is about winning — its just being able to be the best. It’s a hard thing to define actually — being able to push yourself is something that I like.'  
Addy Bucek (Barcelona, Sailing) |

| Pleasure-seeking/ Sensation seeking: |
| Q24:  | 'I take importance to enjoy it. I don’t think anybody can do it if they don’t enjoy it.... This year I was training for myself and not for anybody else — that made it easier to do.'  
Sandra Painin (Biathlon, Winter Olympics Albertville) |
| Q25:  | 'I love to fly and when I’m diving, I feel like I’m flying.'  
Jenny Donnett (Barcelona, Springboard) |

| Task orientation -desire to improve |
| Ego orientation — desire to beat others |
Parameters relevant to the investigation of personality in sporting excellence:

**personality structure and process in a sample of elite sportspeople**

Table 1.1 summarises an array of perhaps expectable (face valid), achievement-related, core traits in this sample of Olympians, such as singularity of purpose, self-discipline, achievement striving, will, determination, focus, and competitiveness. Yet perhaps the three most interesting findings relating to personality structure are the presence of:

1. *Less expected characteristics such as anxiety* that also seem to be persistent, or trait-based, for some of these high achieving individuals (e.g. Q12-13). While anxiety has been a heavily researched aspect of sporting performance, until recently, it has primarily been viewed as a debilitating condition, or a manageable affliction rather than being associated with exceptional performance (Marchant & Morris, 2004);

2. *Stark dispositional differences between individuals with some traits that sit in apparent opposition to one another* such as (a) external and internal motivational styles (Q14-19), (b) pleasure-seeking and self-discipline, (Q24-26 vs. Q3-5) and (c) task orientation and ego (or outcome) orientation (Q20-22 vs. Q23). Individual differences in the salience of particular personality traits for sporting performance have historically been thought to be associated with differences in ability level
(Aidman, 2004) rather than being different pathways to success which is suggested by the diversity of traits within this exceptionally talented sample;

3. Diversity of salient traits within an individual profile that perhaps speak to the possibility of multiple, and quite different, enduring motivational forces for any given individual (e.g. Q18 & Q25). The research literature, contrastingly, reflects a preference for unidimensional motivational constructs related to achievement-striving (such as those reviewed on page 31) rather than complex motivational constellations.

The nature and complexity of individual differences in core trait structure will be one central focus of this thesis.

There are also a number of personality process issues that seem salient in the lives of these Olympians, yet which have not been the focus of concerted theoretical (or data-driven) consideration in the literature to date, specifically:

1. Similarities and differences in the manifestation of an individual’s personality in the sporting domain as opposed to their life more generally. Some individuals hint at quite different behaviour in the sporting domain than in non-sporting life (e.g. Q1). Others see the personality characteristics evident in their non-sporting lives as being critical to their sporting success (e.g. Q3 & Q15).

2. Somewhat related to point 1, are observations of the developmental or emergent nature of personality in both the sporting and non-sporting domains. Some individuals identified notable changes over time, despite personality being supposedly, a stable entity (e.g. Q4 & Q20);
3. The presence of conflicted desire in relation to the sporting endeavour even at the highest level (e.g. Q1 & Q2) which sits in stark contrast to popular notions of sporting champions being unswervingly committed to their sport;

4. The primacy of negative motivational forces (e.g. defiance) for some individuals even at this highest level (e.g. Q16, Q18 & Q23);

5. Varying degrees of metacognitive awareness of personality and its impact on achievement, for example, some individuals expressed an understanding of the difference between their use of learned mental skills, as opposed to more ingrained or innate dispositional forces (e.g. Q6, Q7, Q12 & Q19);

6. Personality as a compensatory factor for lesser physical abilities (e.g. Q6 & Q7); and

7. The potentially fine line between extreme commitment to sporting goals and psychopathology or maladaptive tendencies (e.g. Q10 & Q15). That is, sport may provide a safe and productive outlet for expressing, or indeed masking, potentially destructive tendencies such as obsessionality and self-absorption.

While some of these issues were only hinted at obliquely in this interview data, the first three of these personality processes were more clearly evident. As such a further analytic iteration was undertaken with regard to these issues. Similarities and differences in the expression of personality in the sporting and non-sporting domains will be considered in concert with the development of personality given the overlap in these topics in both texts. Variable commitment to the pursuit of sporting goals once at the elite level will then be considered.
Life and sport: similarities, differences and the development of personality

Some of the quotes selected in Table 1.1, hint at the idea that some Olympians have a sporting personality that differs from their more general or 'life personality'. However, as captured by Shelley O'Donnell (World Champion Netballer) there are some individuals in Bryceson & Herbert's (1992) sample, for whom the opportunity to be 'someone different' on the playing field is considered, quite explicitly, as an important feature of their success:

Q27: 'I'm a different person on the court from off. It's funny. I'm determined on the court and strong, but off the court I'm relaxed, laid back. I don't think I could handle being like I am on the court all the time.'

For others, these different 'selves' are a struggle to be managed, as for Sandra Paintin:

Q28: 'When I was a kid I didn't like competition. Now I look for it, although... I still don't like competing against other people so much.'

It also became apparent that many of these women felt that they had developed important elements of their character as a result of their success in sport, suggesting initial differences in expression of personality in sporting and non-sporting contexts. Most notably, all seemed to have developed trait confidence through sporting achievement:

Q29: 'Personally, however, a lot of my confidence and my self esteem has come from achievements in my sport and this carries directly across to my working life. I can set a goal and I can be disciplined enough to achieve it.'

Sharon Stewart (Athletics, Barcelona 400m relay)

Q30: 'It's given me so much confidence to achieve what I have achieved...all the million different things, the doors that have opened along the way...little things that I doubt would have happened otherwise because I was such a shy person.'

Sharon Stewart (Athletics, Barcelona 400m relay)

Q31: 'I guess I used to play sport because it got me involved – I was very shy.'

Rhonda Cator (Badminton, Barcelona Olympics)
However, many women also identified the contribution of pre-existing characteristics from their non-sporting life in becoming successful in sport:

Q34: ‘I was very sure about things from a young age... The big thing is to make a decision, but then push yourself to do it.’
Rhonda Cator (Badminton, Barcelona Olympics)

Q35: ‘I’ve always been a perfectionist and it’s one of those sports that demands perfection. It’s the challenge to be the best you can be on any particular river.’
Danielle Woodward (Barcelona Silver medal Slalom Canoeing)

Q36: ‘Whatever I do, I excel in and that’s because I apply the same principles as in competing, in exactly the same way. You’ll never see me go in and do something half way – I go in boots and all... I know how to set goals.’
Jenny Donnett (Barcelona, Springboard)

Q37: ‘Personally I want to be successful in what I do and it doesn’t really matter whether its hockey or whether it’s your work or study. I’m a competitive and determined person’... ‘I don’t even play Monopoly to lose. I like to win everything’
Chris Dobson (Barcelona, hockey)

In sum, some of these exceptional individuals emphasise the similarities or consistencies in character across sporting and non-sporting domains and see these as causal, or at least contributing to, success, whilst others seem to be aware of quite salient differences between personality expression in these contexts. Moreover, many individuals are aware of changes in their personality in one or other of these contexts, of a developmental
characterological trajectory, formatively shaped by the significance of their experiences as an elite sportsperson. It is also important to note that, while there were contextual differences in personality expression for some individuals, there seemed to be situational consistency in trait expression within these contexts. Exploring the similarities and differences between personality in sporting and non-sporting contexts will provide a central focus for this thesis.

*Surviving chronic stress: Engagement-Disengagement-Re-engagement*

Another feature permeating many personal stories is that many of these successful sportsmen and women have had significant times, whilst an elite sportsperson, when they have not felt committed to the pursuit of excellence in their sport, when the demands of their sport have overwhelmed them. For some these seem to be acute, short-lived experiences, for others quite protracted or recurrent struggles.

\[\begin{array}{|l|}
\hline
Q38: 'I tried being an athlete for a year, where I [only] worked part-time jobs. The challenge of training each day was not sufficient and I became really lazy. I stayed in bed in the morning ... and found I couldn't really motivate myself.' 
Sharon Stewart (Athletics, Barcelona 400m relay)  
\hline
Q39: 'It's a love-hate thing. I feel like I've sacrificed so much for my sport and I have a longing to lead a normal life ... I wouldn't wish this on anyone... And yet I'm going to Barcelona!' 
Sharon Stewart (Athletics, Barcelona 400m relay)  
\hline
Q40: 'Sometimes mentally I feel like I'm really strong. I can do it no matter what - that once I'm on track it won't matter who's there, it'll just be straight ahead. Sometimes I get out there and I just can't warm up, I have to talk myself into relaxing and calming down - no two races are the same.' 
Kerryn Pethybridge (Winter Olympics 1992, biathlon)  
\hline
Q41: 'Last year I was dropped from the team. That has to be my biggest barrier - getting through, keeping the motivation and the persistence there, working towards the goal of' 
\hline
\end{array}\]
Evident in these statements are a range of different triggers for an individual’s disengagement from their sport – the historical nature of the data allows us to know that these were temporary disengagements, but for most they were clear and significant disengagements nonetheless. Some triggers resulted in active disengagement, others more in amotivation. For some, disengagement resulted from a conflicted desire between ‘living’ life or achieving in sport (Q39), for others from an aversion to (or avoidance of) facing the prospect of going on after a major setback (and the inherent risk of future failure)(Q43), for others still it seemed to evolve as an integral part of being confronted with the realities of making the transition to becoming a full-time sportsperson (Q38).

In sum, many of the triggers, or stressors, experienced by these sportswomen seem to involve pressures inherent in the elite sporting environment and included both positive experiences, such as becoming an elite sportsperson (Q38), and negative experiences, such as losing a major tournament or non-selection (Q42); acute or sporadic experiences, such as selection (Q41); and chronic experiences, such as training demands (Q40). Other
stressors seemed less knowable such as injuries – they were unexpected misfortunes, and thus, are more clearly defined as instances of adversity. Thus, both ongoing pressures and unexpected adversity constituted potential sources of cumulative stress for these elite sportspeople.

Irrespective of the trigger, many of Bryceson & Herbert’s (1992) interviewees had times (in some cases, multiple times) when they felt that were not coping well with the demands of their sport and in fact some had been prepared to abandon their quest. That they returned, or continued in the face of conflicted desire, perhaps says something about the importance of both motivational forces discussed earlier: tension reduction seemed to be achieved by temporarily removing themselves from the sporting context, providing a period of respite, stability and reduced stress; but this was followed by a re-engagement with the tendency toward self-actualisation once adequate personal resources had been garnered and once isolation from the sporting context itself became a source of distress and tension.

There also appear to be some dispositional individual differences in the process of re-engagement with sport which would seem to support the idea of individual differences in the relative strength of these tendencies or drives for any given individual at a given time, and possibly of different traits servicing those motives. For example, some seem to have their desire re-awakened by an underlying (temporarily blunted) optimism that they will achieve great things:
'Best in the world? Yes, I've always liked that idea and from a very young age I always wanted to sail in the Olympics. What keeps me going is the fact that I know this is something that I'm good at, and at which I can be the best.'
Addy Bucek (Barcelona, Sailing)

Others seem to be spurred on by adversity itself – they seem to find strength and direction in the struggle to deal with their distress. On making her comeback from non-selection, Chris Dobson reflected:

'I said 'If I don’t keep going now, its only another 12 months to the Olympics – I'll regret it for the rest of my life'... This year I was named best player in the national championships... to come back in that way - that would be my greatest achievement. To be able to walk out and hold your head up high and say 'Well, I’ve done this'.'
Chris Dobson (Hockey, Barcelona)

Perhaps however, this is less an example of a tendency toward self-actualisation than fear of failure, a desire to avoid the distress that accompanies regret. That is, once the prospect of retirement or withdrawal from sport becomes a source of tension, then returning to sport may indeed reflect further attempts at tension reduction.

Others seem to have come to a more generic acceptance that loss and disappointment are integral features of life contexts that challenge our abilities:

'...there have been times when I have been in tears... You have to make sacrifices and you just have to weigh up whether they’re worth it or not'
Kerryn Pethybridge (Winter Olympics 1992, biathlon)

In some situations, an element of denial also seemed to operate with regard to the perception of stressors. Denial is considered by many to be the last line of mental defense\textsuperscript{10} - a personality based reaction which protects the conscious mind from

\textsuperscript{10} The concept of defense mechanisms emerged from the psychodynamic tradition of Freud. Defense mechanisms are posited to be personality processes that protect us from being fully confronted by
threatening feelings and perceptions (Apitzsch, 1995). Denial can be unconscious or conscious, often working at the borderlands between the two, at the edges of our awareness. While denial may be purposive (it functions to reduce tension), it may not be purposeful (conscious). All sportspeople, for example, know that non-selection is a pressure to be borne at various points throughout an elite career, yet, as in the case of Linley Frame (Q43), many believe in each instance of selection, that they have earned a place on the team. This perhaps allows unbridled pursuit of selection, but means that non-selection, when it happens, is experienced as adversity, as an unexpected misfortune, perhaps, in turn, facilitating the marshalling of resources against a perceived injustice. The fine line between honest self-evaluation and the importance of self-belief in achieving exceptional goals is highlighted in some of these stories and points to both a potential cost and a potential benefit of defense mechanisms such as denial.

Taken together, these experiences perhaps point to the importance of grappling with uncertainty and constant change (and the associated possibility of having to confront great distress) in being able to commit successfully to the arduous road to exceptionality. Little consideration has been given in the literature to stressful experiences off the field of play, as perhaps being pivotal moments in the formation, maintenance or indeed strengthening of sporting (athletic) identity. Perhaps exceptional achievement comes down to successful characterological engagement with chronic and repetitive stressors. In this context, perhaps doubts, fears and even temporary rejection of sport is a necessary feature of becoming an Olympian or continuing to perform at the highest level over the

distressing circumstances (Pervin, 1993). They are thought to be typically, though not universally, unconscious, and can operate both adaptively and maladaptively.
long term (as suggested explicitly in the Heads & Armstrong (2000) text), rather than being pathological or a sign of characterological weakness. The process and function of these experiences of intrapersonal conflict, seem akin to the ‘deviation amplifying processes’ in interpersonal conflict spoken of by Hoffman (1971) and subsequent systems theorists in trying to explain the function of conflict within family systems. Extrapolating from Miller’s (1978) model of all biological systems, stress and distress are seen as functioning to prevent stagnation of the system and to sustain a process of development or morphogenesis (Maruyama, 1960). Indeed, according to systems theory, such mechanisms of growth are at the core of the system’s survival.

In sum, resilience in the face of adversity, and more broadly, in the face of repetitive, chronic and acute pressures both negative and positive, seemed to be a key feature of the stories of many interviewees in both studies. At the highest level, sporting individuals seem to have mastered this art. Notably all of those interviewed were also clear that, given their time over again, they would choose to commit themselves to the same path despite clearly being able to identify significant costs of that choice, spanning social, educational, occupational and financial spheres. All saw their journey as a unique and rewarding opportunity. Throughout this thesis, the view of elite sport as a context defined by chronic and acute life stressors will provide a useful vantage point. In this view, personality is conceived of as a stable stress-adaptation device.

For some, this sporting journey seemed to draw momentum or motivational energy from an insatiable drive to achieve - in the case of some individuals, an aggressive
competitiveness, as evidenced in the *tenor* of comments made by Herb Elliot (Olympic runner) in the introduction to Heads & Armstrong’s (2000) text:

> ‘There was this antagonistic environment built up... Merv [Elliot’s main rival] and I were not friends at that point. I would maybe give him a desultory handshake after a race — that was all... The track to me was ... the boxing ring, the gladiatorial place...’

For others, the journey seemed to resonate more to a sense of personal triumph over perceived pressures and adversity, suggested by the following series of comments made by Jenny Donnet (diving):

> ‘Two years ago I told my mum that I was going to win and she didn’t believe me — that made me much tougher. I knew that I could do it and I had to prove it to her.’

> ‘The loneliness is there very much — different sorts of loneliness ... you can find ways of overcoming it and of replacing your dependence on other people.’

> ‘There’s another sort of loneliness though; there’s a loneliness of the soul. People who know who I am before they meet me have a preconceived idea of what I am like — they never see past that no matter how much I show of myself.’

> ‘So I’ve given up education and I often regret that because I’ve got a hungry mind. I’ve given up a career, I’m 29 years old and I don’t have any money. Most of my friends own their own businesses and houses and cars. And I’ve given up relationships... Men can’t cope with coming second after my sport.’

Both of the case studies above have an element of ‘toughness’ about them, perhaps some would call it mental toughness. A sense of having to defend oneself, against perceived threats or injustices. For others still, their sporting journey seemed to reflect more than merely toughness or dispositional stress endurance, but ‘the tendency to involve oneself fully in life’ and ‘the power to cultivate one’s way under difficult conditions... Not like a reckless attack, but an ability to understand conditions around oneself, an ability to self-decision’ (p.35) — what Kosaka (1996) calls hardiness. This is perhaps most clearly
reflected in Peter Brock's (Formula One driver) comment in Heads & Armstrong's (2000) text:

‘Adversity is your greatest teacher, providing challenges that every human being needs to go to the next level. I think that you’ve go to accept that anything can happen in your life. There’s no value in sport unless you as a human being are growing through the experience.’

These quite different dispositional motivational forces were, it seems, each successfully used to navigate one’s way through a chronically stressful environment in the pursuit of excellence, highlighting that exceptional achievement is not always aligned with a tendency toward self-actualisation – hardiness would seem far more aligned with this process than mental toughness so defined. In the latter case, somewhat counter-intuitively, tension reduction may well be the primary motivational force underpinning an individual’s exceptional sporting achievements. The potential for different trait pathways to success will provide another central focus of investigation in this dissertation.

Synthesis

What is clear from the short excerpts above is that a broad array of personality traits seem relevant to sporting performance at the highest level and indeed that some individuals are characterological opposites of one another in some regards (e.g. extrovert or introvert)! Each individual is also quite complex with some individuals expressing different tendencies in different contexts (note that the term context is used, as opposed to situations to suggest cross-situational consistency within particular contexts, for example training could be considered to be one context, and competition, another). Interestingly,
research foci do not always match up with the types of personality characteristics found in Bryceson & Herbert's interviewees. Some traits have received considerable attention (e.g. anxiety), others less so (e.g. obsessional). Issues such as the existence of a *sporting personality* that may be distinct from an individual's broader non-sporting or *life personality*\(^\text{11}\), have been overlooked (except in univariate studies of competitive anxiety) and evidence of variable motivation, ignored – perhaps because this contradicts the image of heroic perfection that we impose on our Olympians (Grove & Paccagnella, 1995). Finally, sport has not been considered as a chronic stressor in the context of trying to understand exceptional achievement. Nor has consideration been given to the possibility that there are different traits and motivational orientations toward responding to such stressors that prove adequate for the achievement of excellence in the sporting domain. These possibilities will be pursued in the review of the research literature that follows.

Methodologically, the analytic exercise above illustrates the importance of idiographic research approaches. Whilst there are clearly themes running through the comments of many sportsmen and women in these two texts that have been identified in other studies using nomothetic methods, it is also more apparent in these idiographic reports, that each individual is unique in his or her constellation of these features. Moreover, it is apparent that only a subset of themes identified by this researcher from the interview data, involve explicit insights from the sportspersons themselves. Individuals (not surprisingly) do not often analyse or interpret their responses at a meta-level that might be instructive for

\(^{11}\) The term *life personality* will be used as convenient shorthand though it is not intended to suggest that 'life' for an elite sportsperson is ever completely separate from sport, indeed at the elite level, sport is often the primary life context. Rather *life personality* will be used to refer to personality that is operating in non-sporting contexts. *Life personality* is preferred to the term *non-sporting personality* because the latter may suggest unsportsmanlike traits.
investigation. Sportspeople, it seems, like most of us, do not always have access to an understanding of why they behave the way they do.

A Case Study: Cathy Freeman.

In accord with the lines-of-argument approach, it is perhaps apposite to further explore the veracity of these observations with a more detailed case study of, arguably, one of Australia’s greatest athletes, Cathy Freeman (aged 19 when interviewed by Bryceson & Herbert (1992)). Freeman was a quarter finalist at the Barcelona Olympic Games in the 400metres, Atlanta silver medallist and, subsequently Sydney Olympic Gold medallist. In the summary of my analysis of Freeman’s interview presented in Table 1.2, comments have been added in the margin to identify themes as they emerged and to illustrate for the reader, the nature of interpretations being made. Using a similar structure as in Table 1.1, comments in regular print relate to traits and those in bold relate to personality processes.

Table 1.2 Emergent themes relating to personality from re-analysis of Bryceson & Herbert’s (1992) interview with Cathy Freeman, subsequent Olympic gold medallist

<table>
<thead>
<tr>
<th>Cathy Freeman (aged 19)</th>
<th>Traits (structure) or process</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘As a kid ‘I loved sport’ ‘I preferred sport to schoolwork....Sport’s always been in the family.’. ‘I’ve always had natural ability’ ‘My parents always said ‘Natural ability is a God-given talent. Make the most of it.’’. So you progress on with it wherever it takes you or whatever it brings you. ‘I could express myself more in an individual event compared to the group or team sports’ ‘It was part of me that I loved to share with people because I knew I was good at it’ ‘I’m the sort of person who takes things in my stride’ ‘it was all fun really’</td>
<td>Dutifulness, Moral obligation Extraversion Laid back</td>
</tr>
</tbody>
</table>
After the Commonwealth Games selection 'Now I'm starting to think about going further and shooting higher. The higher you get, the higher your aspirations become. The more real they become, the higher you aspire once again'... 'I came to understand that Carl Lewis and Flo Jo are normal — normal people with good determination'... 'Doubting yourself is something you cannot possibly have time to do. You've got to be realistic, but there's no time for doubting yourself.'

'If you realise what you have to do to be successful, you can't let anything stand in your way. You have to be selfish to a point where nothing else matters — but there are things that matter and you have to know what is important and what is not'... 'I want to see how far I can go in my chosen field. But if I had the choice between catching two planes - one to the Olympics and one to spend time with my father who was dying - I'd go to my father.'

... '..for me, every day, holiday or not, isn't complete without doing some exercise. I love exercise...even if it's a walk — a brisk walk'

'You always get what you deserve: the results reflect the amount you put in'.

'If you want something bad enough, you can have anything you want — dreams do come true'.

'Why do I bother? Because it's worthwhile. When training's going to be hard, and when you're not able to breathe or it's too cold, or you know you're going to get sore legs...well, ..you suffer the pain in training knowing that it's not going to hurt that much when you compete'.

'I want to get back down to earth again, instead of being in the hustle and bustle of competitiveness and the intense feeling you get on the track. In the time right before the Olympics you can almost press the panic button and lose all control'.

'After the Olympics I'll probably keep competing because I love it so much'.

'My success has opened doors. I get a bit of publicity, a bit of attention.... The attitudes you require for athletics are really character-building. It's great to have that in other facets of your life. My sport and the attention I get through it, has made me more confident - a bit more responsible and a bit more mature. It's given me the confidence to try. The hardest lesson to learn in athletics is patience. You've got to keep trying again and again... it takes a lot of patience to wait for your time to come'
Low anxiety  
Controlled aggression in sport, not life  
Self-improve vs. compete against others  
Metacognitive awareness of personality as key factor in performance

When an athlete is profiled as in the case of Cathy Freeman, the way core traits come together or are expressed, seem to be in unique combination, or at least illustrates something greater than the sum of the parts. We see complexity – someone who describes herself as both aggressive and patient, achievement striving and relaxed, selfish but wanting to share her gift with others, someone who competes for the enjoyment of exercise and to fulfil a sense of duty, someone who describes herself as ‘relaxed’ in life but ‘Once I get onto the track I let it all explode out from inside me’. This complexity is generally not obvious in nomothetic studies of personality traits. It is also noteworthy that even at this relatively early stage of her career (she was not yet an Olympian), this exceptional sportswoman does not speak in terms of psychological skills she has learned or been taught but rather of responses coming from a more instinctual, dispositional, source.

In Cathy Freeman’s later autobiography (Freeman & Gillan, 2003) these themes were repeated and several new themes emerged possibly pointing to a maturation of
personality as well as a change in the characterological demands of the environment once exceptionality had been achieved. That is, there is evidence of a growing self-awareness, a developmental trajectory to the impact of personality in her elite career:

At high school: ‘I was finding out more about myself on the track. Although I wasn’t keen on training, as soon as I got on the start line for the competitions I found my laid-back attitude disappearing and being replaced by a win-at-all costs mentality.’ (p. 31)

‘Back then, if I won the high jump, on the next jump I’d walk up and tip the bar off with my hand. I never liked going for records and only did enough to win’ (p. 32)

‘The death of my sister charged me with a sense of purpose’ (p. 42)

In the lead up to the Sydney Olympic Games ‘If Fort told me to do fifty sit-ups, I would do sixty... I was obsessed. I knew that to achieve my dream, I simply had to train harder. I became a perfectionist’ (p. 98)

‘My time away from training [after 2000 Olympic Games] had made me realise how much of a goal-oriented person I was’ (p. 314)

She also became aware of characterological differences between herself and her rivals.

‘The rivalry was obviously good for both of us, but it frustrated me how Melinda [Gainsford] seemed to take it personally. I liked to leave everything on the track... Melinda was different’ (p. 70)

Finally, Cathy, like the sportswomen quoted earlier, also experienced many highs and many lows in her sporting life, following both disappointments and exceptional achievements. At times she seemed to feel that she was not coping at all well. She relates the story of the break-up of her long term relationship in the aftermath of the euphoria of the Atlanta Olympic Games, noting that:

‘It was nearly four months since I’d stood on the podium at Atlanta with an Olympic silver medal around my neck. Now my life was unraveling around me... I didn’t want to be in the world anymore’ (p. 122-126)

And at various points in relation to her sport:
These times of disengagement seemed to be in significant measure when compared to the more commonly cited periods of drive and commitment integral to her public image. Feeling suicidal and recurrently lacking motivation are not features usually associated with Cathy Freeman or with sporting greatness more generally, yet this was part of a very real rollercoaster ride that spanned the course of her competitive career. Nevertheless, she managed to keep re-gaining her momentum, finding inspiration & motivation in many places – the death of her sister and father; anger at her ex-partner and former manager (who had stated that ‘Freeman will not make it to the [Sydney Olympics] starting line without me’ (p.212)); and from within as the desire for Olympic Gold in Sydney grew and took on a life of its own. Cathy Freeman’s life story ably encapsulates salient commonalities with the other elite sportspeople considered previously but also captures the complexity of life as an elite sportsperson. In so doing, her story highlights for researchers, the importance of triangulating complementary methods of investigation that can, taken together, hope to adequately capture such complexity.

In summing up, the case study of Cathy Freeman provides further support for earlier observations that (i) there are a multiplicity of traits that are salient for each exceptional sportsperson in navigating the stressors inherent in their environment, (ii) there seem to be differences between personality as expressed in the sporting environment and that expressed in the non-sporting environment for some individuals, (iii) even exceptional sportspeople (perhaps, especially exceptional sportspeople) experience variable
motivation in the pursuit of their sporting goals, and (iv) there may be individual differences in motivational orientations amongst individuals even at the highest levels – both self-actualisation and tension reduction may play a role. On this latter point, Bryceson & Herbert (1992) identify the key findings of their interviews (those which are relevant to personality) as: the ‘drive and determination of these women’, their ‘ability to get up and do it again, to try to achieve the goals they set themselves’. They noted that ‘many had been high achievers since childhood’ (p.8) and that ‘The consistency of this aspect of their character [drive and determination] was telling’ (p.8) but ‘They keep going for a variety of reasons: some for the satisfaction of improving against themselves, some for the thrill of competition, some because they love to sweat, they love physical exertion.’ (p8-9). I would add, some felt they succeeded because they had been told that they couldn’t, and some, as summed up by Nicole Stevenson (Swimmer, Barcelona), ‘... get to a stage where they continue because it’s a habit and they are too scared to give it up.’. Avoiding failure or approaching success; different motives seem to be supported by different personality traits and processes, each manifesting in different ways in the sporting life cycle but all contributing to an overarching momentum toward exceptional sporting achievement. These findings are perhaps best summed up in terms of the principle of equifinality - also originating in the tradition of systems theory – that many life paths can lead to the same endpoint even when the journey, and indeed the endpoint, is an exceptional one (Miller, 1978). The notion of equifinality does not negate the predictive value of understanding personality, rather it emphasizes the worthiness of both nomothetic and idiographic levels of explanation.
The issues of personality structure and process raised in this re-analysis of interview data will now be considered more closely from the vantage point of the research literature. An inductive approach will once again be taken in the first instance so as to remain open to further new possibilities for understanding the personality of exceptional sportspeople. Discussion of personality theories will be withheld until this process is complete.

The Perspective of Researchers

In making the decision to disregard research conducted prior to the 1960’s and to only consider research that explicitly involves sportspeople competing at the national or international level, a swathe is cut through the sport personality literature and we are left with very little that directly, primarily, comprehensively and intentionally assesses the role of personality in sport. What follows is close to an exhaustive review of studies profiling the personalities of elite sportsmen and women since 1961. It was not intended that this would be the case rather that, in accordance with grounded theory, new data (studies) would only be included up to a point of saturation (i.e. until no new issues were emerging) (Glaser & Strauss, 1967). The fact that this process was extensive, ably reflects the disparate nature of the sport personality literature.

Comprehensive personality profiling, rather than the univariate or bivariate study of independent traits, processes or motives, is the pivotal level of exploration in the review that follows (and indeed in this thesis). Personality profiling has conventionally referred to the practice of assessing multiple traits with one instrument, plotting the results against
a normative profile and interpreting the likely primary and interactive effects of traits, particularly those that are significantly different from the normative sample. Utilising one comprehensive instrument in profiling avoids confounds associated with item or construct overlap and also of different levels of investigation (for example, some personality tools examine beliefs and others assess behaviours). Moreover, multivariate analyses of profiles avoids the potential for misunderstandings when exploring univariate relationships, particularly in the absence of an existing framework for interpreting individual studies (Kroll & Crenshaw, 1970; Matthews & Deary, 1998). Historically profiling has been undertaken with the intent of elucidating the structure of personality, that is, personality traits.

The studies which follow will be presented largely in chronological order except where stated, so that the reader can most easily follow the emerging conceptual and methodological path of the discipline and compare and contrast traditional and modern research practices. For the sake of brevity, a degree of familiarity with Eysenck’s and Cattell’s models and measures of personality (EPQ: Eysenck & Eysenck (1975); and 16PF: Cattell & Eber (1957, 1980), respectively) as well as the Minnesota Multiphasic Personality Inventory (MMPI) will be assumed. A summary of the traits in each model can be found in Appendix 1 for reference. In line with the qualitative synthesis tradition, in the first instance the studies will be largely left to ‘speak for themselves’. Subsequently an interpretive framework is presented. However, the reader’s attention is drawn to the conceptual and methodological elements of each study rather than just the particular personality traits that are highlighted, as it is readily apparent that there is little
convergence with regard to defining key traits. A summary of the lengthy list of personality traits to emerge from the literature is presented toward the end of this chapter.

Classical Studies: The credulous-skeptical debate

Kroll & Crenshaw (1970) undertook one of the more methodologically and statistically rigorous early profiling studies, using the Cattell 16PF to assess personality amongst 81 members of 3 highly successful collegiate football teams, 94 amateur wrestlers (including 28 Olympic team and national place winners, 33 university representatives rated as 'excellent' by their coach and having won at least 60% of their matches during the preceding season, and 33 'average to below average' performers from college teams, 71 amateur karate participants and 141 gymnasts from university teams. Skill level was not controlled for in the case of wrestlers and karate proponents due to previous research by the authors suggesting homogeneity of personality within each sport across skills levels (Kroll, 1967; Kroll & Carlson, 1967, respectively) but a lack of homogeneity was found for football players and as such a subsample of successful football players were selected for this study (Kroll & Peterson, 1965). Those who scored above 7 on the lie scale from the MMPI were excluded. Using discriminant functions analysis to evaluate interactive relationships between traits, Kroll & Crenshaw (1970) found several noteworthy things. Firstly, the six major contributors to the first significant factor included the following factors: H (shy vs venturesome), Q2 (group dependent vs self-sufficient), L (trusting vs. suspicious), B (less intelligent vs more intelligent), A (reserved vs outgoing) and C (affected by feelings vs. emotionally stable).
It also became clear that footballers and wrestlers had relatively homogenous profiles that were significantly different from gymnasts and karate practitioners. Both footballers and wrestlers were described as ‘being conventional, valuing social approval, and being satisfied with group association’ (p.104). Gymnasts scored lowest of all four groups on Q4 (and Karate practitioners highest) suggesting that they were more relaxed and tranquil. Gymnasts also scored lowest on G (and karate practitioners highest) suggesting they were conscientious and rule-bound. Both gymnasts and karate practitioners were more self-sufficient, reserved and detached than wrestlers and football players. Kroll and Crenshaw observe that perhaps this finding suggests that the combative nature of sports is more influenced by personality than the ‘team-individual’ sporting dichotomy. However karate is also a combative sport suggesting that perhaps in karate it is not the combative nature of the sport that primarily attracts participants. Analysis of within karate skill levels revealed no differences in personality profile (Kroll & Carlson, 1967). The authors also highlighted the importance of Q2 (group dependence vs self-sufficiency) in discriminating between individual and team sports.

Beyond addressing core hypotheses about the character of participants in these sports, two methodological and analytical issues deserve comment:

(i) Classification and the value of discriminant analysis: Of 387 sportspeople, 197 were correctly classified as a member of their discipline with 73.1% of gymnasts correctly classified and each of the other groups approximately 40% of the time. This is significantly greater than correct classification by chance alone, however it still means
many successful sportspeople were not correctly classified. While the issue of heterogeneity is not addressed by the authors, this finding does point to the additional value of using discriminant functions analysis over MANOVA in considering personality differences in sportspeople – both can identify statistically significant predictive combinations of variables that differentiate sporting groups, but only discriminant functions analysis can tell us how \textit{clinically significant} \footnote{Clinical significance has been variously defined (Follette & Callaghan, 1996; Jacobson & Truax, 1991; Tingey, Lambert, Burlingame & Hansen, 1996), in some cases being operationally less stringent than \textit{statistical tests of significance} in response to the possibility of Type II errors (failing to recognise a meaningful difference when there is one), and in other cases being \textit{more} stringent than statistical significance, for example, where diagnostic or other consequential decisions are likely to flow from research results. The latter issue is of concern here.} these formulae are – that is, how effectively statistical differences between groups can be used for correct ‘diagnosis’ or classification of individuals within that sample or indeed other samples (Tabachnick & Fidell, 2001). In the clinical literature, this distinction is captured by Glaros & Kline (1988) in their discussion of the sensitivity of tests, that is, their capacity for correctly identifying psychopathology in individuals, and specificity of a test, or the capacity for excluding cases from wrongful diagnosis – both are important issues in diagnostic decision making and relate to the positive and negative predictive value of the test. Given the traditionally stated primary aims of sports personology, that is, talent identification and psychological intervention (specifically, performance counselling and mental skills training), reliance on an algorithm that misclassifies a significant number of individuals can have consequential \footnote{The term ‘consequential’ is used throughout this thesis in the sense advocated by Janis & Mann (1977) in their study of decision making under stress. Consequential decisions are those that have potentially very significant outcomes.} implications – lack of selection, lack of access to services and, in the context of counselling and
coaching, perhaps encouraging the development of traits that are not uniform in their efficacy.

(ii) The importance of multivariate analysis: It is noteworthy that factors H & C did not show a significant univariate relationship to discriminating between groups despite contributing significantly to the first discriminating function, demonstrating the primary importance of considering interactive relationships between traits and of multivariate techniques in the study of personality. Kroll & Crenshaw caution against the potential for being misled by univariate analyses or single trait investigations. This is, unfortunately, an insight that seems to have been largely lost in subsequent decades (Cox, 1985). Moreover, the major contributors to the first factor that discriminated between sports, differed when sports were paired – the feature which primarily differed between gymnasts and wrestlers/footballers was factor H, whilst for karate and wrestlers it was Q2, pointing to the different requirements of each sport.

Both points highlight the fact that the way the question is posed, and the statistical method chosen to answer it, can significantly impact on the perceived outcome.

Bruce Ogilvie, Thomas Tutko & Leland Lyon are often referred to in the personality literature as authors of an early sporting personality test, the Athletic Motivation Inventory (AMI; Cox, 1985) and founding members of the Institute for the Study of Athletic Motivation. They report conducting extensive research using the 16PF with successful North American athletes (Ogilvie, 1968, Ogilvie & Tutko, 1966) and concluded that athletes who have *enduring* careers will exhibit most of the following
traits: ambition, organization, deference, dominance, endurance, aggression, emotional maturity, tough-mindedness, trustfulness, intelligence, high conscience, low levels of tension and being less introverted in adulthood. These findings perhaps point to the long term effects of personality or to changes in personality over time. However, written works supporting these claims are hard to find\textsuperscript{14} and Rushall (1973) (cited in Cox, 1985) concluded that despite the significant influence of these researchers in promoting trait research and profiling of elite sportspeople for the purposes of application ‘...a peculiar situation has arisen with this institute. For all its findings and developed tests, no data, data analysis or experimental verifications have been produced’ (p.285) and hence their claims ought be ignored. This position has also been adopted in the current study but the prominence of Ogilvie in ensuing debates about sports personology warrants this reference to him and to his research program.

Cattell is one of the most prolific researchers in this area and his two factor theory of personality has withstood the test of time. However, Rushall (1970) concluded from testing over 2000 sportspeople participating in various sports at various levels (including Olympians) using the Cattell 16PF that there were no systematic trends toward the emergence of the specific 16PF factors said to be indicative of champions, specifically C+ (emotionally stable), E+ (dominant), H+ (Parmia – adventurous, thick skinned), I- (Harria – tough, realistic), and O (confident) (Cattell & Eber, 1957). Rushall (1970) recommended that, rather than profiling for selection purposes, ‘knowledge of the personality of an individual is important for maximizing individual responses’ (p.173).

\textsuperscript{14} This author contacted a representative of Prof. Tutko through the San Jose University and also asked whether, a representative for Prof Ogilvie (who died in 1993) may be able to provide copies of such documentation, but they did not feel that the material was easily accessible.
He then turned away from the study of personality to a distinguished career in psychological skills development. Morgan (1980), in a seminal review, countered that the picture was not quite as grim as Rushall (1970) suggested, pointing out that Rushall’s own research suffered from methodological limitations such as restriction of analysis to first order factors and lack of precision in operationalising independent variables. Morgan pointed to the contrasting findings of Kane (1970) who also used the 16PF but considered second order factors. However, Kane’s study did not involve elite athletes and so, for the purposes of the current study, Rushall’s point still stands.

Hardman (1973) reviewed 27 studies involving 16PF profiling of more than 400 national or international sportspeople and numerous lower level sportspeople across 16 sports including both team and individual sports, contact and non-contact sports. He concluded that at source trait level, participation in sport is associated with Intelligence (B+), Dominance (E+: aggressive, competitive), Surgency (F+: enthusiastic, happy go lucky), Ergic Tension (Q4+: tense, excitable), Protension (L+: paranoid tendency), Instability (C-: emotional, immature, unstable), Threctia (H-: shy, timid), low Super-ego strength (G-: casual, undependable) and at second order level, Anxiety (Factor I+) and Independence (Factor IV+). However, the data presented also illustrate that there was significant, but not predictable variability in mean trait scores across sports, within sports and between achievement levels. There is some evidence of low anxiety, some of high anxiety and emotional instability, as well as counterintuitive findings such as a significant number of sporting codes scoring low on factor Q3 which measures willpower or self-imposed standards. He also concludes that the claim that extroversion is related to sporting
prowess is only valid for some sports and that indeed quite the opposite seems to be true for others. Another intriguing finding was that international sportspeople showed lesser deviation from the personality norm group profiles than did lower level sportspeople. This, he suggests, might explain the generally held belief that elite sportspeople are characterised by a lack of anxiety and greater mental health – that this is a comparative observation in relation to lower level participants.

Taken together, these findings became the core of what has become known as the credulous-skeptical debate (Morgan, 1980) in which Ogilvie was established as the most extreme proponent of personality profiling with, some say, the slimmest of evidence (Rushall, 1973) and Rushall clearly in the skeptics camp. Sport personology limped out of the credulous-skeptical debate. Beyond these early studies, there are few published reports of comprehensive profiling of modern elite sportspeople despite significant sociological changes to participation opportunities, such as the development of the Australian National Institutes of Sport and associated talent identification and development programs, which strengthen the likely role of personality through reducing the impact of SES on which earlier studies may have foundered (Morgan, 1980). Had this debate not occurred in a reductionist climate, these apparently contradictory results could have been interpreted differently – perhaps, as ably illustrating the principle of equifinality. Alternately they could have been taken as an indication that the effects of personality on performance are mediated by something other than, or in addition to, sporting type. These findings do not inherently negate the value of assessing personality traits, they merely point to the limitations of searching only for homogeneous personality
structures that differentiate sports or sporting levels. The questions asked and the methods used, once again, constrained the results.

Williams & Parkin (1980) undertook one of the few profiling studies immediately following this period. They collected 16PF profiles for 85 male field hockey players. Multiple discriminant functions analysis showed that international level players including Olympic gold medalists (n=18) differed significantly from club players (n=33). A third group of players who had represented their province (n=34) and were considered to have elite potential were more similar to the international level players, though not significantly so. Discriminating factor components included confidence (O), intelligence (B), trust (L), emotional stability (C), boldness (H), enthusiasm (F) and toughness (I). Nevertheless, only 63.5% of players were correctly classified into their group by this discriminant function.

Geron, Furst & Rotstein (1986) profiled 379 non sportspeople and 273 sportsmen from national and first division teams representing gymnastics, swimming, track, tennis, basketball, volleyball, handball, soccer and waterpolo. Uniquely, participants were matched on age, gender, academic level, ethnicity and SES. They found, using the MMPI in a series of ANOVA and MANOVA procedures, that there were indeed differences in profiles for different sports and that team and individual sports differed. Only 3 scales related exclusively to particular kinds of sports (L, Mf & Cp). Seventeen of 29 scales (L,F,Hs,Hy,Mf,Pa,Pt,T,Dy,Re-r,Es,Ec,Do-r,Cp,Sf,Am,Tol) differentiated sportspeople from non-sportspeople, with swimmers being particularly differentiable. Nine of 29
scales differentiated sports (L,F,Mf,Pt,Sf,Es,Ie,Cp,Tol). There was also some evidence of psychopathological personality expression with sprinters being profiled as anxious, emotionally disturbed and tense relative to norms. Soccer players were profiled as being both non anxious and tolerant but also hypochondriacal and non-responsible. Nine sportsmen but 28 controls were excluded from consideration on the basis of their lie scale scores. Finally there was some evidence that SES affected the nature of interaction of traits. While these findings are promising, in the absence of a discriminant functions analysis it is unclear how effectively these significant differences might classify individuals into correct groupings.

A more piecemeal approach to personality emerged over the ensuing decades, still with a focus on identifying successful sporting traits but predominantly through the investigation of single constructs or construct pairs (e.g. anxiety and perfectionism) in particular sports. This approach was largely based on the premise that it was still possible to find the holy grail of personality profiles if we were just more selective in choosing traits to investigate and turned our attention to skill level differences within sports. However, there has also been a slow resurgence in studies considering psychological profiling in a comprehensive sense, though often using quite different methodologies from the traditional profiling approach. Seemingly in response to the lack of an emergent framework for personality from the era of single construct studies, more recent studies have largely taken a bottom up, inductive approach to the construction of psychological profiles of sporting champions using qualitative interview methodologies. Thus, the profiling studies to follow have been further grouped according to their methodological
bent. This grouping has emerged as salient in that while such studies have chronological overlap, there appears to be almost no conceptual communication between these two methodological arms of the sport psychology discipline. Quantitative studies have been presented first, to follow naturally from the traditional profiling efforts outlined above. Qualitative profiling studies are then discussed.

**Modern profiling studies using quantitative methodologies**

Davis & Mogk (1994) compared 30 elite sportspeople, 30 sub-elite sportspeople, 30 recreational sport enthusiasts, and a non-sport control group (n=30) (aged 15-46 yrs) on the Eysenck Personality Questionnaire, Sensation Seeking Scale-Form IV, and measures of Achieving Tendency. They found no evidence that elite sportspeople could be distinguished from other groups on Extraversion, Neuroticism, Toughmindedness (Psychoticism), Sensation-Seeking, or Achieving Tendency. Interestingly, those classified as recreational sport enthusiasts had higher scores than any other group on the Psychoticism scale and were the only group who had higher Extraversion scores than non-sport controls which is somewhat reminiscent of Hardman’s (1973) finding.

Van Rossum & Gagne (1994) surveyed 65 top level international coaches from several countries and a range of sports, about the characteristics most important for sporting success. Their sample ranked mental fitness as equal most important with natural endowment, followed closely by physical fitness. The definition of mental fitness included competitiveness, concentration, persistence and self-confidence. Van Rossum (1996) subsequently surveyed 107 international field hockey players (including some
who participated in Study 2 of the current research), male and female, from 4 countries, and asked them to complete the Sport Orientation Questionnaire (SOQ, Gill & Deeter, 1988) – a measure of enduring sport achievement motivation. Interestingly, the SOQ profiles, measuring competitiveness, win orientation and goal orientation revealed different profiles for different countries. He also asked these players to rate the importance of mental fitness, physical fitness, tactical ability, social recognition, natural endowment, motor skills, and quantity of training in elite performance. Mental fitness was ranked as second only to physical fitness and equal to tactical ability (van Rossum, 1996). When asked to rate the specific mental factors contributing to success, by allocating 100 possible points across a list of 11 ‘enduring psychological characteristics (including competitiveness, concentration, persistence, ability to take setbacks, ability to deal with winning and losing, attitude toward training, resilience, will to win, self confidence, independence and control over own emotions), there were differences between countries but the coefficient of concordance (0.21-0.41) would also suggest high variability amongst team members, much more so than for ratings of other types of (non psychological) abilities. This is perhaps the most interesting finding. Different people in the same team believe that different enduring psychological factors are of primary importance. Since all players were successful in their sport at the highest level when this study was undertaken, it may be that each player is correct. Perhaps those characteristics which enable success for one individual are markedly different than for others in their sport. This is consistent with the principle of equifinality emerging from re-analysis of Bryceson & Herbert’s (1992) interviews. However, as discussed earlier, it may also be that individuals have little insight into the critical personality processes operating in the
sporting domain. A final point of relevance in this study is the inclusion of ‘winning’ (as opposed to losing or poor performance) as an experience that may challenge mental fitness. Once again, this adds weight to the finding from the earlier re-analysis of Bryceson & Herbert’s (1992) interviews, that significant sporting pressures can be positive events as well as negative ones.

Aidman (2000) conducted a longitudinal study of 32 elite junior Australian Rules Football League (AFL) players using Cattell’s 16PF. Personality showed weak predictions of performance at the junior level but over 7 years the predictors strengthened in relation to outcomes such as selection into a senior AFL team over a 5 year period and coaches’ ratings of achievement and performance. A discriminant functions analysis identified rule consciousness (G), openness to change (Q1), self-reliance (Q2) and tension (Q4) as central traits on the first discriminant function which resulted in 84.2% correct discrimination compared with 59.4% based on coaches ratings of performance/ability. If carefully selected coaches’ ratings of physical ability were considered in concert with personality, 100% discrimination was possible. This is quite a remarkable finding and one that offers some promise to trait based approaches when more meaningful units of behaviour are used and when a longitudinal design is adopted to assess enduring achievement in a prospective fashion. However it would seem that the sample size in this particular study would compromise the power of the discriminant functions analysis.

Pain & Barsch (2000) profiled 305 AFL players who played in the senior competition, using the Test of Attentional and Interpersonal Style (TAIS, Nideffer, 1973), a profiling
tool that has been widely used to measure attentional style over the past 25 years, but almost overlooked as a measure of personality traits despite the interpersonal scales reportedly having adequate construct validity when compared to the MMPI and MPI (Maudsley Personality Inventory) (Nideffer, 1976). The purpose of Pain & Barsch’s (2000) study was to explore personality differences amongst players from different on-field positions. The theory underlying the TAIS is that personality determines a person’s fundamental level of arousal – the degree to which an individual is highly strung or very calm in nature (in a way similar to Eysenck). Nideffer (1976) believes that this may influence and be influenced by, what we attend to in our environment – that it will affect our ability to process incoming information. It follows that different sports and different playing positions might have different attentional and interpersonal demands and thus, according to this model, that different levels of performance will be marked by different attentional and interpersonal patterns. Interestingly, a MANOVA revealed no differences in personality in the context of playing position or seniority. It may be however, that playing position is increasingly, a dubious independent variable as the modern trend in AFL is to develop players who are flexible enough to play more than one position.  

Karp (2000) took an interesting approach to achievement evaluation amongst 126 drafted professional ice hockey players. She used archival data to compare expected potential as rated by national scouts in the initial drafting process, with their level of actual achievement as also rated by six professional scouts. 16PF profiles revealed that several personality factors were important indicators of achievement or underachievement.

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15 This explanation of findings is also in fact the view held by the first author, Michelle Pain (personal communication, 2005)
relative to potential. Greater success and achievement was associated with higher reasoning ability (B), emotional stability (C), boldness (H), external focus (M), honesty (N), respect for authority (Q1), and less anxiety (Q4) than sporting peers. Physical ability ratings effected initial player expectations but did not significantly contribute to the prediction of hockey achievement.

Another innovative approach to measuring performance is illustrated in a study examining the transition of 48 AFL players in a successful state competition team into the senior competition. Aidman & Beckerman (2001) (as reported in Aidman, 2004 & Aidman & Schofield, 200416) reported on 3 groups of players: those who were regularly selected for teams in the senior AFL competition (elite players), those who regularly played in the reserve competition (non-elite) and a group of ‘swingers’ (sub-elite) who were sometimes selected for promotion to the senior competition but at other times played in the reserves. Aidman & Bekerman utilized independent variables such as playing conditions in AFL games (e.g. easy wins vs. close wins vs. bad losses), and cumulative micro-analytic performance indicators in the form of game statistics (such as number of contested marks, tackles and efforts at protecting the ball handler). These data were accumulated across an entire season for each player. Players also completed a range of self-perception tests and the NEO-FFI (Costa & McCrae, 1992a) a measure associated with Costa & McCrae’s (1992a) Big 5 personality traits. The 5 factors (which will be discussed in some detail later) are Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. In Aidman & Bekerman’s study, the three groups differed on self-discipline, achievement striving and neuroticism. Neuroticism inversely

16 I would like to thank Aidman for making available slides from his talk and a copy of his paper.
predicted overall effort to make an effective play in games that were close as well as those that were easy wins. Interestingly, when the team suffered a bad loss, personality seemed to play no part at all in individual performance. Additionally, 'swingers' showed lower levels of achievement striving and self-discipline than those regularly selected for senior teams and than a group of regular reserve players. These findings led the authors to conclude that 'while ability is what creates an opportunity to play at an elite level (it is what the reserves lack), it needs to be complemented by achievement-striving and self-discipline, in order to produce consistent performances (these are what the swingers lack)' (Aidman & Schofield, 2004, p.31). Aidman (2004) also concluded that longitudinal data collection is essential in understanding the effects of personality in sport and that relationships can be found with both on-field performance and longer term career achievement (as in his earlier study above, Aidman, 2000).

Koo (2003) investigated the utility of the NEO-FFI measure in differentiating between American professional and college football players. Subjects included 24 players from a National Football League team and 54 football players from a Division I program. College football players scored lower on scales of Extraversion and Conscientiousness and higher on Neuroticism than National Football League players. All footballers were significantly different from the NEO-FFI normative sample on all measures. Results of this small scale study are taken by Koo to suggest the potential usefulness of the NEO-FFI in screening (talent identification) of football players, which would mark a return to more traditional profiling approaches in sport psychology.
In sum, quantitative profiling studies are equivocal on whether there is a champion profile, generically or within particular sport types. Three studies, involving, when combined, hundreds of profiles, found no consistent, significant differences between levels of participation, sporting type or playing position (Davis & Mogk, 1994; Pain & Barsch, 2000; Rushall, 1970). Six studies, involving somewhat fewer profiles but triangulating more innovative methodologies, such as using more dynamic outcome measures and longitudinal design, suggest significant personality differences between levels of achievement, between different sports (Aidman, 2000; Aidman & Bekerman, 2001; Geron, Furst & Rotstein 1986; Hardman, 1973; Karp, 2000; Koo, 2003; Kroll & Crenshaw 1970), but perhaps most promisingly, stable differences have been found within ability level groupings and in relation to expert-rated potential (Aidman, 2000; Karp, 2000) though coaches' perceptions and player perceptions have been found to differ on the nature of these salient characteristics (van Rossum & Gagne, 1994; van Rossum, 1996). More recent studies reflect greater accord over the prospect of personality as a predictor of performance and achievement but often have quite small sample sizes and don’t all use classification as the final arbiter on the utility of such differences in identifying talented individuals.

**Modern profiling using qualitative methodologies**

Of the series of qualitative studies to follow, only two were primarily and explicitly targeting personality and its effects on sporting champions (Apitzsch, 1995, and Lamb Ullyot & Myers, 1994). Others were more broad-based profiling exercises, exploring...
salient psychological characteristics of successful sportsmen and women, whether they be
trait- or state-based, dispositional or learned. Mostly, studies combine data from
proponents of different sports yet few contrasts are made between sporting types,
reflecting an implicit assumption that sport type is not relevant to understanding the
psychological components of exceptionality. Curiously, this methodology, then, marks a
return to the search for a generic ‘champion persona’. Moreover, such interviews are
predicated on an assumption that there are differences between champions and lesser
performers – a position not unanimously supported by the quantitative profiling studies
summarized above, but one which is perhaps reflective of the mental skills parentage of
this line of research.

Many of the studies to follow were explicitly designed with the intended purpose of more
clearly defining the nebulous concept of ‘mental toughness’. Taken by mental skills
researchers and practitioners to be a multidimensional and critical feature of excellence
for the past two decades, operationalisation and measurement is considered a holy grail
by many researchers (Carlstedt, 2004b; Middleton, Marsh, Martin, Richards and Perry,
2004). It is interesting in this context then, that leads about the nature of personality
impact on sporting achievement can be gleaned from each study both in terms of
personality structure and process. Many of the psychological characteristics identified can
be considered either dispositional or learned. Some are more clearly identified by
interviewees as dispositional. For brevity, only those findings potentially relating to
personality will be discussed here.
Turning away from the positivistic tradition, Hemery (1986), in a series of interviews, identified several areas of influence in the lives of 22 sporting world champions: physical, social, psychological and moral. Attributes that could be considered personality traits (although he does not necessarily label them as such in all instances) included courage and risk-taking in relation to training and fitness. Personality traits required for training commitment is one issue of particular interest in the current study since it is true for most sports at the elite level that considerably more time is spent in training and preparation than in participation in the sport of choice. In most elite and professional sports, training is a full-time pursuit that enables periodic competitive participation. In many cases, this preparation involves activities quite divergent from the preferred sport, such as weight training or fitness training, raising the question of whether personality is most influential at the level of commitment to training. Hemery (1986) also identified ‘social’ influences and considered ‘personal attributes’ along with familial/childhood experiences and supports. Amongst ‘psychological’ factors he included creativity, athletic intelligence, concentration and control, and competitiveness. In defining ‘moral’ influences, he included gamesmanship and moral standards. Here a number of potentially characterological elements are housed. In terms of psychological traits inherent in the sporting activity itself, Hemery (1986) suggests that ‘sprinters tend to be more highly strung, rather like racehorses. They also appear to be more extroverted. A general rule of thumb is the further up the distance scale, the more introverted the runner, but… there are exceptions’ (p.28). Another interesting possibility posited is that the degree of body contact required in a chosen sport may reflect personality differences. Twenty two percent of those in contact sport saw no risk involved, for others it was a calculated
factor. This finding once again raises the issue of whether the defense mechanism of denial might have a functional role in some aspects of sporting success.

Another study, using a rather unusual personality measure, which nevertheless involves elite sportspeople and a small array of personality traits is a study by Lamb Ullyot & Myers (1994) in which they found that 25 of 27 elite female runners, when given characterological descriptions of seven goddesses, identified themselves with Artemis, huntress, a solitary, self-disciplined, inner-directed, self-confident goddess. Interestingly there was wide variation in the next most likely choice for each participant. The authors importantly concluded that there is both similarity and great dispositional diversity amongst these elite runners.

Apitzsch (1995) undertook one of the few personality studies in which a psychodynamic perspective was adopted. Using three case studies he illustrates how, according to psychodynamic personality theory, primary adaptation to stressful events takes place by the initiation of pre-existing intrapsychic defensive processes in order to reduce intensely unpleasant emotional states. Specifically these defense mechanisms act to distort the individual’s perception of a situation such that it seems less threatening. He explains how these personality processes are generally not available to conscious awareness and illustrates each defense mechanism in case examples of elite Swedish soccer players. Introaggression, for example, is a process whereby unacceptable outwardly directed aggressive impulses are turned in on the self (and often associated

17 The psychodynamic perspective evolved from the work of Freud and is based around the importance of early childhood experiences as the basis for adult psychological functioning. Defense mechanisms, as mentioned earlier, are generally believed to be an unconscious set of self-protective mechanisms, and are a core part of psychodynamic theory.
with self-destructive behaviours). Apitzsch (1995) suggests that this defense can have an adaptive endpoint for goalkeepers in their ability to withstand pain but can also result in maladaptive endpoints such as painseeking or risk taking behaviours that may end in injury or sanction. Similarly, denial has an adaptive endpoint for some players, he argues, in their ability to ignore adversity when others may have hesitated. It may become maladaptive however, when the realities of the situation are ignored, resulting in increased risk of injury or sanction. Reaction formation is a defense mechanism which involves the avoidance of becoming conscious of strong negative feelings such as hatred, by exaggerating strong positive feelings, which, however, might be ambiguous in presentation (e.g. a ‘false’ smile). The adaptive endpoint of reaction formation for his soccer players, he suggests, can be seen in benign interpersonal relationships – such a player would never criticize his team-mates. A maladaptive endpoint might be ambiguous interpersonal relationships which, according to Apitzsch (1995) might result a preponderance of passes to the opposing players. Other defenses discussed included projection, introjection and identification with the aggressor. Perhaps the most unique aspect of this study is the consideration of negative influences of generic personality processes. Moreover, this approach draws attention to the fact that each element of personality can have positive and negative outcomes or adaptive and maladaptive endpoints even at the highest level of sporting involvement. This finding resonates with the observation made of Bryceson & Herbert’s (1992) interviewees that there is a fine line between characteristics that facilitate high achievement, and tendencies that might be described as maladaptive or psychopathological. While this understanding is also inherent in Eysenck’s early works, it has been largely ignored in sport psychology in the quest for
identification of positive, psychologically healthy, attributes that are believed to be associated with exceptional achievement. Finally this study highlights the possibility that personality influences are often outside of the awareness of the player involved, as also suggested by the re-analysis of Bryceson & Herbert’s (1992) interview data.

Fourie & Potgieter\(^\text{18}\) (2001) gathered survey data from 131 expert South African coaches and 160 elite sportsmen and women from 31 sports across provincial, national and international levels. Inductive content analysis of responses to open-ended questions elucidated the notion of mental toughness as relating to: motivation level, coping skills, confidence maintenance, cognitive skill, discipline and goal directedness, competitiveness, possession of prerequisite mental and physical requirements, team unity, preparation skills, psychological hardiness and ethics. Reference to potentially dispositional themes included aspects of motivation such as perseverance, determination, sense of responsibility and commitment. The Coping category also incorporated themes relating to composure and adaptability. Competitiveness included ‘big game temperament’. Psychological hardiness included reference to ‘strong personality’. Sportspersons in this study regarded perseverance as the most important feature of mental toughness whilst coaches focussed on concentration. The authors felt that these characteristics could be learned or dispositional.

Durand-Bush & Salmela (2002) used a rigorous qualitative interviewing and thematic analysis process with 10 enduringly successful sportsmen and women who had won at least two gold medals at different Olympics or World Championships. These included

\(^{18}\) Thanks to Prof. Justus for providing a copy of this paper
six women and four men aged between 19 and 36 years of age. They represented three team sports (e.g. ice hockey) and seven individual sports (i.e. speed skating, wrestling, track, freestyle skiing, synchronized swimming, bobsledding, swimming). This study explored different phases in the individual’s career: sampling, specialization, investment and maintenance. The main personal characteristics identified by the competitors as relevant to performance at a high level pertained to self-confidence and motivation. These sportspeople were confident about their abilities to succeed and were motivated to train in order to become the best. These competitors trained many hours at high levels of intensity and with high expectations of themselves even in activities (such as weights training) that seemed remote from their chosen sport and which they did not enjoy. They had a high work ethic and saw themselves as self-driven to continuously improve. Perseverance, determination and mental toughness were all themes that emerged as was the impact of recovery. Specifically, these successful competitors developed strategies to allow themselves to recover mentally and physically from their intense training and competitions. According to many researchers, the importance of recovery cannot be underestimated. Perhaps in some cases, these recovery strategies include the cyclical disengagement evident in the stories of Bryceson & Herbert’s (1992) interviewees, or, alternatively, moderate the need for such cyclical disengagement. They also found that the ability to focus on a well targeted process (e.g. training) rather than outcome per se (i.e. winning) was central to sporting success. A final factor, particularly once elite status had been reached, was the need to be creative, open-minded and innovative to ‘keep an edge over [their] competitors’. This is one of the few studies that have explored the changing role of personality once elite status has been reached. However, little theoretical
weight has been brought to bear on these data – it remains descriptive. Some terms remain ill-defined and how they fit together is unclear.

Jones, Hanton & Connaughton (2002) undertook a three stage process of investigation with 10 international sportspeople (3 women, 7 men) from a range of individual and team sports to define 'mental toughness'. These stages included a focus group followed by individual interviews and subsequent ranking and rating process of emerging themes (see Table 1.3 below). The definition that emerged was:

'Mental toughness is having the natural or developed psychological edge that enables you to:
- Generally, cope better than your opponents with the many demands (competition, training, lifestyle) that sport places on a performer.
- Specifically, be more consistent and better than your opponents in remaining determined, focused, confident, and in control under pressure.'

This advantage over opponents, was considered to either be innate or developed over years of experience, and enabled the performer to have superior self-regulatory skills. Once again, this study broadens the scope of impact of personality to 'lifestyle' rather than competition and identified 'consistency' as a primary psychological weapon – by definition, a feature unique to traits. Perhaps this study also draws our attention to the importance of understanding the psychological meaning of events for individuals – to understand what 'pressure' translates to for individual sportmen and women. For most, pressure was associated with those events that were considered highly consequential (i.e. resulting in selection or non-selection) and/or highly distressing (i.e. training at high intensity for protracted periods). Elite sport is replete with potential examples.
Table 1.3: Mental toughness attributes and importance ratings as defined by Jones, Hanton & Connaughton (2002) (reproduced from Jones et.al., 2002)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Having an unshakable self-belief in your ability to achieve your competition goals</td>
<td>1</td>
</tr>
<tr>
<td>2. Having an unshakable self-belief that you possess unique qualities and abilities that Make you better than your opponents</td>
<td>3</td>
</tr>
<tr>
<td>3. Having an insatiable desire and internalized motives to succeed</td>
<td>4=</td>
</tr>
<tr>
<td>4. Bouncing back from performance setbacks as a result of increased determination</td>
<td>2</td>
</tr>
<tr>
<td>5. Thriving on the pressure of competition</td>
<td>9=</td>
</tr>
<tr>
<td>6. Accepting that competition is inevitable and knowing that you can cope with it</td>
<td>8</td>
</tr>
<tr>
<td>7. Not being adversely affected by others' good and bad performances</td>
<td>9=</td>
</tr>
<tr>
<td>8. Remaining fully focused in the face of personal life distraction</td>
<td>11</td>
</tr>
<tr>
<td>9. Switching a sport focus on and off as required</td>
<td>12</td>
</tr>
<tr>
<td>10. Remaining fully focussed on the task at hand in the face of competition specific distractions</td>
<td>4=</td>
</tr>
<tr>
<td>11/ Pushing back the boundaries of physical and emotional pain, while still maintaining technique and effort under distress (in training and competition)</td>
<td>7</td>
</tr>
<tr>
<td>12. regaining psychological control following unexpected, uncontrollable events (competition-specific)</td>
<td>6</td>
</tr>
</tbody>
</table>

Gould, Dieffenbach & Moffett (2002) are unique amongst the studies in this review in their integration of qualitative and quantitative methods. They interviewed and tested 10 U.S. Olympic champions (winners of 32 Olympic medals), and their coaches ($n = 10$) and a parent, guardian, or significant other ($n = 10$) in a unique attempt to gauge a fuller multi-perspective appreciation of the psychological characteristics of the elite performer. Psychometric assessments revealed low mean levels of sport-related trait anxiety (Sport Anxiety Scale; Smith, Smoll & Schutz, 1990), high mean levels of adaptive perfectionism (Frost, Marten, Lahart & Rosenblate, 1990), dispositional optimism (Life Orientation Test (LOT-R); Scheier, Carver & Bridges, 1994), positivity/hope (The Adult Trait Hope Scale; Snyder et al., 1999), task orientation (Duda, 1989) and confidence in coping abilities (Athletic Coping Skills ACSI-28; Smith & Christensen, 1995). However, it is noteworthy that there were considerable ranges on scores for anxiety and perfectionism even in this small sample and also that Gould et al. (2002) did not use a profiling
instrument but rather a combination of tools that have some conceptual overlap. Nevertheless, categories emerging from thematic analysis of their interview data supported the quantitative findings, suggesting an array of psychological characteristics as relevant to performance. These are summarized in Figure 1.2 (reproduced from Gould et al., 2002): Despite the existence of a notional personality category, other categories also subsumed personality-like characteristics.

All 30 interviewees identified influential personality traits in these Olympic sportspeople. The most frequently identified higher-order themes related to being optimistic and positive (83.3%) and having healthy psychological characteristics (63.3%). The latter, cited by 4 athletes, 7 parents/siblings/significant others, and 8 coaches corresponded to having patience, pride, a sense of responsibility, a sense of humor, being serious, being well-rounded, being humble, independent, courageous, emotionally even, and calm. Eight sportspeople and 14 other respondents also indicated traits of perseverance, resilience and persistence which was summarized as mental toughness. Emotional responses encapsulated themes such as passion for one's sport. Emotionally guarded or quiet was comprised of categories such as introvert and quiet or shy. Interestingly, only one sportsperson self-identified as 'quiet' while five parents/siblings/significant others and six coaches made statements indicating that they felt the athlete was emotionally guarded or quiet. One sportsperson identified herself as headstrong and self-centred as did 2 significant others, and 1 coach. A sense of general, overall confidence in multiple areas of one's life was identified by 2 sportspeople, 2 significant others, and 1 coach, and was differentiated from a more selective sense of confidence in relation to sport.
Figure 1.2: Mental toughness as defined by Gould, Dieffenbach & Moffett (2002)
Competitiveness was cited by 8 sportspeople, 6 significant others, and 5 coaches and was encapsulated in responses such as ‘competitive spirit’, ‘fighter’, and ‘didn’t give up’. The ability to handle adversity and pressure related, in this study, to a capacity to deal with routine setbacks and anxiety associated with training and competing in elite levels of competition. Psychological characteristics to overcome was a somewhat related category focusing on how sportspeople dealt with adverse situations, but related more to having the personality characteristics and psychological capacity to handle extreme stress and adversity involving long-term illness, loss of sense of self, of having a sense of self only tied to sport. These sportspeople also reportedly had good morals or sense of sportsmanship (cited by 1 athlete, 2 significant others, and 2 coaches), self-awareness (cited by 5 athletes and 3 coaches), and a sense of balance between sport and life (cited by 1 significant other). Intelligence was a higher-order theme and a corresponding sub theme cited by 2 athletes, 3 significant others, and 2 coaches, though is generally considered to be misclassified as a personality construct (Ackerman & Heggestadt, 1997) and will not be considered as one in the current study. Eleven respondents (but no sportspeople) indicated a personable nature which was categorized as ‘Good with people/nice person’ and may overlap with Eysenck’s extraversion trait. The remaining themes seem less relevant to the current study. The importance of Gould et al.’s (2002) study, beyond the particular traits and the developmental trajectory identified, lies in (i) the overlap but also differences in which elements of self are salient for the individual in sport and non-sporting contexts; and (ii) which traits are salient for, or perhaps knowable to, the sportsperson themselves as compared with those closely involved in their lives.
Middleton, Marsh, Martin, Richards & Perry (2004) interviewed 33 elite sportspeople (of whom 15 had achieved an Olympic gold medal or world record), with a view to defining mental toughness. They also interviewed elite coaches. Sports represented included track and field, hockey, boxing, rowing, archery, basketball, mountain climbing, marathon, rugby, AFL, baseball, cricket, cycling, water polo, squash, netball and triathlon. They concluded that mental toughness seemed to relate to the ability to overcome adversity. Moreover, that this required self-efficacy, task specific attention, perseverance, belief in your own potential, task familiarity, task value, goal commitment, positivity, stress minimisation and positive comparison with others. They went beyond the descriptive level of Jones, Hanton & Connaughton (2002) in an attempt to link each separate emergent construct to pre-existing literature but still no theoretical structure resulted and no consideration was given to the likely interactive (configural) nature of key traits.

In sum, these studies have highlighted the diversity of personalities amongst elite sportspeople as well as some degree of convergence, in the qualitative tradition at least, around the concept of mental toughness as well as the personality processes that play a role in achieving this highly regarded form of stress endurance. However, as Carlstedt (2004a,b) has pointed out, this term is now so ‘loaded’ in both sporting literature and practice, as to be meaningless without further clarification and operationalisation. From the research reviewed, and from re-analysis of Bryceson & Herbert’s (1992) interview data, there seem to be two forms of mental toughness, one underpinned by a strong achievement striving as described by Gould et al., (2002) (hereafter, Type I) and one by adaptive expression of psychological vulnerabilities as described by Apitzsch (1995)
(hereafter, Type II). However, traits such as anxiety, and openness to experience, have also been highlighted and seem inconsistent with the idea of mental toughness. In addition to these structural incompatibilities, the singularity of focus housed in the notion of mental toughness in these studies, stands in stark contrast to the complex lives of many of the elite sportspeople in Bryceson & Herbert’s (1992) study (cf. engagement-disengagement-re-engagement) and in apparent contrast to the vulnerabilities revealed in some of the quantitative profiling efforts (e.g. Geron at al., 1986; Hardman, 1973). This tension will be illuminated and elucidated in the synthesis to follow.

**Synthesis**

This synthesis will draw together the knowledge reviewed to date to lead us one step closer to a heuristic framework for considering the role of personality in elite sport. Before such a framework can achieve adequate definition, there needs to be: (i) clearer conceptual operationalisation of mental toughness, and (ii) resolution of how mental toughness relates to salient traits that sit in apparent opposition to it (structural issues), including how the notion of mental toughness can accommodate the observation of periodic disengagement of athletes from their sport (personality process related issues).

**Mental toughness, hardness and vulnerability**

**Mental toughness: two pathways**

89
If mental toughness is taken to be the holy grail of the psychology of Olympic success, then all contributors to this conversation seem to be in agreement that it is a multidimensional, supra-ordinate (overarching) construct, yet one whose constituent traits and processes, are still unclear. It seems to mean quite different things to different people. Personality or disposition is the highest (most abstract) level of description of the construct, although for most researchers, it incorporates both trait-, and state-based, intrinsic and learned, elements. In almost all instances in the research literature, it is discussed as persistence or endurance in response to the inherent pressures associated with the elite sporting context, and in response to adversity.

In many cases this endurance is underpinned by a single-minded striving to fulfil individual potential, an absolute commitment to a goal, an achievement striving. Apitzsch’s (1995) study, located, uniquely, in a psychodynamic frame of reference, enriches the picture by suggesting an alternative pathway to mental toughness. He suggests that mental toughness may not always reflect a picture of uncomplicated psychological health, or the absence of vulnerabilities. Rather it may reflect the successful, adaptive, management or expression of those vulnerabilities. Moreover, he suggests that such expression and management may not always be conscious, but rather ingrained responses (personality processes) to core elements of personality. He suggests that perhaps such dispositional vulnerabilities, conscious or otherwise, in the presence of physical gifts, find succour in expression or resolution through sport. This picture resonates with those quantitative studies that also identified in elite sportspeople, psychological vulnerabilities in the form of pathological traits or extreme personality
expression (e.g. Geron et al., 1986; Pain & Barsch, 2000). It also resonates with an early view held by Cattell (1944) that ‘An inferiority complex, wedded to a great talent, may drive a man to unstable pinnacles of genius’ (p.162). Apitzsch’s (1995) view, however, is that all traits (personality structures) and defense mechanisms (personality processes) have both adaptive and maladaptive potential; that it is the extremity of the situation relative to the individual’s dispositional capabilities, that determines which endpoint is manifest. Thus, in all studies in the current review then, mental toughness is associated with single-mindedness in fending off threats to one’s goal of Olympic success, of being driven to succeed, at all costs in some cases. Yet, it may be associated with either achievement striving (Type I) or adaptive expression of psychological vulnerabilities through the commitment to harnessing physical gifts in the sporting arena (Type II).

Mental toughness and hardiness: Opposing traits?

In many studies there is also a notion of openness to experience amongst exceptional performers (e.g. openness (Aidman, 2000), surgency (Hardman, 1973), venturesomeness (Kroll & Crenshaw, 1970)) which seems in some ways to run counter to the idea of toughness or single-mindedness, which has inherent in it a sense of stress endurance, of defending oneself or restricting options, of discipline and coping (Fourie & Potgeiter, 2001), determination, focus and control under pressure (Jones et al., 2002), perseverance, resilience and persistence (Gould et al., 2002), of maintaining an edge over others (Durand-Bush & Salmela, 2002), of seeking control over all potential sources of threat. Interestingly, the construct of openness has also often been thematically separated from
mental toughness in qualitative studies (e.g. Gould, et al., 2002) and seems more akin to the construct of hardiness discussed in relation to Bryceson & Herbert’s (1992) interviewees.

Thus mental toughness and hardiness may themselves be different pathways to sporting success. In further defining and distinguishing mental toughness and hardiness, it is perhaps helpful to conceptually deconstruct the notion of hardiness (since mental toughness has been explored extensively in this review) and also to look at two characteristics that have been linked thematically with both constructs, specifically resilience and optimism.

**Hardiness**

Kobasa & Maddi (1977) identified hardiness as an operationalisation of the notion of existential courage or growth seeking within the existentialist tradition. Maddi (2004) emphasizes that hardy individuals see life as a continual series of decisions in which we decide to choose ‘a future, unfamiliar path, or repeat a past, familiar path’ (p.279). The former, she suggests, is preferred by hardy individuals, but brings uncertainty and the possibility of failure, and hence requires courage. As discussed earlier, Kosaka (1996) emphasizes that it is not merely stress endurance, ‘but the power to cultivate one’s way under difficult conditions… Not like a reckless attack, but an ability to understand conditions around oneself, an ability to self-decision’ (p.35). It is perhaps in the power to cultivate one’s way under difficult conditions that hardiness shares some features with
mental toughness and how they both share a connection with the construct of resilience. Hardiness is further defined (and measured) as a personality trait encompassing challenge, commitment and a sense of control over one’s life (Kobasa & Maddi, 1977). Each of these constituent traits will be considered in turn along with the traits of resilience and optimism.

**Constituent traits: Challenge, Control, Commitment, Resilience, Optimism**

The hypothesised, differential relationships of hardiness and mental toughness, to proposed constituent traits of optimism, resilience, control, challenge and commitment, are summarised in Table 1.4 in an attempt to provide signposts for the discussion that follows. In this discussion, the relationship of each constituent trait to hardiness and mental toughness will be further explored to support clearer operationalisation of each construct. While the distinctions in Table 1.4 are somewhat gross representations of these relationships, they are intended to highlight the central points of difference.
Table 1.4. The proposed differential contribution of challenge, control, commitment, resilience and optimism to hardiness and mental toughness.

<table>
<thead>
<tr>
<th></th>
<th>Hardiness</th>
<th>Mental toughness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Achievement striving (Type I)</td>
<td>Adaptive vulnerability (Type II)</td>
</tr>
<tr>
<td><strong>Challenge</strong></td>
<td>Change is an opportunity – embrace it</td>
<td>Change is necessary – persist</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td>Perception (locus) of control</td>
<td>Perception of control (realistic or unrealistic) and/or desire for control</td>
</tr>
<tr>
<td><strong>Commitment</strong></td>
<td>Full engagement</td>
<td>Determined and/or driven</td>
</tr>
<tr>
<td></td>
<td>Task orientation</td>
<td>Task or Ego orientation</td>
</tr>
<tr>
<td><strong>Resilience</strong></td>
<td>Yes.</td>
<td>Yes.</td>
</tr>
<tr>
<td></td>
<td>Stress appraisal: Realistic but ‘All experiences are valuable’</td>
<td>Stress appraisal: Denial or exaggeration</td>
</tr>
<tr>
<td></td>
<td>Stress-response: ‘I can cope when things don’t turn out as planned’</td>
<td>Stress-response: ‘I can beat this/them’, ‘I can cope, I will cope’</td>
</tr>
<tr>
<td><strong>Optimism</strong></td>
<td>Reality-based but positive outlook</td>
<td>May be realistic or unrealistic optimism or pessimism (a perceived need to overcome)</td>
</tr>
</tbody>
</table>

**Challenge**

Challenge, in the existentialist tradition that underpins the construct of hardiness, refers to a belief that change, rather than stability, characterises a fulfilled life. Thus, change is anticipated (or at least received) as an opportunity. This is likely to be associated with an optimistic outlook but one which is very reality based – it does not involve an unshakeable faith that ‘things are going well’, rather it accepts that sometimes things do not work out but seems to be defined by the adage ‘as one door closes another one opens’. Conversely, this embracing of change and growth is not so central in either form
of mental toughness elucidated in this review though the implicit expectation that change (improvement) is necessary is a key element of achievement striving (Type I). In mental toughness Type II, the adaptive expression of vulnerability, the focus is more on enduring the constantly increasing demands of sport, by minimising and managing risk.

Control

Both forms of mental toughness identified in the current study seem to be associated with a strong desire for control, to make success possible by controlling as many variables as is feasible. Hardiness is not. De Charms (1968) suggests that ‘man’s primary motivational propensity’ is the need to control his environment. The need for control has been found to be a relatively stable attribute (Burger & Solano, 1994) and is associated with psychological vulnerability in the form of anxiety and depression (Burger, 1987). Burger (1985), however, proposed that people with high desire for control also had higher aspiration levels, respond to challenges with increased effort, persist longer at difficult tasks and make outcome attributions that facilitate future achievement striving.

Hardiness, however, would seem to be linked more closely with an internal locus of control (Rotter, 1992) rather than a desire for control - hardy individuals tend to believe and act as if one can influence the course of events within reasonable limits and includes a sense of responsibility to do so (Maddi, 2004). However, hardy individuals may knowingly choose to give up control in the pursuit of new experiences (Maddi, 2004) – seeking control is not a primary motivation or driving force. Conversely, mental toughness may or may not be accompanied by an internal locus of control.
Commitment

In defining the construct of hardiness, Kosaka (1996) drew attention to a sense of commitment involving the tendency to engage oneself fully in life. This is perhaps the element of hardiness most evident in Bryceson & Herbert’s (1992) interview data and in the qualitative profiling studies reviewed to this point. Moreover, commitment in this sense refers to a sense of purpose (Kosaka, 1996). This sense of commitment may also accompany achievement-striving in sport particularly for those individuals who find inherent pleasure in playing their chosen sport. However, commitment in this sense is differentiable from obsessionality or even duty or obligation that emerged as driving forces for some of Bryceson & Herbert’s (1992) interviewees. These forms of commitment are more ‘other-referenced’ rather than self-referenced and seemed to be accompanied by considerable anxiety. Nicholls’ (1984) distinction between two types of goal orientation is perhaps helpful in unpicking these different forms of commitment—specifically, task orientation and ego orientation. These are considered to be stable by adulthood. A task orientation is aimed at achieving mastery, learning or perfecting a skill, and is akin to the commitment feature of hardiness, whereas an ego orientation to achievement is associated with other-referenced success, a preference for beating an opponent rather than achieving a personal best performance (Duda, 1989). The two proposed forms of mental toughness may be differently aligned with Nicholls’ goal orientations. In cases of mental toughness (Type I) underpinned by achievement striving, a task orientation is likely to predominate. However, mental toughness (Type II) that involves the expression of potential vulnerabilities such as anxiety may involve a greater
ego orientation since trait anxiety is renowned for engendering a focus on external threat and a hyper-sensitivity to others’ judgements (Mathews & MacLeod, 1994).

Resilience

Resilience is a ubiquitous term in the sporting literature and has been linked with both hardiness and mental toughness in this review. In this study, resilience will be considered as the dispositional ‘capacity for successful adaptation despite challenging or threatening circumstances and the development of competence under pervasive and/or extreme adversity’ (Masten, Best & Garmezy, 1990, p.27).

In the case of hardiness, adversity is considered just one of the many offerings of life. Resilience in this case is underpinned by openness to all experiences including those experienced as pressure or adversity – this forms part of a broader desire to embrace life. In the case of mental toughness however, adversity seems to trigger a form of resilience that reflects a more basic survival instinct.

Different facets of resilience also help distinguish between the two proposed types of mental toughness. Resilience may be underpinned by the persistent desire to seek success (Mental toughness: Type I) requiring that any perceived obstacles be nullified. It may also be underpinned by a desire to flee a perceived threat or even by moral obligation – both have the potential to be associated with mental toughness Type II. For example, a sportsperson living in chronically stressful circumstances and prone to depression may not be optimistic or hardy, yet may survive in sport due to a moral edict that says life is
all about suffering, and that suffering must be borne. In this sense, they could be said to be resilient, as it is defined above, and perhaps to be exhibiting mental toughness through adaptive expression of their psychological vulnerabilities - they keep moving forward.

Resilience may also be associated with denial or avoidance (behavioural, emotional or cognitive). Sportspeople who deny to themselves that their performances are slipping by minimising the import of particular performances, or by identifying reasons to explain away those performances, are able to continue, to bounce back from defeat. At least in the short term, they could be said to be exhibiting adaptive expression of potentially maladaptive tendencies.

Resilience, then, can be apparent at the level of stress appraisal, where an individual has a certain invulnerability to perceiving or appraising (and thus, experiencing) events as stressful. Resilience can also be evident at the level of stress responsiveness, that is, confidence in one’s ability to cope. Whether this is an evidence-based judgement or one informed by an optimistic style, may be less relevant in any given situation than whether this belief results in energising the individual to action. However, if, over the longer term, such actions repeatedly tend to have unsuccessful outcomes, this form of resilience may become counter-productive. The case of the sportsperson, who continues in their career despite a prolonged downward performance trajectory in the belief that they are just experiencing a slump, might be one such example. The very quality that has perhaps sustained their career then becomes a maladaptive force and perhaps no longer meets one
of the key elements of the definition of resilience, specifically ‘competence under pervasive and/or extreme adversity’ (Masten, Best & Garmezy, 1990, p.27)

Optimism

It may be helpful to think of optimism as an attitude existing before a particular event, and resilience as how that person might deal with the fall-out from a difficult event after it has occurred. Optimism is a disposition toward expecting a positive outcome in most situations (Scheier & Carver, 1985; Seligman, 2002) and to view bad events as external, transient and specific (Malinchoc, Offord & Colligan, 1995). However, in its extreme form, dispositional optimism may also involve positive illusions or unrealistic optimism (Taylor & Brown, 1988), manifesting in a high threshold for appraising a situation as stressful – this is the point at which optimism overlaps with the construct of resilience.

A measure of optimism such as the Life Orientation Test (Scheier, Carver & Bridges, 1994) includes items such as ‘I believe that every cloud has a silver lining’. Hardy individuals may share such a belief but may not. Hardiness is best represented by a realistic positive outlook, a belief that ‘I want to get the most out of life, even if it is sometimes anxiety provoking’ and ‘I can handle whatever life may throw at me’.

Mental toughness, in incorporating the notion of psychological defenses or defense mechanisms (Apitzsch, 1995), can accommodate optimism (and unrealistic optimism in particular), but defenses are also often about fighting against pessimistic (neurotic) prospects, or realistic but challenging prospects.
Summary

It is interesting to note that the constructs used to help differentiate hardiness and mental toughness are themselves not primary traits, that is, they are not amongst the lower-order traits commonly found on profiling tools, and rather, seemed in the preceding discussions themselves to be embedded in different constellations of traits, which in turn varied for different individuals (cf. discussion on multiple pathways to resilience). Cattell’s (Cattell & Eber, 1957, 1980) distinction between source and surface traits seem potentially helpful here. Source traits are considered to be the biological building blocks of personality, whilst surface traits are held to be more ‘superficial’, they ‘appear to go up and down together but in fact do not always vary together and do not necessarily have a common cause’ (Pervin, 1993, p.294). Optimism, resilience, challenge, commitment and control so defined, share this latter feature of surface traits, in that there is more than one pathway to each. However, on the basis of Bryceson & Herbert’s (1992) interviews and the qualitative profiling studies it seems that resilience, optimism, commitment, control and challenge are salient across all aspects of the elite sporting context from competition to training, to selection, winning and losing. Indeed, they seem to be particularly salient to survival in stressful situations, whatever the context. In this sense they seem anything but ‘superficial’, rather they are perhaps context responsive. In this thesis they will be referred to as emergent traits to differentiate them from surface traits and to reflect both their supraordinate status in the personality structure hierarchy and their configural
relatedness to constituent source traits. More specifically, they will be referred to as *emergent stress-salient traits*.

Cattell also differentiates *temperament traits* from *ability traits* and *dynamic traits*. Temperament traits subsume source and surface traits and relate to ‘the emotional life of the person and the stylistic quality of behaviour’ (Pervin, 1993, p.293). *Ability traits* refer to such constructs as intelligence and *dynamic traits* relate to ‘the striving, motivational life of the individual’ (Pervin, 1993, p.293). Hardiness and mental toughness share features of dynamic traits but in this study, as noted above, are proposed to be an emergent product of temperament traits, rather than a separate class of traits (such as intellectual abilities). Indeed in this thesis they are proposed to be the highest level of emergent trait, a feature captured in the label, *resultant traits*. That they share the energising feature of Cattell’s dynamic traits, suggests that perhaps *resultant motivational traits*, is an even more desirable label and so will be used in this study.

Hardiness and mental toughness, then, can be considered to reflect two possible personality pathways to exceptional achievement in the sporting domain. Both can be seen as ways of taking responsibility for performance, the former through an intrinsic motivation to keep progressing and embrace opportunity, the latter, to achieve, or to avoid the distress associated with failure, or more broadly, to channel and manage anxieties through physical commitment and purpose. Each provides a forward motion, an impetus for the elite sportsperson to continue on what is, by any measure, an arduous journey. Different sports, indeed different coaches (i.e. different environments), may have different demands that draw differently upon these motivational forces. Furthermore,
different individuals may be constrained by different biological source traits in the expression of either supraordinate trait.

**Psychological vulnerability in the absence of resilience**

There is still one remaining quandary emerging from the review of material to date. It is a personality pattern most clearly reflected in one of Apitzsch’s (1995) case studies and has also been encountered in the counseling context by this author. One of Apitzsch’s case studies was of a player whose coach considered him ‘one of the most talented players in the country’ (p.124) but whose level of anxiety only became problematic when he reached the highest level of sporting participation, when his exceptional talent seemed less exceptional. Interestingly, he is now identified by his team-mates as ‘the one who gives up in times of setback’ (p.124) despite rating himself very high in self-confidence and interpreting his anxiety in a facilitative way (‘you should be nervous before a match’). Apitzsch (1995) concludes that his optimistic style is now excessive and unrealistic and he has poor resilience. Given that hardiness and indeed mental toughness (as defined above) encompass resilience (albeit different forms of resilience), he would not meet the criteria for either. So, it seems that in this case, exceptional physical ability may have supported, or indeed, created, a latent vulnerability that became manifest only when this individual began competing at the highest level. At this level, an optimistic style may no longer reflect a reality-base, but may still be robust enough to survive for some time. Characterological vulnerabilities (in this case, anxiety, but it might also apply, for example, to obsessionality), may produce a degree of energized invulnerability to stress through defenses that deny the presence or significance of stressors. However, this
controlled vulnerability may compromise performance once at the elite level as described by Apitzsch (1995). Perhaps abilities or defense mechanisms, conscious or unconscious, that potentiate success by bypassing engagement with formative experiences of distress or personal reflection, prove to be a dispositional Achilles' heel when the individual finds themselves in exceptionally demanding circumstances, where ability and demands converge and the individual is forced to confront significant pressure in the absence of resilience. Proposed relationships between controlled vulnerability, mental toughness and hardiness are summarized in Table 1.5.

Table 1.5 *The proposed differential contribution of challenge, control, commitment, resilience and optimism to the supra-ordinate traits of hardiness, mental toughness and controlled vulnerability.*

<table>
<thead>
<tr>
<th></th>
<th>Hardiness</th>
<th>Mental toughness</th>
<th>Controlled vulnerability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Challenge</strong></td>
<td>Change is an opportunity</td>
<td>Change is a potential threat but may be necessary – proceed vigilantly</td>
<td>Change is a threat – hypervigilance is necessary or perhaps denial</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td>Perception of control</td>
<td>Perception of control or Desire for control</td>
<td>Desire for control</td>
</tr>
<tr>
<td><strong>Commitment</strong></td>
<td>Full engagement</td>
<td>Determined and/or driven</td>
<td>Conflicted commitment but may be quite driven. Ego orientation</td>
</tr>
<tr>
<td></td>
<td>Task orientation</td>
<td>Task or Ego orientation</td>
<td></td>
</tr>
<tr>
<td><strong>Resilience</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>Optimism</strong></td>
<td>Reality-based but positive outlook</td>
<td>Pessimism (need to overcome) or optimism - may be realistic or unrealistic</td>
<td>Pessimism (need to overcome) or unrealistic optimism</td>
</tr>
</tbody>
</table>
Mental toughness, hardiness, vulnerability and personality process:

Inter-individual differences and intra-individual difference

The cross-sectional nature of profiling studies might make it seem that hardiness, mental toughness and vulnerability are three entirely different (if not mutually exclusive) pathways to success, captured in different studies and reflecting purely individual differences between people. However, the interview studies reported in this review bring a different perspective, perhaps suggesting that, in addition to structural differences, for each individual there is an inherent tension, an intrinsic personality conflict between a tendency toward development and morphogenesis, and the need for stability and homeostasis in the face of potential chaos. It seems that for these elite performers, adaptation to stress is about developing a ‘goodness-of-fit’\(^{19}\) between predispositions and the demands of the environment (French, Rodgers & Cobb, 1974) – that is, a sustainable and productive balance between homeostasis and morphogenesis. Depending on the context, goodness-of-fit may be achieved through openness and fluidity of engagement (hardiness), single-minded achievement striving (mental toughness Type I), or even the management of vulnerability consciously or unconsciously (mental toughness Type II or controlled vulnerability). For example, being prepared to pursue continual improvement in sport, to extend oneself beyond one’s current level of expertise, may inherently require that the individual be prepared to accept a period of vulnerability (of discomfort in unfamiliar territory with little experience of potential setbacks and hence little resilience). This may be a functional, in fact, an enabling strategy in the early stages of the development of new skills (such as when one makes the transition from pre-elite to elite

\(^{19}\) Wherever the term ‘goodness-of-fit’ is used in this thesis, it will be used in the sense defined by French et al, (1974) - that is, referring to the degree of compatibility or complementarity between a person and their environment or life circumstances.
status) – it allows development beyond that experienced by most individuals. It perhaps becomes maladaptive when the associated avoidance strategies (such as denial or minimisation of threat) become part of an enduring, primary coping style.

The process of engagement, disengagement and re-engagement with sport may also be associated with an individual’s movement between these resultant motivational traits (hardiness, mental toughness and controlled vulnerability). Similarly, experience and maturation as an elite sportsperson may contribute to the development of different perspectives on the manageability of stress and a consequent shift in the balance between these three forces. Confronting new stressors may provide an opportunity for engagement with characteristics such as resilience. Similarly, the confidence that comes with success may free up the individual to respond to stressful circumstances in different ways that then become newly defined, or enhanced, features of the individual’s self-perception. The appraisal of stressors is also likely to change as part of this process.

THE PATHWAYS FRAMEWORK

In drawing the above conversation on hardiness, mental toughness and controlled vulnerability, into the broader circle of discussion regarding personality structure and process, a heuristic for understanding the complexities of personality has emerged and will be referred to as the pathways framework in the discussion to follow. It is noteworthy that this framework is derived from the coalescence of themes emerging from the process of synthesising a disparate research literature and broader public record (e.g. Bryceson &
Herbert’s (1992) & Heads & Armstrong’s (2000) interview data). Moreover, that to reconcile the observations emerging from the knowledge review, issues of personality structure and process needed to be considered contemporaneously. This is rarely done in studies of personality (Pervin, 1993). Usually, one vantage point is selected, but as evidenced in the preceding discussion of individual differences and intra-individual differences, this can only partially illuminate the issues at hand and may indeed be misleading in the same way that univariate studies of personality can be misleading (Kroll & Crenshaw, 1970) – both sources of variance need to be considered at once to best appreciate the experiences of the individual.

**Personality structure and process**

Taking each study reviewed up to this point as a pixel in a larger, yet to be completed picture, allows us to step outside of each individual research paradigm (i.e. qualitative and quantitative). Then salient structural and process elements of the personality of elite performers seem to emerge. I have summarised these elements in Figure 1.3 which provides a heuristic structure for the discussion to follow and a model to be evaluated in the ensuing series of studies. While this model incorporates the key features of Mellalieu’s (2003) sport stress model presented at the beginning of this review, personality is at the centre of the current framework, rather than at the periphery, informing other elements such as mood, situational appraisal and emotional response in a primary way. The central features of the current framework that enrich our appreciation of the role of personality in this stress-adaptation process, are: (i) a clearly
operationalised, tri-level, personality structure, (ii) identification of salient points of engagement of personality in the lives of elite sportspersons, (iii) descriptions of adaptational personality processes and resultant motivational processes, and finally, (iv) consideration of acute and chronic potential outcomes for the individual. Key theoretical considerations inherent in the framework include understandings of:

1. The diversity of the structure of personality in elite sportspersons, supporting the principle of equifinality. It is this particular feature of the model that has led to it being called the pathways framework,

2. Both personality structure and process as critical to understanding the role of dispositions in high achievement,

3. The motivational processes resulting from this interplay of traits contributing to the individual’s ability to adapt to a chronically stressful environment,

4. The responsiveness of personality to significant life contexts resulting in differences between personality as expressed in the sporting and non-sporting life contexts, and

5. The maturational processes inherent in healthy personality development in this highly significant life context.

Elements of the framework in Figure 1.3 are now defined and discussed in more detail in the order in which they are presented in the flowchart, from left to right. Given the appearance of points of engagement in more than one place in the framework, they are discussed where they first appear (i.e. following consideration of structural features of personality), so as not to disrupt the conceptual flow for the reader. Discussion of each element of the framework is followed by a discussion of the assumptions underlying this model.
Figure 1.3: Pathways of impact of personality for elite sportspeople
**Personality structure**

In the current framework, three structural, hierarchical, levels of personality are considered, specifically:

1. *Source traits* which, named after Cattell’s primary traits of the same name, are considered the primary, biologically constrained, building blocks of personality, the most fundamental (subordinate) level of personality structure,

2. *Emergent stress-salient traits*, are supra-ordinate to source traits and, as described earlier, are so named to differentiate them from the qualities associated with Cattell’s ‘surface traits’. Specifically, emergent traits are not considered ‘superficial’ or subject to situational vagaries, but rather are context-responsive and emerge (or are emergent from) the process of adaptation, specifically, through the engagement of particular constellations of source traits when the individual is confronted with a significant environmental context (see Points of Engagement in Figure 1.3). In effect, emergent traits are the resultant constellation of traits selected by the system as adaptive for its survival in a significant context. In the case of elite sport, these emergent traits seem specifically salient to adapting to stressors (both routine pressures and unexpected adversity) in the sporting context, but also, indeed, to broader contexts of chronic stress. On the basis of the previous literature review, salient stress-responsive emergent traits in the sporting context are hypothesised to include resilience, optimism, challenge, commitment and control.

3. *Resultant motivational traits*, are supra-ordinate to both source traits and emergent stress-salient traits in this framework. They are so named, once again, to differentiate
them from Cattell’s ‘dynamic traits’ due to the fact that motivational traits or forces in this model are considered to result from combinations of lower order traits (source traits and/or emergent stress-salient traits) rather than being a different type of individual difference variable (as per Cattell’s dynamic traits, which, in his theory of personality, are contrasted with ability traits and temperament traits). As the highest level of emergent trait proposed in this model, the term ‘resultant’ has been preferred to ‘emergent’ in this case. Moreover, these traits seem to be constituted of cumulative trait contributors that function to provide personal impetus or motivational energy, hence the term ‘motivational forces’.

The characteristics of each will be discussed in greater detail below.

Source traits

Diverse building blocks: There is a strong suggestion emerging from these studies, though far from a unanimous one, that there are a myriad of trait differences among sportspeople engaged in different sports at the highest level and amongst individuals in the same sport (e.g. introversion vs. extroversion). This is reflected in the model by the undetermined number of salient source traits indicated (Tn). Each study in this review that identified a definable elite sporting personality (mostly using Cattell’s 16PF), reported different combinations of successful source traits in their sample. Several factors have contributed to this:
1. Different studies have adopted different levels of explanation and exploration (e.g. surface vs. source traits in the 16PF, facet vs. domain scales in the NEO-FFI).

2. Different studies have used different measures. The MMPI for example, is a psychopathology-based personality measure while the NEO-FFI is a measure of healthy (or normal) personality (Kaplan & Saccuzzo, 2005).

3. Different studies have used different methodologies, some qualitative, some quantitative, each tradition asking different questions and approaching the search for answers in different ways (for example, inductively or deductively).

4. Different studies have explored different perspectives on trait interpretation. Some traits seem salient from the individual’s perspective, others less so, but are salient to significant others close to them (e.g. coaches or parents).

5. Different forms of data analysis have also been used. While all quantitative studies in this review have been chosen because of their use of multivariate methods, for example, not all have taken the extra step to evaluate the veracity of classification based on the statistically significant differences in personality revealed in their study. In qualitative studies, most profiling analyses have remained purely inductive, fewer have made the link between their findings and existing theory.

6. There is also, however, some evidence that some sports have greater homogeneity of personality amongst their participants than others (e.g. gymnastics vs martial arts, Kroll & Crenshaw, 1970) and even that there may be a cultural influence on the traits considered desirable by sportspeople and coaches (van Rossum & Gagne, 1994) which may of course, produce a self-fulfilling prophecy. Significantly, though, even
when they are team-mates, there is variability among elite sportspeople, as to the
traits they consider to be relevant (van Rossum, 1996).

In sum, in the course of more than 50 years, it is likely that if strong homogeneous
patterns existed there would have been a greater degree of research convergence on the
personality structure of the elite sportsperson. No specific traits have been
incontrovertibly demonstrated to be relevant to sporting achievement through replication.
As Eysenck, Nias and Cox (1982) have pointed out, and as remains the case, in the
research to date, there is no coherence in the identification, definition, comparison, or
measurement of traits. Moreover, exemplars of quite different trait constellations in
successful sportspeople are easy to find even amongst the few case studies presented
from Bryceson & Herbert’s (1992) study. The principle of equifinality, seems to be the
most supportable explanation of the data considered thus far. Even those studies that
found no differentiable profile for elite sportspersons can be seen as providing supporting
evidence for this hypothesis though they have been taken to mean that personality is an
unhelpful construct in understanding achievement. The principle of equifinality is
represented in the current framework by the conceptualisation of source traits as being
non-specified and grouped together, allowing the possibility of multiple interactions and
combinations and multiple levels of convergence. It is further represented by the
inclusion of an array of different emergent traits and motivational traits which will be
discussed below.
Sport traits: Even considering language differences in conversation relating to sport and to non-sporting life, it seems clear from Bryceson & Herbert’s (1992) studies and the qualitative interview studies reviewed, that some Olympians describe themselves in terms of one identity relating to sport and one relating to non-sporting life. For most, this sporting identity seems to draw upon traits already salient in non-sporting life, but also to engage traits that are specific only to the sporting context (or at least significantly more salient there). These sport-specific traits are identified as sport trait 1, sport trait 2... etc in Figure 1.3. They are included with non-sporting traits to represent their potentially interactive nature but are italicised to reflect the possibility that some may be entirely separate from non-sporting traits. Elite sport as a significant life context may draw heavily upon particular traits that may or may not also be called upon in non-sporting life.

Supra-ordinate constructs

On the basis of the evidence to date, it seems plausible that one of the most useful levels of explanation with regard to personality in elite sport is at a level of convergence beyond biologically based source traits. In Figure 1.3, two salient levels of coalescence are represented by emergent traits and their resultant motivational traits or forces. Each will be discussed in turn.

Emergent stress salient traits: Resilience, optimism, challenge, control, and commitment. The emergent traits identified in the pathways framework are unlike higher order traits in traditional trait theories in that they are not uniformly constituted in mutually exclusive
ways from source traits (cf. EPQ or NEO PI-R)(Pervin, 1993). Rather, this knowledge review has suggested that, for example, resilience may potentially result from different combinations of source traits in different individuals. It may be associated with a high threshold for interpreting events as stressful or with stress-responsiveness once a stressor has been identified. Exploring these more complex possibilities for personality has been put on the agenda in the discipline of Psychology more broadly (Matthews & Deary, 1998).

Motivational traits: mental toughness, hardiness and controlled vulnerability. Three primary supra-ordinate constructs identified to date that seem to provide forward impetus for the individual, are mental toughness, hardiness and controlled vulnerability. Mental toughness emerged most consistently from the review of existing research, but was variably defined and poorly differentiated from related constructs. In pursuing a conceptual refinement process in the current knowledge review and synthesis, and in drawing upon re-analysis of Bryceson & Herbert's (1992) interview data, mental toughness, hardiness and controlled vulnerability emerged as related, but, significantly, unique constructs, which may each serve motivational functions for each individual.

As with emergent traits, there is some evidence that these motivational traits may be constituted in different ways for different individuals. It seems from information presented in this review for example, that mental toughness can be constituted of (i) a strong disposition to achieve for its own sake (Type I) or (ii) adaptive expression of psychological vulnerability (Type II), for example, anxiety about failure, or even
aggression, moderated by extreme conscientiousness. Both may manifest in a resolve, a powerful determination and unshakeable orientation toward pursuit of a sporting goal.

Thus, in this model, personality exists as a complex, dynamic entity with supraordinate traits that have the potential to enhance motivational potential by adaptively and dynamically combining the influence of individual source traits and/or emergent traits. Each subordinate trait may be insufficiently powerful on its own to sustain motivation under conditions of stress.

Similarly, it is not proposed that these motivational traits have mutually exclusive constituents. For example, resilience is common to both mental toughness and hardiness and differentiates them both from controlled vulnerability. Further, these different combinations might be more salient in different contexts such as sport as opposed to non-sporting life or even training as opposed to competition, hence in Figure 1.3, they are grouped together in their relationship to other levels of personality structure and in terms of their points of engagement with life contexts. It is conceivable that mental toughness may dominate a particular individual’s enduring adaptation to the training environment whilst controlled vulnerability might be more evident during competition at the highest level, particularly on entry to the elite level. Stability might be seen in responses to these differing contexts across time, or there may be an ongoing tension between the two – adaptable personality processes, not just structures, may be a defining feature in understanding the role of personality at the highest level. Nevertheless, conceivably, the
fundamental building blocks; or *source traits*, would remain stable when measured by a profiling instrument.

*Points of Engagement.*

It is clear from the literature that the presence of stressors in the elite sporting environment is inevitable, indeed, perhaps integral, and that it is at these points that personality is most clearly engaged in the pursuit of sporting excellence. The sporting philosophy of continual improvement has at its core a belief that a state of satisfaction is undesirable – rather, individuals must continue to take on harder and harder challenges. The optimal amount of stress in the sporting environment then is a function of the individual’s personality, stage of sporting development and their ability to cope. The chronic nature of these experiences in sport, makes it likely that dispositional characteristics will be engaged in a significant way in responding to these events.

It is also increasingly clear from the literature, that for elite sportspeople, sport is their primary life context, demanding considerable time commitment and emotional commitment in addition to the more obvious physical commitment - the all-encompassing nature of the sporting endeavour for elite sportspeople, is represented in the current framework, both by (i) the multiple locations of *points of engagement* in Figure 1.3 and (ii) the diverse nature of those points of engagement represented (including features of both sporting and non-sporting life). Both are now discussed.
Location of points of engagement in the framework

The placement of *points of engagement* between source traits and emergent traits in Figure 1.3 is intended to illustrate the critical developmental role of sporting experiences in engaging personality, leading to the emergence of sport-relevant stress-salient traits and motivational forces. The placement of points of engagement after the supraordinate traits and before personality processes is intended to represent the fact that the particular traits brought to bear upon sporting (and indeed non-sporting) experiences influences what sense is made of those events (intermediate processes), the resultant motivational processes, and ultimately, outcomes for the individual.

*Nature of points of engagement*

From the studies reviewed, those circumstances where personality is hypothesised to be engaged by (or harnessed to) the sporting endeavour, are included in the model and are considered illustrative rather than exhaustive. It is notable that they extend well beyond the competition arena. Some are sport-specific (e.g. training), others relate to the wider life context (e.g. the effect of sport on personal relationships). This model also highlights the fact that, at the highest level, stressors are both positive and negative, both predictable pressures and unexpected adversity, and occur on-field and off. Such potential stressors engage personality as a comprehensive and complex adaptation device, firstly in appraising the cumulative demand and then in determining a response.
**Personality processes**

In addition to consideration of the structure of personality, this framework includes consideration of the ways in which traits might be engaged in the process of adapting to the demands of life. That is, there is a focus on personality process.

**Intermediate processes**

There is some consideration given in the model to the fundamental cognitive, affective and physiological processing mechanisms through which personality impact may occur – these have been termed intermediate processes. Where knowledge of particular processes has emerged from synthesis of the literature, these processes have been included in Figure 1.3 but are tentative and are beyond the scope of this thesis. The qualitative profiling studies and historical review (e.g. Mellalieu, 2003) have been most informative to date. Personality seems to effect how we perceive situations (what we attend to), how we appraise situations (as posing a threat or opportunity for growth), how we feel about situations, and how we might cope with those situations. Moreover, each of these processes seems to feed into the others. The order in which these processes occur, or the salience of particular elements of that process, are likely to be effected by the situation and by trait predispositions toward a particular mode of processing (e.g. cognitive, affective etc). These processes may be conscious or unconscious. Refinement of our understanding of these processes is likely to be progressed with detailed consideration of
the copious number of univariate and bivariate studies exploring trait anxiety. However, these intermediate processes are not the focus of this thesis.

**Resultant motivational processes**

It is perhaps in this element of the model that the voices of sportspeople in Bryceson & Herbert’s (1992) studies have illuminated the understanding of personality process most clearly and in a way that has not emerged from formal research. The elite sportspeople who have contributed to this review seem to be motivated by many things, in many ways but also to have variable motivation levels and direction at different times. Four main motivational patterns are hypothesised and are included in this framework. Three motivational patterns relate to a desire for stability but this may be achieved in different ways: through active or passive disengagement (amotivation) from sport (in Figure 1.3, *impetus & disengagement*, and *stasis and disengagement*, respectively) or through engagement in activities related to areas of sporting strength that are not too psychologically taxing, but rewarding (*stasis & engagement* in Figure 1.3). Two motivational patterns also potentially relate to a desire for growth: one through active disengagement with sport and engagement with non-sporting life (*impetus & disengagement* in Figure 1.3) and one through an unimpeded, unconflicted and active desire for engagement with sporting ambitions (*impetus & engagement* in Figure 1.3). This latter motivational pattern seemed most evident for sportspeople in Bryceson & Herbert’s (1992) study when they were nearing the peak of their career achievements, and thus was most salient for them in reflecting on their achievements. Closer analysis
however, suggested that many elite sportspeople cycled through these different levels of engagement throughout their elite careers but that there were individual differences in preference for homeostasis and change which affected how much of the time any particular motivational pattern was influential and/or what degree of risk there was likely to be of permanent disengagement from sport.

Outcomes

The final element of the model relates to outcomes of personality engagement in sport. These can be considered in terms of both life adaptation and sporting adaptation, each of which is hypothesised to have the potential to influence the other. The expectation is that different combinations of personality impact – including individual trait differences and resultant differences in processing of experiences - will result in differential outcomes, both acute and enduring. Outcomes in both sporting and non-sporting life seem to also feed back into the processing or meaning made of future situations (note the solid connectors and arrows in Figure 1.3 between outcomes and intermediate processes) representing a strong and directional relationship), to the events that one will expose themselves to (note the solid connectors and arrows in Figure 1.3 between outcomes and points of engagement representing a strong and directional relationship), even effecting the fundamental expression or relevance of traits if such outcomes are powerful or enduring enough (note the dashed connectors and arrows between outcomes and traits in Figure 1.3 representing the greater stability of these elements – they would require more persistent or extreme feedback to induce change).
Underlying assumptions

The above descriptions summarise the core structural and process elements depicted in the framework to date, but there are also encompassing issues that, while not necessarily visible on the model, are part of the underlying philosophy and as such have contributed significantly to development of the model in some way. These are now elaborated: first, the maturation of personality; secondly, the language of personality (and the impediment of sport-specific language in developing models of personality); thirdly, the concept of goodness-of-fit between personality and life contexts; fourthly, paradigmatic influence on research findings; and finally, issues associated with the translation of the pathways framework to individual profiles.

Maturation of personality: Bidirectionality of trait impact:

It is noteworthy in the pathways framework that traits both impact on experience and are, in turn, affected by experience, as described by Bryceson & Herbert’s (1992) interviewees and as evident in the qualitative profiling studies reviewed. This is represented by bidirectional arrows in Figure 1.3. Given the considerable evidence for the measurable stability of traits (Deary & Matthews, 1993), this requires some explanation and may be resolved by comparison with another individual difference variable, intelligence. According to Anderson’s (1992) theory, our intelligence does not change over the lifespan, it is remarkably stable, yet our knowledge grows incredibly through the
application of our intelligence. When we use knowledge free and knowledge laden measures of intelligence (e.g. Ravens Progressive Matrices and the Wechsler Intelligence Scales, respectively), these differences are readily apparent. Similarly, our personality may have genetic bases and constraints which remain stable over our life course, but through engagement with life, the potential offered by our traits becomes more richly defined and matured. In terms of measurement then, we might expect greater stability in the measurement of source traits. This is represented in Figure 1.3 by the least strong, dotted, lines from outcomes to source traits. However, were we to measure responses to certain significant life contexts we might find elements of personality expression particular to that setting - salient emergent traits and motivational forces - and we might see a noteworthy degree of change or maturation in these emergent traits over time if the person engaged significantly with one domain (such as spending a decade developing as an elite sportsperson). This is depicted in Figure 1.3 by the dashed line between outcomes and these emergent traits and motivational forces.

Thus, the pathways framework as depicted in Figure 1.3, supports the idea that there are likely to be both individual differences in personality and intra-individual maturation of personality over time. The degree of change captured in the measurement of personality is likely to be a function of the context-specificity of questionnaire items, the degree of engagement of the individual with a specific life domain (e.g. sport) and the targeted level of exploration of traits (i.e. by their very nature, source traits will be more fixed than emergent traits or motivational forces).
It seems likely that a considerable impediment to conceptual convergence in sport personality, is language. The qualitative and quantitative traditions in this area have their genesis in different aspects of the discipline of sport psychology and this is reflected in the terminology used to describe personality characteristics. The qualitative tradition is dominated by the notion of mental toughness, and descriptors like 'headstrong' and 'will to win' that have emerged from within the sporting domain. As noted by Middleton et al. (2004), there has been little attempt at discourse between the two traditions to reconcile research findings through terminological synthesis. In attempting to progress the study of personality in sport, such reconciliation is necessary. Middleton et al. (2004) identified several well established psychological constructs as being conceptually related to mental toughness. These included self-concept (Marsh & Shavelson, 1985), attentional control (Nideffer, 1978), self-determination motivation (Deci & Ryan, 1985), coping (Lazarus & Folkman, 1984), positivity (cf. Seligman's (2002) optimism) and mental self concept (belief in one’s mental strength). To further the rapprochement between the two traditions, constructs utilised in the studies summarised to this point, that are explicitly identified as traits or which have trait-like qualities have been inductively synthesised by this researcher on the basis of meaningful linguistic associations drawn from Costa & McCrae, (1992a, pp.47-49) and Matthews & Deary (1998) and have been summarised in clusters in Figure 1.4. Whilst still a lengthy list, this minimal level of data reduction is helpful in offering opportunities for discovery (Glass, McGaw & Smith, 1981) and is most informative at this point in highlighting:
1. The diversity of traits identified even after linguistic synthesis - each cluster represents a different personality construct (highlighted in bold typeface) whose constituent elements are defined by their similarity to each other and difference from other clusters;

2. The rich nuances of similar traits - most clusters encompass several related but different adjectives;

3. The existence of what could be considered polar opposite traits (identified by italics within each cluster) in individuals within this population;

4. The potential complexity of possible higher order traits. Mental toughness and hardiness were highlighted as a somewhat different constructs to reflect the suprordinate position accorded them; and

5. The salience of characteristics often associated with psychological vulnerability rather than toughness. Trait anxiety is a key example, as are descriptors such as 'paranoid tendencies', 'manipulative' and 'immature'.

In deference to the complexity of possible combinations of traits suggested by Bryceson & Herbert's (1992) interviewees, neither connecting nor directional links have been added between any of the clusters at this stage. Rather, Figure 1.4 is just a visual, lexical summary of postulated constructs that seem similar.
Figure 1.4: Traits purported to relate to sporting success as synthesized from the knowledge review & synthesis
Personality as a complex entity: An issue of goodness-of-fit

It is interesting to note that in almost all individual datasets, the identified traits are framed as overwhelmingly positive traits or as making positive (enabling) contributions to success, suggestive of some kind of strength rather than weakness. Yet when the evidence to date is taken together; there are clearly examples of potentially opposing tendencies in most clusters in Figure 1.4, each tendency independently presented as a positive trait within the context of a particular study. For example, both risk-taking and maintaining control are considered to be valuable traits in different studies. The literature also highlights a conflict between consistency, which seems to be a highly desired characteristic and flexibility, openness and creativity. There are three hypotheses that can accommodate this observation:

1. The first is that perhaps there is an optimum amount of a given trait. Each of the tendencies listed could be problematic in particular contexts or in extreme form. Being focussed or ‘driven’, for example, can become unhealthy obsessionality, yet few researchers have addressed this possibility. Gould et al. (2002) identified some traits with negative connotations such as being ‘manipulative’ but still there is no consideration of how such a trait functions or how it might potentiate other positive traits identified, such as ‘being good with people’.

2. The second hypothesis is that malleability in the process of application of personality, is the relevant level of investigation, a means to reconcile these apparently oppositional tendencies. The quarantining or channelling of moderately aggressive tendencies to the sporting domain, for example, may be a
functional environmental adaptation. Being able to switch relatively effortlessly between openness to learning new things and being focussed on overlearning required skills would seem to be an important facility. Those features which are relevant and/or salient on a given occasion may depend on the significant circumstance that is engaging the person(ality), or at least the psychological meaning attached to the circumstance. One study even identified the ability to ‘switch sport on and off' as a defining characteristic of mental toughness, perhaps a personality prerequisite for success (Jones, et al., 2002). That is, significant environments can effect the expression of personality and learning to adapt can be seen as an important maturational process.

3. The third hypothesis, already briefly discussed is that there are multiple pathways to success at the elite level. Apitzsch (1995) gets closest to this model suggesting that elite performers have quite different personalities and motivational styles and that all personalities will respond to stress in ways that emphasise both positive and negative attributes of that personality. He goes further to suggest that the impact of our personality may not always be within our awareness or our control, but may still be adaptive. In Figure 1.3 the elements defining these different pathways to sporting success are, at the highest level of abstraction, hardiness, mental toughness and controlled vulnerability. Each can lead to momentum in the pursuit of Olympic success.

In this review so far, hypotheses 2 & 3 have garnered most support and, as discussed earlier, need not be considered mutually exclusive possibilities – the latter focussing on
individual differences between people, the former also alluding to intra-individual, developmental (maturational), processes within the individual when engaged with a significant life context.

In the final analysis, it is plausible that, no matter what the structural origin, or process, the resultant motivational process for successful competitors represents a goodness-of-fit between the amount and direction of energy (impetus) available to the individual and the cumulative demands of the environment. The absence of energy, or amotivation, may result from excessive demands and result in passive disengagement for a time. Active disengagement may occur where there is adequate energy but the direction of that energy is away from the sporting context (perhaps in the form of active avoidance or active attraction to another life context for example a career opportunity). What may often be considered the optimal situation is one in which there is both energy and adaptive engagement with the sporting context. However, perhaps the notion of adaptation is of "balance" or goodness-of-fit, where approach and avoidance motivations are complementary, or even functional equivalents of different trait constellations, in providing opportunity for intense progress (engagement) as well as recovery & reflection (disengagement).

Paradigmatic influence

The thematically neat division in cumulative findings between studies adopting different methodologies warrants reflection on the significant effects of method and paradigm on
what is measured and what sense is made of the data. When considering personality structure, the quantitative profiling approach has traditionally interpreted non-significant differences between groups as disconfirming of the importance of personality in elite sport, the qualitative profiling tradition has seen complex findings as something requiring further refinement. Neither approach has seen complexity as perhaps the important reality to be grappled with. The principle of equifinality seems to provide a more helpful framework that accommodates both sets of findings.

Similarly, each methodological tradition has (often implicit) underlying assumptions relating to the nature of personality process in elite sportswomen and men. The quantitative tradition is underpinned by a belief that one’s general personality drives sporting achievement. This is revealed in the use of general personality questionnaires for profiling. Despite many other sport-specific inventories being developed to measure such things as pre-competition mood and attentional style, and a number of measures designed to assess individual dispositional constructs in isolation, no sport-specific personality profiling tool has been developed (Morris, 2004).

Qualitative studies have been predicated on quite a different model that assumes relevant personality traits will be specific to the sporting domain. Interview questions are generally contextualised within the sporting frame and terminology used and themes generated are also often specific to sport. Both models may have something to offer when considered in concert. Yet only one study (Gould et al., 2002) combined qualitative and quantitative methodologies with the same sample. Planned triangulation of qualitative
and quantitative data with the same sample offers the most robust complementary, confirmational, possibilities (Dunn, 1994; Tashakkori & Teddlie, 1998; Tenenbaum & Bar-Eli, 1992).

**Individual profiles**

Taken together, consideration of the unique combination of each element of the *pathways framework* has the potential to provide a more comprehensive psychological profile for an individual sportsperson, than a traditional personality test alone. Specifically, assessment of each of the elements of the *pathways framework*, will produce a profile that captures many interwoven sources of inter- and intra-individual difference including:

- The significant presence or activation of particular traits or predispositions,
- The degree of overlap (or conflict) between sporting life and general life and the personality elements drawn upon in each context,
- The number and nature of significant impact points or contexts that tax or challenge the person(ality),
- What events give primacy to, or draws most heavily upon a single trait, for a given individual,
- The relative, absolute and cumulative number and strength of positive and negative sporting outcomes,
- The primacy of particular emergent traits or motivational traits for an individual, and
- The characterological growth and maturation of an individual over time.
The possibility of developing such comprehensive (multivariate), standardised, evidence-based, individual profiles would fill a gap in current practice in elite sport psychology (Aidman, 2004; Carlstedt, 2004b).

**Conclusion**

While this inductively developed framework is not yet fully enunciated, this is as far as it can progress until supporting questions are asked and answers sought. Its ability to pull together core elements of the disparate sport personality literature in a parsimonious way provides sufficient encouragement to take the next step – development through theory triangulation (Patton, 1990). Exploring the compatibility of this framework with existing models of personality from the parent discipline is begun below.

**MODERN PERSONALITY RESEARCH**

**Trait psychology: The Big 5**

In the past 10 years, psychology’s investigation of personality has increasingly converged upon Costa & McCrae’s (1993) five factor model, sometimes referred to as ‘The Big 5’. Costa & McCrae (1993) popularised the five factor model of personality through extensive research and validation. They, and others (see Deary & Matthews, 1993; Matthews & Deary, 1998), argued persuasively for the existence of these five core
personality traits through lexical analysis of characterological adjectives and subsequent factor (re)analysis of many data sets associated with other scientific theories of personality. They concluded that the many hundreds of traits proposed by researchers could be parsimoniously categorised as variations on 5 key traits: Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness (sometimes rearranged to the acronym OCEAN). The Big 5 are routinely measured using their 240 item questionnaire, the NEO PI-R (nee-o-pee-aye-ar)(Costa & McCrae (1992a) which was constructed and validated using rational\(^{20}\) and factor analytic approaches. The elements of the Big 5 model salient for evaluating the pathways framework are now discussed.

\textit{Levels of interpretation: Bandwidth}

Costa & McCrae (1992) acknowledge that there is diversity within the Big 5 traits, and that different ‘bandwidths’, or levels of abstraction, could be fruitfully interpreted. For instance, Costa & McCrae (1992) added 30 facet scales (see Table 3) ‘chosen to represent constructs …that embody important distinctions within each of the five domains’ (p.39). This idea is compatible with the multiple levels of explanation incorporated into the pathways framework however does not extend to the possibility of different combinations of these traits coalescing to manifest as the same emergent trait in different individuals.

\(^{20}\)Rational methods of scale construction will be discussed more fully in the Method section of this thesis.
A search of the Psychlit database for 2000-2004 indicated more than 800 studies using the NEO-PI-R or the shorter NEO-FFI (NEO Five Factor Inventory), with the vast majority using only the five primary factors. This is despite Plomin, DeFries, McClearn & Rutter (1997) encouraging researchers to utilise the facet scales in recognition of the diversity of traits within the Big 5. The ongoing debate about appropriate levels of analysis are reminiscent of the credulous-skeptical debate in sport personology discussed earlier but the centrality of the Big 5 to personality research is indisputable.

**Relevant Traits**

Encouragingly, the NEO traits and facet scales seem to be recognisable in the traits that have emerged so far from this review as being potentially relevant for elite sporting success (see Table 1.6 – Note: this is not intended to be a definitive list, rather an indication of possible relationships). The NEO PI-R also takes a comprehensive, multivariate approach to profiling which is consistent with the philosophy underpinning the pathways framework. Promisingly, as reported earlier, two studies have recently utilised the NEO-FFI to successfully differentiate achievement amongst elite sportspeople (Aidman & Bekerman, 2001; Koo, 2003).
<table>
<thead>
<tr>
<th>NEO PI-R Big Five Dimension</th>
<th>NEO PI-R Facet Scale</th>
<th>NEO PI-R Facet description/ Tendencies (Costa &amp; McCrae, 1992)</th>
<th>Clusters of traits from the knowledge review of elite sportpersonology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuroticism</td>
<td>Anxiety</td>
<td>Apprehensive, fearful</td>
<td>Anxiety</td>
</tr>
<tr>
<td></td>
<td>Hostility</td>
<td>Anger</td>
<td>Oppositional, defiant</td>
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<tr>
<td></td>
<td>Depression</td>
<td>Guilt, sadness, hopelessness</td>
<td>Suicidal</td>
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<tr>
<td></td>
<td>Self-consciousness</td>
<td>Shame and embarrassment</td>
<td>Self-absorbed</td>
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<tr>
<td></td>
<td>Impulsiveness</td>
<td>Inability to control cravings</td>
<td>Excitable</td>
</tr>
<tr>
<td></td>
<td>Vulnerability</td>
<td>Feel unable to cope with stress</td>
<td>Psychopathology</td>
</tr>
<tr>
<td>Extraversion</td>
<td>Warmth</td>
<td>Genuinely like people, form attachments</td>
<td>Good with people</td>
</tr>
<tr>
<td></td>
<td>Gregariousness</td>
<td>Prefer company of others</td>
<td>Group association</td>
</tr>
<tr>
<td></td>
<td>Assertiveness</td>
<td>Dominant, forceful</td>
<td>Headstrong</td>
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<tr>
<td></td>
<td>Activity</td>
<td>Sense of energy, rapid tempo</td>
<td>Initiative</td>
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<tr>
<td></td>
<td>Excitement Seeking</td>
<td>Crave excitement &amp; stimulation</td>
<td>Insatiable desire</td>
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<td></td>
<td>Positive Emotion</td>
<td>Experiences joy, happiness</td>
<td>Passion</td>
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<td>Openness</td>
<td>Fantasy</td>
<td>Vivid imagination</td>
<td>Openness</td>
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<tr>
<td></td>
<td>Aesthetics</td>
<td>Appreciation for art &amp; beauty</td>
<td>Pleasure seeking</td>
</tr>
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<td></td>
<td>Feelings</td>
<td>Receptivity to emotions</td>
<td>Sensation seeking</td>
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<tr>
<td></td>
<td>Actions</td>
<td>Willing to try different things</td>
<td>Challenge</td>
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<td></td>
<td>Ideas</td>
<td>Intellectual curiosity</td>
<td>Curiosity</td>
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<tr>
<td></td>
<td>Values</td>
<td>Readiness to examine values</td>
<td>Fairness</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>Trust</td>
<td>Believe others are honest</td>
<td>Paranoid tendencies</td>
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<td></td>
<td>Straightforwardness</td>
<td>Frank, sincere, ingenious</td>
<td>Honest</td>
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<td></td>
<td>Altruism</td>
<td>Active concern for others</td>
<td>Fairness</td>
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<td></td>
<td>Compliance</td>
<td>Defers to others</td>
<td>Rule-bound</td>
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<td></td>
<td>Modesty</td>
<td>Humble &amp; self-effacing</td>
<td>Humble</td>
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<tr>
<td></td>
<td>Tender-mindedness</td>
<td>Sympathy &amp; concern for others</td>
<td>Public spirited</td>
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<tr>
<td>Conscientiousness</td>
<td>Competence</td>
<td>Feels capable &amp; effective</td>
<td>Confidence</td>
</tr>
<tr>
<td></td>
<td>Order</td>
<td>Neat, tidy and well organised</td>
<td>Obsessional</td>
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<tr>
<td></td>
<td>Dutifulness</td>
<td>Moral obligations</td>
<td>Dutifulness</td>
</tr>
<tr>
<td></td>
<td>Achievement Striving</td>
<td>High aspirations and hard work</td>
<td>Achievement striving</td>
</tr>
<tr>
<td></td>
<td>Self-discipline</td>
<td>Carry tasks through to completion</td>
<td>Disciplined</td>
</tr>
<tr>
<td></td>
<td>Deliberation</td>
<td>Think carefully before acting</td>
<td>Perfectionism</td>
</tr>
</tbody>
</table>
Motivational forces and personality structure

The NEO-PI-R has been found to factor analyse sensibly with measures of needs and motivation (Costa & McCrae, 1992), specifically with Murray’s (1938) list of needs, when completed by college and adult samples. This is particularly interesting to note, in light of earlier discussion on the relative nature of motivation and personality, and also in light of the emergence of supraordinate traits from the knowledge review that seemed to represent motivational forces. Each of Murray’s (1938) needs had at least one substantial loading on one of the five factors and each factor was marked by at least three needs, leading Costa & McCrae (1992) to conclude that the NEO-PI traits and Murray’s needs ‘appear to tap a similar range and scope of individual differences’ (p.52). Individuals with high Neuroticism for example, worried about what others thought of them, had high dependence needs and high need for succour. Those with high Extroversion scores had needs for social affiliation, attention, and fun etc.

Stress-salient traits

It should be noted that the five emergent stress-salient traits in the pathways framework are in no way aligned with the Big 5 traits currently being discussed. The fact that there is the same number of traits in both models is purely coincidental. As discussed earlier for example, it is plausible that resilience in the pathways framework may involve anxiety
(Neuroticism in the case of the Big 5 scales) and mental toughness for some individuals, but for others it may be more closely aligned with openness to experience and hardiness.

Of interest to the current study however, is a finding by Hogan & Lesser (1996) that the Big 5 factors helped to identify which personnel were most suited to hazardous occupations pointing to the utility of the NEO PI-R in making distinctions between stress-resilience in individuals. Moreover, the relationship between traits and occupational type was non-linear. There were individuals both high and low on measures of conscientiousness and also on risk-taking suggesting once again, equifinality, multiple pathways to the same endpoint - of adaptation in stressful situations. This finding also suggests the utility of the NEO-PI R in making such distinctions. Such a finding augers well for using the NEO-PI R in the current research program.

**Exceptionality as an emergenic force**

The Big 5 approach draws heavily on the behaviour-genetics literature to support the argument for the relevance of universal trait personology. Largely the behaviour-genetics approach involves studies exploring genetic and environmental contributions to personality using large scale twin study methodology involving thousands of identical and fraternal twins. Results consistently support the stability of personality traits and their predictive relevance in a number of domains. However, perhaps the most relevant finding for the current study is that while high achievement runs in some families, genius is often an emergenic force, that is, a non-linear configuration of polymorphic genes (Lykken et
al., 1992). While additive familial effects can produce high achievement, emergenic traits are likely to be associated with exceptional achievement. Lykken et al., (1992) draw the comparison between two very different, but equally great leaders, Churchill and Gandhi, to note that ‘The recipes for leadership, like the recipes for cakes, seem likely to be configural, rather than additive’ (p.1571). Further that ‘genius of this caliber seems to be not just an abundance of one or several components such as IQ, but rather a harmony...a compound rather than merely a mixture’ (p.1573). Moreover, that such exceptional characters are irrepresible as illustrated by examples such as the great mathematician Ramanujan who was ‘reared in a one-room adobe hut...[with] two books, both in a foreign language’ (p1572). This view holds that personality is inherently harnessed to the service of talent development. Moreover, this line of evidence is consistent with the principle of equifinality and the notion of maturational processes contributing to achievement in a significant life domain. It suggests that understanding the unique contributors to emergent personality for each individual, may be more illuminating than looking for particular combinations of traits that will enable exceptionality in every instance.

Change and adaptation

The resurgence of interest in trait psychology has paralleled a renewed focus on the stability of personality across the lifespan. In response to the claim that traits do not reflect the interactionist approach to personality, Costa & McCrae (1994) counter that ‘In the course of 30 years most adults will have undergone radical changes in their life
structure...divorced, remarried... yet most will not have changed appreciably in their
standing on any of the 5 dimension’ (p.87) as rated by self or others, despite this
inventory containing more than 200 items. Perhaps this view is not problematic for the
study of elite sport because these individuals are by definition and by dint of purposive
sampling, not ‘most’ individuals, however, as mentioned earlier, any model utilised to
help understand elite sportspeople must, it seems, be able to accommodate changes to
their personality, or at least to accommodate stable differences in behaviour between the
sporting context and general life. More recently, Costa & McCrae (2002, see also Costa,
Herbst, McCrae & Siegler, 2000, McCrae, Costa et al., 2004) acknowledge that, on the
basis of the accumulated evidence of thousands of profiles, while traits are largely stable,
some personality changes do occur across the lifespan, particularly during adolescence.
Interestingly, adolescence is often the time that sportspeople make the transition from
pré-elite to elite status. Costa & McCrae (1994) hypothesise that changes in trait levels
are primarily governed by intrinsic, biologically based maturation. However, they
acknowledge that it is possible that historical, cultural, or environmental effects are also
influential. There is evidence to suggest that the transition to the elite sporting context
indeed has a profound effect on one element of self-perception, athletic identity (Brewer,
van Raalte & Linder, 1993; Murphy, Petitpas & Brewer, 1996). The comprehensiveness
of the lifestyle change involved in this transition constitutes a major life event. Miller &
Kerr (2002) go further to suggest that ‘It is clear ... that many high level athletes
compromise their identity development in order to pursue performance excellence’
(p.144).
Plomin et al., (1997) on the basis of an extensive behaviour-genetics literature, suggest that future personality research, more broadly, would benefit from investigating developmental change and continuity in personality as well as exploring personality in different situations and the role of personality in the interplay between nature and nurture. Unfortunately such exploration is beyond the Big 5 model when used in isolation, but is relevant for the current study. Costa and McCrae (1990) acknowledge that the five factor model is explicitly and intentionally not an explanatory model of personality. Instead, its purpose is to enunciate the structure of personality, not the process. In the absence of theory, Pervin (1993), and Eysenck (1991) before him, suggests that circularity is a risk where descriptions of behavioural regularities become explanations for regularities. In the current study, the Big 5 framework needs to be harnessed to a process model for a full appreciation of personality’s impact. Such a model will now be presented.

A person-centred approach to understanding personality process

Combining trait psychology with a more phenomenological approach to understanding personality, specifically, a person-centred approach, might prove fruitful in resolving some of the uncertainties and conflicting interpretations faced by elite sport personology. This framework emerged from the tradition of Carl Rogers’ (1951) person-centred therapeutic work. The elements of this framework salient for understanding the personality of exceptional sportspeople, and, more specifically, for evaluating the pathways framework are now discussed.
Sporting personality and life personality

Barrett-Lennard (2005), a former colleague of Rogers, has a contribution to make to the *pathways model* in terms of understanding the apparently different personas identified by elite sportspeople in the sporting and non-sporting contexts. He, and several other person-centred theorists (see Rowan & Cooper, 1999), propose that even in a well-functioning individual, there are multiple or manifold 'selves' that develop in each significant area of our life functioning. Barrett-Lennard (2003, 2005) calls these *contextual selves*, highlighting the core feature of their responsiveness to salient environments. He believes that we are inherently systemic creatures, responding to the core contexts in which we find ourselves. In this view, each 'self' may overlap to a degree but also exhibit quite significant differences and functions to allow us to explore our diverse potentials in a range of domains. Thus, the best fit of personal characteristics are brought to each significant domain in a consistent way, yet, healthy individuals also maintain a clear link between other elements of our personality across domains. Therapy may enable improved relations of the self-systems, to promote open dialogue between diverse selves and, most importantly, assist the individual to consider the relationship between specific contexts and the salience of certain elements of self (and determine how these characteristics be adaptive or maladaptive). Mearns and Thorne (2000) also propose that there are different 'configurations of self' – a 'myriad structure of interacting components' (p.102), and that these configurations are 'co-existing in a creative and self-protective conflict' (p.104). They suggest that each configuration may operate in the same or different environments,
but that all contribute together to the health of the individual. Linville (1987) also talks about 'self-complexity' as the 'number of aspects one uses to cognitively organise knowledge about the self and the degree of relatedness of those aspects' (p.97). He proposes that resilient individuals are those who have greater complexity in their self-description and less overlap between these personas. Some empirical research has indeed supported the idea that self-complex individuals are buffered against the general emotional effects of stress, that effects are more limited to the self domain related to the stress (Dixon & Baumeister, 1991; Linville, 1987; Showers, Abramson & Hogan, 1998). However, it is also possible that such engagement with multiple contexts may compromise levels of achievement in the first instance. Once again, it seems to be an issue of balance. Nevertheless, the concept of sporting and non-sporting personalities is supported by these theorists as being likely to be a central feature of adaptation and endurance in this highly stressful environment.

**Constellations of traits and maturational processes**

Barrett-Lennard (2005) and Mearns & Thorne (2000) also discuss the distinctive configural nature of contextual selves which is a notion that resonates with the hierarchical but dynamic view of supraordinate trait constellations in the pathways framework. Barrett-Lennard considers contextual selves to be dynamically active in maturing, reflecting a self-actualising tendency. However, he also suggests that traits associated with the person's core 'self' will be consistent enough across situations to be significantly correlated and will be slow to change in response to environmental
feedback. Nevertheless, significant environments might draw on particular constellations of those traits to create a somewhat different ‘contextual self’ (emergent traits).

_Self-actualisation and tension reduction_

Rogers’ person-centred model of personality is born of the view that humans have a single life motive which is to self-actualise ‘to grow, to develop, to realise its full potential’ (Rogers, 1986, p.127). Self-actualisation, as defined within this approach is somewhat different to Maslow’s notion of self-actualisation in that Rogers (1961) saw it as ‘a process, not a state of being. It is a direction, not a destination. It is not a state of virtue or contentment’ (p.186-187, italics added), but rather an approach to life. He considers the self-actualising tendency to be a universal life force, which, however, can be stifled by extremes of experience. The role of therapy then, is to facilitate the emergence and maturation of this tendency, of supporting the ‘self’ in its true expression. Additionally when events create a schism or point of conflict between our actual (perceived) self and our ideal self, therapy can facilitate the process of re-connection with the self, of supporting, what Rogers refers to as the ‘fully functioning person’ who is freed up from the constraints of an environment experienced as unsupportive.

Self-actualisation, then, is about attaining what is possible as laid down in our genetic code, it is a ‘biological pressure to fulfil the genetic blueprint’ (Maddi, 1996, p.106). This is a very trait-receptive position and a particularly relevant approach in considering the
nature of the elite sportsperson who is seeking continual improvement. It could be said, in some senses that elite sport offers a 'hot-housing' opportunity for self-actualisation. However, Barrett-Lennard (2003, p.28) points out that 'In my perspective [self-actualisation] exists side by side with another principle: a tendency toward homeostasis, balance and conservation' - when there is a high perceived threat, then homeostasis is preferred. While Rogers (1980) believed that self-actualisation was the sole, universal tendency, Barrett-Lennard's dualistic view would seem to explain the observations about the defensive stance associated with mental toughness for some individuals, and also speaks to the observations about cyclical disengagement emerging from Bryceson & Herbert's (1992) interviews. This idea is also captured in Mearns & Thorne's (2000) notion of 'not-for-growth' configurations of self. So, whilst the self-actualising tendency holds great potential for understanding and indeed, providing a framework for working with, elite sportspeople, so the competing, perhaps complementary, aspects of character that favour homeostasis are equally as instructive.

In Barrett-Lennard's (2003) view, 'specific motives or needs can be viewed as varied expressions of the impetus to grow or develop, learn, expand, transcend or the disposition to release tensions, to maintain or restore equilibrium, to heal or recover from damage, to preserve the organism of self intact' (p.28). Mearns & Thorne (2000) also propose that the 'not-for-growth' configurations may have been 'of crucial import in helping stabilise and define his existence, not to mention protecting him from other dangers' at various life stages (p.116). Thus, each must be valued. Once caught up in the life demands of being an elite sportsperson, many and continual forces insist that the individual confront these
competing tendencies. In the *pathways framework*, stasis and impetus, are both identified as outcomes of motivational processes. The person-centred frameworks of Barrett-Lennard (2005) and Mearns and Thorne (2000), emphasise the potentially adaptive function of both outcomes.

*Pressure, adversity and defense mechanisms*

Another feature of the *pathways framework* that finds support in the person-centred approach is the centrality of ongoing pressures, and experiences of adversity, in preparing an individual for high levels of achievement. Rogers’ theory of personality suggests that obstacles are a necessary part of the process of self-actualisation. However, Rogers also indicates that when the degree of challenge to the ‘self’ is too great, we use a range of defenses to minimise the threat. The anxious, emotionally taxed individual may cope by denying to awareness significant sensory and emotional experiences (e.g. distress) that are incongruous with the self-structure, in this case, that of ‘sportsperson’. Rationalisation may help to distort behaviour so that it is consistent, for example, by making external attributions of cause (e.g. “I am distressed because my coach has been unreasonable in his demands”). The purpose of therapy then, is to ‘free up’ the individual such that they experience congruence between their perceived self and ideal self. This includes the accepting of the multiple contextual selves or configurations discussed earlier. This view is consistent with the notion, underlying the *pathways framework*, of defense mechanisms being an Achilles’ heel for sportsmen and women once they reach the elite level. Therapy involves working with a client at the edge of his or her awareness, of ‘staying close to the
client's symbolisation' (Mearns & Thorne, 2000, p.103). That is, to work with their current level of sense-making as they reflect on problematic experiences such that their awareness can unfold at a pace that facilitates personal growth and self-direction. This is a very different kind of process to that associated with the directive, often didactic, mental skills approach to applied sport psychology, and offers new possibilities for the sports practitioner in facilitating both personal and sporting maturation with elite sportsmen and women.

**Intermediate personality processes: Translating traits to behaviour**

The Rogerian approach emphasises that the self affects what we attend to, process, remember, recall and access. These are the mechanisms through which we manage ourselves in the process of self-actualisation and map neatly onto the mechanisms in the *pathways framework* that emerged from the previous review (i.e. cognitive appraisal, mood, attention/concentration and coping responses).

**Application of the person-centred theory to the practice of sport psychology**

Seldman (2004) recently called for a person-centred approach to intervention with elite sportspeople, noting that mental skills training only 'scratches the surface for elite athletes' and that a more person-centred counseling orientation might be needed. Miller & Kerr’s (2002) recently proposed Athlete-Centred Model of performance excellence is
also built around some of the key ideas of the person-centred approach and grew out of a concern over the evidence of poor psychological outcomes for elite sportsmen and women (some of which have been discussed). The basic tenet of this model is that sport should contribute to the overall development of the individual: physically, psychologically, and socially, which is, essentially, a return to Coubertin's Olympism. Advocates believe that performance excellence is thus made truly possible only through personal excellence. Without that, the wellbeing and sporting success of the individual is thought to be compromised. From a practitioner's vantage point, personal excellence is only possible through the knowing of the individual's preferences and styles, including understanding their personality and how it impacts on their sport. Amongst other things, the Athlete-Centred Model advocates the development of independent, self-reliant individuals who take responsibility for their achievements, and in so doing develop resilience – a model consistent with the description in the *pathways framework*, of 'controlled vulnerability' (defined by a lack of resilience) being an Achilles' heel. It is predicated on a position that all sportspeople have their potential weaknesses or vulnerabilities. Miller & Kerr (2002) suggest that research should focus on whether elite competitors do in fact compromise some aspects of their development in the process of success or, whether sportspeople learn more about themselves and about life through sport than their non-athlete peers. Thus, there is a call back to more comprehensive profiling of athletes, not in an effort to identify their similarities, but their individuality or uniqueness. This model for practice seems to have the best fit with the evidence synthesized to date. It incorporates the notion of equifinality, the importance of considering the whole person - both their sport-specific and general personality.
Emphasis is also given to the developmental process throughout the lifecycle of the elite sportsperson. While this approach is not entirely drawn from the person-centred tradition, it’s key principles resonate with the person-centred model of therapy.

**Synthesis**

It seems that a rapprochement between the new trait psychology and Barrett-Lennard’s systemic person-centred approach to personality could prove productive in efforts to evaluate the merits of the *pathways framework*. No research to date has been undertaken in the elite sporting realm using the person-centred model although it seems particularly relevant. Both the Big 5 and person-centred approaches offer useful accounts of themes that have emerged throughout this review. The trait approach offers an opportunity to comprehensively explore those characteristics that are stable and enduring, whilst the person-centred account draws us toward a framework for exploring the difference between the sporting personality and life personality, and also to consider the role of stress and distress in fireproofing elite sportsmen and women.

**THE CURRENT STUDY: Exploring the *pathways framework***

It seems that while the search for the optimal sporting personality is long since dead (Vanek & Cratty, 1970), there is much still to know about how personality contributes to the exceptional achievements of our sporting greats. Moreover, when we open ourselves
up to the extensive but loosely woven tapestry of knowledge that addresses issues of personality, instead of a disappointing lack of findings, sport personology, and the sportsmen and women themselves have presented us with a multiplicity of findings that have found a point of coalescence in the *pathways framework* derived from this review. This framework has found some support in models of personality from the broader discipline of psychology and will now submit to further evaluation in a series of studies of Olympian personality.

**Level of exploration**

It is perhaps pertinent to begin with a statement about the level of exploration chosen for these studies. While that the preceding review took an inductive (bottom-up) approach to the development of a framework for considering the role of personality in the elite sporting environment, the studies to follow will adopt both a topographical (top-down, deductive) stance oriented by the *pathways* heuristic, whilst keeping an inductive eye to new themes. These studies will, in concert, allow exploration of the landscape of the *pathways framework*, the broad parameters and central features of the model rather than focussing on one specific question or circumstance. It is hoped that using a method of planned triangulation, or strong inference (Landers, 1983), will provide a more defined preliminary canvas for future investigations to explore.
A research taxonomy

In deciding how best to proceed, the myriad of methodological options considered in the review were brought to bear. The research taxonomy that follows in Figure 1.5 (across three pages) is an attempt to bring together each of the methodological considerations that have emerged from this lines-of-argument synthesis. The array of techniques adopted are visually summarised to highlight conceptual differences that have driven methodological decision making and also to point to pragmatic influences that permeate the field of research in this area. In sum, both conceptual and pragmatic considerations have affected the participants selected in individual studies, the performance and personality measures utilised, the research design chosen and finally the methods of analysis used to explore the data. As discussed throughout, each methodological choice has its strengths and limitations and so a multi-study, mixed methods approach was adopted in this dissertation. Those parameters highlighted (shaded in grey) in the research taxonomy were pursued in the current series of studies and the reasons for these choices are elucidated further in the chapters to follow. They are summarised at this point, to orient to the reader to what is to come in the context of what has already been presented.

Briefly, three studies contributed to this investigation, each addressing a different question pertaining to the substantiation of the pathways framework. Participants in each study are elite sportsmen and women, including a sample of more than 100 Olympians.
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Figure 1.5 Taxonomy of research parameters
Study 1: A longitudinal, archival study of traits and sporting exceptionality in 5000 elite Australian sportsmen and women

The purpose of Study 1 was to explore the range and nature of traits present in a large sample of elite Australian sportsmen and women. The pathways framework would suggest that we might see a diversity of traits in such a population, however, there is equivocal evidence in this regard as captured in the review of knowledge in this chapter. Study 1 is an archival study of more than 5000 elite sporting TAIS personality profiles gathered at the Australian Institute of Sport between 1983 and 1996 across more than 50 sporting disciplines. This series of analyses explored the utility of the TAIS profiling tool in differentiating participants across (i) sports, (ii) sport ‘types’, and (iii) levels of expertise. Given that the pathways framework is built upon the principle of equifinality, evidence of homogeneity of personality across such a large sample, were it to occur, has the potential to be a powerful disconfirmatory test of the efficacy of this model.

Study 2: Sporting personality and life personality amongst Olympic hockey champions

The purpose of Study 2 was primarily to explore proposed differences between sporting personality and life personality amongst very successful elite sportspeople. The study centred upon a sample of 58 exceptionally successful sportswomen, from the Australian Women’s Hockey squad. The complex interplay of personality traits in sporting success was explored through detailed profiling using the NEO PI-R, in conjunction with a sport-
specific version of this measure, developed specifically for the purpose of this study. Case studies were also considered, to enrich the analysis.

Study 3: Reflections of 65 Australian Olympians

The purpose of Study 3 was to compare quantitatively derived profiles with phenomenological accounts of personality in the same sample and in so doing also to explore in more detail the source traits, emergent traits and motivational traits as well as motivational processes proposed in the pathways framework. Study 3 involved profiling of 65 Olympians whose careers spanned Olympiads 1948-2004, and 22 Olympic disciplines. Interviews with a subsample of 20 Olympians provide a counterpoint to these profiles.

Design

Each of these three studies assessed achievement longitudinally and all used comprehensive profiling instruments. Each of the three studies triangulated both qualitative and quantitative methods and each was informed by participant observation. The combination of these methodologies is unique in the literature exploring exceptional sporting achievement.
Key foci and structure of this dissertation

It should be stated that the dataset elicited from the process of working with this unique sample of sportsmen and women has a richness and depth that was beyond expectations and it is envisaged that the process of analysis will be an ongoing, dynamic journey. However, in an effort to keep a manageable rein on the scope of this dissertation, assessing the primary elements, the main organising schema, of the *pathways framework*, set the parameters for this investigation. The key foci were:

1. Elucidating the nature and diversity of traits relevant in sporting success at the highest level
2. Exploring the relationship between sporting personality and life personality
3. Considering the nature and role of emergent, stress-salient traits and resultant motivational forces in sporting success
4. Exploring the nature and impact of stressors in the elite sporting environment
5. Developing outcome measures that adequately capture the complexities of sporting achievement

Finally, the structure of this thesis is as follows:

*Chapter 1* has set up the aims for this thesis, has reviewed relevant material using a line-of-argument synthesis approach. It has utilised this process of deep analysis and synthesis to develop a heuristic framework to guide the further exploration of the role of personality in exceptional sporting achievement.
Chapter 2 will discuss methodological issues, concepts and techniques pertinent to the whole program of research undertaken and to lead into subsequent chapters that will deal with the specific details of individual studies.

Chapter 3 reports the methods, findings and interpretive discussion (including limitations) for Study 1.

Chapter 4 reports the methods, findings and interpretive discussion (including limitations) for Study 2.

Chapter 5 reports the methods, findings and interpretive discussion (including limitations) for Study 3.

Chapter 6 brings together the findings from all three studies in a discussion of what they mean for the pathways framework and for the aims of this research program overall. This final chapter also considers directions for future research.

In extending the lines-of-argument approach used in this review, presentation of results from each study concludes with a cumulative synthesis of findings. This facilitates the emergence of a complex picture as it develops rather than summarising a myriad of findings as though they are independent, until reconciled in the final chapter. The final chapter can then go beyond these findings to greater exploration of their implications for research and practice.
CHAPTER 2

PRELIMINARY METHODOLOGICAL CONSIDERATIONS

This chapter addresses the principles underpinning all phases of this research program and introduces concepts and techniques that are common to more than one part of the investigation. The methodology specific to each of the three studies is then presented in concert with results and relevant discussion of those results. It should be noted, however, that in the qualitative tradition, there is less of a clear cut distinction between sections of this dissertation - the story is told in the most sense-making way (Patton, 1990). Thus, the comments included in this methodological discussion help set the interpretive framework for both the design of the project and the results that follow.

There were many choice points in the undertaking of this project. The methodological paths chosen necessarily exclude other relevant lines of investigation. It was decided to focus on longitudinal outcome data, to use comprehensive personality profiling tools, and to adopt a participant researcher methodology, so as to:

• Explore the personality traits prominent amongst elite sportspeople using a large scale archival, profiling database (Study 1);

• Develop a sport-specific personality profiling instrument to explore the proposed differences between sporting personality and life personality amongst very successful elite sportspeople (Study 2); and
• Compare quantitatively derived profiles with phenomenological accounts of personality in the same sample and in so doing to explore in more detail the structural and process elements of the proposed pathways framework (Study 3).

The rationale for prioritising these selections is provided below.

**Epistemological considerations**

In considering the strengths and frailties of past studies in the area of exceptional sporting achievement, particularly in considering the multiple incompatibilities that make cross-study comparison difficult, this research program adopted an integrated mixed methods approach (Patton, 1990; Tashakkori & Teddlie, 1998). The underlying principle of planned triangulation, is that converging evidence from considered, multiple and heterogeneous sources is more persuasive in the investigation of complex, socially embedded phenomenon, than a single, necessarily imperfect attempt at measurement or the opportunistic meta-analysis of unrelated studies with incompatible or ill-considered flaws (Patton, 1990). Planned triangulation can build on the strengths of each type of data collection and minimize the weaknesses, while evaluating how different perspectives on the topic of achievement resonate with one another. It can, arguably, be further enhanced by a participant observer methodology and associated consideration of ethnographic conversation. Gilbourne (2000) has suggested that reflections on practice, while not widely accepted in sporting publications are often 'fine moments. They serve to bring the ...author into focus... and offer insights into a reflective practitioner facing up to the
tensions between theory-driven and reality-driven practice' (p.212). He also suggests that 'the 'doing' of reflection needs to be matched with a willingness to share the end product' (Anderson, Knowles & Gilbourne, 2004, p.198). A reflective participant observer stance is an inherent part of this project but will be more visible and central in some parts than others and will be discussed in more detail as this discussion of methodology unfolds.

In sum, in this research program, three central studies approach the issue of exceptional achievement from different and complementary angles and are informed by participant observations and conversations. As the broad issues to be investigated emerged from the knowledge review and synthesis, initially a two part investigation was envisaged. However as the findings from the first study emerged, more questions were raised and in the implementation of the second study further ethical and practical issues arose that constrained the flexibility of the chosen setting for answering some of the nominated questions. This led to the design of a third study. The format of the first study set the scene, and the development of the subsequent studies was a dynamic process, responsive to the findings and constraints in Study 1. This research was very much driven by Mellor's (2001) maxim that research is a 'messy, unfolding process'.
Level of explanation and type of investigation

Nomothetic, idiographic and idiothetic methodologies

The personality structure that an elite sportsperson brings to the sporting context and the process of engagement of the person with that environment, uniquely provide concurrent foci for this series of studies (cf. Magnusson, 1990). Nomothetic, idiographic and idiothetic approaches were utilized to explore these complementary elements of personality. A nomothetic approach was primarily utilised to consider multivariate relationships between elements of personality structure (trait profiles) across groups of individuals, whilst an idiographic approach was adopted in considering how a constellation of traits was engaged for a particular individual in successfully navigating the demands of their environment. The combination of these complementary approaches resulted in a process of theoretical emergenesis. Each provided confirmational opportunities for the other but also, through a process of reconciliation of each level of observation, new questions arose that would not have been elicited from either level of explanation independently (Dunn, 1994; Tenenbaum & Bar-Eli, 1992). Inherent in the mixed methods philosophy is the understanding that each method has its limitations. Nomothetic techniques can ‘clarify by abstracting the most important bits of information’ but also ‘obfuscate by submerging into averages individual differences that are vital to the understanding of the phenomena under investigation’ (Spotts & Schontz, in Pervin, 1984, p.271). Idiographic approaches see the person as a whole but may focus in on a case that turns out to be extremely idiosyncratic. An idiothetic approach, looking for
patterns across individual profiles gleaned from idiographic measures and methods, was
utilized to bridge these two approaches as suggested by Lamiell (1981) in his landmark
discussion of personality psychology.

**Qualitative and quantitative methods**

Mixed method approaches encourage the use of both qualitative and quantitative data
sources and analytic approaches, and are, arguably, most helpful in instances where
paradigmatic development is in its embryonic form or the discipline in a state of flux
(Tashakkori & Teddlie, 1998). The mixed methods framework considers that both
methodologies have advantages and drawbacks, the challenge being to find a judicious
balance (Miles & Huberman, 1994). A well planned combination of quantitative and
qualitative data can offer the best opportunity for both breadth and depth of coverage
(quantitative and qualitative studies, respectively) as well as providing generalisable
findings and rich, sample-specific knowledge (Tashakkori & Teddlie, 1998). In this
exploratory study, both types of analysis are of interest and will feed into an iterative
investigative process rather than the sequential stage process traditionally associated with
programmatic, particularly reductionistic, research (Miles & Huberman, 1994).

Quantitative approaches were primarily utilized to separate out specific elements of the
complex phenomenon of exceptional achievement through multivariate analysis of
personality profiles, whilst qualitative approaches attempted the same task through
observation and thematic analysis of profiles in combination with conversational
material, to flesh out and perhaps challenge the general findings flowing from preliminary large scale, quantitative analyses. Classic and deviant exemplars were utilised in each study to further explicate the bounds of the relationship between personality and achievement.

Kidder & Fine's (1997) distinction between the 'Q' qualitative approach and the 'q' qualitative approach is also relevant here – the former attempting to let the data (or participants!) lead the questions, the latter merely referring to open-ended interviewing styles embedded in an otherwise structured format. In this study, the 'Q' approach will be taken. One example of this which will be discussed in some detail as this treatise progresses, is the utilisation of a hermeneutic, person-centred interview process rather than the standard semi-structured interview process.

**Cross-sectional and longitudinal design**

Sport personology is replete with cross-sectional research design (Aidman & Schoifield, 2004). As mentioned in the knowledge review there has been a call for longitudinal research designs for two reasons:

(i) to ensure veracity of achievement grouping (many non-elite control group samples are likely to combine pre-elite sportspeople as well as non-elite sportspeople), and

(ii) to enable mapping of the unfolding of personality across the life cycle of the elite sportsperson.
Each study in this series has adopted a longitudinal design albeit in more or less comprehensive ways. Outcome measures in Studies 1, 2 & 3 are longitudinal in nature. That is, the final career outcomes of all participants in Studies 2 & 3 are known, and of most participants in Study 1, strengthening the predictive potential of these studies. In Studies 1 & 2 consideration is also given to the maturation of personality through consideration of test re-test data (i.e. repeat profiling) collected up to six years apart.

Where cross-sectional design has been used, such as when comparing profiles across different sporting disciplines in Study 1, considerable efforts have been made to match participants on: demographic variables such as gender and age; cohort variables such as timeframe for career; and, level of achievement such as whether or not the individual attained Olympic status (and, if so, whether they won a medal and also whether they were selected for more than one Olympic Games). In this way, some of the issues of comparability of groupings addressed by longitudinal design, are also, in this study, uniquely addressed by careful participant matching.

Data sources

Central to the process of triangulation is comparison of evidence gathered using diverse sources of data (Tashakkori & Teddlie, 1998). To successfully work with diverse types of data, issues of rigour are paramount and dependent upon clarity and transparency in selection of both appropriate and compatible data sources. Relevant issues for this series of studies will be discussed below. Several complementary data sources were utilised
including psychometric testing, public documents, key informants, participant observations, case studies and interviews. Psychometric testing in this case primarily refers to personality profiling using a standardised personality test. Given that this is one of the central data sources in this series of studies, it will be discussed last to lead into a related discussion on data analytic issues. Interviews were also used for profiling purposes but were additionally used to consider contextual factors in relation to personality in the elite sporting domain. However, interviews were only used in Study 3 and hence, will be discussed in some detail in the context of Study 3 (in Chapter 5). The remaining data sources are now discussed in turn.

Document studies

Public, archival document analysis is one central methodology utilized in this research program. Fetterman (1989) suggests that documents are often a preferable data source, in that they require minimal additional effort from, or intrusion into, the life of the participant. In the current series of studies, this was a critical consideration given the constraints in accessing high-profile Olympians and elite sportspeople more generally.

Lincoln & Guba (1985) define a document as ‘any written or recorded material’ not prepared for the purposes of the study or at the request of the researcher and which may take the form of public records and private documents. Study 1 primarily involved public records, specifically, an analysis of data held in an archival database of personality
profiles held at the Australian Institute of Sport, Canberra\textsuperscript{18}. This information is supplemented with performance (outcome) data sourced from published books and credible internet sites, such as the AIS Athlete Performance Database, that record the achievement of Australian sportsmen and women. The author was in a privileged position to gain access to some of these rich sources of information including the Australian Olympic Team Handbooks which included brief profiles of every Australian Olympian.

Personal documents refer to first-person accounts of events and experiences (Mahoney, 1997). Study 2 uniquely combined personality profiling with consideration of autobiographical material published by several participants. Study 3 similarly compared profiling and interview data. Validity checks on interview information were in turn conducted through autobiographical and biographical documents analysis. Only personal documents that are part of the public record are explicitly incorporated in this dissertation so as to minimise any potential conflict between the researcher’s dual roles as practitioner and researcher. However, while not formally part of this study, in this instance access to non-public personal documents over more than a decade were instrumental in generating an interest in the research area, in formulating the research ideas and then, more specifically, in generating interview questions, in the selection of assessment measures and, particularly, the choice to use both a general and sport-specific personality measure in this study. Privileged access to personal letters and poetry written by elite sportspeople, team scrapbooks, ‘tour’ photographs and artwork led to a growing awareness that for a significant number of sportspeople, but not all, there was a

\textsuperscript{18} I would like to thank John Boultbee, former director of the AIS for giving his permission to access this data and for facilitating this access. Without his assistance, this study would never have taken place.
noticeable difference between their sporting persona and their ‘life’ persona. Moreover, that an individual’s commitment to sport, whilst constituting the central axis of their life, was also often a source of considerable personal conflict. Personal documents were produced both incidentally and in the context of formal settings such as team meetings. Access to such documents provided an invaluable appreciation of values, perceptions, lifestyle and the process of maturation of elite sporting individuals.

As per Lincoln & Guba’s (1985) guidelines, written material was selected according to the following criteria:

1. The general credibility of the author and publisher in producing high quality biographical or performance-related data.

2. The purpose of the publication. In most instances, preference was given to peer-reviewed, technical or professional publications rather than those designed for popular consumption as the latter was deemed to be more prone to social desirability bias (a significant issue when reporting on individuals with high public profiles).

3. The ability for key data to be cross-referenced with at least one other credible source such as the sportsperson themselves, their coach, National Sporting Organisation, or a credible internet site.

4. Where the information pertained to individuals known professionally to the investigator, this was also considered a form of validity check though the potential for confirmatory bias is acknowledged and was vigilantly considered.
Internet sites were selected according to the criteria that they must be:

1. Associated with a formal sporting organization

2. Sufficiently detailed to allow the researcher to make considered decisions about data inclusion. For example, a website that selectively profiles only a handful of sportsmen and women was considered less valid and reliable than one that routinely or comprehensively listed the performance of all athletes within that sporting code for a given time period.

3. Cross-referenced with at least one other source for information on a representative sample of sportspeople. These sources included published books, the sportsperson themselves or the National Sporting organization to which they belonged. It is worth mentioning that these cross-checks proved fruitful in excluding internet sourced material in more than one instance. Some sites are infrequently updated, others have significant typographical errors, whilst others have restrictive decisions on what indices of performance are worth reporting. For example, some report selection for international competitions but not National titles. An exception to cross-referencing was made for the AIS database, which was considered to be based on the most complete access to information and is regularly updated through feedback from sportsmen and women and national sporting organizations.

The primary websites utilized in this study were the Australian Institute of Sport Athlete Database, International Olympic Committee website, Australian Olympic Committee (and State branches) website, Sydney 2000 Olympic Games website, Athens 2004
Olympic Games website and National Sporting Organisation websites such as Women's Hockey Australia and Rowing Australia.

**Key Informants**

Key informants are people who have unique skills or professional background relevant to the area being studied – they are ‘insiders’ who can offer expertise beyond that of the researcher (Mahoney, 1997). The use of key informants is another method usually associated with qualitative research. In this instance National level sporting coaches and support staff, with experience in international competition and intensive training squads were nominated as a valuable source of preliminary and primary information. In Study 2, such coaches provided ratings of individual performance and detailed, structured descriptions of personal characteristics of national hockey players. In another part of the study, key informants were involved in the development of measures and as a reference and feedback mechanism for the ‘sense’ of the study from the ‘inside’. It is noted that key informants come to the study with their own biases and impressions. It is also important to consider how the relationship between the key informant and the researcher can potentially influence the data obtained. In both cases, using *multiple* key informants helped to identify and act as counterpoint to such idiosyncratic influences.
Participant Observations

A central methodological feature of the current study is the participant status of this researcher. Qualitative methodologies emphasise that all research takes place within a context and within the explicit and tacit interpretive frames of reference of the researcher. This frame of reference exists whether at the level of broad paradigmatic indoctrination or conscious adherence to a particular theoretical viewpoint (Patton, 1990). Quantitative methodologies attempt to control (and thereby minimise the effect of) such influences whilst qualitative methods make the relationship of the researcher to the data and the data gathering process a relevant part of the interpretive process. My ‘insider’ position in relation to the current study is pivotal in the sense that it would not have been possible to undertake such a study as an ‘outsider’, yet there were also some constraints on the methodology as a consequence of my particular role in this context. Marte Pensgaard & Duda (2002) in their study of an Olympic gold medallist rower, draw attention to the fact that there can be no theory-free observation or knowledge and that this situation demands great forethought and rigor to make such effects as clear as possible. Specifically, the impact of a participant observer on eliciting responses within his or her frame of reference must be carefully considered and his or her role transparently described for others to evaluate (Altheide & Johnson, 1994; Glesne & Peshkin, 1992; Hammersley & Atkinson, 1983; Maykut & Morehouse, 1994). Thus, in best accounting for potential effects, salient features of my position and role within the elite sporting context in Australia is now described.

19 In the context of the current study, the terms researcher, author and interviewer can be taken as referring to the same individual.
I am a clinical psychologist and have worked in the elite sporting context for over a decade. Increasingly my client group has been constituted of Olympians. My professional reputation in this field made it possible to gain permission to access the TAIS database at the Australian Institute of Sport (for Study 1) and to contact former Olympians through the Western Australian Olympic Council\textsuperscript{20} (for Study 3). My public profile was sufficient to sustain a private practice by word of mouth which was relevant in this instance because many potential Olympian participants were already at least aware of my work and credibility within the industry.

For seven years, Australian Women’s Hockey was my largest consultancy. The National Women’s team constitute the primary participants in Study 2. For a considerable time, I worked in an exclusive fulltime capacity with the national women’s hockey program. I worked through two Olympic cycles with the team and attended two Olympic Games (Atlanta, 1996, and Sydney, 2000) in which they were dual gold medallists. I participated in two successful World Cup campaigns (1994, 1998) and three successful Champions Trophy events (1995, 1997, 1999) during this time along with many other national and international tournaments. At these tournaments I was exposed to the various elements of the elite sporting experience including having access to the Olympic village and stadium and other living, training and competition venues. My weekly schedule routinely included attending training sessions, coaching/support staff meetings, competition matches, pre-game meetings, team-talks, half-time coaching talks, post-game debriefing.

\textsuperscript{20} I would like to thank Tania Sullivan at the Western Australian Olympic Council for her assistance in this regard.
as well as team meals and significant social events. I travelled on the same planes and buses as the team on many occasions and stayed in the same hotels. My specific role included the provision of individual counselling for players, teamwork facilitation, to act as advisor to the National coach, to co-ordinate the involvement of support staff in my role as sport science co-ordinator and to organise and facilitate group meetings variously involving players and coaching staff. My involvement was highest in Olympic and pre-Olympic years. Direct contact with players increased during this time and included weekly (and sometimes twice weekly) psychology meetings for the player group for the purpose of raising and discussing any issues that were of concern. These discussions covered a wide range of topics from management of competition anxiety to dealing with issues of sexuality in the team\textsuperscript{21} (Charlesworth, 2001). I also facilitated annual planning and team development activities, including the facilitation of group sessions to develop the team mission statement\textsuperscript{22}.

During the four year period preceding this study, a central feature of my practice involved recording, reflecting and articulating observations about this domain. This reflection led to by subsequent decision to embark on the current research program. In this way, the research grew out of my participation in this community. I was ‘living’ with the community in a more anthropological sense than in the sense of a researcher who decides to utilise a participant observer methodology (Jordan & Roberts, n.d.). The effects of this particular form of participant role will be discussed as the studies unfold.

\textsuperscript{21} A more comprehensive list of topics covered can be found in Appendix 2
\textsuperscript{22} A copy of the 1996 Atlanta Olympic campaign team mission statement is provided in Appendix 3 as an exemplar of the kind of work emerging from psychology sessions and has been selected because it is already part of the public record
Such extended participant observation provides an obvious and valuable opportunity for ‘thick description’ (Patton, 1990) but also, though less considered in the literature, for curiosity-driven intrusiveness and hence, for compromise to pre-existing relationships between researcher and participants. Patton (1990) advocates negotiating the degree of participation that will yield the most meaningful data, but I would add, the most ethically supportable, meaningful data. As Patton (1990) argues, participant observation needs to be carried out with generous reflexivity. In undertaking Study 2 of this research project, I made a very deliberate decision to prioritise my clinical role with the team over my research role which had several important ramifications: data collection was timed so as to be minimally disruptive to clinical contact (it was collected during ‘down times’ between major competitions); measures were chosen that had immediate clinical relevance and thus provided some direct benefit to players; and, a decision was taken as the project progressed, not to formally interview hockey players lest it disrupt the therapeutic context and relationships that had developed. This last decision was taken after careful deliberation and peer discussion and was primarily underpinned by the following factors:

1. Prior to this research being conducted, attendance at individual psychological sessions had always occurred on a voluntary basis (although sometimes at the request of the coach or a team-mate);

2. Interactions were often informal both in content and context, often occurring on the bus on the way to a tournament or in a hotel room whilst on tour depending on the
topics to be discussed, reflecting a deliberate choice to make psychology as accessible and non-threatening to players as possible;

3. Some players formally accessed psychological counselling more than others and there were a few who made clear choices not to access psychological input at all on an individual basis; and

4. Finally, of the majority of players that did access individual sessions, some were quite open about this contact even commenting on it publicly, and others were not.

Formalising this relationship through investigative interview seemed potentially counterproductive to the relationship that had been developed. Asking for volunteers seemed likely to draw a biased sample and to place too great a burden on the players. In the final analysis, it was deemed ethically compromising in the context of a therapeutic power relationship differential. The importance of each of these issues was particularly salient at the time, as interviewing began in an Olympic year. It was decided that a period of high anxiety was not an appropriate time for such a request to be made. Moreover, it was not an appropriate time to be ‘unpicking’ such an important and potentially distressing topic as the psychological factors contributing to success, either for those that were selected or for those that were not. Thus, the idea of interviewing former Olympians involved in other sports emerged and the framework for Study 3 was born. Whilst this decision arguably resulted in compromise to the richness of the dataset for Study 2, my knowledge of each hockey player, of the culture within the team and wider organization is extensive and was still brought to bear upon the data analytic process in specific ways that will be discussed.
Importantly for the current study, my involvement in elite sport over this extended period allowed the development of a familiarity with the ‘native language’ spoken by these exceptional sportsmen and women - this had a strong impact on the understanding of responses and of particular response sets in both studies 2 and 3. Notable non-occurrences (Mahoney, 1997) were able to be evaluated – what was left out was often as important as what was said. I was also in a unique position to compare self-presentation in the profiling exercise with longitudinal observations of context-relevant behaviour. Field notes taken during this time were used as a reference point for these observations. Observational data provided a rich source of direct information from natural, unstructured settings and, in this instance, was strengthened by:

1. My free access to the participants;
2. The participants’ familiarity with my often daily presence over a previous time period of several years which ameliorated the issue of research-related response bias in behaviour; and
3. The juncture of my areas of content expertise: clinical psychology, psychological assessment, and achievement in the elite sporting context within which these participants were functioning. As discussed by Mahoney (1997), lack of such content expertise is a potential pitfall for naturalistic observations.

Rogers (1954) believed the use of clinical notes to be a valuable source of data for the participant researcher. In this study, given the small sample size and high public profile of the players, it was decided not to seek permission from players to use individual case files but rather to present only personal information already in the public domain and
draw upon the extensive notes kept by the author on many generic aspects of the players and team in a way that would be non-identifying of individuals yet significant, indeed unique, in helping to interpret the data. For example, direct access to players over a number of years provided the basis for this researcher’s detailed, self-generated assessment of personality of all participants which provided a measure of ‘consonance’ with self-report measures of personality. Case studies utilised in this dissertation have also drawn upon biographical information already in the public domain, where these could be verified by my own experience, and that of key informants, to provide rich information in a real-world setting.

While the impact of extensive experience as a participant observer with the national hockey team was most obvious in Study 2, it also impacted heavily on my ability to interpret data in Study 1 and on the means for gathering data and conducting interviews in Study 3. Jordan & Roberts (n.d.) point out that the participant observer who ‘hangs around’ for even a few months can ‘usually only gain partial access to the meanings experienced by the actors studied’. They suggest that the observer may still be restricted to experiencing things from an ‘etic’ (outsider) perspective rather than an ‘emic’ (insider) perspective. Whilst the participants in Study 1 were never in the same room as me, a decade of experience with a range of elite sportspeople suggested things to look for both in presence and absence that have not been addressed by other researchers. One simple but important example of this with regard to personality profiling, was the consideration given to ranges of scores, rather than just reporting means, as it has become evident in my work with elite sportspeople, that some quite extreme individuals make it to the top of
elite sport. Similarly, in Study 3, it was my experience in working in this context that alerted me to the fact that interview participants were initially using 'media-speak' and that this differed from 'therapy-speak' and often from 'life-speak' and 'self-speak'. This allowed the issue to be addressed directly and more deeply, enabling more productive conversations to ensue. My experience in working with such individuals also prevented any sense of being overwhelmed by the occasion or of accepting what was being said only at face value. Deeper questioning resulted and was allowed by the interviewees, in some cases explicitly, because, as one participant put it, she had 'heard about you... that you are 'alright” from one of her sporting friends, and subsequently indicated that it was helpful that I was a member of the ‘Olympic family’. It was notable that participants did not restrict their self-disclosure to positive events, suggesting that a degree of trust was granted me. One interviewee who had been difficult to draw out and whose responses changed considerably from the beginning of the interview to the end, stated that 'I didn't intend to tell you all that. In fact, I had 'forgotten' that I felt so strongly about those things until you pushed my buttons! I guess I've developed a 'safe story' to tell my friends and family'

It is also possibly relevant to note that, in this instance, my decade of practical involvement in the domain being studied was almost accidental and not born of a professional history in sport. Moreover, I came to the discipline of elite sport from two very different domains – exceptionality in intellectual pursuits (giftedness in children) and the therapeutic management of child abuse. This unique developmental trajectory has contributed to the development of this research in at least two key ways, specifically:
1. Developing an appreciation of the attributes which seem to contribute to
exceptionality in more than one domain, provided a rich contextual knowledge
of both domains, which in turn facilitated a more than superficial analysis.

2. My experience in the area of child abuse has enriched my working
understanding of hardiness, optimism and resilience, each of which have,
unexpectedly, had a profound impact on the approach I have developed in my
work with elite sportspeople.

The direction of this research program in terms of the questions asked, measures used,
design chosen and analytic techniques adopted has been influenced by this particular
confluence of researcher expertise. This process has nevertheless been a very reflective
one to monitor for unhelpful assumptions that may come from such ethnography.

Case Studies

Case studies have a long history in psychology and will be utilised in this research
program in several different ways:

1. In Study 1, a suite of three individual profiles are presented concurrently to
consider differences in personality for exceptional achievers from within the
same sporting discipline. An additional case is subsequently used to consider
personality in the context of a sporting ban.

2. In Study 2, case studies are again used individually and in concert to illustrate
the wide array of personality profiles apparent in the data. Personality profiles
are contextualised by comments made by the National Coach about particular
players, giving a deeper understanding of the lived experience or manifestation of these personalities.

3. Case studies are used in a more primary way in Study 3 to help evaluate the relationship between psychometric personality profiles, self-descriptions regarding salient experiences as Olympic sportspeople, and key elements of the *pathways framework*.

Thus, in this series of studies, case studies provide both classic and deviant exemplars (Miles & Huberman, 1989). They are sometimes illustrative, sometimes exploratory (testing out key parameters of a tentative model) and generally used cumulatively (with the exception of Study 1 in which the case study emerged as a serendipitous, critical incident case study) (Datta, 1990; Miles & Huberman, 1984).

**Personality profiling**

Personality profiling using a standardised personality test offered unique opportunities with this sample of exceptional sportspeople, to compare personality structure amongst a large number of individuals in a multivariate way and also to compare them to the normal population. In deciding how to measure personality, a preliminary decision was taken that, wherever possible, the introduction of multiple separate measures of individual personality constructs would be avoided in favour of using a comprehensive personality profiling tool. The NEO PI-R and the TAIS were identified as the most appropriate, accessible, broad-spectrum profiling instruments and will be discussed in more detail in
the context of the specific studies in which they are used. However, the reasons for using such broad-spectrum tests are critical and will now be discussed:

1. As indicated in the introduction to these studies, there are inherent difficulties with combining data from questionnaires that have unknown compatibility and unspecified overlap into multivariate analyses, particularly when they measure closely related types of phenomena (Tabachnick & Fidell, 2001). Often there is item redundancy and rarely an item-level analysis of such overlap. Hence there is the potential for over-fitting of the data when considering correlations between measures and undermining of multivariate analyses when independence of predictors is assumed.

2. There is increasing convergence on the Big 5 factors of personality and the NEO PI-R as a measure of these factors. Given the presence of this psychometrically and conceptually well-supported measure with 30 facet scales, which also seem to tap an impressive array of those constructs of interest in this study, it seems difficult to argue for multiple unidimensional measures.

3. The individuals involved in Studies 2 and 3 are very busy and difficult to access. Streamlining the task was an important consideration and was accomplished by minimising the number of questionnaires each with different formats and instructions.

4. Finally, in the case of the pathways framework, there is proposed to be a hierarchical trait structure which may be either additive or configural in nature for different individuals (cf. high achievement vs genius in Lykken et. al., 1992). These possibilities can be most easily explored with a comprehensive profiling instrument. Two processes were used to explore the proposed hierarchical structures in the pathways framework: (i) factor analytic methods were used inductively to explore clusterings of traits in particular
samples and (ii) conceptual construction of scales was pursued to target particular hypothesised combination of traits. The former approach will be discussed later in the context of data analytic considerations. The latter approach will be discussed at this point.

Measuring emergent traits

The emergent traits in the pathways framework seemed most amenable to operationalisation and measurement given the conceptual definitions and distinctions made between these scales in the knowledge review. They also seemed most salient for measurement given their differentiating potential in defining the supraordinate motivational traits of hardiness, mental toughness and controlled vulnerability (as per Table 1.5 in chapter 1). A four stage rational-conceptual-statistical process was undertaken in constructing these scales:

The first stage of item identification involved a rational approach which began with the earlier review of the literature to clearly define and differentiate the construct definitions (cf Broughton, 1984; Costa & McCrae, 1992a; DeVellis, 1991). For the purpose of this study, it seemed most defensible to focus on elements that differentiated one construct from another. Moreover, constructing scales from items within the TAIS and NEO PI-R rather than domain scales or facet scales seemed to best allow the exploration of the possibility of complex (non mutually exclusive) hierarchical relationships between the motivational traits and elements of emergent or source traits. Supporting this decision is

23 Although, surprisingly, this has not been undertaken in the existing literature. Similarities have been noted in some cases, but no active attempt at differentiation was found in the course of reviewing over 100 articles relating to these topics.
the fact that existing measures of these constructs have previously been shown to relate to
the domain scales of the NEO PI-R, and even to facet scales imperfectly and often to
more than one scale (e.g. Optimism: Boland & Cappaliez, 1997; Hardiness: Maddi,
Khoshaba, Persico, Lu, Harvey & Bleecker, 2002; Parkes & Rendall, 1988).

Stage two involved item selection driven by these construct definitions. Where items
were thought to be relevant to more than one of the core constructs, the items were re-
examined. Resolution resulted when consensus could be reached on placement with a
particular scale, when exclusion of the item was agreed upon, or, in the case of items that
had positive loadings on one scale and negative loadings on another, items were left in
the sample to be further discriminated by psychometric evaluation process. The resulting
items were then given independently to three adult laypersons who were unfamiliar with
the personality literature, so as not to be influenced by items on existing questionnaires.
They were provided with construct definitions and a list of items and asked to identify
which of the sets of questions belonged with which of the five scales (i.e. control,
commitment, challenge, optimism, resilience). Consensus resulted in relation to the
constructs of commitment, challenge, optimism and resilience after removal of 3 items
suggested a degree of construct validity. The items selected and rejected are listed in
Appendix 4. However, this process of rational item selection made it apparent that the
concepts of control and the task/ego orientation element of the commitment construct
could not be adequately measured utilising items from the existing profiling tools. The
critical distinction between perceived control and desire for control (important in
distinguishing between hardiness and the other motivational traits) was not clearly
evident in sufficient items on the TAIS or NEO and so a decision was taken to add another measure of control for Studies 2 & 3 (i.e. prospective studies). Inclusion of the Desire for Control scale (DFC: Burger & Cooper, 1979) allowed more refined analysis of the difference between preferred and perceived control and will be discussed in some detail subsequently. The Task-Ego Orientation in Sport Questionnaire (Duda & Nicholls, 1992) was selected as the original and best available measure of task and ego orientations.

Stage three involved further assessment of items representing scales of Commitment, Challenge, Optimism and Resilience. Content comparisons were made between the derived item combinations, and widely used existing measures of these constructs, specifically, the Attributional Style Questionnaire; (Seligman et al., 1979), the Life Orientation Test (Scheier, Carver & Bridges, 1994), and the Dispositional Resilience Scale (Bartone et. al, 1989). While each pre-existing measure clearly includes more items and broader correlates of each construct (often overlapping with the other constructs under investigation), it was clear that the subset of items identified from the TAIS, NEO and now also the TEOSQ and DFC, could be said to be representative of the subset of items most central to, and differentiating the constructs of, challenge, commitment, optimism and resilience. Interestingly, it seemed to this researcher at least, that this process 'cleaned up' some of the confounds in these scales reported in the literature. Given that participants in Study 1 were not accessible for further testing using the DFC and TEOSQ, there remained limitations in the measurement of control, task-ego orientation and also of optimism (which drew from these scales) when using the TAIS.
The fourth and final stage of scale construction involved preliminary psychometric evaluation of both the TAIS and NEO PI-R (separately) to assess support for the derived constructs of control, challenge, commitment, hardiness, optimism and resilience. This analysis was necessarily post hoc, and, for the NEO, also incorporated consideration of the DFC and TEOSQ. It is acknowledged that these analyses normally constitute only the first stage of psychometric evaluation which is, as always, a process that ‘continues indefinitely (Gregory, 1996, p.107). The approach taken to psychometric evaluation of these measures was however comprehensive and will be outlined in the final section of this chapter which addresses data analytic considerations common to each of the three studies that follow.

**Validity of profiling scales**

There is a final issue that needs addressing in relation to the scales selected for use in this series of studies. Neither the TAIS nor the NEO have a lie detection scale, a point which has led to considerable criticism. However, Marten’s (1977) argues (in defense of his own sporting measure, the State Competitive Anxiety Scale (SCAT)) that ‘these [lie] scales suffer from the same weakness that they supposedly detect’ (p.37). In the broader personality literature, both Matthews & Deary (1998) and Rogers (1957) take a slightly different view. Rather than seeing socially desirable responding as a ‘weakness’, and one which cannot be ameliorated by using a lie scale, they argue that it is people’s self-presentation that effects their behaviour and reliably predicts behaviour, and hence, this
self-report should be considered valuable. While it is not the only relevant vantage point in understanding personality, it is one relevant vantage point. Indeed Aidman (2004) recently called for a greater consideration of the ‘actor’ perspective in sport personology. Whichever argument resonates, both suggest that the lack of lie scale is not a fatal flaw for a personality inventory. In light of these arguments and the widespread use of both scales, it was decided to retain the TAIS and the NEO PI-R for use in this study despite their not having a lie scale. Finally, in Study 2, there was a unique opportunity to check coach ratings, psychologist ratings and self-ratings of personality in a sample of Olympic hockey players using the NEO PI-R. This data will be discussed in the context of other results from Study 2 insofar as it speaks to the issue of profile validity.

Data preparation and analysis

A planned triangulation framework using a series of studies with different methodologies, requires some consideration of cross-study compatibility in terms of the ways in which data are handled. Principles of data analysis are addressed here insofar as they affect and reflect the use of data in all studies to be presented. Other data-related issues will be discussed in the context of the specific studies to which they are relevant. Underlying principles of data preparation and analysis that span both qualitative and quantitative elements of these studies will be discussed first. This will be followed by more specific consideration of two primary quantitative processes of data analysis that are common to all three studies, specifically: (i) psychometric evaluation of the personality profiling
instruments, and (ii) utilisation of profiles to discriminate amongst various groupings of elite sportspeople.

Principles of data preparation and analysis

The first principle of the mixed method approach is that data consideration and analysis ought be a rigorous, iterative process where the findings from one element of the study should feed back into, and shine new light upon, the findings of previous parts of the study, resulting in confirmational support, further enrichment of our understanding of a particular issue, or the highlighting of a conflict that needs resolution for the research to progress. In Studies 2 and 3, findings indeed pointed to the potential value in re-considering data from Studies 1 and 2 respectively. These new directions were pursued in both cases.

A summary of several key principles driving the data analytic process follow. Whilst emanating from the qualitative tradition, these principles lend themselves to ensuring the validity and reliability of both qualitative and quantitative data collection, analysis and interpretation. Notably, the processes of data analysis undertaken are as central to rigorous clinical practice as to research (Corey, 2001) and thus were familiar to the researcher.

Berkowitz (1997) points out that ‘good qualitative analysis is both systematic and intensely disciplined’ and coalesces around consideration of the following questions:
1. What specific patterns or themes emerge in response to specific prompts?
2. How do these illuminate the broader questions of the study?
3. Are there deviations and can they be explained?
4. What interesting stories emerge?
5. How do they illuminate the broader questions?
6. Do any of these findings suggest that additional data needs to be collected?
7. Do these findings corroborate any other findings? If not, what accounts for the discrepancy?

The process of data analysis in this study also conforms to the following guidelines:

1. Data analysis is an iterative process using a ‘method of constant comparison’ (Glaser & Strauss, 1967) which involves comparing and contrasting available instances to establish significant patterns, then further questioning and refining these patterns as part of an ongoing analytic process.

2. Evidence is considered with an eye to suggestions of convergence, relatedness and divergence.

3. The frequency and intensity with which issues are raised is considered as well as the frequency and intensity of response.

4. Emergent conclusions are drawn and tested for their validity by way of sturdiness (i.e. they are able to withstand alternate explanation), plausibility (i.e. the argument is credible) and confirmability (i.e. the finding is defensible) (Berkowitz, 1997; Miles & Huberman, 1994).
5. Assumptions of the study are addressed so as to be in a firm conclusion drawing position.

6. ‘Hard’ conclusions are differentiated from more speculative conclusions.

7. Limitations, both methodological and conceptual, are discussed.

Miles & Huberman (1994) outline 13 tactics for testing or confirming findings, all of which address the need to build systematic ‘safeguards against self-delusion’ (p.265). Those most salient for this study include:

1. Using multiple sources and modes of evidence and evaluating whether responses corroborate each other.

2. Weighing the evidence rather than deciding what is ‘right’ and ‘wrong’ per se. This process should however consider the relative veracity of sources. Discrepancies, say, between personality profiles and interview data might be profitable areas for future exploration.

3. Maintaining vigilance for possible interconnections between the data and ‘following up surprises’ (p.270). Being receptive to surprises is one of the strengths of the qualitative approach.

4. Checking the meaning of outliers or extreme cases as an opportunity for further elaboration or verification.

Data reduction then has proceeded from the vantage point firstly of sense-making and then manageability, and has involved an iterative process of selecting, focusing, simplifying, abstracting and transforming the data such that it speaks most clearly to the
questions being addressed (Miles & Huberman, 1994), specifically questions relating to the structure of personality and the process of its application. Notably, in all data analytic processes, consideration has been given to the pathways framework (deductive approach) as well as an eye being kept to new directions emerging from the data (inductive approach).

In accord with the qualitative and mixed methods tradition, data display will variously take the form of an extended piece of text, diagrams and flow charts that provide a new way of thinking about the data. Flow charts in qualitative analysis often display critical paths, decision points and supporting evidence as illustrated by the flow chart developed in the knowledge review process. Where relevant, data display for intra-case analysis will be presented as well as cross-case analysis.

The emphasis on rigour is equally as evident in the analysis of quantitative data in this study, particularly in terms of looking for convergence (or divergence) of multiple data sources and having each analysis as part of a multi-stage process that serves as a check on the validity and reliability of findings. Two key examples of these principles in practice are captured in:

1. The extensive and careful evaluation of the psychometric properties of the personality measures used in this study, when used with this population. This was considered a priority given the lack of psychometric data reported using these instruments with elite sportspeople, despite, in the case of the TAIS, extensive use of the tool in research and practice within the sporting domain.
2. The three-stage, multivariate approach taken to utilising the resultant personality profiles to differentiate different groupings of elite sportspeople.

Both of these examples pertain to all three studies that follow and thus, the process of analysis undertaken, and its philosophical underpinning, will be discussed in some detail at this juncture.

**Psychometric evaluation of personality profiling tools**

Psychometric evaluation of the TAIS and NEO PI-R, and of the *constructed scales* of Optimism, Resilience, Challenge, Control and Commitment, involved several stages and assessed convergence of findings from several analyses. The most conservative way to pursue the psychometric evaluation of these scales was a combination of item and scale analyses using (i) Cronbach’s alpha as a measure of internal consistency, and (ii) Ware & Gandek’s (1998) multi-trait evaluation criteria, followed by (iii) exploratory factor analysis of reliable scales (see Nunnally, 1978). It should be noted that in Study 1, none of the *constructed* scales had ideal content validity in the sense of representativeness of the construct (Messick, 1995) due to the archival nature of this study. However, each scale was considered to have adequate construct validity to proceed to further psychometric assessment. Given the recent discussion illustrating the process of conceptualisation and construction of the *emergent trait scales*, the psychometric evaluation process will be discussed in relation to these scales as derived from the TAIS in Study 1.

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*24 Confirmatory factor analysis was inappropriate in this instance as any loosely specified target matrix [i.e. all items would have one large loading and all the rest zero] would be too easy to fit ‘even with so large a sample’ (Kline, 1994, p.133).*
Preliminary data preparation included the reverse scoring of all items that were thought to load negatively onto the scales. Some items were hypothesised to load negatively on one scale and positively on another (e.g. Item no.62 on the TAIS ‘I make mistakes because my thoughts get stuck on one idea or feeling’ could be related negatively to a sense of control or positively to commitment to a task) but at this stage of scale construction, over-inclusiveness was considered preferable with construct refinement through item reduction occurring as an integral part of further statistical and conceptual analysis. Items were then parcelled into scales summatively in the traditional fashion (also utilized in the official scoring of the TAIS and NEO PI-R). This gross method of scale formation was considered adequate for a first pass evaluation of the merits of these scales though it is acknowledged that there are some limitations with this method (Little, Cunningham, Shahar & Widaman, 2002).

Testing scale validity and reliability was a process that incorporated several stages. Internal consistency of scales was measured using Cronbach's alpha although it is recognized that it would be differentially affected by the variable number of items in each proposed scale and item homogeneity. Thus, a lenient reliability criterion of 0.70 was set for group level comparisons as suggested by Nunnally (1978). The standard error of measurement when alpha is 0.70 still exceeds half of one standard deviation (Garson, 1999). It should be noted that for use as an individual profiling and counseling tool, a reliability of 0.90 is generally recommended given the potential consequences of errors of classification in clinical application (Kaplan & Saccuzzo, 2005, Nunnally, 1978).
Notably, no scale reached this goal in any of the three studies to follow. Standardised alpha will be reported in each case so that scales with different numbers of items can be directly compared (Miller, 1995). While reliability is a prerequisite for soundness in a scale, Cronbach’s alpha is an insufficient psychometric indicator on its own, as it does not illuminate the degree of independence between constructs or between items measuring supposedly different constructs. Ware & Gandek’s (1998) guidelines for multi-trait evaluation of the adequacy of proposed new scales were thus pursued in concert with evaluating internal consistency. Validity was explored at the item and scale level:

*Item-level descriptive statistics.*

Goodness-of-fit of items within a scale was determined according to whether:

1. *Summated items had roughly equal variance such that they contributed equally to the scale.* This was assessed through examination of item means, response range and standard deviations, although it should be noted that on a 5 point scale (and with such a large sample in Study 1 (n=1376)), there is, necessarily, some attenuation of variance, and, not surprisingly, all item response possibilities were utilised for each item on both TAIS and NEO PI-R –derived scales. However, five point scales (‘Never’ to ‘Always’) have been found to be adequate for creating reliable measures with sufficient variability, indeed reliability of measurement has been found to plateau around 5-7 response categories (Cicchetti, Showalter & Tyrer, 1985) and responses to 5 point items have been
shown to closely approximate more continuous response formats (Bollen & Barb, 1981; Hays & Huba, 1988). Moreover, the vast majority of items in this case approximated a standard deviation of 1.0 (Range .76-1.38) as advocated by Ware & Gandek (1998) for 5 point scales. Nevertheless, as Kline (1994, p.126) notes with regard to factor analysis 'even with five and seven point scales the variability is limited such that Pearson's correlations... are far from ideal... Factors derived from item correlations, partly as a result of this...tend to account for rather small proportions of variance' which needs to be combated with large samples and high subject to variable ratio (p.127). Such a precaution is taken here in Study 1 but was less easy to accommodate in Studies 2 or 3. Data from the NEO PI-R from Studies 2 & 3 was combined where possible in the process of psychometric evaluation of the scales. Where this has occurred it is indicated in the text.

Graphical displays suggested that most items on these five scales showed reasonable symmetry when derived from the TAIS and when derived from the NEO PI-R. Items 64 & 136 on the TAIS showed the greatest skewness & kurtosis, but as discussed previously, given the large sample size the impact of departure from zero is lessened particularly with samples over 200 (Tabachnick & Fidell, 2001, p.75; Watarnaux, 1976). Thus, standardization or transformation was not considered necessary or fruitful and both items were retained.

2. There was item internal consistency. Items were assessed as to the linearity of their relationship to the total score from all other summed items in the scale. In accordance with Ware & Gandek's (1998) guidelines, item-scale correlation, corrected for overlap
(i.e. The item was removed and correlated with the remaining keyed\textsuperscript{25} scale), was considered ‘substantial and satisfactory’ (p.5) upon reaching 0.4. Although a larger correlation is desirable with pre-existing measures that are being refined, the more lenient criterion was used in this case due to the novel nature of the scales being considered.

3. \textit{There was equality of item-scale correlation} (in addition to point 2 above), demonstrating that items contained roughly the same proportion of information about the scale being constructed and countering the need for differential item weighting.

4. \textit{There was adequate item discriminant validity}, specifically, each item correlated most highly with the scale to which it was meant to conceptually belong. Item discriminant validity was checked by comparing the magnitude of corrected item-total correlation of an item with its own keyed scale and its correlation with other proposed scales. Formal multi-trait analysis requires a 2 standard error difference in correlation size (approx. 95\% confidence interval), however, in this preliminary study, it will be adequate to identify notable difference.

The data was also checked for missing values as summated ratings are particularly compromised by large amounts of missing data. In each instance, missing data was not of notable proportions due to pre-analysis screening of cases. Scale level descriptive statistics were also examined, checking for ceiling and floor effects and variability as reflected in scale means and standard deviations.

\textsuperscript{25} The ‘keyed’ scale is the scale to which an item is thought to belong.
Reliabilities and inter item correlations for the proposed 5 scales resulted in refinement of item inclusion. Specifically, items were considered for removal where:

(i) Cronbach’s alpha for the scales would be significantly improved by their removal (Tabachnick & Fidell, 2001)

(ii) In concert with point (i), corrected item-total correlations less than 0.4 were considered to be weak (Ware and Gandek, 1998) and resulted in removal unless there was a strong case for retention (e.g. Alpha >0.8).

(iii) Higher item-total correlations existed with other (non-keyed) scales or scales to which items had originally had co-membership but from which they were removed when it came to a conceptual choice with regards to their 'belongingness' to more than one scale. These items were moved to be included in their alternate scale.

Scale-level descriptive statistics.

Scale scores should have substantial variability in the population of interest even if the distribution is skewed. Graphic representation was the most efficient way of examining this feature in a large dataset.

In addressing the question of whether scales are distinct from one another, the following criteria were used. If the correlation between two scales was less than the reliability coefficient, then unique reliable variance was considered to be measured by each scale. If the correlation between scales was equal to the reliability coefficient, then scales were
considered to be performing like alternate measures of the same construct, with no evidence of unique variance.

*Factor Analysis*

Following scale construction, the TAIS and the NEO were (separately) factor analysed to assess whether indeed the final items clustered together either in the unrotated factor structure or after oblique rotation (as utilised by Thurstone when looking for higher order factors in the measurement if intelligence) (Kline, 1994).

The same rigorous, multi-stage, triangulating, analytic process was pursued in establishing the psychometric validity of the regular scales for the TAIS and NEO PI-R. Findings relating to each of these analyses will be discussed separately in the context of the study in which they are used.

*Using personality profiles to differentiate sporting groups:*

*Discriminant functions analysis in the context of establishing clinical significance*

The primary questions asked in each study in this thesis relate to the ability to differentiate sporting groups (e.g. those engaged in different sports or those achieving different levels of success) on the basis of an array of personality traits. Given the proposed configural nature of personality in this high achievement context, multivariate
analyses of trait profiles was considered essential lest complex relationships be overlooked (cf. Kroll & Crenshaw, 1970).

The primary method of quantitative data analysis used in this regard in all three studies, is discriminant functions analysis (specifically, the DISCRIM procedure in SPSS Version 11.0). Discriminant functions analysis (DFA) is a multivariate technique suitable for considering constellations of personality traits in terms of their ability to differentiate salient groups of sportsmen and women. While DFA is essentially 'MANOVA turned around' (Tabachnick & Fidell, 2001, p.457) and both can essentially answer the question of whether group membership is associated with reliable mean differences in combined scores on salient constructs, 'classification is the major extension of DISCRIM over MANOVA' (p.457), specifically, the 'robustness of the prediction of group membership' (Biddle et al., 2001, p.783) as discussed earlier in the review, and was thus chosen for this study.

To reiterate the conceptual reason for considering classification as an extension to prediction, statistically significant differences on trait scores between, say, participants in different sports, or successful and less successful competitors, are perhaps theoretically interesting, but it is the clinical significance, and the sensitivity and specificity of the measure, that is arguably most important in the context of personality profiling being advocated as a selection (talent identification) tool (Bloomfield, 1995, Koo, 2003) or to inform counselling goals (Nideffer, 1993). Talented sportsmen and women can potentially be denied access to opportunities or services on the basis of supposedly ideal
sporting profiles. They may also be counselled or coached to develop particular characteristics (e.g. aggression) on the basis of such profiles, when the reality may be, as suggested by the pathways framework, that there is more than one constellation of traits sufficient for success. Notably in Kroll & Crenshaw's (1970) classic study, whilst discriminant functions were significant and interpreted, in some sports only 40% of individuals were correctly classified using the resultant equation. The best classification correctly identified only 73% and this is in the sample from which the discriminant function was derived meaning that, if anything, there would be over-fitting of the data\textsuperscript{26} (Huberty & Hussein, 2003; Tabachnick & Fidell, 2001). This means that, still, a very substantial number of individuals would have been misclassified if such an equation were used in an applied context. Thus, the utility of derived discriminant functions as classificatory tools is highly salient. Biddle et al. (2001) have commented that DFA is underutilised in sporting research given this particular facility.

A second difference between MANOVA and DFA is that ‘In DISCRIM there is often an effort to interpret the pattern of differences among the predictors as a whole in an attempt to understand the dimensions along which groups differ’ (Tabachnick & Fidell, 2001, p.457). Moreover, like factor analysis, DFA provides the potential to analyse more than one significantly discriminating function. In the current study, if additional functions contribute significantly to the explanation of variance between groups, then it may offer support to the hypothesis in this study that there are multiple pathways to sporting success (i.e. the principle of equifinality) recognizable in a significant number of elite sportsmen

\textsuperscript{26} Independent verificational samples should be utilized to further test the veracity of a discriminant function (Tabachnick & Fidell, 2001)
and women. Moreover, it becomes possible then to qualitatively describe the differences between these orthogonal, but both sufficiently discriminating, dispositional pathways. Given the importance of evaluating configural trait possibilities in assessing the pathways framework, this opportunity was important in the current study.

It should be noted that there are differences of opinion in the theoretical literature as to whether classification (predictive DFA) and interpretation of discriminating functions (descriptive DFA) analyses should be undertaken together (in the same analysis for the same sample), for a range of mathematical and conceptual reasons (Huberty & Hussein, 2003). However, this practise is routinely evident in the literature and will be used in the current series of studies with the following precautions:

(i) Most of the discriminant analyses undertaken will be used in the context of two-group (rather than multi-group) situations. Even the most ardent critics of the practice of combining predictive and descriptive DFA recognise that for the 2 group situation, though mathematical equations differ, results are identical (Huberty & Hussein, 2003);

(ii) Whilst over-fitting of data is an obvious limitation to post hoc prediction (using an equation derived from a sample to then classify the same sample into groups), this analysis nevertheless provides an upper-limit estimate of the utility of the discriminating function (Statsoft, 2005; Tabachnick & Fidell, 2001). Were this upper limit classification impressive, one might invest more time in further investigating this relationship with a new sample; and, finally,

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27 It is recognized that the resultant classification process would not be mutually exclusive (but rather would re-classify all participants), but nevertheless, it would constitute support for heterogeneity of some kind.
(iii) SPSS DISCRIM is one program that has been designed to yield information pertaining to both classification and description (its designers do not share the concerns of Huberty & Hussein (2003)).

In each of the studies to follow, DFA has progressed with source level traits first as suggested by Plomin et al., (1997), so as to explore the greatest diversity of possible trait combinations. Emergent traits have then been considered where indicated by demonstration of adequate psychometric properties of these constructed scales. Consideration was given to constructing typologies reflecting motivational traits but was not pursued due to Asendorpf's (2003) findings which persuasively put the statistical case for the superiority of personality dimensions over ‘types’ when predicting personality correlates, even when configural relationships are hypothesised.

Finally, Tabachnick & Fidell (2001) and Broughton (1984) have noted that DFA is the form of analysis where there is the greatest variability in style of reporting due to the multiple purposes and differing levels of analysis of results. In this study, once again, the most sense-making presentation of results will be pursued for each study (Patton, 1990).

Now that the principles and central practices underlying the methodological decisions and data analytic practices have been elucidated, the specific methodology, results, data analysis and interpretation for each study will be presented in turn.
CHAPTER 3.

STUDY 1

A longitudinal, archival study of traits and sporting exceptionality in 5000 elite
Australian sportsmen and women

‘When John Landy stopped to help pick up Ron Clarke...he’s acclaimed for eternity
for that. If you fell over in front of Herb Elliot, he’d leave a set of spike marks on you’
Olympian, Study 3

Study 1 adopted a large scale, predominantly quantitative approach, supplemented by
case studies, to address perhaps the longest standing issue in sport personology: Do
successful sportspeople share a particular constellation of identifiable, personality
characteristics? The pathways model would suggest diversity at the level of source traits,
emergent traits and motivational traits amongst elite competitors. This archival study of
more than 5000 personality profiles of elite sportsmen and women provides a valuable
opportunity to explore this issue in some depth.

The methodological parameters for investigating this issue flow directly from the
framework emerging from the knowledge review, specifically:
1. Restriction of the sample to elite sportspeople, including those who were
   exceptionally successful at this level and those who were considered to have potential
to be so;
2. The use of profiling in the context of multivariate analysis rather than combinations of single construct measures and univariate or bivariate analyses;

3. Measurement of a broad range of attributes suggested to be relevant personality traits;

4. A longitudinal design to allow for (i) accurate classification of each participant’s ultimate level of achievement (ii) exploration of long term impact of personality on achievement and (iii) to explore the maturation of personality itself; and

5. Multiple comparisons at different levels of inquiry using the same sample and the same measure. In this study, consideration will be given to differences between sports, sporting types and levels of achievement using the same participants and the same profiling instrument. Uniquely, where these groups were compared to one another, they were carefully matched according to sport, gender, age, and year of testing.

In this context, the first question posed, is whether those sportspeople who are considered to have sporting ability or potential, along with opportunity, can be systematically differentiated as a function of characterological differences. Specifically,

1. Are different sports home to representative, homogenous personality types. This question looks for interactive relationships between personality, choice of sport and success – broadly a role for personality in selecting a productive, personality-consonant environment and then enabling survival within that environment.

2. Do Olympians have different and homogeneous personality profiles when compared to those who were considered to have potential but did not make it? This question
relates to the issue of personality as an enabling force at the point of transition between being elite and becoming ultimately successful at the elite level;

3. Are multiple Olympians different from one-time Olympians? This addresses the issue of whether, once personality begins to take effect at the elite level, it impacts on the longevity of success; and

4. Are medal winning Olympians different from non medal winners? That is, does personality have a more acute role, that of enabling success in a major tournament?

Each of these questions takes a somewhat different approach to addressing the same issue, but, importantly, all questions are answered utilizing the same sample of elite sportspeople (as suggested by Geron, Furst & Rotstein, (1986)).

Uniquely, in analyses focusing on Olympians, every effort was then made to match each Olympian with a non-Olympian from the same sport, of similar age and same gender, and tested on the TAIS within the same year. This allowed closer exploration of personality as it related to subsequent long term performance outcomes. The latest testing for this sample was 1996, and Olympic selection and performance was tracked through until the Athens 2004 Olympic Games – more than the elite career span of most sportspeople. While it is acknowledged that this remains a somewhat gross outcome measure, it is a more fine grained analysis than relative skill level between elite and non-elite samples. Moreover, matching samples in this way, is something not previously undertaken with such a high performing group of individuals.
The second phase of analysis in Study 1 addresses the question of whether the supraordinate traits proposed in the pathways framework are identifiable using this dataset. That is, are the emergent stress-salient traits of resilience, optimism, control, challenge and commitment salient in this sample; and, if so, are the motivational traits of mental toughness (Type I & II), hardiness and controlled vulnerability evident in this sample? These questions were addressed using conceptually based scales, constructed using TAIS items (as discussed in Chapter 2).

A final issue addressed by this study is whether personality changes over time for elite sportsmen and women as suggested by the pathways framework. This question speaks to the relative utility of process models of personality (cf. Barrett-Lennard, 2003, 2005; Mearns & Thorne, 2000) (as opposed to purely structural, trait models) in understanding elite sporting success. Personality change was assessed from test-re-test data.

**METHODOLOGY**

**Participants**

Participants included sportsmen and women who attended the Australian Institute of Sport between 1983 and 1996 and who have competed at the elite level or who have been identified as having the potential to do so (Bond, personal communication, 1997). Whilst attending the AIS they have completed a TAIS protocol as a routine part of the psychological assessment service. Some are residents at the Australian Institute of Sport.
and participants in the AIS elite programs, but most are located in their home states and receive coaching and sport science services through the satellite institutes in each state. It is important to note that the purpose of routine profiling was not talent identification or selection but rather, explicitly, to help athletes improve their concentration skills, for team building and to improve communication between athletes and their coaches (Bond & Gross, 1990). This is relevant in evaluating the validity of the profiles in this dataset. Open and honest responding to the TAIS has been encouraged by this method of use.

Over 6000 TAIS profiles in the AIS database have raw scale scores recorded. A subsample of 1500 sportsmen and women have individual item profiles.

Measures

*Personality profiling: The TAIS*

The TAIS is a 144 item profiling inventory developed by Nideffer (1976) to test his theory of attentional and interpersonal style. There are six subscales that purport to measure attentional style and 2 sets of subscales assessing personality variables. These two latter sets of scales include ten subscales assessing interpersonal style, and two measuring dispositional elements of behavioural and cognitive control. More specifically these include the list of scales in Table 3.1 and subsume a significant, but not exhaustive, number of those traits emerging as potentially relevant from the knowledge review:

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1 A copy of the questionnaire could not be appended due to copyright restrictions.
Table 3.1: Description of TAIS attentional and interpersonal scales (from Nideffer, 1974)

<table>
<thead>
<tr>
<th>TAIS Attentional Scale descriptions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BET</strong></td>
<td><strong>Broad external attentional focus</strong>: High scorers describe themselves as able to effectively integrate many external stimuli at once.</td>
</tr>
<tr>
<td><strong>OET</strong></td>
<td><strong>Overloaded by external stimuli</strong>: High scorers make mistakes because they become confused and overloaded with external stimuli (e.g. distracted)</td>
</tr>
<tr>
<td><strong>BIT</strong></td>
<td><strong>Broad internal attentional focus</strong>: High scorers indicate that they can integrate ideas and information from several sources</td>
</tr>
<tr>
<td><strong>OIT</strong></td>
<td><strong>Overloaded by internal stimuli</strong>: High scorers make mistakes because they confuse or distract themselves by thinking about too many things at once</td>
</tr>
<tr>
<td><strong>NAR</strong></td>
<td><strong>Narrow attentional focus</strong>: High scorers describe themselves as able to being able to narrow their attention when they need to, to sustain concentration.</td>
</tr>
<tr>
<td><strong>RED</strong></td>
<td><strong>Reduced attentional scale</strong>: The higher the score, the more individuals make mistakes because they narrow their attention too much.</td>
</tr>
</tbody>
</table>

**Control Scales:**

| **INFP** | **Information Processing**: High scorers tend to process a great deal of information |
| **BCON** | **Behaviour Control**: High scorers have trouble delaying gratification. Low scorers tend to play by the rules |

**Interpersonal Scales:**

| **CON** | **Control Scale**: A high score indicates the person is in control of most situations and he/she attempts to take charge |
| **SES** | **Self Esteem**: High scorers tend to think highly of themselves & present as confident |
| **DEP** | **Depression**: High scorers indicate the person gets down on themselves, feels guilty, ashamed and a burden to others |
| **PO** | **Physical Orientation**: High scorers enjoy participating in competitive sports. |
| **OBS** | **Obsessive**: High scorers tend to ruminate and worry without resolution. Low scorers make decisions quickly |
| **EXT** | **Extroversion**: High scorers are outgoing and need to be with other people. They like being the centre of attention |
| **INT** | **Introversion**: A high score indicates the person likes to be alone, enjoys quiet times but does not necessarily dislike people |
| **IEX** | **Intellectual Expression**: A high score indicates the person expresses his or her thoughts or ideas to others. They like to talk |
| **NAE** | **Negative Affective Expression**: High scorers express angry or negative feelings to other. They are often critical of others and themselves |
| **PAE** | **Positive Affective Expression**: High scorers express feelings of affection to others both physical & verbal. Such people like others and need to be liked |

---

2 On the TAIS a person can score high on extroversion AND introversion

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The TAIS is underpinned by Nideffer's theory of attentional and interpersonal style which suggests that while individuals can master and utilise a range of attentional mechanisms and interpersonal skills in the course of their daily lives, individuals begin to lose control over their ability to alter their behaviour to systematically fit the demands of their environment when they are under pressure. Instead, they revert to preferential styles or traits which may or may not be the most appropriate or effective for the situation. Thus, it is important for an individual to understand their likely behaviour under pressure. If they have a strong desire to be in control of their environment, then when they are under pressure, they will seek control even if it is not functional to do so.

Nideffer's theory does not see any particular behaviour(s) or attentional styles as good or bad, instead, the functionality of the behaviour is evaluated in terms of the accomplishment of the desired objectives. Introversion for example is not viewed as a negative interpersonal characteristic as it is in some other theories, nor even as the opposite of extroversion as it is in many trait theories. Nideffer believes that some situations will be most successfully navigated by working alone, others will be best handled through teamwork and the ability to work with others. Similarly a disposition toward focussing on detail has some advantages and some disadvantages depending on the situation.

The TAIS measures personality traits as they relate to interpersonal style. In this sense, Nideffer's theory also has some consonance with Barrett-Lennard's (2005) view, that we
are all defined in terms of our relationships with others. While not all items explicitly relate to interpersonal interactions, they putatively relate to likely reactions in social situations.

Since its development, the TAIS has been one of the most widely cited measures in sport psychology practice and sporting research (Summers & Ford, 1990). However it has also been widely criticized. When examined more closely, the critiques of the TAIS have focused almost exclusively on the attentional subscales rather than the personality subscales (Maynard, & Howe, 1989; Summers & Ford, 1990; Summers, et al., 1991; Van Schyock & Grasha, 1981). Moreover, the main criticism has been the ill-founded nature of the suggestion that attentional processes can be accessed by self-report and the lack of predictive validity of the attentional scales in differentiating between groups of different sporting skill level. There is much evidence in the expertise and clinical literature to suggest that the former claim is well founded – that attentional processes of the type used in elite sport, are likely to be pre-conscious and not accessible to reflection (Mathews & MacLeod, 1994). Thus, utilizing these scales as measures of attentional style ought be avoided. However, in undertaking a rational approach to item evaluation of the TAIS, it seems clear that many of the items in the attentional scales are not dissimilar to items incorporated as part of other personality scales (e.g. Item 2 on the TAIS ‘The world seems to be a booming buzzing brilliant flash of color and confusion’ compared with an item from the NEO, ‘I’m attracted to bright colours and flashy styles’). This observation is also supported by two other facts. Firstly, twenty attentional items also contribute to personality scales in the scoring of the TAIS and, secondly, the psychometric analyses
presented by Nideffer show that these attentional scales are indeed correlated with other measures of personality such as the MMPI and MPI (Nideffer, 1976). Thus, it was decided to initially include the ‘attentional’ scales in this study as measures of dispositional characteristics, but not necessarily attentional style.

With regard to the personality (interpersonal) scales on the TAIS, a review of the literature identified no peer-reviewed, published studies that had utilized these scales (much less found them wanting). To understand how this interesting situation has arisen we need to refer back to the historical context in which it occurred. When the TAIS emerged there was declining interest in sport personology and growing interest in issues such as task expertise and state based phenomenon. Thus, Nideffer’s theory of attentional style provided the impetus for an exciting new research program within the sporting community whilst the interpersonal style component of the theory was almost entirely ignored. Interestingly, in recent times, Nideffer has re-presented his theory for evaluation by the sport science community and re-stated the relevance of both the personality and attentional components of the theory.

In the absence of competing evidence suggesting that the personality scales ought not be used, we are left with three sources of information to help make a judgement about the psychometric status of the scales. The first is Nideffer’s original published paper in which he detailed the psychometric properties of the TAIS and reported adequate correlations between the personality scales and the MMPI & MPI (Nideffer, 1976). The second is the conceptual basis underlying the original construction of the scales. In this regard, it is
relevant to note that Nideffer’s measure is one of the few behaviourally anchored personality measures available which is seen as an important feature by the interactionist personality school (Pervin, 1993). Moreover the measure is derived from a theory in which the underlying constructs have been researched (Nideffer, 1976, 1989). The third available avenue for assessing the validity of the TAIS personality scales are a string of non-peer-reviewed and largely undated papers published on Nideffer’s website. In the same way as Tutko and Ogilvie have been criticised for not submitting their findings to the scrutiny of the scientific community, so Nideffer and his colleagues could be so accused. Certainly caution needs to be exercised in blindly accepting the validity of non-peer-reviewed work. However, given that such caution has been highlighted, these articles do purport to support the validity and utility of the personality scales in several ways. Specifically: test-retest data suggests adequate reliability; the scales relate sensibly to a range of other measures; and there is a credible 5 factor version of the TAIS derived from the original scales. There is also an article posted by Nideffer, Bond, Cei, & Manili (n.d.) which reports differential profiles for world champions and Olympians compared to less successful sportspeople. A more detailed summary of these unpublished findings is provided in Appendix 5.

Taken together, albeit cautiously, it is possible that the TAIS may be a helpful measure of personality and broader dispositional characteristics, both intrapersonal and interpersonal. Moreover, it may be useful in identifying the nature of personality changes over time and identifying chronically successful profiles at the highest levels of competition. Thus, Study 1 will utilize this pre-existing but largely unexplored resource.
RESULTS & DISCUSSION

(relevant SPSS output files for all stages of Study 1 can be found in Appendix 6)

Analyses were pursued in several stages which form the skeleton for this presentation and discussion of results, specifically:

Stage 1: The psychometric properties of the TAIS were explored for this sample of elite sportspeople, using the processes outlined in Chapter 2. Several different scale structures were considered for viability, specifically:

i. The original TAIS scale structure;

ii. A 5 factor version of the TAIS (in recognition of the ‘Big 5’ model of personality dominant in Psychology at present); and

iii. A pathways version of the TAIS. In this version, items were restructured to conceptually reflect measures of the emergent stress-salient traits from the pathways framework, specifically, resilience, optimism, control, commitment, and challenge. The psychometric qualities of these constructed scales were evaluated.

Stage 2: Investigation of this large sample was undertaken using the most supportable solutions from Stage 1 in a series of discriminant functions analyses attempting to predict membership of:

iv. Different sports
v. Different sporting types

vi. Different levels of achievement

Stage 3: In light of disappointing findings in Stage 1, a further data analytic iteration was called for, given the popularity of this instrument in applied practice. Specifically, a final opportunity was provided for the TAIS to demonstrate its utility by selecting the *most robust* of the original scales and attempting to apply them to the task of differentiating elite sporting performers.

Given the reflective stance advocated by the mixed methods research school, the reporting of findings in this study as in those to follow will provide a greater degree of detail regarding the decision making process in data analysis than is generally common when using more quantitative methodologies. Greater reflection in the use of quantitative methods has been advocated on the grounds that an interpretive frame is just as important in justifying and contextualising quantitatively derived findings as qualitative (Patton, 1990). In the current study, as argued earlier, the historical 'moment' in the discipline is also one in which deeper description is essential, given the diverse array of methods and analyses in the sport personality literature to date.

In terms of order of presentation, the tradition of the qualitative school will be adopted wherein results and discussion co-occur to support (lead the reader through) a dynamic, emerging process of data analysis.
**Data screening**

Preliminary data screening involved (i) examination of descriptive statistics and graphic representations of group data, and (ii) ‘case-reading’ (or proofreading) the dataset at the level of the individual and sporting groups to assist in interpretation. Both forms of analysis are considered helpful with large datasets, the former in identifying any systematic coding errors or generically notable features, the latter, in alerting the researcher to potentially relevant analytical questions (Patton, 1990). Both forms of screening proved fruitful in identifying replicated cases, repeat testing of individuals (only the first testing was considered for these analyses except where repeat testing was helpful such as in establishing test-retest reliability), ambiguous classification of sport personnel as ‘athletes’ (e.g. incongruous ages (outliers) drew attention to possible mis-codings of coaching staff as players and were followed up through internet searches or contacting National Sporting Organisations for clarification), gender mis-codes, and missing data such as the sport played (which was clarified using various references and by contacting National Sporting Organisations). A selection of cases identified as outliers were considered as individual case studies to assess possible response biases (e.g. acquiescent response sets or extreme responding).

**Item normality**

Item statistics were examined for each of the 144 TAIS items and graphical representations of frequency scrutinised. This latter method was utilized to evaluate the
noteworthiness of departures from normality, given the large sample size which renders standard statistical tests of normality ineffectual (Tabachnick & Fidell, 2001). Given the fact that any 5-point Likert response scale is likely to result in some degree of skewness in graphical form, a 4 category system was used to classify item distributions as symmetrical, slightly non-symmetrical, moderately non-symmetrical or severely non-symmetrical (which collapsed Tabachnick & Fidell’s (2001) distinction between severely skewed distributions and extremely severe or ‘L-shaped’ distributions (p.82-82)). Fifty of 144 items (35%) had a roughly symmetrical, distribution while the remainder had a notable degree of skewness or kurtosis in either a positive or negative direction. Thirty-eight percent were classified as slightly non-symmetrical, 19% moderately non-symmetrical and 8% severely non-symmetrical. Restriction of range can lead to deflated correlations and has the potential to severely undermine multivariate statistical techniques, so it is important to establish the cause of such skewness (Ware & Gandek, 1998). The severely skewed items in this case, included attentional items such as ‘I get confused at busy intersections’ (item 64), which was positively skewed (strongly disagree), ‘Sometimes lights and sounds come at me so rapidly they make me lightheaded or dizzy’ (item 70) which was negatively skewed (strongly disagree); and, a range of items relating directly to sporting ability such as ‘I engage in physical activity’ (item 76), ‘I enjoy physical activity’ (item 87) and ‘I compete(d) athletically’ (item 88) all tended strongly toward the Strongly Agree end of the scale. While the TAIS is not a sport-specific inventory, AIS athletes are instructed to use ‘sporting colleagues as a frame of reference’ and to answer questions ‘as they are relevant to your sport’. Therefore it is unsurprising that most of these talented sportsmen and women might consider themselves
more physically oriented than their less talented sporting peers and not rate themselves as being unable to handle excessive attentional stimuli more than their lesser talented sporting counterparts. In some ways it is surprising that any members of this sample might score these items as Strongly Disagree and yet a small percentage did so. Closer scrutiny suggests that where questions relating to athleticism were scored low, it was typically by individuals in sports where ‘athleticism’ is perhaps not considered to be a necessary feature of skilled performance (e.g. bowls or shooting). These responses thus seem to accurately reflect true features of the elite or pre-elite sporting population. Less intuitively, items such as ‘I can keep a secret’ (item 94) were strongly positively endorsed though there were no other signs of response sets underpinned by social desirability; and item 111 ‘I wish I had lived in another time’, strongly negatively endorsed, perhaps suggesting that these individuals feel fortunate to have the opportunity to develop their sporting talent in a way that may not have been possible at other points in history.

Unfortunately, given the lack of published item analysis data (or psychometric data in general) on the TAIS, it is impossible to gauge how, or indeed, if, these non-symmetric distributions differ from the non-sporting population or the less competitive sporting population. However, given the departures from symmetry associated with a significant number of items and the potentially undermining effects on multivariate analytic techniques, consideration was given to transformation of responses to these items. The points below justify the final decision not to pursue transformation.

Large sample sizes are the best defense against the impact of non-normality (Kline, 1994). When considering potential benefits and costs of transformation, Tabachnick &
Fidell (2001, p.72) indicate that 'underestimates of variance associated with positive kurtosis...disappear with samples of 100 or more cases; with negative kurtosis, underestimation of variance disappears with samples of 200 or more' (Tabachnick & Fidell, 2001, p.74-75), moreover 'In a large sample, a variable with significant skewness often does not deviate enough from normality to make a substantive difference in the analysis' (p.74). In this case, two samples were primarily utilized, one of 5119 sportsmen and women, the other, a subsample of 1372. In both cases, these sample sizes were in excess of power requirements except for a small number of non-inferential analyses conducted utilizing subsamples of Olympians. Other factors moderating the impact of non-symmetry in these instances will be discussed below.

Each kind of statistical technique is affected to different degrees by non-normality of scales or non-symmetry of items. Factor analysis and discriminant functions analysis will be utilized in this study. Tabachnick & Fidell (2001, p.588) indicate that for exploratory factor analysis 'assumptions regarding the distributions of variables are not in force'. Multivariate normality is only enforced when 'statistical inference is used to determine the number of factors' (p.588) such as in maximum likelihoods method of factor analysis. This method will not be used. With respect to discriminant functions analysis, Tabachnick & Fidell (2001) indicate that 'Classification makes fewer statistical demands than does inference' and that discriminant functions analysis is 'robust to failures of normality if violation is caused by skewness rather than outliers' (p.461-462) as it is in this case (see comments below on outliers). With grouped data and discriminant functions analyses, the assumption of normality 'is evaluated with respect to the sampling
distribution of means (not the distribution of scores) and the Central Limit Theorem predicts normality with decently sized samples' (Tabachnick & Fidell, 2001, p.80, emphasis added). Finally, sample exploratory transformations following the guidelines set down by Tabachnick & Fidell, 2001, p.82-83) did not result in improved distributions. Tabachnick & Fidell (2001) also warn that transformation is 'not universally recommended' and that, 'If the scale is meaningful or widely used, transformation often hinders interpretation' (p.80). Each of these points has relevance to the TAIS. Taken together, these arguments supported a decision in the current case, not to transform the data.

**Missing values**

Missing value analysis showed that no item had more than 2% of cases missing. There did not seem to be any systematic pattern to missing data though most cases had at least one item missing. This is not uncommon when completing such a lengthy questionnaire. For most analyses, cases with missing data were excluded from the analyses to which it was relevant. This was the most supportable option with such a small rate of missing data and random pattern of missing data and in the context of such a large dataset (excess to requirements in its totality) (Tabachnick & Fidell, 2001). However, in some analyses of smaller subsets of data (e.g. of medal winning Olympians), missing values were replaced with a midscore of ‘2’ as is the tradition in scoring the TAIS which assisted in preserving power through maximizing the number of available participants. This is indicated in the text where relevant.
Outliers

Unsurprisingly with 5 point scaled items, there were no univariate outliers at the item level - all scores on the Likert scale were utilized for every item. Univariate and multivariate outliers were however identified (using a combination of stem-and-leaf plots and box plots as per Kinnear & Gray, 2004) for the summed, weighted scales resulting from the factor analysis of these items and these cases were removed from the relevant analyses. Outliers are particularly problematic for discriminant functions analysis (Tabachnick & Fidell, 2001). Where subsets of the data were being used, such as the comparison between Olympians and matched non-Olympians from the same sport, these cases were replaced with an appropriately comparable case where necessary to preserve power and equal cell sizes (i.e. from the same sporting code and of the same gender and matched as closely as possible on age and time since completion of the TAIS).

Linearity and homogeneity of variance-covariance

Linearity amongst variables is necessary for factor analysis as it is based on correlations between variables. Linearity amongst pairs of individual items however, is difficult to assess with such a large matrix. It is likely that there will be some violations given the non-symmetry of the distributions of some items as reported above. However, the same argument applies here as for those individual items – large sample size is the best defense (Kline, 1994). Similarly, in discriminant functions analysis ‘violation leads to reduced
power rather than increased 'Type 1 error' (Tabachnick & Fidell, 2001, p.463). Scatterplots for the first two discriminant functions were viewed for each analysis to assess homogeneity of the variance-co-variance matrices and were adequate in all instances as assessed by their general equality of their overall size (Kinnear & Gray, 2004; Tabachnick & Fidell, 2001).

Demographics

Sample 1: TAIS scale scores only (n=5119)
(i.e. no individual item scores)

Demographics of this sample of 5119 sportsmen and women are summarized in Table 3.2 and Figure 3.1. There were 1583 sportswomen (30.9%) and 3532 sportsmen (69.0%) though obviously gender representation varied across sports. Ages at testing ranged from 8 to 60 years (mean 22.5yrs). Not surprisingly, most of these sportsmen and women were in their late teens and early twenties though some sports such as Bowls, which is a Commonwealth Games sport, had a much higher mean age of participants. Fifty-five separate sports were represented, in variable numbers with no single sport accounting for more than 9.1% of the sample (swimming was highest). Sporting groups could be further categorized, according to Nideffer & Bond’s (1989) ‘types’: as closed skill sports (such as diving, gymnastics, shooting, golf, archery and skating (n=1140 (22%)); a combination of open-skilled individual sports involving one on one competition including judo, wrestling, fencing, squash and tennis, and sports that require the individual to react to the
environment such as cycling, canoeing, skiing, and kayaking (n=1825 (36%)); and team sports such as baseball, basketball, soccer, hockey, netball, lacrosse and volleyball (n=2154 (42%)). It is acknowledged that this particular taxonomy of sport type is but one of a number advocated in the literature, each struggling with different ‘grey areas’ of classification. In this instance, for example, team sports could also be considered ‘Open’ sports in almost all instances. However, given that this classificatory system has been developed by Nideffer, the author of the test being used in this study, in collaboration with the Jeff Bond, former Head of the Sport Psychology program at the Australian Institute of Sport where the data utilized in the current study were collected, it was decided that this classification system might be particularly pertinent to the dataset. A full listing of sporting disciplines according to these ‘types’ can be found in Appendix 7.

Sample 2: TAIS item scores and scale scores (n=1376)

Demographics of this subsample of 1376 sportmen and women are summarized in Table 3.2 and transposed against the larger sample in Figure 3.1. There were 395 (28.7%) sportswomen and 980 (71.3%) sportmen. Ages at testing ranged from 13 to 68 (Mean=23.5yrs). Fifty-one separate sports were represented, albeit not in equal numbers (the upper outliers were golf (20.3%) and rowing (16.6%)). Sporting ‘types’ included 371 (27%) participants in closed skill sports, 537 (39%) in ‘open’ sports and 468 (34%) in team sports.
Figure 3.1: Age ranges for the sample of sportspeople attending the AIS & for whom (i) TAIS scale scores were available (n=5119) and (ii) for whom both scale scores and item scores were available (n=1376).

It can be seen from Table 3.2 and Figure 3.1 that these two samples, the larger with only scale scores and the smaller sample with both item and scale scores, are comparable in terms of both age and gender distribution. While there are some differences in terms of the relative size of the representation for specific sports, it is clear that both samples include a diverse range of sports. Even in the smaller sample (i.e. profiles containing both item and scale scores), 8 sporting codes were each represented by more than 50 participants which is a large group in the context of previously published studies.
Table 3.2: Sports played by sportsmen and women attending the Australian Institute of Sport, Canberra for TAIS profiling between 1983 and 1996

<table>
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<tr>
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<th>Percent</th>
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</tr>
<tr>
<td>Biathlon</td>
<td>10</td>
<td>0.7</td>
<td>49</td>
<td>1.0</td>
</tr>
<tr>
<td>Bobsleigh</td>
<td>19</td>
<td>0.4</td>
<td>71</td>
<td>1.4</td>
</tr>
<tr>
<td>Bowls</td>
<td>11</td>
<td>0.8</td>
<td>28</td>
<td>0.5</td>
</tr>
<tr>
<td>Canoeing</td>
<td>11</td>
<td>0.8</td>
<td>85</td>
<td>1.6</td>
</tr>
<tr>
<td>Cricket</td>
<td>1</td>
<td>0.1</td>
<td>55</td>
<td>1.1</td>
</tr>
<tr>
<td>Cycling</td>
<td>12</td>
<td>0.9</td>
<td>71</td>
<td>1.4</td>
</tr>
<tr>
<td>Darts</td>
<td>1</td>
<td>0.1</td>
<td>49</td>
<td>1.0</td>
</tr>
<tr>
<td>Diving</td>
<td>1</td>
<td>0.1</td>
<td>24</td>
<td>0.5</td>
</tr>
<tr>
<td>Equestrian</td>
<td>30</td>
<td>2.2</td>
<td>51</td>
<td>1.0</td>
</tr>
<tr>
<td>Fencing</td>
<td>1</td>
<td>0.1</td>
<td>23</td>
<td>0.4</td>
</tr>
<tr>
<td>Gliding</td>
<td>46</td>
<td>3.3</td>
<td>51</td>
<td>1.0</td>
</tr>
<tr>
<td>Golf</td>
<td>279</td>
<td>20.3</td>
<td>313</td>
<td>6.1</td>
</tr>
<tr>
<td>Gymnastics</td>
<td>2</td>
<td>0.1</td>
<td>44</td>
<td>0.9</td>
</tr>
<tr>
<td>Hang-Gliding</td>
<td>5</td>
<td>0.4</td>
<td>5</td>
<td>0.1</td>
</tr>
<tr>
<td>Hockey</td>
<td>70</td>
<td>5.1</td>
<td>236</td>
<td>4.6</td>
</tr>
<tr>
<td>Ice-Racing</td>
<td>1</td>
<td>0.1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Ice skating</td>
<td>3</td>
<td>0.2</td>
<td>44</td>
<td>0.9</td>
</tr>
<tr>
<td>Judo</td>
<td>10</td>
<td>0.4</td>
<td>65</td>
<td>1.2</td>
</tr>
<tr>
<td>Karate</td>
<td>55</td>
<td>4.0</td>
<td>63</td>
<td>1.2</td>
</tr>
<tr>
<td>Lacrosse</td>
<td>26</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luge</td>
<td>3</td>
<td>0.2</td>
<td>23</td>
<td>0.4</td>
</tr>
<tr>
<td>Modern Pentathlon</td>
<td>1</td>
<td>0.1</td>
<td>34</td>
<td>0.7</td>
</tr>
<tr>
<td>Motorcycling</td>
<td>1</td>
<td>1.0</td>
<td>3</td>
<td>0.1</td>
</tr>
</tbody>
</table>
When smaller subsamples of these datasets were utilized for particular analyses demographic information was compared to assess representativeness of the sample (and will be presented throughout the Results section in the relevant context except where this may prove identifying of individuals). In all instances, the primary age groups were represented, the gender split was comparable and a wide range of sports were represented, including sports from each of the categories listed above. For the level of analysis being pursued, adequate demographic comparability was established in each subsample used throughout these series of analyses.

**The original TAIS scales**

**Psychometric analysis**

Each of the original 18 TAIS scales defined by Nideffer (1976), were submitted to psychometric analysis. A summary can be found in Table 3.3 and will provide the basis for the discussion that follows.

Testing scale validity and reliability was a process that incorporated several stages as outlined in Chapter 2. Cronbach’s alpha for each scale is reported first. Ware & Gandek’s (1998) guidelines for multitrait evaluation are then addressed. Item and scale –level descriptives were considered. Test-retest reliability will then be reported and was afforded by the existence of a number of repeat testings of some participants, in one case on 5 separate occasions!
Table 3.3 *Item and scale psychometric data for each of Nideffer’s 18 TAIS scales*

<table>
<thead>
<tr>
<th>Attentional Scale</th>
<th>Alpha</th>
<th>Corrected item-scale correlation</th>
<th>No. of items in scale</th>
<th>Scale mean</th>
<th>Scale Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BET</td>
<td>.64</td>
<td>.33-.41</td>
<td>6</td>
<td>15.28</td>
<td>3.11</td>
</tr>
<tr>
<td>OET</td>
<td>.70</td>
<td>.17-.48</td>
<td>12</td>
<td>17.77</td>
<td>5.37</td>
</tr>
<tr>
<td>BIT</td>
<td>.69</td>
<td>.27-.52</td>
<td>8</td>
<td>19.89</td>
<td>4.01</td>
</tr>
<tr>
<td>OIT</td>
<td>.71</td>
<td>.22-.56</td>
<td>9</td>
<td>13.56</td>
<td>4.44</td>
</tr>
<tr>
<td>NAR</td>
<td>.64</td>
<td>.06-.55</td>
<td>12</td>
<td>26.02</td>
<td>5.20</td>
</tr>
<tr>
<td>RED</td>
<td>.62</td>
<td>.00-.45</td>
<td>15</td>
<td>25.33</td>
<td>5.48</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Personality Scales</th>
<th>Alpha</th>
<th>Corrected item-scale correlation</th>
<th>No. of items in scale</th>
<th>Scale mean</th>
<th>Scale Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFP</td>
<td>.72</td>
<td>.02-.43</td>
<td>19</td>
<td>45.95</td>
<td>7.10</td>
</tr>
<tr>
<td>BCON</td>
<td>.65</td>
<td>.14-.41</td>
<td>13</td>
<td>21.29</td>
<td>5.58</td>
</tr>
<tr>
<td>DEP</td>
<td>.67</td>
<td>.29-.50</td>
<td>5</td>
<td>6.81</td>
<td>2.84</td>
</tr>
<tr>
<td>SES</td>
<td>.77</td>
<td>.26-.51</td>
<td>13</td>
<td>31.62</td>
<td>6.15</td>
</tr>
<tr>
<td>P/O</td>
<td>.71</td>
<td>.23-.51</td>
<td>7</td>
<td>20.47</td>
<td>3.96</td>
</tr>
<tr>
<td>OBS</td>
<td>.42</td>
<td>.02-.28</td>
<td>9</td>
<td>15.19</td>
<td>3.56</td>
</tr>
<tr>
<td>EXT</td>
<td>.73</td>
<td>.16-.58</td>
<td>14</td>
<td>30.76</td>
<td>6.54</td>
</tr>
<tr>
<td>INT</td>
<td>.61</td>
<td>.10-.47</td>
<td>11</td>
<td>20.87</td>
<td>4.83</td>
</tr>
<tr>
<td>IEX</td>
<td>.65</td>
<td>.09-.48</td>
<td>8</td>
<td>16.89</td>
<td>4.25</td>
</tr>
<tr>
<td>NAE</td>
<td>.79</td>
<td>.25-.64</td>
<td>9</td>
<td>13.19</td>
<td>5.25</td>
</tr>
<tr>
<td>PAE</td>
<td>.69</td>
<td>.03-.61</td>
<td>9</td>
<td>21.78</td>
<td>4.62</td>
</tr>
<tr>
<td>CON</td>
<td>.75</td>
<td>.06-.45</td>
<td>20</td>
<td>48.77</td>
<td>7.72</td>
</tr>
</tbody>
</table>

**Internal Consistency**

Eight scales reached the critical reliability threshold for Cronbach’s alpha of 0.70 (Nunnally, 1978), only two of those were attentional scales (see Table 3.3). Concerningly, no scales reached the 0.80 limit deemed more appropriate for existing scales and more worrisome therefore, no scales reached the 0.90 criteria for tests used in applied contexts where they may have their most direct and significant impact (Kaplan &
Saccuzzo, 2005). It should be noted that each scale includes items that also contribute to other scales. Some had more of these dual-functioning items than others (see Appendix 6 for a listing of item-scale relationships). Fourteen scales had items which, upon their removal would noticeably improve alpha for the scale, but in only two instances (PAE & OET) would the removal of the items result in alpha greater than 0.70.

Multi-trait evaluation criteria

The multi-trait evaluation criteria outlined in Chapter 2 also produced variable results. The most salient findings from the assessment of the goodness-of-fit of items within a scale were that only very few items reached the corrected item-scale correlation minimum of 0.4 suggested by Ware & Gandek (1998), suggesting poor internal consistency. Further, there was inequality of item-scale correlation (as evidenced by the range of CIT in Table 3.3). In terms of scale level descriptives, graphic representations suggested that most scales were reasonably normally distributed.

Personality change over time or test-retest reliability?

808 sportsmen and women in this sample had been retested at some point - some on the same day (!), others more than 6 years later. Same-day testing was excluded from consideration in this analysis as was testing in less than a one month time period to prevent random carryover effects (Kaplan & Saccuzzo, 2005).
One hundred and nineteen participants had been retested between 1 and 6 months after their initial test. Correlations between testings on attentional scales ranged from .478 (NAR) to .649 (BET). Correlations between testings on personality scales ranged from .428 (DEP) to .809 (NAE). One hundred and ninety nine participants had been retested between 1-2 years after initial testing. Attentional correlations ranged from .437 (NAR) to .675 (BIT) and personality correlations, .464 (OBS) and .706 (EXT). After 6 years (n=24), attentional scales ranged from .236 (BET) to .719 (OET) and personality scales from .025 (OBS) to .803 (IEX). Other time intervals were also considered but illustrate the same features. That is, most scales show moderate test-retest correlations but there are certainly exceptions in both directions for attentional and personality scales. Moreover, the general correlations are certainly lower than those reported for other personality scales such as the NEO PI-R which, across a number of studies covering time periods of up to 6 years were found to range from 0.63-0.92 (Costa & McCrae, 1992). This may suggest greater error variance in the TAIS or that it is measuring something that can change markedly with time. If the latter hypothesis were to be supported we might expect to see higher test-retest correlations in the short term than in the long term (when the effects of counseling for example might show an effect at the characterological level). On the whole, this was not discernible in this sample (indeed several scales showed increasing correlations over time), though there were such patterns for some scales.

One reason for this unclear set of results may be the number of times an individual had been tested – up to five times in this dataset. However, even correlations between initial test scores and first retest (n=199) for attentional scales only ranged from r=.54 (NAR) to
r=0.65 (BIT). Personality scales ranged from r=0.50 (OBS) to r=0.72 (EXT). Test-retest reliability between the original testing and the second re-test (for n= 141) indicated lower correlations for all attentional scales and ranged between r=0.32 (NAR) and r=0.57 (OET). The personality scales faired similarly ranging between r=0.38 (INT) and 0.69 (EXT) with Control being the only scale showing a comparable test-retest reliability when a second re-test was undertaken (r=0.65 on first retest and r=0.67 on the second retest). A similar pattern of generally decreasing test retest reliability was found when third retest data (n=67) was compared with the original test with test retest reliability ranging between r=0.27 (broad external focus) and r=0.34 (obsessiveness).

Taken together, these results are somewhat disappointing insofar as the psychometric viability of the TAIS is concerned. However, further investigation was warranted given the broad popularity of this measure as a clinical tool. Factor analysis of all TAIS items was undertaken.

**Factor analysis**

Given the many factor analytic methods available, and the ubiquitous application of these methods, direction was sought from the work of Robert Nideffer, the author of the TAIS, in the selection of factor analytic methods that would be comparable with already published information about the test, either in its original form or a more recent 5 factor supraordinate version of the scales (Nideffer, n.d; see Appendix 5). Unfortunately, in the available literature published on his website and in peer-reviewed journals there was no
evidence of factor analysis of items into scales, not even in the article outlining the original development of the test (Nideffer, 1976a). The original scales were developed using the rational item construction approach and assessed by the significance (p<.01) of the item-(subscale) total correlations. Preliminary analyses were undertaken to establish test-retest reliability, construct validity and predictive validity. In a more recent article, Nideffer (1989) presents two factor analyses of the TAIS scales however, in which he utilized a principal components factor analysis with the popular varimax rotation, and an eigenvalue 1.0 cutoff for inclusion of factors. Given this precedent, in combination with (i) the status of the principal components/varimax combination as the most widely used factor analytic technique (Kline, 1994; Tabachnick & Fidell, 2001) and (ii) Nideffer's stated attempt to conceptualise independent scales (Nideffer, 1976), the same orthogonal version of factor analytic method was initially used in this investigation. All 144 items (including 16 dummy items that do not load on any scale) were included in the analysis. A principal component analysis identified communalities generally in the order of 0.5-0.6 and 36 factors with eigenvalue greater than 1, but the Scree test suggested far fewer useful factors. Eighteen factors were within the factorial order of magnitude suggested by the Scree test and an 18-factor solution was thus pursued to reflect the fact that Nideffer (1976) claims there are 18 scales in the TAIS. Principal Axis Factoring with Varimax rotation, and with 18 factors intentionally extracted, failed to converge in 25 rotational iterations (which is the default set by SPSS as a reasonable number of iterations in which

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3 Given moderate inter-scale correlations, mean correlation between subscale items and total subscale score was used as a cut-off comparison point (cf, Jackson, 1975) to determine the percentage that correlate with the score higher than the mean of the subscale items. The highest percentage of overlap was found to be 0.022 (three items) which was considered satisfactory.

4 Both Principal Components and Principal Axis Factoring were used. Neither showed acceptable results but the latter is a more supportable technique when used in combination with rotation and is thus reported here. In large matrices, however, as used in this study, both techniques produce similar results (Kline, 1994)
a solution should converge) but converged in 28 iterations when the default was over-
ridden. The first factor was a large and undifferentiated conglomeration of attentional
items, but was neither exhaustive nor exclusive. Of the remaining factors, four did not
meet Kline’s (1994, p.72) minimum criteria of being defined by at least 3 variables. Some
of these small factors seemed to be tautologous, reflecting ‘bloated specifics’ or
paraphrased items measuring essentially the same thing (Kline, 1994). Fifteen (of 144)
items do not load on any factor at 0.3 or higher. Kline (1994) has identified 0.3 as the
minimum acceptable level of loading (in the absence of competing loadings on other
scales), with 0.6 being a stronger benchmark, particularly in large samples. Whilst
acknowledging that other personality researchers such as Cattell have often accepted
much lower loadings, Kline’s arguments against this are cogent, as only 9% of the
variance is accounted for in such a solution. The 0.3 criteria will be applied in these
studies. Interestingly, fifteen items also had loadings greater than 0.3 on more than one
factor. Finally, factors do not accord with Nideffer’s (1976) conceptually derived scales,
nor are they easily interpretable, or psychologically meaningful, in many instances.

A subsequent series of factor analyses were undertaken ‘hold(ing) in abeyance well-
learned proscriptions against data snooping’ (Tabachnick & Fidell, 2001, p.609) in the
spirit of factor analysis that marks its uniqueness from other statistical techniques (Kline,
1994). Some dismiss factor analysis as ‘in-credible’ on the basis of the infinity of
mathematically equivalent solutions, however, these solutions presuppose (i) the presence
of an unrotated factor solution that is sensible and (ii) the ability to reach ‘simple
structure’ on rotation in a reasonable number of iterations. As we shall see in the outcome
of this study, neither of these criteria should be taken for granted! Moreover, psychometricians have developed powerful methods of choosing the most supportable solution. Kline’s (1994) criteria for decision making in this regard were followed in this instance. Specifically, Kline (1994) advocates that:

1. Principle components factor analysis is a sensible choice for determining the optimal number of factors, but a credible alternative is the maximum likelihoods approach. The maximum likelihoods technique is statistically more robust, as it provides estimates of the significance of the factors extracted. In this instance, maximum likelihoods was not an available option due to the non-symmetry of a notable number of TAIS item distributions.

2. Principal Axis Factoring (PAF) is to be preferred to Principal Components as a precursor to rotation when an exploration of expected underlying constructs is desired rather than an empirical summary (see also Tabachnick & Fidell, 2001, p.611). However, in a large matrix the two produce very similar results.

3. Despite its popularity, Varimax rotation should generally be avoided in the case of personality tests because it assumes factors to be orthogonal and uncorrelated which is unreasonable in the case of personality traits. Kline suggests oblique rotation instead, and advocates Direct Oblimin in most instances.

PAF with Direct Oblimin was attempted. Eighteen factors were extracted in 12 iterations accounting for 34.3% of the variance and rotated to convergence in 40 iterations. Still four factors contained only two items, again contravening Kline's (1994, p.72) minimum criteria for worthy factors. In the absence of the expected factor structure using PAF, an
empirical summary of the data seemed an appropriate next step and as such a principal components extraction with Oblimin rotation was attempted. This procedure resulted in convergence in 50 iterations and a stronger component (factor) composition with the minimum number of items per factor in the Pattern Matrix being three (in 4 components). However, the components were still not identifiable as Nideffer's scales, or in terms of relevant personality traits emerging from the knowledge review. Additionally there were still combinations of 'attentional' items and personality items with principal loadings in the same components. This was the rule rather than the exception suggesting neither good discrimination between the two elements of the test, nor clear personality factors. Twenty-two items did not load on any component at levels greater than 0.3. More detailed results of this analysis can be found in Appendix 6. Given every opportunity, it was not possible, even with this very large sample, to factor the TAIS according to Nideffer's proposed factors, or, in its totality, in any meaningful way when 18 factors were extracted.

Given the current acceptance of a 5 factor model of personality and Nideffer's (n.d.) own discussion about what a 5 factor equivalent of the TAIS might look like, a five factor solution was considered. PAF was undertaken converging in 4 iterations and accounting for 22.56% of the variance. Direct Oblimin rotation followed, converging in 26 iterations. Four factors were conceptually consistent with 4 of the Big 5 personality dimensions: Neuroticism, Extraversion, Openness, and Agreeableness. Notably 28 of 144 items did not load greater than 0.3 on any scale. These 28 items are not all attentional items as might have been expected, nor is there any clear reason that they may be differentially
related to the rest of the test. While this was not a bad solution, it also seemed possible that the attentional items were swamping the personality items as they consistently appeared in large numbers on the first rotated factor. Moreover, that a 5 factor solution with this many items could be considered somewhat overdetermined (MacCallum, Widaman, Preacher & Hong, 2001). Consequently, all 32 items designated by Nideffer as only relating to the attentional scales⁵, were removed from the analysis, and a 12 factor solution was sought in accordance with the 12 personality scales of the TAIS, as well as a 5 factor solution, after the Big 5 model (see Appendix 6). Choosing two quite different solution possibilities is justifiable on the grounds of theoretical sense and the fact that neither quantity of factors is contraindicated by eigenvalues less than one. The Scree test is quite compact and thus the changing point of the slope could arguably lie anywhere between 6 & 13 factors. Given the theoretical impetus for looking at 5 factors, it was deemed prudent to conduct both sets of analyses (Kline, 1994).

**12 factor solution:** Principal Components analysis of the personality items resulted in 30 factors with eigenvalues greater than one but the Scree test suggested that a 12 factor solution was a more viable order of magnitude. However, rotation resulted in eigenvalues greater than 1 for only 11 factors therefore the analysis was re-run with eleven factors specified, resulting in an unrotated solution that accounted for 30.40% of the variance. Communalities ranged from 0.08 - 0.50 with most hovering around 0.3. PAF extracted 11 factors in 6 iterations. Oblimin rotation converged in 42 iterations. The rotated solution also resulted in one factor with only 3 items, one of those items barely made the cut of

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⁵ Many items contribute to both attentional and personality scales in the traditional scoring of the TAIS — these items were retained for the current analysis.
0.3. Eight of the resultant factors were conceptually equate-able (though not item consonant with) Nideffer's scale profile (see Table 3.4 for Pattern Matrix\(^6\)), specifically:

- Factor 1, which drew items from the Depression and Self Esteem scales and was interpreted as best reflecting Self-Esteem (SES11);
- Factor 2, which focuses on the expression of anger and was labeled Negative Affective Expression (NAE11) after its parent scale;
- Factor 3, which drew items from the Self Esteem, Control, Introversion and Information Processing Scales as well as incorporating two dummy items but could be said to be representative of Intellectual Expressiveness (IEX11) despite there being no items from Nideffer's IEX scale;
- Factor 5, named Extroversion (EXT11), drew items from the scale of the same name as well as the Self-Esteem scale;
- Factor 6, drew items from the Behavioural Control scale in addition to an item that contributes to both the Extroversion and Intellectual Expression scales and 3 dummy items centring around themes of delinquency and lack of inhibition. This factor was named Behavioural Control (BCON11);
- Factor 7, reflected a Physical Orientation (PO11), which also incorporated items from the Information Processing scale and which taken together, seem to relate to athletic identity;
- Factor 9 was labeled Information Processing (INFP11) including items from the Nideffer scale of the same name in addition to items from the Obsessionality scale, Control scales and one item that was included in 4 scales(!); and

\(^6\) Once again the factor correlations are small (.003-.320), thus the Pattern and Structure matrices similar. The Pattern Matrix has been reproduced as it provides the clearest separation of factors (Kline, 1994)
• Factor 10, drew primarily on items from the Extroversion and Introversion scales and was labeled Introversion (INT11).

The remaining factors were not easily interpretable in a psychologically meaningful way. Forty personality items (from a total of 117) did not have a factor loading in excess of 0.3. In sum, there is some conceptual support for the validity and utility of some of the constructs from Nideffer’s TAIS, though not for the actual measures of those constructs as defined by Nideffer. There are also many items that do not contribute to this level of solution in any significant way (i.e. do not load >0.3). It ought be noted that these findings are a triumph for proponents of factor analysis. Despite the large sample size, and many attempts to factor analyse the data using different techniques (the most conceptually supportable of which are reported here), it was not possible to find or ‘create’ a ‘neat’ solution (Kline, 1994). The preceding analysis was even re-run with missing data replaced with the Likert mid-value as is traditionally done in the scoring of the TAIS. The resultant factor solution was no more convincing and the former technique (exclusion of missing data pairwise) more conceptually sound in such a large dataset, and has thus been reported here.

Of the 8 factors that were conceptually consistent with the TAIS scales, Cronbach’s alpha (standardized) reached the cut-off of 0.7 for 6 factors (see Table 3.4) – again a remarkably disappointing finding given that these scales were induced through factor analytic methods which maximizes the relationships between variables and minimizes the relationship between scales (factors). As Kline (1994) points out, however, often the
benefit of factor analysis is 'in the abandonment of theories or items which, though thought to be relevant, turn out not to be' (p.179).

Of the 6 scales with acceptable Cronbach's alpha, the corrected item-total correlations were also, on the whole, stronger than for the 18 factor solution supporting the case for the relative internal robustness of these scales (though it should be noted that each of these scales still had some CIT less than 0.4, the criteria set by Ware & Gandek (1998)). Thus, these 6 scales are considered to be a more psychometrically viable means of utilizing this TAIS data for the purposes of sub-group differentiation.

Note that in Table 3.4, as in all factor analytic tables to follow, presentation is in non-traditional form in deference to the large size of the matrices and the associated space requirements. To accommodate this, factor loadings are presented in columnar form rather than a matrix.
Table 3.4: Pattern matrix & standardized alpha for TAIS items according to the 11 factor solution.

<table>
<thead>
<tr>
<th>TAIS item no</th>
<th>Factors (standardized Cronbach’s Alpha in brackets)</th>
<th>TAIS scale</th>
<th>Factor load.</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1:</td>
<td>Self-Esteem (SES11) (Alpha=0.7177)</td>
<td>F1</td>
<td></td>
</tr>
<tr>
<td>113.</td>
<td>I feel ashamed.</td>
<td>DEP</td>
<td>-.518</td>
</tr>
<tr>
<td>137.</td>
<td>I feel as though I am a burden to others.</td>
<td>DEP</td>
<td>-.505</td>
</tr>
<tr>
<td>112.</td>
<td>I feel guilty.</td>
<td>DEP</td>
<td>-.481</td>
</tr>
<tr>
<td>97.</td>
<td>I am socially self-confident when interacting with authority figures.</td>
<td>Dum.</td>
<td>.367</td>
</tr>
<tr>
<td>99.</td>
<td>I am socially self-confident when talking with the opposite sex</td>
<td>SES</td>
<td>.334</td>
</tr>
<tr>
<td>96.</td>
<td>I am socially self-confident when interacting with those who are like myself.</td>
<td>SES</td>
<td>.333</td>
</tr>
<tr>
<td>104.</td>
<td>I get down on myself.</td>
<td>DEP</td>
<td>-.328</td>
</tr>
<tr>
<td>82</td>
<td>I am good at getting my own way.</td>
<td>CON</td>
<td>.302</td>
</tr>
<tr>
<td>F2:</td>
<td>Negative Affect, Exper (NAE11) (Alpha=0.7890)</td>
<td>F2</td>
<td></td>
</tr>
<tr>
<td>103.</td>
<td>I get mad and express it.</td>
<td>NAE</td>
<td>.765</td>
</tr>
<tr>
<td>100.</td>
<td>I express my anger.</td>
<td>CON / NAE</td>
<td>.733</td>
</tr>
<tr>
<td>138.</td>
<td>People see me as an angry person.</td>
<td>NAE</td>
<td>.636</td>
</tr>
<tr>
<td>119.</td>
<td>When I am angry I lose control and say things that sometimes hurt others.</td>
<td>BCON / NAE</td>
<td>.582</td>
</tr>
<tr>
<td>139.</td>
<td>I see myself as an angry person.</td>
<td>NAE</td>
<td>.568</td>
</tr>
<tr>
<td>120.</td>
<td>I have been angry enough that I physically hurt someone.</td>
<td>BCON / NAE</td>
<td>.486</td>
</tr>
<tr>
<td>83.</td>
<td>I like to argue.</td>
<td>CON / IEX</td>
<td>.412</td>
</tr>
<tr>
<td>114.</td>
<td>I am seen as a cold person by others.</td>
<td>INT / PAE</td>
<td>.324</td>
</tr>
<tr>
<td>F3:</td>
<td>Intellectual Expression (IE11) (Alpha=0.7618)</td>
<td>F3</td>
<td></td>
</tr>
<tr>
<td>105.</td>
<td>I was one of the smartest kids in school.</td>
<td>SES / CON</td>
<td>.529</td>
</tr>
<tr>
<td>61.</td>
<td>I would much rather be doing something than just sitting around thinking.</td>
<td>Dum.</td>
<td>-.488</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
<th>Alpha</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
<th>F5</th>
<th>F6</th>
</tr>
</thead>
<tbody>
<tr>
<td>41.</td>
<td>I am more of a doing kind of person than a thinking one.</td>
<td>(INT)</td>
<td>.483*</td>
<td></td>
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</tr>
<tr>
<td>86.</td>
<td>I enjoy intellectual competition with others.</td>
<td>CON/EXT/IEX</td>
<td>.470</td>
<td></td>
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<tr>
<td>53.</td>
<td>In school I was not a &quot;thinker&quot;.</td>
<td>Dummy</td>
<td>-.459</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>132.</td>
<td>People admire me for my intellect.</td>
<td>SES/IE</td>
<td>.452</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>90.</td>
<td>I compete with myself intellectually.</td>
<td>CoNSes</td>
<td>.399</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>I theorize and philosophize.</td>
<td>BIT/INFP</td>
<td>.334</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>124.</td>
<td>In school the kids I hung around with were intellectuals.</td>
<td>INT</td>
<td>.312</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>134.</td>
<td>People admire me for my concern for others.</td>
<td>SES/PA</td>
<td>.514</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>108.</td>
<td>I need to help others.</td>
<td>EXT</td>
<td>.511</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>127.</td>
<td>People trust me with their secrets.</td>
<td>Dummy</td>
<td>.400</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>107.</td>
<td>My feelings are intense.</td>
<td>PA</td>
<td>.370</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>I figure out how to respond to others by imagining myself in their situation.</td>
<td>CON</td>
<td>.337</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>106.</td>
<td>I am a good person.</td>
<td>SES</td>
<td>.324</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>I enjoy quiet, thoughtful times.</td>
<td>INT</td>
<td>.309</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>116.</td>
<td>I am socially outgoing.</td>
<td>INF/EXT/PAE</td>
<td>-417</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>115.</td>
<td>I am a good mixer.</td>
<td>EXT/PAE</td>
<td>-381</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>122.</td>
<td>I acted in dramatic productions in high school and/or college.</td>
<td>EXT</td>
<td>-346</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>98.</td>
<td>I am socially self-confident when talking in front of large groups.</td>
<td>SES</td>
<td>-341</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>I cut school in high school</td>
<td>Dummy</td>
<td>.542</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>143.</td>
<td>I have engaged in activities that could get me in trouble with the police.</td>
<td>Dummy</td>
<td>.538</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>130.</td>
<td>I have used illegal drugs.</td>
<td>BCON</td>
<td>.517</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38.</td>
<td>In school I would become distracted and didn't stick to the subject.</td>
<td>Dummy</td>
<td>.497</td>
<td></td>
<td></td>
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<tr>
<td>16.</td>
<td>In school I failed to wait for the teachers' instructions.</td>
<td>BCON</td>
<td>.439</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>129.</td>
<td>I fought in school.</td>
<td>BCON/CON/NAE</td>
<td>.383</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>85.</td>
<td>I talked a lot in class when I was in school.</td>
<td>EXT/INFP</td>
<td>.312</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F7:</td>
<td>Physical Orientation (PO11) (Alpha=0.7676)</td>
<td>F7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>91.</td>
<td>I compete with myself physically.</td>
<td>CON/SES/PO</td>
<td>-.642</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>88.</td>
<td>I compete(d) athletically.</td>
<td>CON/PO</td>
<td>-.629</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>87.</td>
<td>I enjoy individual athletic competition.</td>
<td>CON/PO</td>
<td>-.591</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>76.</td>
<td>I engage in physical activity.</td>
<td>PO</td>
<td>-.567</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>133.</td>
<td>People admire me for my physical ability.</td>
<td>SES/PO/EXT</td>
<td>-.567</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>140.</td>
<td>I have a lot of energy for my age.</td>
<td>INFP</td>
<td>-.438</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>141.</td>
<td>I am always on the go.</td>
<td>INFP</td>
<td>-.326</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F8:</td>
<td>Distractibility (Alpha=0.6534)</td>
<td>F8</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>57.</td>
<td>I make mistakes because I try to do too many things at once.</td>
<td>Dummy</td>
<td>.422</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75.</td>
<td>I sometimes confuse others because I tell them too many things at once.</td>
<td>Dummy</td>
<td>.418</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>I focus on one small part of what a person says and miss the total message.</td>
<td>RED/INFP</td>
<td>.387</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>I have difficulty clearing my mind of a single thought or idea.</td>
<td>RED/OBS</td>
<td>.364</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>When I make a mistake it is because I did not wait to get all of the information.</td>
<td>Dummy</td>
<td>.362</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>62.</td>
<td>I make mistakes because my thoughts get stuck on one idea or feeling.</td>
<td>RED/OBS</td>
<td>.344</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>I seem to work in &quot;fits and starts&quot; or &quot;bits and pieces&quot;.</td>
<td>OET/CON/INFP</td>
<td>.330</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>F9:</td>
<td>Information Processing(INFP11)(Alpha=0.7725)</td>
<td>F9</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>54.</td>
<td>In a roomful of people I can keep track of several conversations at the same time.</td>
<td>INFP</td>
<td>-.546</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>58.</td>
<td>I am good at analyzing situations and predicting in advance what others will do.</td>
<td>CON</td>
<td>-.527</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34.</td>
<td>I am good at quickly analyzing complex situations around me, such as how a play is developing in football or which of four or five kids started a fight.</td>
<td>BET/BIT</td>
<td>-.467</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>In a room filled with children or out on a playing field, I know what everyone is doing.</td>
<td>BET/INFP</td>
<td>-.464</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>It is easy for me to focus on a number of things at the same time.</td>
<td>BET/(RED)INFP</td>
<td>-.439</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>52.</td>
<td>I can plan several moves ahead in complicated games like bridge and chess.</td>
<td>BET/INFP</td>
<td>-.397</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45.</td>
<td>I have difficulty shifting back and forth from one conversation to another.</td>
<td>OBS</td>
<td>.394</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44.</td>
<td>I am good at rapidly scanning crowds and picking out a particular person or face.</td>
<td>BET/INFP</td>
<td>-.336</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>56.</td>
<td>I am good at glancing at a large area and quickly picking out several objects, such as in those hidden figure drawings in children's magazines.</td>
<td>BET/INFP</td>
<td>-.315</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>68.</td>
<td>I can figure out how to respond to others just by looking at them</td>
<td>BET/CON</td>
<td>-.304</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>131.</td>
<td>In groups I am one of the leaders.</td>
<td>CON/SES/EXT/INFP</td>
<td>-.302</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>F10:</td>
<td>Introversion (INT11) (Alpha=0.6665)</td>
<td>F10</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>125.</td>
<td>In school the kids hung around with were popular.</td>
<td>EXT</td>
<td>-.574</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>126.</td>
<td>In school the kids I hung around with were outcasts or loners.</td>
<td>Dummy</td>
<td>.537</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>84.</td>
<td>Others see me as a loner.</td>
<td>INT(PAE)</td>
<td>.445</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>135.</td>
<td>People admire me for my social status.</td>
<td>SES/EXT</td>
<td>-.398</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>121.</td>
<td>At dances or parties I find a corner and avoid the limelight.</td>
<td>INT</td>
<td>.337</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>123.</td>
<td>In school the kids I hung around with were athletes.</td>
<td>PO</td>
<td>-.317</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F11:</td>
<td>Closed (Alpha=0.6376)</td>
<td>F11</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80.</td>
<td>I keep my thoughts to myself.</td>
<td>INT(IX)</td>
<td>.693</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>81.</td>
<td>I keep my feelings to myself.</td>
<td>INT(IX)</td>
<td>.677</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>93.</td>
<td>I express my opinions on issues.</td>
<td>CON/IX</td>
<td>-.304</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**5 factor solution:** A five factor solution was attempted. PAF with Direct Oblimin rotation converged in 34 iterations (see Table 3.5). The 5 factors accounted for 22.9% of the variance before rotation. Four of the five factors reflected Costa & McCrae’s (1992) Big 5 personality traits within the constraints of the available items: Openness (particularly reflecting an ‘Intellectual’ aspect); Agreeableness (in this case its inverse, Anger or Negative Affective Expression); Introversion (the Big 5 includes Extroversion); and Neuroticism. The final factor of the 5 factor solution reflected a factor conceptually similar to Nideffer’s Physical Orientation (and involved several items from the PO scale) but also a degree of extroversion and a twist of social desirability. Interestingly, Conscientiousness, a factor that is arguably the most important trait in elite sporting life, was absent and a scan of item content suggests that it is not measured in any clear or direct way in the TAIS.

Cronbach’s alpha (standardized) for these 5 scales was approaching or above 0.80 in all instances (see Table 3.5) suggesting a more reliable factor solution than the preceding 11 factor solution. This is somewhat counterintuitive, given the Scree analysis. Thirty one items did not load on any factor at a level greater than 0.3. The correlations between factors was insubstantial (-.02 to 0.27). Corrected item-total correlations for each scale (factor) were on the whole considerably stronger than for the 18 factor solution, though some items still fell below 0.4 on each scale, particularly on the Neuroticism and Social Desirability scales.

---

7 Given that item content analysis revealed the absence of any conscientiousness related items, a four factor solution was attempted but was less justifiable on the basis of the Scree test and even less clearly interpretable than the 5 factor solution.
Table 3.5: Pattern Matrix for 5 factor solution drawing from TAIS personality items (excluding attentional items).

<table>
<thead>
<tr>
<th>TAIS Item</th>
<th>Items loading &gt;.3 and Standardised Cronbach’s alpha in brackets</th>
<th>TAIS scale</th>
<th>Factor loading</th>
<th>24.</th>
<th>27.</th>
<th>122.</th>
<th>138.</th>
<th>103.</th>
<th>120.</th>
<th>119.</th>
<th>100.</th>
<th>139.</th>
<th>83.</th>
<th>144.</th>
<th>114.</th>
<th>134.</th>
<th>95.</th>
<th>143.</th>
<th>BIT/INFP/SES</th>
<th>NAE</th>
<th>BCON/NAE</th>
<th>BCON/NAE</th>
<th>BIT/INFP/SES</th>
<th>NAE</th>
<th>BCON/NAE</th>
</tr>
</thead>
<tbody>
<tr>
<td>F 1:</td>
<td>Openness (OPENS) (Alpha = 0.86)</td>
<td>F 1</td>
<td>.646</td>
<td></td>
<td></td>
<td>.552</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.353</td>
<td></td>
<td></td>
<td></td>
<td>.327</td>
<td></td>
</tr>
<tr>
<td>86.</td>
<td>I enjoy intellectual competition with others</td>
<td>CON/EXT</td>
<td>.626</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>.326</td>
<td></td>
<td></td>
<td></td>
<td>.589</td>
<td></td>
</tr>
<tr>
<td>132.</td>
<td>People admire me for my intellect.</td>
<td>SES/CON</td>
<td>.589</td>
<td></td>
<td></td>
<td></td>
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<td>.522</td>
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<td>.575</td>
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<tr>
<td>93.</td>
<td>I express my opinions on issues.</td>
<td>CON/EX</td>
<td>.416</td>
<td></td>
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<td>.410</td>
<td></td>
<td></td>
<td></td>
<td>.376</td>
<td></td>
</tr>
<tr>
<td>97.</td>
<td>I am socially self-confident when interacting with authority figures.</td>
<td>Dummy</td>
<td>.411</td>
<td></td>
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<td>.317</td>
<td></td>
<td></td>
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<td>.376</td>
<td></td>
</tr>
<tr>
<td>58.</td>
<td>I am good at analyzing situations and predicting in advance what others will do.</td>
<td>CON</td>
<td>.397</td>
<td></td>
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<td>.586</td>
<td></td>
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<td>.586</td>
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<tr>
<td>52.</td>
<td>I can plan several moves ahead in complicated games like bridge and chess.</td>
<td>BIT/INFP</td>
<td>.371</td>
<td></td>
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<td>.498</td>
<td></td>
<td></td>
<td></td>
<td>-.624</td>
<td></td>
</tr>
<tr>
<td>136.</td>
<td>I ran for class offices in school.</td>
<td>EXT</td>
<td>.371</td>
<td></td>
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<td>.445</td>
<td></td>
<td></td>
<td></td>
<td>.586</td>
<td></td>
</tr>
<tr>
<td>85.</td>
<td>I talked a lot in class at school.</td>
<td>EXT/IEX</td>
<td>- .401</td>
<td>F5: Physical Orientation (PO5): (Alpha=0.79)</td>
<td>SES/PO/EXT</td>
<td>.521</td>
<td></td>
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<tr>
<td>99.</td>
<td>I am socially self-confident when talking with the opposite sex</td>
<td>SES</td>
<td>- .383</td>
<td>133. People admire me for my physical ability.</td>
<td>SES/SES/PO</td>
<td>.512</td>
<td></td>
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<tr>
<td>81.</td>
<td>I keep my feelings to myself.</td>
<td>INT (PAE)</td>
<td>.362</td>
<td>88. I compete(d) athletically.</td>
<td>CON/PO</td>
<td>.503</td>
<td></td>
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<tr>
<td>101.</td>
<td>I dated in high school.</td>
<td>EXT PAE</td>
<td>- .315</td>
<td>140. I have a lot of energy for my age.</td>
<td>INFP</td>
<td>.494</td>
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<tr>
<td>57.</td>
<td>I make mistakes because I try to do too many things at once.</td>
<td>Dummy</td>
<td>.464</td>
<td>87. I enjoy individual athletic competition.</td>
<td>CON/PO</td>
<td>.446</td>
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<tr>
<td>62.</td>
<td>I make mistakes because my thoughts get stuck on one idea or feeling.</td>
<td>RED/OBS</td>
<td>.432</td>
<td>123. In school the kids I hung around with were athletes.</td>
<td>PO</td>
<td>.377</td>
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<tr>
<td>112.</td>
<td>I feel guilty.</td>
<td>DEP</td>
<td>.427</td>
<td>127. People trust me with their secrets.</td>
<td>Dummy</td>
<td>.362</td>
<td></td>
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<tr>
<td>113.</td>
<td>I feel ashamed.</td>
<td>DEP</td>
<td>.424</td>
<td>125. In school the kids I hung around with were popular.</td>
<td>EXT</td>
<td>.361</td>
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<tr>
<td>137.</td>
<td>I feel as though I am a burden to others.</td>
<td>DEP</td>
<td>.422</td>
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<td>17.</td>
<td>I have difficulty clearing my mind of a single thought or idea.</td>
<td>RED/OBS</td>
<td>.413</td>
<td>23. My environment is exciting and keeps me involved.</td>
<td>INFP</td>
<td>.343</td>
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<tr>
<td>8.</td>
<td>I seem to work in &quot;fits and starts&quot; or &quot;bits and pieces&quot;.</td>
<td>OET/BCON</td>
<td>.412</td>
<td>135. People admire me for my social status.</td>
<td>SES/EXT</td>
<td>.340</td>
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<tr>
<td>15.</td>
<td>I focus on one small part of what a person says and miss the total message.</td>
<td>RED (INFP)</td>
<td>.407</td>
<td>128. I am in control of interpersonal situations.</td>
<td>(BCON)CON</td>
<td>.333</td>
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<tr>
<td>35.</td>
<td>At stores I am faced with so many choices I can't make up my mind.</td>
<td>OET/OBS</td>
<td>.406</td>
<td>89. I physically express my feelings of affection.</td>
<td>PAE</td>
<td>.317</td>
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<tr>
<td>79.</td>
<td>People take advantage of me.</td>
<td>(CON)/DEP</td>
<td>.391</td>
<td>107. My feelings are intense.</td>
<td>PAE</td>
<td>.311</td>
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<tr>
<td>75.</td>
<td>I sometimes confuse others because I tell them too many things at once.</td>
<td>Dummy</td>
<td>.365</td>
<td>41.* I am more of a doing kind of person than a thinking one.</td>
<td>(INT)</td>
<td>- .309</td>
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<tr>
<td>117.</td>
<td>I have difficulty waiting for good things to happen.</td>
<td>BCON</td>
<td>.357</td>
<td>108. I need to help others.</td>
<td>EXT</td>
<td>.307</td>
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<td>60.</td>
<td>People fool me because I don't bother to analyze the things that they say; I take them at face value.</td>
<td>(CON)</td>
<td>- .351</td>
<td>106. I am a good person.</td>
<td>SES</td>
<td>.307</td>
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<tr>
<td>67.</td>
<td>Even when I am involved in a game or sport, my mind is going a mile a minute.</td>
<td>INFP</td>
<td>.349</td>
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<tr>
<td>7.</td>
<td>I run back and forth from task to task.</td>
<td>OET/BCON</td>
<td>.348</td>
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<tr>
<td>109.</td>
<td>I need to be liked.</td>
<td>EXT</td>
<td>.327</td>
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<tr>
<td>104.</td>
<td>I get down on myself.</td>
<td>DEP</td>
<td>.324</td>
<td></td>
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</tr>
<tr>
<td>111.</td>
<td>I wish I lived in a different time.</td>
<td>Dummy</td>
<td>.323</td>
<td></td>
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<tr>
<td>102.</td>
<td>People think I am a clown.</td>
<td>EXT</td>
<td>.300</td>
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</tbody>
</table>

Note: See appendix 6 for items excluded from factors. These are quite informative in some instances, particularly in comparing the 11, 5 & 2 factor solutions. Also see appendix 6 for distributions of scales.

*Reverse scored item therefore reverse the direction of the factor loading for interpretation.
Summary

At this point, consideration was given to the validity of proceeding further with analyses of sporting personality using the TAIS given its irreproducible scale structure, a feature that had been previously reported in relation to the TAIS attentional scales (Ford & Summers, 1992). Several factors influenced the decision to proceed, with caution.

One remarkable feature of the sample used in this study is that they are all sportspeople, and somewhat talented sportspeople at that. Given that the TAIS is not a sport-specific instrument (though its use has by and large been restricted to sport and high performance business domains), a generous explanation might be that the sample is too homogeneous for a factor analytic solution to be a viable option (Kline, 1994). From the limited information available on these participants, it is clear that there is heterogeneity of sport played, but a restriction of range of ages and a gender bias (i.e. reflective of the reality of competitive sporting men and women the sample is largely aged in their 20’s). Whilst this does not negate the importance of assessing the psychometric properties of the scales for this sample before proceeding to further analysis, it is possible that with a broader sample (including, for example, non sporting individuals), the TAIS scales may have been more identifiable. Nevertheless the poor psychometric outcome for the TAIS in the sporting context is cause for some considerable disquiet. The lack of a strong multidimensional structure suggests that it should not be used in its current form for selection purposes such as talent identification (though this is not recommended by Nideffer on any account) but neither for individual counseling (which is advocated by
Nideffer), as it is seriously lacking validity and reliability in its purported scales (Messick, 1995).

However, there are two ways in which existing TAIS databases are of some practical utility in a research context. These will provide the bedrock for the analyses to follow. The TAIS data is psychometrically most credible when:

1. *re-factored according to the 5 factor solution and 11 factor solutions* (summarized in Tables 3.4 and 3.5). It should be noted that in analyses using the 11 factor solution, only the 6 reliable scales will be utilized. The term ‘11 factor solution’ will be retained to indicate that they were derived from a factor analytic procedure that set out to replicate 11 of the personality scales of the TAIS. Factor analysis would have produced a different factor structure if 6 factors had been requested in the first instance; and

2. *bivariate consideration is given to the most robust scales with mutually exclusive item constituents.* Specifically, a subset of the original TAIS scales may prove informative. Specifically, those that had (a) adequate internal consistency (Cronbach’s alpha >0.70) (summarized in Table 3.3), (b) were independent of each other (sharing no items in common), and (c) were conceptually represented in more than one factor analytic solution (even if not in totality). Such bivariate comparison is still preferable to univariate comparison. The pairs to be investigated include:

   i. Extroversion and Negative Affective Expression;

   ii. Self-esteem and Negative Affective Expression;

   iii. Physical orientation and Negative Affective Expression;
iv. Information Processing and Physical Orientation; and
v. Information Processing and Negative Affective Expression.

However, before proceeding to use these statistically derived reformulations of the TAIS in attempting to predict sporting achievement, one final interpretive stance is evaluated. Specifically, the psychometric viability of the conceptually constructed scales of Optimism, Resilience, Control, Commitment and Challenge.

**Preliminary analyses of scales constructed to represent emergent traits: Optimism, Resilience, Control, Commitment and Challenge**

One of the primary aims of this series of studies is to explore, and hopefully verify, elements of the *pathways framework*. As such, scales representing *emergent traits* in the framework were constructed from the 144 items of the TAIS. For ease of reference, items proposed to constitute each of the scales representing emergent traits can be found in Table 3.6. Also see Chapter 2 for detailed rationale for scale construction and description of the evaluation process.

<table>
<thead>
<tr>
<th>Table 3.6: Items conceptually selected to represent the constructs of Optimism, Resilience, Control, Commitment &amp; Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commitment – full engagement in activities</strong></td>
</tr>
<tr>
<td>7 (-)</td>
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<tr>
<td>8 (-)</td>
</tr>
<tr>
<td>19 (+)</td>
</tr>
<tr>
<td>23 (+)</td>
</tr>
<tr>
<td>57 (-)</td>
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<tr>
<td>62 (+)</td>
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<tr>
<td>63</td>
</tr>
</tbody>
</table>

**Control – perceived locus of control**

<p>| | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>26</td>
<td>(+)</td>
<td>It is easy for me to direct my attention and focus narrowly on something</td>
</tr>
<tr>
<td>27</td>
<td>(+)</td>
<td>It is easy for me to focus on a number of things at the same time</td>
</tr>
<tr>
<td>28</td>
<td>(+)</td>
<td>It is easy for me to keep thoughts from interfering with something I am watching or listening to</td>
</tr>
<tr>
<td>29</td>
<td>(+)</td>
<td>It is easy for me to keep sights and sounds from interfering with my thoughts</td>
</tr>
<tr>
<td>39</td>
<td>(-)</td>
<td>When I get anxious or nervous my attention becomes narrow and I fail to see important things that are going on around me</td>
</tr>
<tr>
<td>43</td>
<td>(+)</td>
<td>It is easy for me to keep my mind on a single sight or sound</td>
</tr>
<tr>
<td>51</td>
<td>(-)</td>
<td>In games I make mistakes because I am watching what one person does &amp; forget about the others</td>
</tr>
<tr>
<td>56</td>
<td>(-)</td>
<td>People have to repeat things to me because I become distracted by irrelevant sights or sounds</td>
</tr>
<tr>
<td>57</td>
<td>(+)</td>
<td>I am good at analyzing situations and predicting in advance what others will do</td>
</tr>
<tr>
<td>62</td>
<td>(-)</td>
<td>I make mistakes because my thoughts get stuck on one idea or feeling</td>
</tr>
<tr>
<td>64</td>
<td>(-)</td>
<td>I get confused at busy intersections</td>
</tr>
<tr>
<td>66</td>
<td>(-)</td>
<td>I get anxious and block out everything on tests</td>
</tr>
<tr>
<td>68</td>
<td>(+)</td>
<td>I can figure out how to respond to others just by looking at them</td>
</tr>
<tr>
<td>73</td>
<td>(-)</td>
<td>People pull the wool over my eyes because I fail to see when they are obviously kidding by looking at the way they are smiling or listening to their joking tone</td>
</tr>
<tr>
<td>79</td>
<td>(-)</td>
<td>People take advantage of me</td>
</tr>
<tr>
<td>82</td>
<td>(+)</td>
<td>I am good at getting my own way</td>
</tr>
<tr>
<td>97</td>
<td>(+)</td>
<td>I am socially self-confident when interacting with authority figures</td>
</tr>
<tr>
<td>97</td>
<td>(+)</td>
<td>I am socially self-confident when talking with the opposite sex</td>
</tr>
<tr>
<td>12</td>
<td>(+)</td>
<td>I am in control of interpersonal situations</td>
</tr>
<tr>
<td>13</td>
<td>(+)</td>
<td>In groups I am one of the leaders</td>
</tr>
</tbody>
</table>

**Challenge – inviting of change**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>23</td>
<td>(+)</td>
<td>My environment is exciting and keeps me involved</td>
</tr>
<tr>
<td>24</td>
<td>(+)</td>
<td>My interests are broader than most people</td>
</tr>
<tr>
<td>86</td>
<td>(+)</td>
<td>I enjoy intellectual competition with others</td>
</tr>
<tr>
<td>90</td>
<td>(+)</td>
<td>I compete with myself intellectually</td>
</tr>
<tr>
<td>91</td>
<td>(+)</td>
<td>I compete with myself physically</td>
</tr>
<tr>
<td>92</td>
<td>(+)</td>
<td>I enjoy activities with danger or an element of the unknown in them</td>
</tr>
<tr>
<td>101</td>
<td>(+)</td>
<td>I dated in high school</td>
</tr>
<tr>
<td>110</td>
<td>(+)</td>
<td>I enjoy planning for the future</td>
</tr>
<tr>
<td>115</td>
<td>(+)</td>
<td>I am a good mixer</td>
</tr>
<tr>
<td>121</td>
<td>(-)</td>
<td>At dances or parties I find a corner and avoid the limelight</td>
</tr>
<tr>
<td>136</td>
<td>(+)</td>
<td>I ran for class offices in school</td>
</tr>
<tr>
<td>143</td>
<td>(+)</td>
<td>I have engaged in activities that could get me in trouble with the police</td>
</tr>
</tbody>
</table>

**Resilience – when things go wrong**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>39</td>
<td>(-)</td>
<td>When I get anxious or nervous my attention becomes narrow and I fail to see important things that are going on around me</td>
</tr>
<tr>
<td>49</td>
<td>(+)</td>
<td>It is easy for me to forget about problems by watching a good movie or listening to music</td>
</tr>
<tr>
<td>82</td>
<td>(+)</td>
<td>I am good at getting my own way</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>----------------------------------------------------------------</td>
</tr>
<tr>
<td>95</td>
<td>(-)</td>
<td>When I believe in something I find I am a poor loser and unable to compromise</td>
</tr>
<tr>
<td>103</td>
<td>(+)</td>
<td>I get mad and express it</td>
</tr>
<tr>
<td>104</td>
<td>(-)</td>
<td>I get down on myself</td>
</tr>
<tr>
<td>112</td>
<td>(-)</td>
<td>I feel guilty</td>
</tr>
<tr>
<td>113</td>
<td>(-)</td>
<td>I feel ashamed</td>
</tr>
<tr>
<td>138</td>
<td>(-)</td>
<td>People see me as an angry person</td>
</tr>
<tr>
<td>139</td>
<td>(-)</td>
<td>I see myself as an angry person</td>
</tr>
<tr>
<td>144</td>
<td>(-)</td>
<td>I guess you could call me a poor loser</td>
</tr>
</tbody>
</table>

**Optimism**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>82</td>
<td>(+)</td>
<td>I am good at getting my own way</td>
</tr>
<tr>
<td>110</td>
<td>(+)</td>
<td>I enjoy planning for the future</td>
</tr>
<tr>
<td>137</td>
<td>(-)</td>
<td>I feel as though I am a burden to others</td>
</tr>
</tbody>
</table>

**Reliability and validity of the five scales**

The reliability and validity of the five scales is now addressed in turn through consideration of Cronbach’s alpha and Ware and Gandek’s (1998) guidelines for multi-trait evaluation described in Chapter 2.

**Commitment**

The item correlation matrix identified two items each with several negative correlations suggesting conceptually inconsistent coding (q19 & 62). After reverse scoring these items, α was 0.54, but items 63 & 23 were sequentially identified as having the potential to increase alpha even further by their deletion. The re-constituted Commitment scale again had substantially improved alpha (0.59) but still did not meet the criteria of 0.70 suggested by Nunnally (1978). Given the additive nature of errors of reliability, this is a concerning finding in a subscale proposed to be a potential contributor to a higher order scale. Inter-item correlations were modest, ranging from .06-.41. Similarly, 4 of 5 final items did not meet the corrected item-total correlation standard of 0.4 suggesting poor
discriminability. Corrected item scale correlations ranged from 0.25-0.40 suggesting only moderate item-scale equality. It was concluded that the scale of Commitment, thus measured, was inadequate for further consideration.

Control

The scale measuring perceptions of control was more promising with standardized $\alpha$ of 0.84 however it should be noted that there are still 8 of 20 corrected item-total correlations of less than 0.4 (0.24-0.53) and modest inter-item correlations with few reaching 0.3 (Range .03 -.57), the criteria for factorability of a matrix. This latter issue should be taken in context however, as modest correlations are to be expected when using a 5 point scale and large sample (Kline, 1994). The distribution of the scale scores was sound in terms of its symmetry and shape, if somewhat attenuated, as illustrated in Figure 3.2.

![Figure 3.2: Distribution of the Control scale scores in a sample of 1335 sportspeople](image)
**Challenge**

The correlation matrix for this scale showed two items with negative correlations (q.101 & q.143) close to zero. When these items were reverse scored the correlation matrix became even more negative resulting in a lower alpha. All corrected item-total correlations were less than 0.4. Removal of dubious items with corrected item-total correlations less than 0.3 still resulted in an inadequate standardized alpha coefficient of 0.68, particularly in conjunction with the fact that only 3 inter-item correlations in a matrix of 12 items were above 0.3. The Challenge scale, thus constructed, was deemed inadequate for further exploration.

**Resilience**

Item 103 correlated negatively in the matrix and was therefore reverse scored. Items 82 & 49 were identified as having the potential to improve alpha by their removal, as, subsequently, did item 39. Resultant standardized alpha of .72 met the cutoff criterion set but it should be noted that there were still many modest inter-item correlations (.09 - .66). Six of eight corrected item-total correlations were greater than 0.3 but less than the desired 0.4. Only the remaining 2 corrected inter-item correlations exceeded 0.4. The Resilience scale thus composed, had a distribution with a slight negative skew but an adequate spread of scores (see Figure 3.3). It was retained for use in further analyses.
Figure 3.3: Distribution of the Resilience scale scores in a sample of 1349 sportspeople

Optimism

The optimism scale was poorly defined in the first instance by the available items (there were only three considered relevant to this construct) and proved inadequate on all dimensions, with low inter-item correlations (none greater than 0.15), poor corrected item-total correlations (none greater than .18) and very low alpha (0.30).

In sum, only the Control and Resilience scales warrant further investigation. Both have adequate alphas but modest inter-item correlations on the whole and a number of corrected item-total correlations less than 0.4. However, as noted earlier, high correlations are difficult to attain in a large sample with a 5 point scale. Given the greater degree of potential variability in summated scale scores, the inter-scale correlation is more illuminating. The correlation between these scales was a credible, yet desirably modest correlation of 0.33, less than the reliability coefficient of the respective scales.
Moreover, corrected correlations for each item and its keyed scale (Control \( r = .24-.52; \) Resilience \( r = .35-.53 \)), were uniformly higher than that for each item with its non-keyed scale (Control \( r = .10-.34; \) Resilience \( r = .00-.26 \)) suggesting a degree of discriminant validity. Item 113 was the only item where correlations were close (.37 vs .34) but still in the preferred direction. It was thus decided to proceed to factor analytic consideration of the two scales for further verification as per Kline (1994).

**Factor analysis of the Control and Resilience scales**

Factor analysis is driven by the principle of parsimony in explaining the variance accounted for by multivariate combinations of responses representing latent factors and has the advantage of being able to work at different levels of abstraction – resulting in optimal solutions whether they be at the level of suprafactors or individual facet scales in the case of personality. In this instance factor analysis can help to assess whether the combination of items identified above is optimal in the context of two proposed scales whilst at the same time considering the possibility of other, totally different arrangements of the items. Given what we know so far, it is still possible that factor analysis may, for example, suggest that there are more than two factors required to adequately interpret the combination of these items.

Each of the two proposed scales met Kline’s (1994, p.4) minimum criteria for factor analysis: a minimum of 3 variables to define a factor (although 8-10 items is preferable), a minimum variable to subject ratio of 2:1 and a minimum subjects to factors ratio of
20:1. According to Comrey & Lee’s (1992) assessment of sample size, more than 1000 cases (in this case n=1372), is 'excellent'. Arguably, even more importantly, communalities, as the ‘most important determinant of population factor recovery’ (Kline, 1994, p.626) ranged between 0.33-0.71 with most hovering around 0.4. This is encouraging given that communalities are likely to be lower for items than parcels or scales (MacCallum, Widaman, Preacher & Hong, 2001). Tabachnick & Fidell (2001) also suggest that to be factorable, a correlation matrix must have some correlations greater than 0.3. The current matrix does, although, not surprisingly, as Tabachnick & Fidell (2001, p.589) warn, 'larger sample sizes tend to produce smaller correlations'. Bartlett’s test of sphericity, designed to identify poor correlation matrices, is inapplicable in this case as significance is likely with such a large sample. Kaiser's measure of sampling adequacy however was .87, above the criterion value of 0.6 set by Tabachnick & Fidell.

Kline (1994) notes that the criteria usually used to determine the correct number of factors, eigenvalues greater than one, will overestimate the number of significant factors in a large matrix. He suggests that the Scree test ought be used in such circumstances. Thus, items for the two scales were submitted to a principal components analysis and a Scree test to determine the optimal number of factors reflected in the items, then principle factoring (Principle Axis Factoring extraction) and Direct Oblimin oblique rotation as the 'most efficient path to simple structure' (Kline, 1994, p.105). Oblique rotation is also thought to be more reflective of reality in the context of personality variable as most traits

---

8 Comrey & Lee (1992) suggest the following sample size guidelines: 50 is very poor; 100 is poor; 200 is fair; 300 is good; 500 is very good; and 1000 is excellent.
are somewhat correlated and thus, not truly orthogonal in the sense assumed by the more common Varimax rotation (Kline, 1994).

Seven factors had eigenvalues greater than 1, but the Scree test suggests that a 2 or 3 factor solution marked the criterion change in slope, and is thus more likely to be valid (Kline, 1994). Given the fact that two factors have been conceptually derived, that the corrected item-total correlation matrix had values greater than 0.4 (and only on the keyed scale), and the fact that the correlation between the two scales was moderate, the two factor option was pursued. Principle Axis Factoring was undertaken specifying 2 factors and Oblimin rotation convergence occurred in 7 iterations with all items loading greater than 0.3 on one factor only, and on the expected factor, except item 113 which loaded almost equally on both factors (.30 vs. .31). The combined factors before rotation accounted for 23% of the variance which can be taken as a 'rough approximation of its importance' (Kline, 1994, p.625).

The modest correlation between factors (0.24), is reflected in the similarity between the Structure Matrix (correlations between the variables and the factors) and the Pattern Matrix (weights on the variable to produce factor scores which take into account the correlation between factors). In such cases, preference need not be given to interpreting the structure matrix, particularly where the pattern matrix provides a clearer separation of items (Kline, 1994) as it does in this case. Thus, items on each scale can be found in the Pattern Matrix as re-created in Table 3.7. A loading of 0.3 or above was considered adequate for factor membership in the absence of competing loadings on other scales.
Only item 113, ‘I feel ashamed’, loaded higher that 0.3 on both scales and was subsequently retained in the Resilience scale where it seemed to have its strongest conceptual link.

Table 3.7: Pattern matrix of principal axis factoring of items on the Resilience and Control scales (only loadings >0.3 are shown)

<table>
<thead>
<tr>
<th>TAIS Item.</th>
<th>TAIS scale(s)</th>
<th>Factor 1 items: Resilience</th>
<th>Factor 2 items: Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>95 CON/NAE</td>
<td>When I believe deeply in something I find I am a poor loser and unable to compromise.</td>
<td>F1</td>
<td>.40</td>
</tr>
<tr>
<td>103 NAE</td>
<td>I get mad and express it.</td>
<td></td>
<td>.53</td>
</tr>
<tr>
<td>104 DEP</td>
<td>I get down on myself.</td>
<td></td>
<td>.32</td>
</tr>
<tr>
<td>112 DEP</td>
<td>I feel guilty.</td>
<td></td>
<td>.34</td>
</tr>
<tr>
<td>113 DEP</td>
<td>I feel ashamed.</td>
<td></td>
<td>.30</td>
</tr>
<tr>
<td>138 NAE</td>
<td>People see me as an angry person.</td>
<td></td>
<td>.63</td>
</tr>
<tr>
<td>139 NAE</td>
<td>I see myself as an angry person.</td>
<td></td>
<td>.64</td>
</tr>
<tr>
<td>144 Dummy</td>
<td>I guess you could call me a poor loser.</td>
<td></td>
<td>.44</td>
</tr>
<tr>
<td>26 NAR</td>
<td>It is easy for me to direct my attention and focus narrowly.</td>
<td>F2</td>
<td>.44</td>
</tr>
<tr>
<td>27 BIT/(RED)/IN</td>
<td>It is easy for me to focus on a number of things at the same time.</td>
<td></td>
<td>.43</td>
</tr>
<tr>
<td>28 (OIT)/NAR</td>
<td>It is easy for me to keep thoughts from interfering with something I am watching or listening to.</td>
<td></td>
<td>.42</td>
</tr>
<tr>
<td>29 (OIT)/NAR</td>
<td>It is easy for me to keep sights and sounds from interfering with my thoughts.</td>
<td></td>
<td>.47</td>
</tr>
<tr>
<td>39 INT</td>
<td>When I get anxious or nervous my attention becomes narrow and I fail to see important things that are going on around me.</td>
<td></td>
<td>.47</td>
</tr>
<tr>
<td>43 NAR</td>
<td>It is easy for me to keep my mind on a single sight or sound.</td>
<td></td>
<td>.41</td>
</tr>
<tr>
<td>51 (BIT) RED</td>
<td>In games I make mistakes because I am watching what one person does and forget about the other</td>
<td></td>
<td>.41</td>
</tr>
<tr>
<td>56 OET</td>
<td>People have to repeat things to me because I become distracted by irrelevant sights or sounds around me.</td>
<td></td>
<td>.50</td>
</tr>
<tr>
<td>57 Dummy</td>
<td>I make mistakes because I try to do too many things at once.</td>
<td></td>
<td>.31</td>
</tr>
<tr>
<td>58 CON</td>
<td>I am good at analyzing situations and predicting in advance what others will do.</td>
<td></td>
<td>.45</td>
</tr>
<tr>
<td>62 RED/OBS</td>
<td>I make mistakes because my thoughts get stuck on one idea or feeling.</td>
<td></td>
<td>.47</td>
</tr>
<tr>
<td>64 OET</td>
<td>I get confused at busy intersections.</td>
<td></td>
<td>.34</td>
</tr>
<tr>
<td>66 RED</td>
<td>I get anxious and block out everything on tests</td>
<td></td>
<td>.38</td>
</tr>
<tr>
<td>68 BET/CON</td>
<td>I can figure out how to respond to others just by looking at them...</td>
<td></td>
<td>.33</td>
</tr>
<tr>
<td>73 OIT</td>
<td>People pull the wool over my eyes because I fail to see when they are obviously kidding .....(cont.).</td>
<td></td>
<td>.49</td>
</tr>
<tr>
<td>79 (CON) DEP</td>
<td>People take advantage of me.</td>
<td></td>
<td>.37</td>
</tr>
<tr>
<td>82 CON</td>
<td>I am good at getting my own way.</td>
<td></td>
<td>.46</td>
</tr>
<tr>
<td>97 Dummy</td>
<td>I am socially self-confident when interacting with authority figures.</td>
<td></td>
<td>.62</td>
</tr>
</tbody>
</table>
I am socially self-confident when talking in front of large groups

I am in control of interpersonal situations.

In groups I am one of the leaders.

Note: In column 2, brackets denote reverse scoring.

Note that all items on the Resilience scale, unfortunately, are negatively oriented to the construct. These items predominantly come from Nideffer's Depression scale and Negative Affective Expression (NAE) scale as well as incorporating a dummy item that is of a similar ilk. Their conceptual link is that, individuals who focus on negative emotions and describe themselves as 'poor losers' are unlikely to bounce back after adversity. However, these items are not, on the whole, 'bloated specifics' or tautologies (Kline, 1994, p.175). These items reflect a range of negative responses to life and notably, they are different from pessimism (the inverse of optimism) or hardiness. It is also relevant to note that there were other items from the Depression and Negative Affective Expression scales that did not end up in this Resilience scale, one which was more akin to optimism/pessimism (cf. Depression scale, item 137 'I feel as though I am a burden to others') and one Depression scale item that was both conceptually and statistically placed on the Control scale (item 79 'People take advantage of me') supporting the veracity of the scales. It is also noteworthy that the 'Control' scale incorporates many items designated 'attentional' by Nideffer as well as those designated as personality items in several scales, but all seem to converge on the idea of having a command over life, of life being 'easy' or manageable with few mistakes being made along the way. Both scales seem conceptually adequate though would obviously not be

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9 However, this is complicated by the fact that many items by Nideffer's reckoning are, perplexingly, included on more than one scale and more than one type of scale (attentional and personality-related) in a non-weighted fashion.
ideally represented by these items if constructing a scale from scratch. Nevertheless they provide another justifiable starting point for analysis with this sample.

The relationship between the 5 factor and 11 factor solutions and the 2 conceptually constructed scales\textsuperscript{10}, Resilience and Control.

There was a moderate degree of correspondence found between the 5 factor and 11 factor solutions, both in terms of the items excluded and the content of the factors; however a stronger relationship would have been needed to argue for a hierarchical relationship involving mutually exclusive constellations of traits. If anything, these findings perhaps support a configural hierarchical model. Thus, similarly named scales are not item equivalent but are so named to reflect conceptual relatedness. All three factor sets will be considered in the analyses to follow. In the corresponding tables, factors in each set are labeled similarly but with a suffix of factor solution number (2, 5, or 11). Consideration of these factor sets will be followed by analyses involving the bivariate combinations of original TAIS scores summarized previously on page 241.

In sum, each of these derived combinations of scales, will be evaluated in terms of their ability to differentiate sportsmen and women on the basis of (i) their chosen sport (ii) their level of achievement and (iii) the chronicity of that achievement. Given the archival nature of the dataset, and the fact that only scale scores are available for 5119 athletes, the following analyses will centre upon the smaller dataset of 1376 for which item level

\textsuperscript{10} These 2 scales will henceforth be referred to as the ‘2 factor solution’ for the reader’s ease, though they were not originally derived from a factor analytic process.
data is available to be transformed into the three different factor sets. One set of analyses will however, be conducted with the larger dataset.

Profiling groups using discriminant functions analysis and case studies based on the three newly constructed sets of scales

The three newly constructed sets of scales will be considered in separate discriminant functions analyses in an attempt to differentiate (i) sports, (ii) types of sports, and (iii) levels of Olympic achievement (specifically, those selected for the Olympic team vs. those not; medalists vs. non-medalists; and those who have been selected for more than one Olympic Games vs. those who have managed only one (!) selection).\(^{11}\)

In each of the factor solutions sets, for each of the different groupings listed above, a handful of extreme scores were identified using a combination of stem-and-leaf plots and box plots, and were removed for the relevant analysis. A small number of cases had missing data which seemed to be randomly scattered throughout groups and predictors. For the remaining cases, evaluation of assumptions of linearity, normality, multicollinearity or singularity and homogeneity of the variance-covariance matrices revealed no threat to multivariate analysis. Homogeneity of variance-covariance was evaluated through scatterplots of the first two functions produced separately for each group and found to be adequate in the sense of having rough equality of overall size (Tabachnick & Fidell, 2001, p.463).

\(^{11}\) Analyses of different gender and age groups were conducted but not reported as they are not central to the questions of interest and were uniformly unproductive.
Scale scores for the 2, 5 and 11 factor solution were calculated for 1376 sportsmen and women using the weights on the variable from the Pattern Matrix (Kline, 1994). Additive loadings on each component were not utilized (i.e. true factor scores), only the principal loading, due to the effect that individual items of missing data would have using such a procedure (i.e. if any questionnaire had a single item missing that was part of the factor solution for any of the factors, the case would be disregarded). In this sample, many cases had the odd item missing. It was decided that the cost of missing data replacement for the validity of the procedure was greater than was calculation of weighted scores from the principal factor only as the vast majority of other loadings were of a trivial magnitude.

Different sports

A sample of 906 profiles were selected belonging to sporting codes that had a minimum of 50 competitor profiles on the database, increasing the power of the discriminant analyses. A prerequisite for discriminant functions analysis is that there must be more cases than dependent variables in every cell (Tabachnick & Fidell, 2001). However, given the wide variability in group size between these sports (5:1 cases in some instances), another threat to the viability of a discriminant functions analysis emerged. This group imbalance can, and did, lead to problems with classification (Tabachnick & Fidell, 2001). In this case, classification into these larger groups was almost exhaustive with only 8 cases, in total, being allocated to other sports. While this, paradoxically, led to more accurate classification for the group as a whole, this is a statistical artifact of the
much larger (relative) group size. Given that there was no reason to suspect that these differences in group size reflected an important feature of the underlying population (rather they were an artifact of the access of particular sports to profiling services at the AIS) (Tabachnick & Fidell, 2001), those groups with exceptional size were reduced to comparable order of magnitude (maintaining ranking of group sizes) through alphabetic deletion once sporting codes and gender had been combined (see square brackets in Table 3.8 below for original group sizes). This method of case reduction was preferable to random case selection with such a large dataset to facilitate data checking in a context where there is no reason to believe that the alphabetic order of a surname\textsuperscript{12} would be anything other than random. This procedure was used in all subsequent analyses where group size required reduction. The characteristics of the resultant subsamples were checked for representativeness and were sound.

<table>
<thead>
<tr>
<th>Sport (final number of cases)</th>
<th>Age (yrs)</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td>Golf (n=70) [278]</td>
<td>25</td>
<td>20-37</td>
</tr>
<tr>
<td>Hockey (n=70)</td>
<td>19</td>
<td>14-40</td>
</tr>
<tr>
<td>Karate (n=55)</td>
<td>20</td>
<td>13-54</td>
</tr>
<tr>
<td>Netball (n=53)</td>
<td>19</td>
<td>15-39</td>
</tr>
<tr>
<td>Rowing (n70) [229]</td>
<td>22</td>
<td>15-32</td>
</tr>
<tr>
<td>Rugby League (70) [105]</td>
<td>24</td>
<td>16-48</td>
</tr>
<tr>
<td>Rugby Union (56)</td>
<td>21</td>
<td>17-32</td>
</tr>
<tr>
<td>Yachting (60)</td>
<td>22</td>
<td>15-63</td>
</tr>
<tr>
<td>TOTAL 479 [906]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{12} Note that first (Christian) names were not used for this purpose as it is plausible that our personality may be effected by, or developed in accordance with, the features attributed to particular given names, and/or that Christian names are selected by parents to reflect the perceived temperament (personality) of the newborn infant. Under such circumstances, this procedure would not reflect a random process of deletion and may skew the personality types excluded from the study.
In determining whether the outcome of discriminant functions analysis is of significance, there are many potential indicators – Tabachnick & Fidell (2001) & Huberty & Hussein (2003) have noted that there is greater variability in the reporting of results from discriminant functions analysis than most other forms of analyses. This is likely to be due largely to the different questions one might be trying to answer as well as different theoretical opinions about the mathematics of particular forms of DFA. Tabachnick & Fidell (2001) & Huberty & Hussein (2003) have been used as a guide in this study.

Of the many indices available to report, in this study, to facilitate comparability with Nideffer’s (1990) own study, priority will be given to (i) Wilks lambda as an index of significance of contribution of individual scales to discriminant functions, and (ii) the results of classification. Additionally, a second Wilks’ Lambda will be reported to indicate the significance of any or all of the discriminant functions. In all cases in the current series of analyses, there were at least two functions that were significant\(^\text{13}\). Eigenvalues illuminate the contribution made by each successive function.

As indicated in the knowledge review, in sport personology, there have been two reasons for profiling sportsmen and women: (i) individualising counseling needs, and (ii) talent identification. Given the potential consequences of profiling then (selection and access to services etc), classificatory success would need to be impressive to warrant drawing the conclusion that a statistically significant discriminant algorithm was also clinically significant as discussed in the knowledge review – that is, mis-classifying even a small

\(^{13}\) Huberty & Hussein (2003) argue that SPSS DISCRIM uses an incorrect choice of weighting index in calculating its functions, but by their own acknowledgement, even if this were true, it affects results from quadratic DFA which is not used in the current studies.
number of potential Olympians into the wrong sporting program or, worse, out of sporting programs altogether, would be considered a travesty by many.

Given this criterion, different sporting codes were not considered adequately differentiated by the 5 or 11 factor solution or the two constructed scales of Resilience and Control. In each case, although group means on most individual scales were significantly and reliably different between groups (cf. Wilks Lambda I in Table 3.9), and although significant discriminant functions were found in all cases (cf. Wilks Lambda II in Table 3.9), the proportion of cases correctly classified compared to chance, was judged to be insufficiently accurate (cf. Correct classification statistic in Table 3.9) - in all instances, fewer than half of all combined cases were correctly classified. The most successfully classified individual group was Rugby League at 49%, 52% & 56% correct classification using the 11 factor, 5 factor solution and 2 scale solution respectively. While these are comparable to those reported by Nideffer (1990) (also in the order of 50%) for the purposes of the current study, it is suggestive of an algorithm that is inadequately reliable for diagnostic purposes. Moreover, all other classifications were of lesser magnitude. Classification was evaluated based on equal prior probabilities given that (i) differences in group size were not a result of proportional sampling methods – they were an artifact of selection (i.e. access to the AIS) and therefore group size priors were unsuitable, and (ii) there is no guidance from the ‘literature, research or expert judgment’ (p.183) as to particular prior probabilities that might be relevant based on knowledge of the population (Huberty & Hussein, 2003). Equal priors will be used in all analyses reported in this dissertation.
When classificatory power is deemed inadequate it is generally wise to resist the temptation to interpret the particular discriminant functions. However in the current case, there is a further question to be asked. The pathways framework suggests that there may be different personality pathways to sporting excellence. The existence of a second significant discriminating function in each of the preceding analyses might be taken to be supporting evidence for this hypothesis. Given that the two factor solution has the clearest conceptual link with the pathways framework (the scales of Resilience and Control are conceptually derived from the framework), this is the most feasible
(conservative) relationship to be explored qualitatively. Each scale contributes primarily to a different function. Resilience is strongly positively related to the first significant discriminant function (.91 in the structure matrix\textsuperscript{14}) and has a moderately negative relationship with the second significant discriminant function (-.42). The Control scale is moderately associated with the second significant discriminant function (.59) but very strongly associated with the second function (.81). Minimally one could say that

(i) resilience and a sense of control (so measured) do not always co-occur which is consistent with the notion that these constructs have the potential to differentiate motivational traits in the pathways framework For example, in defining mental toughness, Type II, it was hypothesized that there may be a sense of lack of control underpinning (driving) a persistent effort to seek control, resulting in a form of resilience.

(ii) there are a significant number of people in some of these sporting groups for whom resilience (so measured) is a salient personality feature, but a significant number of others for whom it is not. Moreover, for this latter group, many nevertheless have a strong sense of being in control of their circumstances. In the pathways framework, denial was highlighted as a sometimes functional, sometimes unhelpful style of coping amongst exceptional sportspeople which might explain this finding.

Without overstating the case given the relatively poor classificatory power of each significant discriminant function, and based on very preliminary evidence (particularly given that only 2 of 5 emergent traits identified in the pathways framework have been

\textsuperscript{14} Tabachnick & Fidell (2001) suggest that the structure matrix weights are the correct loadings to use for the purpose of deriving substantive, meaningful labels.
successfully measured by reconstituting the TAIS), these observations do provide some support for the principle of equifinality and for the salient personality features outlined in the *pathways framework*. They point to the value of pursuing such issues in subsequent studies in which the conceptual construction of relevant scales may be more successful.

**Sporting type** (as per Nideffer & Bond (1989)):

Analyses of sporting type utilized the full sample of 1376 cases, categorized as: closed skill sports (n= 371 (27%)), a combination of open-skilled individual sports involving one on one competition (n= 537 (39%)), and team sports (n= 468 (34%))(see Table 3.10).

<table>
<thead>
<tr>
<th>Sport Type</th>
<th>Age (yrs)</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td>Closed (n=371)</td>
<td>24</td>
<td>15-64</td>
</tr>
<tr>
<td>Open (n=537)</td>
<td>24</td>
<td>13-68</td>
</tr>
<tr>
<td>Team (n=468)</td>
<td>21</td>
<td>13-63</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When differentiating sporting type, the three different factor solutions produced differences between group means on most individual scales (Wilks Lambda I in Table 3.11), and significant discriminant functions (Wilks Lambda II in Table 3.11), but once again, for the group overall, classification was not as successful as would be required for justifiable service targeting using the first discriminating function. Once again, less than half of all cases were successfully classified in each analysis. The most successfully categorized groups, ‘open’ skilled sports, were successfully classified (against a prior probability of 33%) at 44%, 48% and 47% for the 11, 5 and 2 factor solutions.
respectively. Still this means that more than half of all skilled, current participants in ‘open’ skilled sports would have been misclassified. Once again, the fact that there is, in all cases, a second significant discriminant function, may suggest the viability of at least one alternative, and relatively common, successful sporting personality type. In once again considering the nature of the results from the 2 factor, discriminant analysis, the first significant discriminant function was predominated by the Control scale (.99) and the second discriminant function, by the Resilience scale (.92) with little additional contribution in either case.

Table 3.11: Discriminant summary for 11, 5 and 2 factor solutions by sporting ‘type’

<table>
<thead>
<tr>
<th>Factor solution</th>
<th>Wilks Lambda (Equality of means)</th>
<th>Wilks Lambda (Discrim. Function)</th>
<th>Eigenvalue (% between groups variance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 factor (6 of 11) (n=1232) Df[2,1229]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SES11</td>
<td>.985**</td>
<td>DF1(.948)**, df=12</td>
<td>.037(67.0%)</td>
</tr>
<tr>
<td>NAE11</td>
<td>.998</td>
<td>DF2(.982)**, df=5</td>
<td>.018(33.0%)</td>
</tr>
<tr>
<td>IEX11</td>
<td>.977**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCON11</td>
<td>.990**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PO11</td>
<td>.991**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INFP11</td>
<td>.990**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Correct Classification:**
41.8% (Range: 25.4 - 43.5%) Classification by chance: 33.3%

5 factor (n=1153) Df[2,1150]

| Openness | .960** | DF1(.936)**, df=10 | .052(76.7%) |
| Agreeableness | .996 | DF2(.985)**, df=4 | .016(23.3%) |
| Introversion | .990* | | |
| Neuroticism | .991* | | |
| SocDesirability | .991* | | |

**Correct Classification:**
43.7% (Range: 22.1 - 47.9%) Classification by chance: 33.3%

2 factor (n=1274) Df[2,1271]

| Control | .977** | DF1(.971)**, df=4 | .024(79.0%) |
| Resilience | .991* | DF2(.994)*, df=1 | .006(21.0%) |

**Correct Classification:**
39.7% (Range: 24.0 - 46.4%) Classification by chance: 33.3%

(*denotes sig p<.01; ** p<.001)

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Olympians

Seventy-four Olympians were identified and a comparison group of 74 non-Olympians matched on sport and as closely as practicable on age, gender, and time since completion of the TAIS (see Table 3.12). Given the small sample size in this and the subsequent analysis, missing item data was replaced with a mid-scale score of ‘2’ as is traditionally advocated in the scoring of the TAIS. Missing values were neither great in number nor systematic in presentation. For DFA ‘the sample size of the smallest group, should exceed the number of predictor variables’ (Tabachnick & Fidell, 2001, p.461), otherwise over-fitting of the data will occur. This criteria was met. Interestingly, women are over-represented amongst Olympians relative to their overall number in the sample.

Table 3.12: Demographic characteristics of Olympians and matched non-Olympians

<table>
<thead>
<tr>
<th>Level of achievement</th>
<th>Age (yrs)</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td>Olympians (n=74)</td>
<td>24</td>
<td>15-49</td>
</tr>
<tr>
<td>Matched pair (n=74)</td>
<td>24</td>
<td>15-49</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In this sample of Olympians, neither the differences in group means on each scale were significant, nor any of the functions. This analysis was not pursued.

Interim Summary

None of the foregoing analyses support the idea of a homogeneous personality profile within sporting codes, sporting types or across different levels of elite achievement.
However, there is more that can be drawn from the findings. Adopting the method of
strong inference in this thesis (Dunnett, 1966) it is also important to ask the question as to
whether, or how, this analysis can contribute further to our understanding of the *pathways
framework*. In this regard it becomes important that

(iii) there is more than one significant discriminant function (significant
personality constellation), in each solution relating to different sporting
disciplines. This is consistent with the principle of equifinality in each of
these discipline grouping of elite sportspeople;

(iv) there is some evidence of the differentiating power of Resilience and
Control in ways consistent with the proposed motivational traits in the
*pathways framework*; and

(v) there were no significant discriminating functions in any of the
achievement level grouping (i.e. Olympians vs. non Olympians)
suggesting personality heterogeneity even more strongly at this highest
level of achievement when sporting code, age, gender and cohort were
controlled for through participant matching.

*Medalists & Enduring (dual/multiple) Olympians: Case studies*

*Medalists:* Twenty-two Olympians were medalists and 52 were not (see Table 3.13). Unfortunately this is insufficient to proceed with a discriminant functions analysis and so a case study approach was used to explore this question. Notably the mean age for
medalists is a little higher which may suggest that their success has come with longer time in their sport.

*Enduring Olympians:* Eighteen Olympians in this study have been selected to compete in more than one Olympic Games suggesting chronically high levels of achievement (see Table 3.13). Once again, this sample size was insufficient for discriminant functions analysis and once again a case study approach was adopted.

Table 3.13: *Demographic characteristics of Olympians who have won medals vs. Olympians who have not won a medal, and also of dual Olympians vs. single Olympians*

<table>
<thead>
<tr>
<th>Level of achievement</th>
<th>Age (yrs)</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td>Medalist (n=22)</td>
<td>27</td>
<td>16-49</td>
</tr>
<tr>
<td>Non medalist (n=52)</td>
<td>23</td>
<td>15-49</td>
</tr>
<tr>
<td>Percentage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Olympian (n=56)</td>
<td>23</td>
<td>15-49</td>
</tr>
<tr>
<td>Enduring Olympian (n=18)</td>
<td>27</td>
<td>18-49</td>
</tr>
<tr>
<td>Percentage</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Two primary questions emerged from the knowledge review in relation to the highest achieving sportsmen and women. Firstly, does exceptional achievement at the elite level (compared to elite peers) demand, or depend upon, or perhaps create, an exceptional or odd personality. Secondly, do these high achieving sportsmen and women have homogeneous personalities, at least within particular sporting domains. In discussing these issues through case studies of Olympians, some detail will be excluded to preserve their anonymity. Specifically, it will not be possible to discuss the individual’s particular
Exceptional personalities: To address the first question, a case was selected that had emerged in the sample of Olympians as a univariate and multivariate outlier. This was an exceptional personality in every sense of the word. To understand a little more about this individual, a frequency count of his/her response selections was conducted to evaluate any particular response sets such as acquiescence. However, he/she had utilized each of the 5 response possibilities ('Always' to 'Never') with roughly comparable frequency. Certainly there was no evidence of a strong response set. What of the particular nature of his/her scale scores? This case would be described, according to the 11 factor solution as high on physical orientation, indeed higher than other outliers both Olympian and non-Olympian, high on the expression of negative affect though not the highest outlier (by one), very low on self esteem compared to both Olympians and non-Olympians and high on the tendency to analyse situations. On the 5 factor scale, the most notable features of this profile are high scores on agreeableness, introversion, and neuroticism. The 2 factor scale showed that this individual scored lower than all other individuals on both the control and resilience scales. Perhaps the salient message from this profile is that it is possible to achieve at the highest level with personality characteristics that would seem to be both extreme, and indicators of poor psychological wellbeing, though this is indeed the exception (outlier) rather than the rule. This person was not a medalist - however, to place this in context, Australia is not really considered to be a medal contender in this sport. This case study supports the notion, captured in the pathways framework (cf.
controlled vulnerability), that psychological vulnerability does not entirely preclude success at the highest levels.

**Heterogeneity of personal style:** Three Olympians were selected from the same sport who have competed in roughly the same era, all at more than one Olympic Games and all have won medals. Their profiles on each scale from each of the 2, 5 and 11 factor solutions are represented graphically in Figure 3.4. While it is difficult to interpret directional detail from z scores, this analysis is really targeted at the level of patterns of responses. There are two salient points illustrated in this figure. Firstly, these individuals have quite different profiles from each other despite competing at the highest level in the same sport at the same time, over an extended period. Secondly, that, compared to the rest of the sample of 1376 individuals, one has quite a flat, non-exceptional profile and the other two have more variable patterns of scores, but still not extreme compared to the range for the whole sample and also notably reflecting opposite traits to one another.

![Figure 3.4: TAIIS profiles of 3 exceptionally high achieving Olympic medalists](image)

Figure 3.4: **TAIS profiles of 3 exceptionally high achieving Olympic medalists**
Taken together, these case studies would seem to suggest that if personality makes a contribution to high achievement in the sporting domain, it is not in a linear, homogeneous way. Rather, these data would support the principle of equifinality – many paths to one destination. There are clearly examples where extreme personality traits have not stood in the way of success. Contrastingly, we have an example of an individual who does not seem to stand out in any way, yet has won an Olympic medal.

**Interim Summary**

In sum, none of the newly constructed factor solutions resulted in adequate discrimination between sports, sporting ‘types’ or level of expertise (Olympians vs non-Olympians) with sufficient accuracy to warrant the utilization of the primary discriminating function for the purpose of talent identification, nor for counseling athletes regarding ‘desirable’ attributes for Olympic success. On the basis of these analyses, there is no support for the idea that there are homogenous ‘types’ of personalities that characterize Olympians or sporting high achievers in different sports. Rather the presence of multiple significant discriminating functions in many analyses, and the case studies above, support the notion of diversity amongst elite sportspeople, and even amongst Olympians, rather than similarity. Moreover, there is some preliminary support for the particular kinds of diversity captured in the *pathways framework* in the form of emergent and motivational traits that were proposed to be salient for exceptional sportspeople.
In the interests of comprehensiveness, one final opportunity was provided to disconfirm the hypothesis of equifinality. Specifically, the most robust of the original TAIS scales were considered in terms of their potential for differentiating groups.

**Profiling groups using discriminant functions analysis based on a subset of bivariate combinations of the original TAIS scale scores**

Given the psychometric limitations of some TAIS scales discussed earlier, bivariate combinations of the most robust and mutually exclusive (no common items) TAIS scales were identified for further consideration. TAIS scale scores were available on 5119 sportsmen and women. As in the analyses above, the following scale combinations were considered in their ability to discriminate groups:

vi. Extroversion and Negative Affective Expression;

vii. Self-esteem and Negative Affective Expression;

viii. Physical orientation and Negative Affective Expression;

ix. Information Processing and Physical Orientation; and

x. Information Processing and Negative Affective Expression.

Standardised TAIS scale scores from the archival dataset were used. As this was the only analysis for which the larger dataset was used, scale calculation was checked using the item scores in the smaller subsample and an SPSS syntax file constructed from the score sheet of the TAIS. Standardised scores were preferred to raw scores to maximize variation within the sample (Tabachnick & Fidell, 2001), particularly given the lack of discriminability of scales in previous analyses. A small number of missing cases were
found on each scale but nothing of note in terms of order of magnitude or patterns of missing data. Outliers were once again identified and removed using Kinnear & Gray's (2004) procedure employing a combination of stem and leaf plots and boxplots. In the remaining cases, evaluation of assumptions of linearity, normality, multicollinearity or singularity and homogeneity of the variance-covariance matrices revealed no threat to multivariate analysis. Homogeneity of variance-covariance was evaluated in scatterplots of the first two functions produced separately for each group and found to be adequate in the sense of having rough equality of overall size (Tabachnick & Fidell, 2001).

**Different sporting types**

After removal of outliers, this analysis utilized an alphabetically selected sample of 1000 athletes in each category (a total of 3000 in the analysis) to keep group sizes within comparable limits. The alphabetic case selection technique was conducted after sports had been combined into sporting ‘types’ so as not to effect the representation of sporting groups, genders or ages. A check of descriptives, confirmed that this group was adequately representative of the larger sample on these criteria (see Table 3.14).

<table>
<thead>
<tr>
<th>Sport Type</th>
<th>Age (yrs)</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td>Closed (n=1000)</td>
<td>26</td>
<td>13-62</td>
</tr>
<tr>
<td>Open (n=1000)</td>
<td>23</td>
<td>12-58</td>
</tr>
<tr>
<td>Team (n=1000)</td>
<td>22</td>
<td>13-60</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
When differentiating sporting 'type' according to Nideffer & Bond's (1990) classification, the five bivariate combinations produced differences between most group means on individual scales (Wilks Lambda I) and significant discriminant functions (Wilks Lambda II) (see Table 3.15). However, once again, for the group overall, classification was not as successful as would be required with approximately one third of all cases successfully classified in each analysis. The most successfully categorized group was the closed skill group at approximately 50% correct classification in most instances. Interestingly there was only one significant discriminating function in each case.

It is also notable that several univariate tests did not show significant differences in group means but were significant and important contributors to bivariate relationships. Univariate analysis would not have revealed the potency of these factors as important contributors to discrimination between groups.

Table 3.15: Summary for bivariate combinations of original TAIS scales discriminating sport 'types'.
418 Olympians were identified and a comparison group of 418 non-Olympians were matched on sport and as closely as practicable on age, gender, and time since testing on the TAIS (see Table 3.16).

Table 3.16: Demographic characteristics of Olympians and matched non-Olympians

<table>
<thead>
<tr>
<th>Level of achievement</th>
<th>Age (yrs)</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td>Olympians (n=378)</td>
<td>23</td>
<td>12-49</td>
</tr>
<tr>
<td>Matched pair (n=396)</td>
<td>22</td>
<td>13-59</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In the three analyses (of five) in which a function could significantly discriminate between Olympians and non-Olympians, classification was still, at best, successful in 60% of cases (see Table 3.17). Once again, heterogeneity rather than homogeneity seems to be indicated.

Table 3.17: Discriminant summary for bivariate combinations of most robust original TAIS scales discriminating Olympians from non-Olympians.

<table>
<thead>
<tr>
<th>Standardised scale scores</th>
<th>TAIS Wilks Lambda (Equality of means)</th>
<th>Wilks Lambda (Discrim. Function)</th>
<th>Eigenvalue (% between groups variance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFP P O</td>
<td>(n=774)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Info. Processing</td>
<td>.996</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Orientation</td>
<td>.968**</td>
<td></td>
<td>.033(100%)</td>
</tr>
<tr>
<td>Correct Classification</td>
<td>57.8% (Range:56.1-59.5%)</td>
<td>Classification by chance 50%</td>
<td></td>
</tr>
<tr>
<td>INFP NAE</td>
<td>(n=774)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Info Processing</td>
<td>.996</td>
<td></td>
<td>.006(100%)</td>
</tr>
<tr>
<td>Neg. Aff. Expression</td>
<td>.997</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SES NAE</td>
<td>(n=774)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self Esteem</td>
<td>.982**</td>
<td></td>
<td>.020(100%)</td>
</tr>
<tr>
<td>Neg. Aff. Expression</td>
<td>.997</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correct Classification:</td>
<td>55.7% (Range:51.1-60.1%)</td>
<td>Classification by chance 50%</td>
<td></td>
</tr>
<tr>
<td>P-O NAE</td>
<td>(n=774)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Orientation</td>
<td>.968**</td>
<td></td>
<td>.038(100%)</td>
</tr>
<tr>
<td>Neg. Aff. Expression</td>
<td>.997</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correct Classification:</td>
<td>57% (Range:52.9-60.9%)</td>
<td>Classification by chance 50%</td>
<td></td>
</tr>
<tr>
<td>EXT NAE</td>
<td>(n=774)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extroversion</td>
<td>.997</td>
<td></td>
<td>.007(100%)</td>
</tr>
<tr>
<td>Neg. Aff. Expression</td>
<td>.997</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*denotes sig p<.01; ** p<.001)
None of the discriminant functions for the comparisons between medalists and non-medalists, or single and multiple Olympians reached significance and thus will not be reported further here.

Postscript: A critical instance case study

One case in the TAIS database has been excluded from his/her sport for a considerable time for breaching the rules of their sporting code. In interpreting the profile of this person there was only one remarkable feature, specifically, he/she was an outlier on the self-esteem scale, scoring at the 90th percentile. This is perhaps consistent with the pathways notion of denial having a significant role in managing psychological vulnerabilities.

Synthesis

The purpose of this study was to utilize a unique and large dataset of personality profiles from sportsmen and women attending the Australian Institute of Sport, to address some of the enduring issues in sport personology concerning ‘special’ characteristics thought to define successful sportspeople. Taken together, the results of this study provide equivocal findings. Not because the analyses returned internally contradictory results in relation to the questions of interest. Indeed they were uniform in finding no evidence to support the notion of clinically significant homogeneity of personality profiles amongst members of the same sport, or sporting type, or amongst those who achieve at the highest levels
Moreover, some evidence emerged to support the particular range of personality pathways proposed to be salient for exceptional sportsmen and women in the *pathways framework* (i.e. emergent traits and motivational traits). Rather, what has been surprising is that the process of investigation has identified, heretofore unpublished limitations to the veracity of the instrument used, not just in terms of its attentional scales (previous criticisms of which were presented in the introduction) but its personality indices, or ‘interpersonal’ scales. This issue will be addressed first.

**Key findings from analysis of the TAIS**

*Using the original scales and 144 attentional and personality items*

Given the popularity of the TAIS in sporting assessment, every opportunity was afforded it to produce its most interpretable and informative data. One of the issues raised by Nideffer himself is that of the appropriate, most informative, most defensible, level of analysis for the TAIS. However, in the current study, neither the original scale structure of the TAIS, nor Nideffer’s Big 5 superstructure, nor the alternate 5 factor structure proposed by the *pathways framework* (incorporating optimism, resilience, control, commitment and challenge) could be located in a sample of 1376 sportsmen and women, with any clarity. Thus, it was concluded that the TAIS was no more (or less) able to measure the constructs proposed by its author, than the constructs of optimism, resilience, challenge and commitment proposed in this study. In the latter case this is likely to be a reflection of the retrospective attempt to construct adequate scales from a subset of items...
on an existing questionnaire. That 2 of these 5 scales showed reasonable reliability and
differential construct validity on factor analysis, was encouraging. In the case of
Nideffer's scales, the situation is more complex. With curiously little detail provided on
published normative data (particularly at the item level) and minimal original (or
subsequent) scale verification data, it is impossible to determine how unusual these
findings are.

Many opportunities were provided to extract data from the amassed dataset that was
consistent with Nideffer's original intention. Those few personality scales that achieved
adequate reliability levels were pursued in pairs that had no item overlap to maximize
their ability to be linearly combined for the purpose of differentiating sportspeople at the
level of (i) choice of sport, and (ii) level of achievement (achieving Olympic selection,
winning an Olympic medal, achieving Olympic selection on multiple occasions). These
combinations, while statistically capable of differentiating groups in some cases, proved
ineffectual in classifying individuals into groups, that is, in discriminating these groups in
clinically significant ways. It would seem fair to conclude on the basis of this dataset, that
the TAIS in its current form (which may be taken to include the 18 scale version or
restricted to include only the 12 personality scales), has poor psychometric properties
when used in an elite sporting context. This should preclude its use in talent identification
and in a counseling context. The consequence of errors in both talent identification and
counseling is such that a test with much greater reliability, and more carefully evaluated
validity, is needed.
Consideration of the personality items alone

In moving beyond the offerings of the TAIS in its original form, and beyond the Big 5 version described by Nideffer that drew upon both attentional and personality scales, exploration of a Big 5 version incorporating only personality-related items was warranted given the general agreement in the field of personality about the existence of traits of Neuroticism, Agreeableness, Openness, Extroversion and Conscientiousness. While a factor solution emerged reflecting four of the five factors (each scale approximating impressive alpha of 0.80 but only using a subset of the items), and while these factors could statistically discriminate groups, this solution proved no more fruitful than the previous solutions or the two scales of Resilience and Control, in classifying individuals into groups to a clinically adequate level of accuracy.

This leaves us in the position of having no evidence to support homogeneity of personality amongst competitive sportspeople, nor within sports, nor between levels of achievement within the elite domain. This may be an accurate reflection of equifinality and heterogeneity amongst competitive and achieving sportspeople. Indeed the existence of more than one significant discriminant function in many analyses, together with the diversity captured in the selected case studies, also support this view. Moreover, some support emerged for the presence of psychological vulnerabilities amongst some of these elite performers supporting the pathways framework more directly. Psychological vulnerabilities were evident in (i) qualitative examination of individual case profiles, and (ii) the interpretation of primary and secondary significant discriminant functions.
involving the conceptually constructed Resilience and Control scales from the pathways framework. However, a strong conclusion is beyond the data available in this study due largely to the problems that emerged with the TAIS as a measure of personality.

**Problems with the TAIS**

Given the incongruity between the popularity of the TAIS in the elite sporting community and the lack of success in factoring the TAIS in a form true to its origins, further consideration was given to features which may support or undermine its credibility. Several points have been noted in papers previously published critiquing the attentional scales which also seem to apply to the personality scales (Ford & Summers, 1992; Summers, Miller & Ford, 1991). In addition there are a number of limitations uniquely associated with the personality items. Both sets of limitations are discussed below:

1. **Many items load on several scales.** Of the 144 TAIS items, 41 load on two scales, ten load on three scales and three load on four scales. Twenty items load on both attentional and personality scales. As Costa and McCrae (1992a) point out, this will lead to artefactual correlations between the scales. Interestingly on the two sets of scales which could be said to be conceptually related, there is no item overlap: The Extroversion scale shares no items with the Introversion scale and the Negative Affective Expression Scale shares no items with the Positive Affective Expression Scale.
2. There are also far more positively keyed items than negatively keyed items which may lead to an acquiescence effect.

3. The assessment of dispositional personality characteristics in the TAIS is largely restricted to 'interpersonal' or communication-related dimensions. While communication and interpersonal relations are likely to be an important part of team unity and cohesion, they are arguably of secondary importance in terms of the effect of personality on individual performance in some sports. In individual sports, the performance of individuals is obviously of primary importance. It is also the case however, that in team sports the ability to work together will not create a champion team if the individual's within that team are unable to attain their optimal level of ability. Personality factors may be of primary importance in maintaining a focus on, and a commitment to, tasks related to individual development, which could be translated as Conscientiousness, the one Big 5 trait absent from the items on the TAIS. This is a curious oversight.

4. In Nideffer's (1976) original attempts to ascertain construct validity of the personality scales, there is a notable absence of relationship between the control scale of the TAIS and Rotters Internal-External Control Scale (-.03); and between the TAIS Introversion scale and MMPI Introversion Scale (.07). Additionally, the subject sample was quite small (n=60) and consisted of police applicants (Nideffer, 1976).

5. The instructions on the TAIS provided by the AIS are also somewhat ambiguous. One set of instructions are generic, while an attached frontispiece suggests to the athlete that
‘This questionnaire is *designed* to assist athletes and coaches’ (italics added) and that ‘where a situation is “open” or general, make your response relevant to your sporting situation’. Further that respondents should ‘Use...sporting colleagues as a frame of reference in such a way that the ‘average’ person in your team/group would answer sometimes to a fair number of occasions’. Nideffer’s (1976) article on the development of the TAIS does not refer to its development for use in sport, indeed the majority of participants completing the TAIS were college students, university students and police applicants with only 10 swimmers participating in the initial studies. It is also unclear what effect the sport-specific instructions might have on responding – there seems to be no published research available in this question.

On the basis of the question marks overhanging the use of the TAIS with this population, it was decided not to progress to exploratory causal modeling of possible multiple pathways to exceptional achievement, but rather to explore the relationships between personality and achievement with a more robust measure and a group of highly successful (albeit smaller) sample of sportspeople.

*Post script to study 1: Comparing the TAIS and the NEO PI-R*

A fortuitous occurrence in Studies 2 & 3 allowed further empirical investigation of the psychometric properties of the TAIS to facilitate more confident interpretation of findings from Study 1. On collection of data for Study 2 it became apparent that 31 participants in the sample (from Study 2) were also listed on the TAIS database with
profiles completed several years earlier. This allowed a rudimentary posthoc comparison of the two measures, albeit measures that were taken at different times.

Interestingly, correlations between the scales of the NEO\textsuperscript{15} and the TAIS were generally more modest in this sample of hockey players, than were the intercorrelations among the TAIS scales themselves, eleven of which were greater than 0.5. The highest TAIS-NEO correlations barely reached this degree of association (the EXT scale on the TAIS correlated 0.51 with the extroversion scales for the NEO; the PAE scale of the TAIS also correlated 0.51 with the NEO extroversion scales).

Some evidence of construct validity for the TAIS was offered by more moderate, but still noteworthy correlations between the INT scale of the TAIS and the extroversion scales of the NEO (-0.39 and -0.42 for the standard and sport versions of the NEO respectively). Neuroticism on the NEO PI-R also correlated 0.37 with BCON on the TAIS and Agreeableness, with the CON (-0.39) and NAE (-0.39) scales of the TAIS. On the NEO-Sport inventory, Conscientiousness correlated most highly with CON on the TAIS (r=.41). The remaining correlations were considerably lower, ranging between 0 and -0.31.

The relatively small sample of 31 hockey players in this analysis was subsequently increased with the addition of 11 non-hockey Olympians from Study 3 who also happened to have profiles in the AIS TAIS database. Recalculated correlations did not

\textsuperscript{15} The acronym 'NEO' will be used in preference to NEO PI-R when both standard and sport versions of the scale are being indicated. 'NEO PI-R' will be restricted to use when referring to the standard form and 'NEO-Sport' will refer to the pilot measure that involves sport-specific items developed for this study.
change notably. A number of factor analytic approaches were trialled combining the NEO facet scales with the TAIS scales for the 42 cases available. Only the standard NEO PI-R scales were used given the high correlation between the NEO-sport and NEO PI-R scales (4 of 5 were above 0.8), and given the small sample size being utilised. A 6 factor PAF with Varimax rotation provided the most structurally sound and psychologically clear outcome. Bartlett’s test of sphericity was significant at p<.001 suggesting that, in this small sample, the matrix was factorable, though the Keyser-Meyer Olkin statistic was less than 0.6 suggesting that the results be interpreted with caution. The principal point of interest was that seven of 11 TAIS scales loaded together on the first rotated factor. The only NEO PI-R facet scale to load on this factor was Straightforwardness. Communalities for this solution were variable but higher than 0.4 in 30 out of 41 cases. Other facet scales loaded in ways reasonably consistent with the NEO PI-R domain scales, though not uniformly so, which possibly reflects the small sample size (This pattern of loadings remained consistent when the TAIS scales were removed from the analysis). BCON loaded with Neuroticism facet scales, INT and PAE clustered with Openness facet scales and OBS with Agreeableness facet scales. Thus, while there is some evidence of construct relatedness between the TAIS and this more well-established measure, the most powerful relationships exist among the scales within the TAIS, probably in large part due to the unweighted inclusion of a large number of common items across scales. Once again, use of the TAIS in its standard form seems to be contra-indicated.

In sum, it seems clear that the TAIS in its original form is a less than ideal instrument to assist in answering the key questions of this dissertation. However, difficulties with the
TAIS in its original form, does not invalidate the results found with the scales developed in the current study through stringent factor analytic process. Were these scales of no particular utility, a factor solution would not have been found, nor would the other psychometric indicators have supported their viability. Thus, some credence needs to be given to the possibility that, as suggested by the results with these newly constructed and psychometrically evaluated scales, there is no clinically significant homogeneity of personality profiles to be found in this elite sporting sample.

Limitations in measures of achievement

Another limitation in the current study relates to the outcome measures available. The performance data utilised as indices of 'successful outcomes' were restricted to Olympic selection (and re-selection) and medal winning record due to a reliance on public archival documents. It was not possible, for example, to access personal best performance information which would have provided another interesting, more dynamic index of success. It is well known in elite sporting circles that Australia is a strong Olympic contender in some sports and not in others and so personal best would have provided a better measure of individual performance and achievement. Ratings from coaches would also enable us to estimate the extent to which the individual had developed their skills to capacity, as opposed to 'sufficiency' for Olympic selection. Measures of overachievement and underperformance would have been desirable. In sum, the available measures of performance, despite improving on the win/loss record utilised in other studies, remains at quite a gross level, representing a 'snapshot' picture of the attainment
of excellence (or not) by individual athletes. These measures do not illuminate the 'development' of potential.

Conclusion

In conclusion, in relation to the primary questions of interest, Study 1 established that:

1. There is no single 'champion' profile but rather diversity amongst the profiles of this large sample of elite sportspersons;

2. Sports are statistically differentiable according to multivariate analyses of various constellations of personality traits, however, that selection on the basis of the resultant profiles would overlook (misclassify) a considerable, clinically significant, number of exceptional sporting champions; and

3. There is likely to be some value in pursuing the emergent traits of Resilience and Control in understanding the role of psychological vulnerabilities amongst elite sportspeople.

In conclusion, the findings from this study, of a lack of homogeneity of personality within and between many subgroups of elite sportsmen and women, requires verification with a more robust personality profiling instrument and with more dynamic measures of individual performance and development. But at this stage the hypothesis that there are multiple personality pathways to success, still stands.
CHAPTER 4.

STUDY 2:

Sporting personality and life personality amongst Olympic hockey champions

'There are different people in me. One is here, another is in the gym. Two different personalities. Completely different, like lights on and off'

Kostya Tszyu, World Boxing Champion
(The West Australian, Saturday, October 2nd, 2004, p.182)

The primary aim of Study 2 was to explore the notion, as proposed in the pathways framework, that elite sportspeople might have a sporting personality that is different from their more general life personality. While this is, in itself, an idea embedded in popular conceptions of some sporting champions, interestingly there exists no profiling measure of sporting personality per se. The current study took up this challenge.

A secondary purpose of Study 2 emerged from the findings of Study 1. That is, further work was required on defining the nature and diversity of personality traits that exist among sportspeople competing at the highest levels. Specifically, this study aimed to explore diversity amongst source traits but also to explore the proposed emergent stress-salient traits and motivational traits proposed in the pathways framework, as additional meaningful levels of explanation.
The task for Study 2 then was to choose a sample where it was possible to explore the person by context interaction in some greater degree of detail, to focus on the development of personality as individuals engage with the elite sporting context. One such sample that was accessible for this more detailed level of investigation, was the Australian Women’s Hockey squad. However, whilst it may seem that the selection of the hockey team for this study was convenience sampling, the reverse is true. The questions driving this series of studies radiated outward from reflective practice in my role as practitioner with this team. In that sense, Study 2 is a perfect example of purposive sampling, albeit one in which the conclusions might not be extended to other sports. Hence the need for a third study, but more of that later.

My professional position within this squad provided a wealth of otherwise inaccessible background information about the players and the demands of their sporting context to aid in translation of ‘native language’ so as to verify interpretations of events. However, my active participation in facilitating the development of the culture of this team has both benefits in offering deep insights, but also potential drawbacks. The effects of immersion need to be balanced by drawing upon other sources as part of a bias-checking process, hence there are quite protracted references in the introduction to this chapter, to books by the National coach and two key players from the Australian Women’s Hockey Team as an interpretive backdrop for the readers to make their own judgements about the fieldwork-informed data to come (Altheide & Johnson, 1994; Glesne & Peshkin, 1992; Maykut & Morehouse, 1994). Specifically, it is important to sketch out the key elements of the environment in which these players were ‘living’ as well as my role in that
environment. My relation to the key participants, both staff and players, will be described in some detail to guard against the ‘failure to legitimise findings’ (p.6) identified by Onwuegbuzie & Daniel (2003), as a primary error in their typology of common analytical errors in published qualitative research.

The Australian Women’s Hockey Team

An outsider’s description of the Australian Women’s Hockey team and the organization that surrounds it, is perhaps a good place to start. Gilson, Pratt, Roberts & Weymes (2000) took a look at 10 of the world’s ‘consistently most successful sports organisations’ (p.xv), to explore the topic of ‘enduring peak performance’. The sports chosen had to be ‘team based and global…were championship contenders at the time of the study, had exhibited continuous championship contention for at least a decade, and were recognized as leaders in the sport’ (p.xvi). The Australian Women’s Hockey program was one of the 10 sports chosen. In the case of women’s hockey, this group of researchers was given unprecedented access to coaches, management staff, training sessions, competitions and national team members as well as a wealth of archival material resulting in a rich understanding gleaned through observation and interview. The researchers state that rigorous analysis of interview data was undertaken until there was convergence of perceptions amongst research team members. They came to the view that insight into this decade of unprecedented success in women’s hockey, must begin with an understanding of Richard Charlesworth, National Coach from 1993-2000, and Olympian himself. His imprint on the development of each player is also unmistakable and central to this
investigation of the unfolding of personality of elite sportsmen and women. Specifically, his comments highlight the nature of stressors (and opportunities) facing members of the Australian squad, including a coach’s expectation of his players. However, these comments also constitute a case study of an Olympian personality and expert data on the nature of personality amongst elite sportswomen.

The National Coach: Richard Charlesworth

Richard Charlesworth is commonly renowned as the world’s best hockey player of his era, with 227 caps for Australia, a gold medal from the World Cup in London, 1986, but, perhaps importantly in understanding his single-mindedness, no Olympic Gold, ‘only’ a silver in Montreal, 1976. He is a medical practitioner and has been a member of parliament. None of these facts were known to me when introduced to him and his also accomplished assistant, Chris Spice. This is relevant, as is my lack of hockey knowledge, in understanding the nature of my relationship to him and to the hockey program insofar as it might have a bearing on interpretation of the data about to be presented. The reader can thus make their own judgement about the likely biases or influences my participant observer status is likely to have on this study.

Coaching philosophy

A clear understanding of Richard Charlesworth’s standing was provided for Gilson et al., (2000) by his predecessor, Brian Glencross, who generously commented that ‘He is
unique, he is probably the best coach in the world' (p.122) and Sharon Buchanon, former
captain of the National team who also states that 'He could coach just about any sport
and be successful. He demands so much of himself and you know he will demand the
same of you. He's got that competitiveness which is fantastic. You would lie down and die
for him if that enabled someone to score a goal for us' (p.123). Another former captain,
Rechelle Hawkes confers that 'There is intensity. There is the running off the ball,
helping each other, communication, confidence, and everyone wants to get involved'
(p.126). The authors conclude that 'The self-confidence that travels with this team, ...has
its origins in Charlesworth's ability to develop the whole person.....Shirley Davies
explains that the emphasis on maintaining individuality runs through the entire coaching
system' (p.127) and is a philosophy reflected in Charlesworth's belief that 'Once the ball
is in play, the opposition rarely do what you expect them to do...Increase their capacity
to decide. In the end, they have to play, you cannot do it for them' (p.127). Moreover, that
'If you improve yourself, you will beat the opposition. We actually don't go out there to
win, we go out to play well, and winning is the byproduct of that' (p.125).

Gilson et al., (2000) also identified that 'Personal responsibility for performing is
strongly reinforced by Charlesworth's insistence on playing the game using all available
resources' (p.125). An example of this is the adoption of a policy of having no starting
line-up. In their interview, Charlesworth indicated that 'Every time I had a bench,
implicitly or explicitly I was saying, 'You are not good enough to start'. Players start to
believe that.' (p.125). As they noted, this policy of rotational play applied to all players
including Alyson Annan, ‘arguably the best hockey player in the world, [who] had less
time on the field during the 1998 World Cup than several other players’ (p.126).

Moving one source closer to the team, Charlesworth (2001) has himself enunciated some
of the key elements of the culture that developed within the National team and some of
the key forces that underpin his coaching style\(^1\). Starting with his own development he
says ‘My parents encouraged me to seek excellence and provided an environment in
which I could thrive’ (Charlesworth, 2001, p.4) an understanding that he has transposed
to his own role as coach. What is important in coaching, according to Charlesworth, is
acting in an enabling role and choosing other assistant coaches and support staff who
have different capacities for ‘freeing up’ the abilities of very different athletes – akin to a
therapeutic (‘helping’) role within the person-centred counselling tradition. He also notes
that ‘I had three chances at a gold medal in my career as a player and three
disappointments’ (p.12) and ‘I have tried to be the coach I would have liked to have had’
(p.13). Each is a telling statement about his approach to coaching. Always one to draw
upon his life experience more broadly, Charlesworth indicates that through his training as
a medical doctor ‘I learned the value of thoroughness and vigilance, the gains made
through good teamwork, the necessity of prioritizing.’ (p.30), from his father ‘Work hard
to achieve. Never take for granted anything in sport. Prepare yourself well for
competition. Concentration is critical… Basic’s are the core of the great player’s game’
(p.65) and from his own experience, ‘Sometimes, just sometimes, I surprised myself with

\(^1\) Charlesworth has written further creative and insightful books on coaching since this time (Charlesworth,
2002, 2004) that confirm and extend the views in his earliest book, but this first book provides the material
for review in this dissertation as it most directly and clearly relates to his work with the hockey team during
my tenure with the team.
what I could do. Those were moments of sheer exhilaration but they occurred as often at practice as in matches. In many ways they were the drug to which the perfectionist became addicted...’ (p.104).

He believes that a coach must ‘optimise athletes’ capacities with a training, learning and counseling regime’ (p.31) and that ‘a coach should know when to give an athlete their head, and when to leave them alone. It is often the coach’s task to lift pressure from athletes and allow them the freedom to express themselves’ (p.31). A very person-centred perspective indeed. He notes that ‘Professional sports teams present a great challenge for the coach. Often spoiled and over-indulged athletes are required to perform together to produce a result.’ (p.52). With respect to the Hockeyroos training ‘Our training was designed to be physically, mentally and tactically more complex and difficult than match play’ (p.74) and ‘It is distress that often brings about change and improvement’ (p.212). ‘The coach must stand for and require quality’ (p.74). He believes that ‘Sloppiness and short cuts must be identified and redirected or reprimanded’ (p.82) but ‘..there is no place for abusing players.praise and encouragement are absolutely essential’ (p.83).

These beliefs map onto the well-researched literature on the importance of fidelity (ecological validity) in successful training programs for stressful occupations. Fidelity is thought to be best served, not just by overlearning particular skills under pressure, but by the learning of self-management techniques (Johnston & Cannon-Bowers, 1996; Meichenbaum & Novaco, 1985). Charlesworth further stated that ‘I always saw it as my duty to try and help athletes to realize their potential. With many I feel my input played a role in doing so, yet there were always those who seemed to be out of reach. As a coach

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2 ‘Hockeyroos’ became the official name of the Australian Women’s Hockey Team in 1994
one of the great challenges is to find the key to unlock the occult talent of some athletes. However, you can only help those who want help — those who are looking for improvement and are willing to change and work at it. From my experience all the best players come into this category. There are those with enigmatic and brilliant skills but they would not meet my criteria of greatness, for without continual polishing and perfecting at practice, they did not last or were not consistent' (p.106). This description hints at the Achilles Heel of controlled, or masked, vulnerability identified in the pathways framework. 'As a coach one walks a tightrope between training and testing with adversity, teaching skills and tactics and providing support and showing faith in athletes' (p.153). Charlesworth believes that successful sports teams '..respect their opponents and the vagaries of competition. They can be confident, assured, aggressive, competitive and optimistic, but they are never arrogant' (p.84'). He believes that a team should 'Never defend a lead' (p.87) but continue to push forward no matter what. His preference in selecting players is to '..choose methodical consistency over flashy inconsistency' (p.98)

In terms of behavioural indices of the culture in the team, Charlesworth (2001) recounts a decision in 1999 to organize the players into committees so that 'the players would be responsible for input and ideas that could increase the team’s knowledge or assist in improving our program' (p.77). However he notes that 'There must be compelling arguments before a player’s view changes a coach’s approach' (p.79). Such discussions were always welcomed by Charlesworth from players and support staff alike, 'Of course, with fellow staff members discussions often became heated, but never vitriolic. The airing
of passionately held ideas was almost always positive in the end’ (p.79). He mentions one player committee called the ‘Lateral inputs committee’ whose brief was to organize outings such as visits to watch other sporting contests so as to broaden the players’ understanding of what constitutes excellence. He also emphasizes the role of statistics, not just the ‘glamorous’ statistics like number of goals scored, but what came to be known as the ‘non-glam’ statistics, reflecting the effort being contributed when the player was ‘off-the-ball’. This focus reflects the broader concern with the whole of a person’s contributions. Moreover Charlesworth demanded the same exacting standards of himself and his staff - statistics were collected on the coaches’ ‘bench behaviour’ to assess whether they were providing predominantly positive or negative input. I was the instigator and collector of these statistics, and it is relevant to note that both Richard and his assistant at the time, Chris Spice were overwhelmingly positive in their comments during the course of games and training (although inevitably players tended to focus on the criticisms more than any specific words of encouragement!). Another behavioural measure of his approach to coaching and the culture that developed within the team was the fact that after each tour Richard wrote reports to the selectors on each of the players and the players would get a copy. Eventually, the practice became sending the reports directly to the players and it was the selectors who waited for a copy. He included players in decision making on such issues as whether Olympic selection should be early or late; how the gold medal incentive money (given to gold medal winning Olympians) should be spent; whether the notion of captaincy ought be dropped in favor of a rotating leadership policy and whether the notion of a starting line-up ought be dropped. Each of these issues was very contentious at the time, yet Charlesworth’s philosophy was that this fact made it
more, not less, important to trust players to participate in the process of deciding as a launching pad for the consequent process of change.

In these examples and discussion of Richard’s coaching philosophy, the notion of elite sport being an opportunity for developing a ‘fully functioning individual’ (cf. Rogers, 1961), can be clearly seen. Charlesworth’s approach is very much one aligned with the Rogerian notion of self-actualisation as an approach to life, rather than Maslow’s perception of it being a desired endpoint (i.e. the self-actualised individual). One of Charlesworth’s favourite terms is ‘kaizan’ – the Japanese word for continual improvement. However, the shadow side of this opportunity for continual growth and development is an inherent tension with burnout – while there is a strongly individualised element to Charlesworth’s coaching style, there are nevertheless external time constraints on performance optimisation in elite sport. The Olympics, for example, will go ahead whether each individual is ‘ready’ or not. Facilitating a self-actualising tendency, in Rogers terms, is about providing conditions to enable the natural unfolding of the self (Bozarth & Brodley, 1991) rather than encouraging a more driven approach. In the Australian Women’s Hockey Team there was a premium placed on curiosity-driven development but also on resolve and very active, often time-pressured, pursuit of goals. This leads to an inherent tension between the self-actualising tendency and a need for ‘time out’ from these fast-paced demands (opportunities) - a desire for homeostasis (comfort) and tension reduction. Recognising and managing this tension was part of Charlesworth’s genius and a primary reason for engaging a team psychologist.
Personality and exceptional achievement

Of particular relevance to the current study is Charlesworth’s view on personality and psychological strength. Charlesworth believes that ‘All the elite performers in sport have natural ability and it is usually the utilization of that ability to the fullest that distinguishes the truly outstanding performers’ (p.99). ‘So, brilliant skill, however practiced, is not enough. The imponderable quality of mental strength or resilience is also required’ (p.105). Moreover, ‘Every athlete in a team has characteristics that distinguish them from one another. Every athlete best receives the messages of a coach in different ways. Every athlete sees the world differently and is motivated by a range of factors that vary for each of them... You cannot treat all players in the same way. You can best reach players through individual interactions and exchanges.’ (p.107). An example of this was the method of dealing with the range of unexpected life circumstances that inevitably arose over the years such as the illness of a parent or partner. ‘In every case the prescription for dealing with the situation was different. No doubt some felt that we were not sympathetic to their plight.’ (p.110). This approach is consistent with the findings of a review by Keinan & Friedland (1996) which suggests that training programs that are responsive to individual differences are most effective in engendering optimal performance under stress. It is also consistent with the findings from the behaviour-genetic literature that ‘environmental influences in individual development [of personality] are specific to each [individual], rather than general to an entire family’ (Plomin, Chipuer & Loehlin, 1990, p.239), or, in this case, an entire team.
With regard to selection criteria; Charlesworth included: physical qualities (as 'essential but rarely the defining characteristics in selection'); current form; past record (eg ‘... to perform well in a losing team is often a sign of real quality’ (p.144)); special qualities such as exceptional agility or timing or courage (p.145); set play skills; flexibility and versatility; and the remaining two criteria which he describes as ‘perhaps the most nebulous but also in many cases, the most critical differentiating qualities between athletes’ (p.152), team orientation and mental strength.

In terms of particular dispositional qualities necessary for success he suggests that: ‘Qualities such as generosity and tolerance come into focus when the task is to work co-operatively in a team....A benefit of participating in team sports is the way in which we learn to balance the cohering but sometimes conflicting interests of self and team’ (p.109). Charlesworth is considered one of the more insightful and thorough coaches with regard to player management, reflected in his domination of the Australian Coaching Council Team Coach of the Year Award in the 1990's – he won a record 6 times over 7 years. His following comments reflect his understanding of the complexities of human nature: ‘.. when I talk about mental strength I am really referring to resilience. This one word best encapsulates what I want in a player – one who springs back from shock or depression or upset and keeps going... I want athletes who have the courage to express their own opinions and argue the case for what they believe, but at the same time will be willing to put the team’s good ahead of their personal wishes or ambitions... I want an athlete who can manage their frustrations for their own good and that of the team. Finally I want an athlete who understands that it is their demeanour and discipline that
can infect the whole team in a positive way' (p.154). 'Honesty with one's self, of course, is a principle of the best performers' (p.212). 'Humility, a sense of your own vulnerability and an honesty about your own performance and training are central to continued excellence for they fuel the wish to keep improving...' (p.213). Taken together, a description quite akin to the core elements of hardiness. Poor qualities he suggests include 'Lack of punctuality, poor training habits (being lazy, sloppy or careless), and complaining about training or commitments with the team all obviously come into this category' (p.161). He also notes, somewhat controversially, that 'Many who aspire to captaincy and indeed often solicit the job are by their very nature and actions the wrong people' (p.158). 'Some athletes display leadership by their attitude and demeanour at training. By their approach they can lift the quality of a session by infecting their teammates with enthusiasm. Some by their inspirational on-field exploits lift their team-mates. Others are socially gregarious and by being inclusive of others can play an important role in enhancing the harmony of the group. ...' (p.160). These comments reflect an abiding belief in the principle of equifinality in the context of achieving greatness, of many unique pathways to success. However, he also recognises that many talented people have a psychological Achilles heel that can lead to them falling at the final hurdle.

In terms of the effect of sport on fundamental aspects of character, he states, 'Too often athletes try to ignore many of these issues [relationships, finances etc] in a mad rush to devote all their energy to their sport. The one-dimensional outcome of such an approach can seriously retard the athlete's future growth and development as a well-rounded individual. Coaches should endeavour whenever possible to develop and encourage the
whole person. The long term rewards are obvious, but in the short term you can often
find yourself with a better balanced and more productive performer' (p.108). 'A coach
cannot change an athlete's background, but perhaps can provide another perspective or
an environment in which more can be discovered or learned.' (p.108)... 'In a way that
most Australians never experience we traveled in every continent and had contact with
people from all over the world. These were great opportunities to grow and learn about
the world beyond our backyard.....one of the great pleasures of the job was to see the
players mature and broaden their outlook as the years passed' (p.109). 'One's soft
underbelly is exposed on the sporting arena. It is not possible to hide flaws and
weaknesses. They are exposed and exploited. The best athletes are interested in self-
discovery and analyse their abilities.... How many of us procrastinate and play hide-and-
seek with reality in our everyday lives?... Those who seek excellence in anything cannot
afford such an approach' (p.111). Once again, an appreciation of the potential
vulnerability in mechanisms such as denial, once competing at the highest levels. But
further, 'I hoped that the players would be prepared for life after Sydney... I thought that
such an endeavour would be a great lesson in life and one which would give the players
confidence to tackle any of the issues they might later face. It could be a template for a
life lived fully' (p.110). The picture painted is very much one of personality maturing and
unfolding toward a construct akin to hardiness in the dispositional sense outlined in the
pathways framework – of openness to life and positive resilience, of seeing opportunities,
and bravely embracing them knowing the risk of failure when working at the extremes of
our abilities or understanding. Notably, Charlesworth identifies hardiness not just in
sporting life, but, as a characterological strength equally relevant to non-sporting life in a way akin to Coubertin’s notion of Olympism.

Charlesworth’s contribution in this regard, resonates with the addition of a hierarchical, element to the motivational traits in the pathways framework, suggested in Chapter 1 after reviewing the person-centered material of Rogers (1961), Barrett-Lennard (2003, 2005) and Mearns & Thorne (2000). At the top of this hierarchy is the trait of hardiness which seems to be a dispositional manifestation of the self-actualising tendency that can contribute to sporting success but also to wellbeing and success in life more broadly. Mental toughness, either underpinned by achievement striving or adaptive expression of a psychological vulnerability, would seem to involve slightly lesser openness of engagement with life experiences – is less curiosity driven and more driven by resolve, and protected by a degree of denial or narrowness of life engagement. Whilst it may be sufficient to enable exceptional sporting success, it often comes at a price in life more broadly – such single-mindedness is often associated with an underdeveloped non-sporting life which poses a risk on retirement from sport (see Lavallee & Wylleman, 2000 for a series of relevant contributions in this area). Finally, controlled vulnerability, whilst sufficient to enable the attainment of elite status in the presence of exceptional sporting talent, houses vulnerabilities with regard to sporting achievement at the highest level where there is less differentiation in sporting ability. It is defined by a strong element of denial (and other defense mechanisms according to Apitzsch (1995)) as a chronic and pervasive life strategy, which compromises wellbeing and achievement in both domains. It is important to note that this notion of a hierarchy at the level of
emergent motivational traits does not negate the idea of equifinality and heterogeneity at the level of source traits. Charlesworth’s notion that ‘every athlete sees the world differently and is motivated by a range of factors that vary for each of them’ is very much in line with this idea of different levels of differentiation at the level of source traits, stress-salient traits and motivational traits.

In addition to their being a hierarchy of desirable motivational traits, with individual differences therein, Charlesworth’s reflections (2001), like those of the person-centred theorists, suggests a developmental, directional, maturational quality to the expression of these traits. Specifically, that for most sportsmen and women, the defensiveness and self-protective quality (‘playing hide-and-seek with reality’) of controlled vulnerability and of mental toughness become less evident over time (perhaps in the face of continued success?). This is also consistent with the stories of many of Bryceson & Herbert’s (1992) interviewees reviewed in Chapter 1.

The team psychologist as researcher

The following background material is presented to further define the extent of my immersion in the hockey program as well as the nature of my contact with the players and coaching staff. I worked with the Hockeyroos between 1994-2000, covering two World Cup campaigns (1994, 1998) two Olympic campaigns (1996, 2000), and three Champions Trophy events (1995, 1997, 1999). The National Coach summarises his view on key aspects of our relationship and my role with the team:
'Corinne Reid, our psychologist, who had worked very effectively with the program from 1994 to 1996 had agreed to remain. As someone from outside the sport and without any background in hockey, she had an important role to play in helping establish our direction. Her capacity to draw the 'hockey people’ back from the minutiae of sport-specific issues to look at the larger picture was significant. The program would have to be more inclusive and less directive if we were to maintain interest and involvement. It fitted with my broad philosophical position that required players to take more initiative on the field. However Corinne emphasized the need to underpin this by increasing the player input to the program off the field and gradually devolving 'ownership' to the player group. ....our weekly program in 2000 was an amalgam of player and coach input.' (p.190),

and

'Perhaps one of my earliest and best lessons I learned from the Hockeyroo’s sports psychologist, Corinne Reid, was that sometimes I should listen more and say less when athletes were bravely expressing their views’ (p.79).

In terms of practical hands-on support to the coach: ‘Corinne Reid – gave me a quote that I utilized on the day of the Olympic final ...[in sum, stating that]... On the day of the Olympic final one has to be brave. Such matches are not won by timid hearts.’ (p.114).
In terms of understanding the role of adversity in high achievement: 'As Corinne Reid put it so well in a note to me during 2000, "We need firefighters". She meant people with passion and determination tested by difficult and challenging environments...’ (p.153).

In terms of contributing information from outside the sporting domain ‘Social loafing’ was discussed openly. This attitude or behaviour which says 'Someone else will do it'... was to be shunned' (p.168). 'Corinne ran a couple of very valuable sessions with the group outlining some of the rationale behind our move. Social loafing was to be outlawed. Curiosity was encouraged and learned helplessness... was discouraged. We were looking for more from everyone and we expected them all to behave as leaders’ (p.170).

With regard to a conflict that arose between two assistant coaches ‘To her eternal credit, Corinne Reid played a pivotal role in soothing the troubled waters of the triangle as best she could’ (p.180).

In relation to the importance of self-management by players (and in the context of a new system of ‘Wildcards’ which could be used by players to excuse themselves from training with no explanation) 'In the end, Corinne Reid, the program psychologist, suggested they should be unlimited. This sent the athletes a clear message – they had plenty of autonomy. At the end of the year with twenty-five players in the squad only three or four wildcards had been used in total’ (p.204). In a media article, Richard summed up the nature of this my professional role as that of 'critical friend'.
As counterpoint to these comments, it is also relevant to note that my role was not always perceived positively by the players or by other support staff. The complex relationship with individual players is captured below:

Alyson Annan in her autobiography (Jeffery, 2004) noted both positive and negative feelings about psychology in general and my role in particular. On the positive side she notes that ‘Over two days of discussion, directed by team psychologist Corinne Reid the players wrote ten points to describe their dedication to the task...born of the players and their dedication to the cause. The players made their pledge. They dedicated themselves to the greater good of the team, while accepting that each had responsibility for her own commitment to excellence. They wouldn’t allow anything to divert them from their chosen goal’ (p.100). This was a very defining moment for the group.

However, she also related to Jeffery (2004) that in the lead-up to the Sydney Olympics ‘Charlesworth involved team psychologist, Corinne Reid, in more and more facets of their preparation, believing that her expertise would help him and the players to cope with the ever-increasing expectations from the public, media, friends and family’ (p.183) and that ‘Alyson was suspicious of Reid’s growing influence.’ (p.184). It is noted in this account that ‘Charlesworth agreed that there was tension between the off-field staff, which filtered down to the players. ‘There was some friction within the coaching group about [Reid’s] role’ he says.’ (p.185). but then later, in relation to the Champions Trophy in 1999 which the team lost for the first time in a decade, ‘...the pressure test had fractured
their usual cohesive unit. Psychologist Corinne Reid convened an epic team meeting when the Hockeyroos returned to Perth. The players were encouraged to air their grievances and they did. 'That was where everyone said, “This has got to stop”.' Alyson says, 'It was the most successful meeting we ever had. We needed to set things straight and we did.' Lisa Carruthers says of that period: 'Everything started to become a bit unstuck then. People were blaming each other. But it sparked an amazing meeting where everyone realised that we were drifting a bit. There were a few issues, a few conflicts, which had been simmering under the surface and were vented at that meeting. It was a horrible meeting that went for over three hours, but people felt a lot better about things after that. It was a major stepping stone.' Charlesworth also remembers that meeting as a cathartic experience. 'They spilled their guts... It was a very traumatic time. Handling the group was a constant vigil....But in the course of the meeting the players realised that they all felt the same fears and insecurities, and they needed to make a collective effort to subsume these to the needs of the team. They began to come to terms with the unpalatable truth that not all of them would go to the Olympic Games, but that none of them would win a gold medal unless they all worked together' (p.198).

Later, in relation to a Blue Mountain retreat that took place in Sydney immediately prior to the 2000 Olympics, Alyson made the point that 'there was a serious purpose to the camp, and psychologist Corinne Reid led some confronting meetings with the players. 'The dreaded psychology' Rechelle Hawkes recalls. 'They came at me asking “You’ve done all this before. How are you going to stop yourself from being complacent?”. They made people look inside themselves and be open and honest in how they responded. I
remember it being quite confrontational. They were getting stuck into me. Al was quite used to that, because they had done that to her all along, but I really felt like I was being hammered.’ Alyson remembers a humorous finish to her psychology session there. ‘I was the first and I was hammered,’ she says. ‘Ric said that when I felt stressed I started coaching on the field and Corinne asked: “What if the coaches miss a game and they can’t go to the games?” and I said straight out, “Yeah, I’ll coach,” as a joke. And he said, “You’re always coaching Alyson” and I said, “Yeah, I’ll coach and Renita will be assistant coach” and they all laughed. But I hated those meetings. I don’t think it necessary that if I had a problem or I was feeling stressed, that I should have to go to the psychologist” (p.209).

Finally, in relation to making a decision about going to the Opening Ceremony, Alyson noted that ‘They were no longer the malleable young women that Charlesworth had fashioned for the 1996 Olympics... ‘We were a different team,’ ... ‘In 1996, everything that Ric said and everything that Chris [Spice] said and Corinne said, we just did. But in 2000 that wasn’t the case. More people had their own point of view, and more people were willing to stand up and voice it.’ (p.211). ‘That had always been part of the plan, as far as Charlesworth was concerned – to nurture mature, independent players who no longer needed him to lead them.... ‘No one gives you a certificate to say that you were in the Hockeyroos and this was part of your education. They’re learning lessons about life – about being good individuals, if you like – every day’’ (p.211).
Nova Peris, in her autobiography (Peris & Heads, 2003), in speaking about the issue of sexuality amongst players noted that ‘...yes, there was bitchiness at times because of those relationships – which I think was part of the reason that Ric Charlesworth had Corinne Reid on hand through the campaigns that led up to the 1996 Atlanta Olympics. But any such divisions never took away from what we were out to achieve...as a very ‘together’ elite sporting group....Differences within the team were accepted and we all just got on with our lives...’ (p.98).

In the course of seven years, there are very few players that I can think of who did not experience some degree of frustration with me and/or with my role as team psychologist at some point. For the vast majority this was managed successfully as just an expectable and routine part of such a long term therapeutic relationship particularly when clients are engaged in very stressful life circumstances. Particularly salient client-therapist issues include unconscious coping mechanisms or defenses (Vaillant, 2000) such as dependency (a desire for another to take responsibility for decision making), transference (reacting to the therapist in a manner more determined by the nature of other problematic relationships than by the person/therapist per se. For example, the therapist might ‘represent’ the coach to the sportsperson and thus be responded to in this context) and projection (following from transference, the individual may project certain beliefs or attitudes onto the therapist that are often not held by the therapist). Different therapeutic approaches focus on these processes to differing degrees as therapeutic material, but Kivlighan & Shaughnessy (2000) talk about the ‘tear and repair’ phenomenon where, in the normal course of things, therapeutic relationships start well, experience difficulty and
then recover. Certainly such processes were an integral part of my role in working with individual players\(^3\) and mirrored a similar process to that noted by players in relation to their coach (Jeffery, 2004; Peris & Heads, 2003).

It is also relevant for the reader to be aware of my therapeutic orientation. My therapeutic style morphed from primarily a cognitive-behavioural approach (hereafter, CBT) informed strongly by systems theory (particularly relevant to working with teams), to one more strongly influenced by a person-centred philosophy, as the limitations of CBT as an explanatory model in the domain of high achievement became apparent. I concluded that CBT provided an inadequate explanatory model of exceptional achievement in its focus on skills development. My experience was, that at the elite sporting level, personal maturation seemed to be a key element of the required process for self-determination. Mental skills development seemed a somewhat superficial, inadequate response to this process. Therapy seemed more about facilitating a personal tussle – the struggle to know what one was capable of and ‘freeing up’ the individual to translate that into action. Interestingly, this is a view recently presented by Seldman (2004) – specifically, that elite sport is an exercise in immersion, deep self-exploration and often self-discord which translates more productively into the person-centred frame. This model recognises that ‘attempts to instil a new [behavioural] pattern may alter behaviour but cannot produce wellness, since wellness is a function of being not a rendered shape or adjustment. Recovery and growth flow from the nature of living beings in a favourable environment.

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\(^3\) My case notes formed the core of reflexive practice in my professional role. Notes were kept on such phenomena as transference and dependency issues. In light of Apitzsch’s (1995) findings, it was interesting to note that the frequency with which such issues arose, paralleled the frequency with longer term non-sporting clients in my private practice.
The challenge of therapy is the discovery and creation of such an environment' (Barrett-Lennard, 2003, p.2, italics added). This professional transition was significantly influenced by my taking up an academic position at Murdoch University during my tenure with the hockey team, and meeting one of my new colleagues, Godfrey Barrett-Lennard whose work has been referred to throughout. He strongly influenced the way in which I conceptualised the elite sportspeople with whom I was working. Specifically, his extension of the classical person-centred framework could account for the depth of self-exploration and the strength of defenses that were observable in this high achieving group. His systemic person-centred account also made team dynamics much more richly interpretable (see Barrett-Lennard, 2003, 2005) – that is, seeing every individual, in all walks of life, as primarily being defined in terms of their inter-relating with others. This is also a departure from classical person-centred theory which is individual-centric, but one which made considerable sense of the elite sporting experience. Additionally, the person-centred approach is centred on a profound belief in the power of each individual to solve their own problems - a model consistent with Richard Charlesworth’s coaching philosophy and the requirements of the elite sporting environment in which I was working. Finally, Barrett-Lennard’s (2003, 2005) development of the notion of contextual selves was the first model that I had come across that could make sense of the apparent consistencies and contradictions in player’s behaviour on-field and off-field, in a way that was not suggestive of psychopathology.

Appendix 2 also lists many of the central topics addressed in my work with this team in both individual therapeutic contexts, as well as groupwork, over the course of seven
years. Appendix 8 has a copy of a flowchart summarising the overarching developments within the team in terms of maturation of team culture toward a model of self-determination. This model was presented at the APS conference in 2000 immediately following the Sydney Olympic Games (Reid, 2000) and reflects the framework to which I contributed.

**METHODOLOGY**

**Participants**

Fifty-eight members of the Australian Women’s Hockey national squad, aged 18-28 years, took part in this study. The ‘squad’ constituted regular members of the national team in addition to players who had been identified as having the potential to make the team. Some were concurrently members of the junior national team, others were older players whose performance had placed them on the fringe of the national program. At the beginning of the study, 13 were Olympians, whilst at the end of this study, 25 had become Olympians, 33 had not after 2 Olympic cycles (some had been eligible for selection for 3 Olympiads). Of those that had not become Olympians, 24 had nevertheless become members of the National Senior Squad with the remaining nine not progressing beyond the Senior Youth Squad. Of those selected for Olympic teams, there were 19 gold medallists, 15 multiple Olympians, and 9 multiple gold medallists. Further demographic characteristics will be discussed along with presentation of results from this study.
Measures

In improving upon the methodology of Study 1, there were two critical measurement challenges in this study. The first was in establishing ecologically valid and comprehensive measures of achievement or ‘outcome’. The second, to access a more valid and reliable personality profiling tool. The process of addressing each of these challenges will be addressed in turn and was central to the unique advances made in this study when compared to the existing research and practice literature.

*Evaluating potentially relevant outcome indicators*

A prerequisite in defining exceptional achievement is to understand the expectations and attributions of those involved in the selection and development of elite participants. Ideally, outcome indices ought have construct validity within their specific field of endeavour and, where possible, also provide a bridge to wider notions of exceptional achievement through concepts such as (i) maximisation of individual potential (ii) absolute levels of performance at the highest level and (iii) chronicity of achievement. Assessment of each of these elements was facilitated in this study by its longitudinal nature. ‘Outcome’ has been evaluated over 8 years, and 2 Olympic cycles after the initial personality data were collected, such that even the youngest participant at the beginning of the study has had the opportunity to reach an age that would constitute the peak performance age range for this sport. Thus, any achievements made or opportunities missed cannot be attributed to prematurity of assessment in the career trajectory of any
given individual. It is testament to the importance of such a longitudinal approach that indeed 4 participants in this study were selected for the Olympic Games in 2004 for the first time, despite being part of the National program for the previous two Olympic cycles. No participants in this study who are non-Olympians, remain in the National Program suggesting that their career peak in this sport has indeed passed.

In considering a range of potentially relevant achievement indicators, various ratings from coaches and expert support staff (eg physiologist) of short and longer term performance, development and effort were trialled. Measures considered more objective, such as performance on fitness tests, match statistics and medical health (injury) records were also considered. The process of identifying and evaluating achievement indicators was sufficiently complex that it evolved into a successful 3 year grant to develop the MIDAS system, a Multidisciplinary Integrative Database for Athlete Servicing (Reid, 2000; Reid & Sawada, 2000). Amongst other things this process facilitated the development of a range of clinically useful indices for tracking individual progress. Some of these included:

**Match (game) statistics.** These were founded on traditional performance indicators such as goals scored and penalties conceded but were developed into a much more diverse battery of performance markers as the coaching staff and this researcher grappled with confounding factors such as positional opportunity and limitations, such as an exclusive focus on proximal cause in on-field successes (e.g. who scored the goal). There was a

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4 At least one member of the Australian women’s hockey team went on to international success in another sport
strong coaching commitment to capturing on-field contribution in a more comprehensive way including consideration of (i) effort, (ii) successfully executed skill and (iii) attempts to implement new skills (even if they resulted in errors), so as to provide comprehensive feedback about both performance and development, and in so doing facilitate the self-improvement opportunity for each individual. This philosophy is reflected in the following statement by the National Coach: ‘Everybody gets carried away with the score. I like to develop different attitudes in the players. One of the most critical things that you have to do is develop an attitude that is analytical and clinical....If you improve yourself, you will beat the opposition. We actually don’t go out there to win, we go out to play well, and winning is the byproduct of that. The focus is on how we play, rather than the outcome’ (Gilson, et al., 2000, p.125). The ‘Non-Glam (non-glamorous play) Index’ was developed comprising a selection of measures of ‘behind-the-scenes’, traditionally unrewarded contributions such as ‘running off the ball’ to create play opportunities, and facilitating a penalty corner opportunity (rather than just recognising the player who was awarded the corner). The benefits of developing these measures included the informative process of operationalisation of important ‘invisible’ elements of on-field performance as well as the intrinsic clinical utility for coaching staff in making explicit, and understanding, the individual patterns of contribution made by each player. It also highlighted the importance of placing positive plays in the context of negative plays as some individuals contribute lots of both! Thus, an ‘efficiency index’ was developed by the National coaches that involved consideration of actions, both positive and negative, both ‘on-the-ball’ and ‘off-the-ball’, relative to opportunity, with consideration given to positional differences. Perhaps the most important insight to crystallise from this process,
from recognising the number of indices necessary to adequately capture the contribution of a diverse range of players playing a diverse range of positions, was that, at the highest level, each individual has developed their own particular repertoire of skills to maximise their particular set of physical and intellectual abilities. A fruitful summation of their performance must take into account what is required at this level of competition while capturing how each player generally adapts their particular resources to these demands. This insight had two corollaries: firstly, the awareness that an expert coach is perhaps in the best position to draw together this diverse information (indeed that is what they implicitly do), and secondly, that, in the same way as an exceptional player seems to develop a ‘niche’ that utilises their physical and psychological strengths, so they perhaps ‘utilise’ their personality in the same way. Rather than one personality ‘type’ being suited to sporting excellence, perhaps successful individuals are adaptable in engaging the traits required by this significant life context – particularly in a team sport where too many ‘like-minded’ people could create an unbalanced team. Rather than seeing sporting personality that is completely distinct from life personality, perhaps we are more likely to see magnification of particularly salient elements of existing personality. This possibility will be explored in some detail later.

As a result of the process outlined above, the micro-measures of performance (outcome) discussed, were supplemented by subjective, global, coaches’ ratings of match performance completed independently of the match statistics and of each other. These were compiled across tournaments and included measures of performance relative to peers (team-mates) as well as performance relative to an individual’s own ability (cf. past
performance). Four examples of the efficacy of these arguably less objective measures are captured below:

1. Over the course of one international tour involving 6 games, the National coach’s ratings of individual match performance for each player, completed immediately after the game, correlated between 0.70 – 0.72 with the non-glam or ‘workrate’ index coded and calculated independently from data collected during the game by a statistician and former National hockey coach using a real-time sports video analysis system5.

2. During a subsequent international tournament, some six months after introducing the ‘Efficiency Index’, coaches’ mean match ratings of player performance on the field, correlated between 0.79-0.88 with the efficiency index also coded and calculated independently. When the coaches’ ratings were revised following viewing of video after the game (which was routine practice) these correlations were even more impressive.

3. To assist in capturing the more stable, chronic picture of achievement, the National Coach and Assistant Coach were asked, at the close of the 1996 Olympic Games, to independently rate players in terms of how well they had met their individual potential. Specifically, to rate their performance (i) during the Olympics, and (ii) in the 6 months preceding the tournament, on the following scale: ‘This player has performed…’

   a. Not at all well

5 In developing this system of game performance evaluation, category definitions (operationalisation of target behaviours) were refined until there was at least 85% expert inter-rater agreement on match scores across several games. In addition to this researcher, the team statistician and national coaching staff were participants in this process.
b. Moderately well  
c. Very well but it was not their best performance  
d. Better than they have ever consistently performed  
e. As well as they can perform

Perhaps unsurprisingly in a squad at this point in their Olympic endeavours, no-one was rated by coaches as performing ‘Not very well’ (not even those seven players who were not selected in the final team). However, nor was any player’s performance rated ‘As well as they can perform’, not even the player subsequently awarded ‘International Player of the Year’. At this early stage of his tutelage, the coach felt that there was a lot yet to be achieved. He had also just selected a new squad which constitutes the majority of this sample, therefore any players whom he considered to have reached or passed their peak would in all likelihood have been dropped from the squad and not appeared in this dataset. An interesting feature of the ratings from the National coach, was consistent under-rating of the player’s performance compared to the players’ self-ratings which is consistent with his reputation as a hard task master! Where there were absolute differences in ratings between the national coach and assistant coach (in 6 of 15 cases), these were also in the direction of under-ratings on the part of the national coach in the case of Olympic performance, and in variable directions when considering the 6 month lead-up performance (in 11 of 23 cases). A two-way, mixed methods intra class correlation procedure\(^6\) indicated considerable consistency between the two sets of ratings with an intra-class coefficient of 0.51 for

\(^6\) This version of the intra-class correlation was selected as per Shrout & Fleiss (1979) as (i) the two coaches selected were the only two coaches involved in this tournament, therefore the judges are a ‘fixed effect’ and (ii) we are interested in the reliability of a single judge’s ratings therefore the individual ratings constitute the unit of analysis rather than the average of the judges’ ratings.
Olympic performance (n=16 players) and 0.53 for the 6 months preceding the Olympics (n=22 players) (As a point of comparison, intra-class correlations considered acceptable for peer/peer ratings of the facet scales of the NEO PI-R range between 0.15-0.54 (Costa & McCrae, 1992a)). Notably in analyses of all ratings by coaches and players only one case involved a separation of rating of more than one response category out of a possible 5 categories. Taken together, this information suggests that the coaches were very close in their impressions of large group of individuals. This is consistent with my impressions from 7 years of attending the frequent coaching meetings and multidisciplinary team meetings (generally held weekly) in which player progress and development were discussed. It was evident at these meetings that large discrepancies in opinion about player performance and development were rare - particularly when longer term impressions were being discussed. That is, there may have been disagreement about performance on a particular day or during a particular event but the enduring impressions were invariably close. This was reflected in the general agreement over selection decisions – generally only the final one or two places provoked debate amongst the coaches.

When coaches were asked to rank order players (i.e. compare them in terms of their absolute level of ability compared to their peers), Spearman’s Rho for rankings of 15 players at the Olympics was an impressive 0.78 between the National Coach and Assistant Coach. When ranking the entire squad of 23 players in terms of their performance in the 6 months preceding the Olympics, Spearman’s Rho was 0.80.
While such concordance of views amongst coaching staff cannot be assumed in sport, in this case, the evidence bears out an impressive consistency of views.

4. A final data point on this issue was the independent classification of players by the National Coach and his assistant coach 8 years after the beginning of the study, and several years after both coaches had left the team (Both had retained an interest in the performance of the women's hockey team during this time, indeed this National Coach was again recently offered the National coaching position). In classifying 57 players as having either reached their hockey potential or not, there was 77% agreement. In ranking the players in terms of their ability to perform under pressure during competition, Spearman's Rho reached 0.74 (p<.001). Rankings completed 4 years earlier by another Assistant Coach, also correlated with the 8 year rankings of the National Coach at 0.71 (p<.001). A former National Coach and Team Manager also had rankings that correlated with the National Coach at 0.68 (p<.001) and 0.64 (p<.001) respectively. The National Coach's own rank ordering of a subset of 16 players on the issue of performing under competitive pressure, from 4 years earlier, correlated at 0.80 (p=.000). This suggests remarkable consistency of impression between the coaching staff and over time.

**Fitness achievements:** These were routinely, periodically, recorded by the sports physiologist and included measures of skinfold, weight, speed and power, strength and flexibility as well as aerobic capacity to name a few. Consideration was given not just to absolute levels of achievement but once again (i) achievement relative to individual physiology and (ii) rate of improvement. Ratings of effort were also provided for the
current study by the sports physiologist, which incorporated his observations of gym attendance and effort as well as objective measures of progress. Ratings of fitness achievement made by the sports physiologist were closely related, explicitly, to measures of progress in the case of younger players and maintenance in the case of players who had reached their physical peak. The sports physiologist was also asked to rate the fitness achievement of players in the 6 months leading up to the Olympics. Like the Assistant Coach, his ratings of fitness achievements were never more than one category removed from the ratings of overall achievement made by the National Coach. His rankings of the Olympic squad (n=24) in terms of fitness-related achievement in the 6 months prior to the Olympics correlated (Spearman’s Rho) 0.54 with the ranking of the National Coach – reflecting shared impressions regarding the players progress but also reflecting the contribution of factors other than fitness to the coaches’ final impression of player achievement.

**Training effort and associated skill improvement in a non-competition environment:**

One example of a more objective measure of effort included proficiency in basic passing and receiving skills at training. Given that each player *can* perform these skills adequately if they try, the number of times a player *did* accurately execute a basic skill at training when given 10 opportunities to do so was proposed as an index of commitment to the task. Each player was observed at training (i.e. a naturalistic context) while they completed 10 consecutive passing or receiving actions and a score given according to whether the skill was well performed or was substandard. One of the problems with this measure soon became apparent as a result of my close knowledge of the team. Two
players were experiencing a form slump at the time, and one was recovering from injury, which meant that accuracy was not reflecting effort (a point corroborated in discussions with coaches) and yet, in such a small sample these results can affect the outcome significantly either by the exclusion of cases resulting in a smaller sample, or inclusion of non representative results. Additionally, the opportunity for involvement in these training activities varied for players in different positions which meant that the sample of events for some players was much greater than for others. Similarly, in some instances the performance of one player was affected by the skill level or effort level of their drill partner. When results from a four week period were consolidated, the validity of results was assessed by comparing these statistics with training effort as rated by the coaches after training sessions (and prior to seeing the training statistics). These measures correlated about 0.6 although it should also be noted that there was variable inter-rater agreement on training effort between the National coach and his Assistant Coach (0.3 – 0.8) seemingly due to the direct involvement of the coaches in the implementation of specific elements of the training session which necessarily and literally impacts on their view of events. When the National Coach and two former Assistant coaches were asked at 8 year follow-up, to rank order players in terms of effort during training, Spearman’s Rho was 0.73 (p<.001) for one assistant when compared with the rankings of the National coach and 0.62 (p<.001) for another assistant.

Selection in competition teams or training squads: One of the limitations of this index was positional opportunity and issues of ‘balance’ that are central to selection of teams as opposed to individual sports. In the latter case, the best performing athletes are, arguably,
easier to identify on a ‘personal best’ performance trajectory and on an absolute performance basis. Moreover, in the case of the Australian hockey team, the National coach had an explicit philosophy of playing all players and developing individuals in the heat of good competition. It was often commented upon at major tournaments that Australia had such depth of talent that proven players were sometimes not selected in favor of newly developing talent. Moreover, it was considered that many non-selected players in the Australian team would have gained Olympic places on any other National team.

Similarly ‘time played’ in major competitions (i.e. relative to opportunity), another potential index, was affected by the National coach’s philosophy that “Every time I had a bench, implicitly or explicitly I was saying ‘You are not good enough to start.’ Players start to believe that.” (Gilson et al., 2000, p.125). Hence, time on field did not necessarily reflect good form, sometimes it reflected opportunity to improve.

Finally, the rapid development of hockey as a sport during the course of this study markedly affected the utility of considering the number of international ‘caps’ as a measure of relative achievement. The growing momentum of the ‘Charlesworth era’ meant that older players in this study, whose careers peaked early in this study, had relatively few international caps compared to younger players largely due to the vastly increased opportunity for international competition during this period as increased success led to improved funding and more travel for the team.

7 A ‘bench’ is a group of players used only in cases of injury or acutely poor performance in a member of the ‘starting line-up’
Injury and recovery from injury: The low rate of significant injury in this small group made formal investigation of the relationship between frequency of injury or time taken to recover, impossible. However, individual approaches to recovery and rehabilitation will be commented upon in some later case studies.

Originally in developing the MIDAS system to record each of the above indices, it was envisaged that particular indices might prove particularly illuminating in their own right, and that the process would involve identifying, from a vast array, (i) those which might prove most representative of the construct of achievement, and (ii) which might best reflect the impact of individual personality. Over the course of two years, it became clear that no single index offered equal opportunity to all playing positions or equally reflected the efforts and achievements of younger and more experienced players. While these measures proved clinically useful for monitoring individual change and for tailoring coaching advice, the inequities were fatal for making group comparisons between high achieving and lesser achieving individuals. For example, an older player may not rate highly on measures of improvement but may still (i) require, and commit to, a higher workrate (effort level) to maintain form, and (ii) be performing at a consistently higher level than a less experienced player. Taken alone, improvement as an index would not adequately reflect the effort expended by the individual nor the level of achievement. Another illustrative example was the observation that speed may be the predominant factor in the selection of one player but be less relevant in the case of an individual with
particularly exceptional tactical ability or whose field position does not require sudden acceleration. Thus, it seemed that achievement in its fullest sense reflected a multifactorial system, moreover, one of complementary and possibly compensatory abilities both physical but also possibly, psychological. Some players excelled in one domain, others excelled in a different way. In discussions with national coaching staff it became clear that they considered each player as a whole entity and provided opportunities for improvement in areas that were lacking for each individual. In the final analysis, selection was made on the basis of a multifactorial constellation at both the individual and team level.

Given that the national coach's ratings of each element of performance correlated remarkably well with more objective measures of specific progress and with the impressions of his coaching team, a decision was taken to utilise informed expert ratings from the national coach as the primary data source. This use of human expertise in integrating the wealth of information housed on the MIDAS system had a considerable advantage over investigating the possibilities for statistically combining these indices given the small sample size and the immense amount of data that would be required over an extended period. It was concluded that the best use of the statistical information gathered, and indeed the process of gathering it, was to inform the views of the coaches who then had their own, partly implicit, yet remarkably consistent formulae for deriving impressions of achievement. As the coaching staff had been closely involved in the development of the indices and the scoring and interpretation of those measures on a weekly basis, this statistical information was already integral to their dynamic
impressions of player performance and achievement. Informal comment about the remarkable concordance between ‘the stats’ when taken together and over the longer term and the ‘gut feeling’ of the coaching staff were increasingly commonplace as the measures were developed, tested and refined. In this context, it seems appropriate to utilise the coach as the expert who is in the best position to interpret and integrate each piece of information that is available. Confidence in his ability to do so is also partly a function of the degree of internationally recognised expertise of this coach, and indeed, of his assistants.

The final constellation of achievement indices selected for rating by the National Coach were longitudinal and global as the focus of this study was on the effect of enduring personality traits on long term achievement. Items were targeted to consideration of both performance and self-development. Thus, eight year follow-up measures included:

1. Dichotomous classification of players according to whether they had reached their hockey potential or not.
2. A rating of each individual’s ‘typical’ effort at training on a scale of 0-100 anchored by the individual who put in the least effort and the individual who was the most hardworking.
3. A similar rating of each individual’s ‘typical’ ability to perform under pressure, in the heat of competition.

Ratings of performance under pressure and effort committed at training correlated 0.66 suggesting a notable association but also some considerable differences. Neither achievement index correlated more highly than 0.33 (Dutifulness) with any single facet.
scale or domain scale on the standard or sport NEO (indeed many correlations were near zero).

Finally these performance ratings were converted to categorical (dichotomous) variables using a median split to accommodate the small sample size available in this study for the purposes of inferential analysis. Given the importance of categorical distinctions being 'real' for the successful use of discriminant functions analysis (Huberty & Hussein, 2003; Tabachnick & Fidell, 2001), the veracity of the median split for creating meaningful conceptual distinctions was verified through reference to case notes from coaching meetings, other ratings made by these coaches during the years of their stewardship, and with a book subsequently written by the National Coach in which he talks about the attributes of individual players (Charlesworth, 2001). All sources were remarkably consistent in identifying those players who were allocated to 'lower' and 'higher' performance categories as summarised in Table 4.1 below. As with factor analysis, classificatory success in discriminant analysis is the final arbiter of adequate variable definition, as, if anything, underestimation will occur when dichotomising a continuous variable. Results of this series of classificatory exercises revealed that:

1. Only 50% of the 57 players in this sample were considered by the National Coach to have reached their potential. Of those, 11 did not attain the status of Olympian. Of the 25 Olympians, 17 (68%) reached their potential. This finding suggests that even at the highest levels of sport, there is still room for the harnessing of personality to even higher achievement.
2. Only one player coded in the ‘low’ category of performing under pressure was an Olympian and interestingly she achieved selection to the Olympic team after the National coach had left the team. Three in the ‘high’ category were not Olympians, two of these were also rated as generally contributing little effort in training. The third, was a player whose performance was chronically variable. This finding suggests that the ability to perform under the pressure of competition at the highest levels is almost always a necessary, but not sufficient condition for success.

3. Five Olympians were located in the ‘low’ category for training effort. Nine in the ‘high’ category did not make Olympic selection. This result suggests that perhaps, even at this high level, ability can still over-ride effort in a small number of cases.

Table 4.1: Classification of players according to Olympic status, hockey potential, typical training effort and typical performance under pressure

<table>
<thead>
<tr>
<th>Frequency count (n=58)</th>
<th>Olympian</th>
<th>Not Olympian</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>reached potential</td>
<td>did not reach potential</td>
</tr>
<tr>
<td>Training Effort</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>Low</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>4</td>
</tr>
<tr>
<td>High</td>
<td>Performance under pressure</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>17</td>
</tr>
</tbody>
</table>

Taken together these outcome data reinforce the importance of considering achievement from more than one angle and of looking for multivariate relationships between achievement and personality.

Additional, more traditional, and arguably more objective outcome measures utilised in this study include:
1. Olympic status, though unfortunately sample size prevented statistical consideration of differences between single Olympians and multiple Olympians.

2. Chronicity of success: Long term membership of the National Squad was contrasted with those offered only a single selection opportunity or who prematurely resigned from the squad.

Potential differences between personality characteristics of pre-elite and elite hockey players were also considered by comparing those individuals who were members of the Senior Squad when first profiled with those who were members of the Senior Youth Squad or young members of the Senior Squad.

**Personality measures**

The primary personality profiling measure selected for this study was the NEO-PI-R for reasons summarised earlier. As discussed in Chapter 2 it was supplemented in this study with the Task-Ego Orientation Questionnaire (Duda & Nicholls, 1992) and the Desire for Control Scale (Burger & Cooper, 1979) to facilitate adequate measurement of the emergent stress salient traits from the *pathways framework*. The Spielberger State-Trait Anxiety Inventory – Trait form (STAI-T) (Spielberger, Gorsuch & Lushene, 1975) was also included as a well accepted measure of dispositional stress reactivity given the centrality of stressors in the proposed model. Finally, a sport-specific version of each of these scales was developed to explore hypothesised differences between *sporting personality* and *life personality*. Each questionnaire will be considered in turn following a
descriptive summary of a preliminary analysis of relevant personality traits with a sample of elite coaches.

Assessing the relevance of personality traits captured in the NEO PI-R

Given the relative inaccessibility of elite sporting samples and the short time frame available for data collection with this team, a process of preliminary verification of the relevance of these measures to the elite sporting context was undertaken.

Sixty-nine adjectives representative of the 30 facet scales of the NEO-PI-R were drawn from the manual and were selected on the basis of their face validity in the sporting domain (Costa & McCrae, 1992a). Many were in fact the name of the domain or facet scale, others were listed as highly correlated with these scales. Several other attributes were added that had particular face validity in sport but were not directly included in the NEO, such as the ubiquitous characteristic encapsulated in the adjective ‘competitive’. Thirteen National and State Australian hockey coaches were asked to rate the importance of each of these characteristics on a 4 point scale (Strongly Disagree to Strongly Agree) to represent their centrality to success as an elite hockey player.

A two way mixed method intra class correlation procedure was utilised (as per Van Rossum, 1996) in assessing consistency in ratings of attributes between coaches. For the 10 coaches considered together, the Intra Class Coefficient (ICC) for the reliability of a
single coach’s scores was 0.53. This is a substantial correlation when considering over
more than 50 attributes.

Given the large number of items, visual inspection of histograms of responses was
undertaken to identify important patterns. Attributes strongly and consistently considered
to represent elite hockey players were ‘self-disciplined’, ‘determined’, ‘positive’,
‘competitive’ and ‘confident’. Those that provoked most ‘strongly disagree’ responses
‘forgetful’. There were many traits that had some variability in rating and a considerable
number where the opinion was almost equally divided between agreement and
disagreement (see Table 4.2).

Table 4.2 Sixty-nine traits derived from the NEO PI-R manual, and rated by elite hockey
coaches according to their relevance for success in hockey.

<table>
<thead>
<tr>
<th>Consistent Strong Agreement</th>
<th>Consistent Agreement</th>
<th>Variable responding</th>
<th>Evenly split</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ratings (1-4)</td>
<td>Mean ratings (1-4)</td>
<td>Mean ratings (1-4)</td>
<td>Mean ratings (1-4)</td>
</tr>
<tr>
<td>Stabile 3.17</td>
<td>Emotional 2.27</td>
<td>Extroverted 2.55</td>
<td></td>
</tr>
<tr>
<td>Risk-taking 3.25</td>
<td>Generous 3.08</td>
<td>Warm 2.67</td>
<td></td>
</tr>
<tr>
<td>Perfectionism 3.33</td>
<td>Friendly 2.83</td>
<td>Gregarious 2.5</td>
<td></td>
</tr>
<tr>
<td>Imagination 3.25</td>
<td>Impulsive 2.5</td>
<td>Assertive 3.33</td>
<td></td>
</tr>
<tr>
<td>Dependable 3.33</td>
<td>Intelligent 3.33</td>
<td>Wide Interests 2.6</td>
<td></td>
</tr>
<tr>
<td>Industrious 3.42</td>
<td>Prob-solving 3.08</td>
<td>Idealist 2.7</td>
<td></td>
</tr>
<tr>
<td>Active 3.33</td>
<td>Efficiency 3.0</td>
<td>Conservative 2.3</td>
<td></td>
</tr>
<tr>
<td>Open 3.17</td>
<td>Calm 3.08</td>
<td>Compliance 2.67</td>
<td></td>
</tr>
<tr>
<td>Original 3.0</td>
<td>Wise 2.75</td>
<td>Modest 2.63</td>
<td></td>
</tr>
<tr>
<td>Considerate 3.0</td>
<td>Leader 3.17</td>
<td>Sympathetic 2.72</td>
<td></td>
</tr>
<tr>
<td>Curious 3.08</td>
<td>Likeable 2.75</td>
<td>Softhearted 2.18</td>
<td></td>
</tr>
<tr>
<td>Trusting 3.17</td>
<td>Angry 2.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conscientious 3.42</td>
<td>Self-conscious 3.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-confident 2.18</td>
<td>Excited 2.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thorough 3.33</td>
<td>Artistic 2.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

328
<table>
<thead>
<tr>
<th>Forgetful 1.5</th>
<th>Organised 3.42</th>
<th>Excitable 2.42</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fearful 2.17</td>
<td>Methodical 3.0</td>
<td>Spontaneous 2.83</td>
</tr>
<tr>
<td>Dutiful 3.18</td>
<td>Unconventional 2.67</td>
<td></td>
</tr>
<tr>
<td>Ambitious 3.42</td>
<td>Agreeable 2.45</td>
<td></td>
</tr>
<tr>
<td>Deliberate 3.0</td>
<td>Straightforward 2.91</td>
<td></td>
</tr>
<tr>
<td>Altruistic 3.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficient 2.92</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a degree of agreement amongst coaches about the factors most important to success, yet additional areas of difference of opinion. Other features of interest in this study are the strong agreement that anxiety is not conducive to success at the highest levels contrary to any consideration of its catalytic effects on motivation and effort. Variable opinion on some items may reflect a focus on different aspects of the game or positional differences when answering the question, for example, Charlesworth (2001) contends that ‘Thinking, I suspect, is for defenders and midfielders. It is not the stuff of goalscorers – they act best on their instincts and reflexes’ (p.147). Salient individual cases might also influence ratings at a given time. Some exceptional players come with a nature that could be considered both essential to their success and potentially problematic depending on the situation. One such attribute, often discussed by coaches is ‘intensity’. Charlesworth captures the value and the cost of this trait in discussing one of his players: ‘...none is more reliable than Kate Starre...I truly believe it was her professionalism that got her there [Sydney Olympics]...she was wonderfully aggressive, yet controlled at the Olympics. The feisty and often controversial ‘bad girl’ of club and interstate competition showed composure and calmness time and time again’ (Charlesworth, 2001, p.12). Intensity can manifest as aggression as well as total calm control. Finally, the coach’s own style or personality may influence what characteristics he/she considers desirable in their players, or indeed, if the Solloway’s (1996) niche theory has merit, which players
succeed under his/her tutelage. Coaches were evenly split, for example, in their views about whether assertiveness and extroversion were desirable traits despite both being clearly associated with achievement in many life domains (Matthews & Deary, 1998). In any case, it seems that the types of characteristics represented on the NEO-PI-R were understood by, and considered relevant to some extent, by all coaches which augers well for the use of this instrument. Moreover those traits considered essential by all coaches relate to ‘control’, supporting the inclusion of the Desire for Control Scale to further explore the relationship between desire for control and perceptions of control.

In sum, it seems that in Australian women’s hockey at least, there is some agreement over the nature of the particular attributes that are important in sporting success, but also considerable variability (in fact greater variability than in the views of elite Australian hockey players as reported by van Rossum (1996)). Notably however, all coaches believed that a different set of attributes is required at the elite level than the pre-elite level and all had a multifactorial impression of relevant personality characteristics that were, nevertheless, compatible with those targeted in the NEO PI-R. These findings suggest that we can now turn to consideration of what personality traits actually do exist amongst elite Australian hockey players and can be confident that using the NEO-PI-R to do so targets elements of personality considered relevant by elite sporting coaches in this field as well as providing points of contrast (i.e. elements that they do not believe are relevant).
The initial norm group for the NEO PI-R was quite modest but the psychometric properties have subsequently been assessed across thousands of subjects (1998). Coefficient alphas, or the intercorrelations between items on the facet scales vary from .56-.81 in self-reports and .60 to .90 in observer ratings which Costa & McCrae (1992a) report as being sufficient for scales with only eight items. The domain scales were stronger and varied from .86-.95. Costa & McCrae (1992a) report that the NEO PI-R has test-retest coefficients after a 3 month interval of 0.75-0.83 for each of the 5 main scales. Longitudinal studies (of 3 and 6 years) showed N,E,O stability coefficients of .68-.83 and for A&C of .63 and .79. Internal consistency coefficients ranged from 0.68-0.86. Convergent validity has been established through correlations with adjective reports. The shorter NEO-FFI was not used as, while quicker to complete its psychometric properties are considered to be not as strong (Matthews & Deary, 1998) and the level of fine grained analysis provided by the facet scales has been compromised.

A modification was made to the NEO PI-R response format in this study to discourage respondents from choosing the Neutral response option unless they had carefully considered all other options. Specifically, the Neutral category was moved from the midpoint on the scale to the right hand side of the page and separated noticeably from the other response choices which range from strongly disagree to strongly agree. This modification was made in recognition of the fact that Neutral categories do not function in a reliable way when placed as a midpoint on such a scale (Andrich, de Jong &
Respondents may circle Neutral when they mean ‘Neither agree not disagree’ or ‘Both agree a little and disagree a little’ or when they are ‘Unsure’ despite the fact that being neutral is conceptually quite distinct from each of these options. The impact of this instructional change on the psychometric properties of the NEO measures is explored and reported.

*Sport-specific personality measure: The NEO-Sport.*

Fogarty’s (1995) review of the sporting literature found no sport-specific personality profiling measures despite personality being the second most heavily researched topic involving measurement (second only to anxiety). The preceding review for the current study suggests that this remains the case.

The process of development of a sport-specific inventory involved several stages and was predicated upon a commitment to conservatism. The intention was not to construct a new questionnaire (which would entail submitting the tool to extensive psychometric evaluation) but rather, to circumscribe the application of the existing NEO PI-R questionnaire to a particular environment (cf. The adaptation of the TAI S attentional scales for use in many sport-specific contexts, and Barrett-Lennard’s Relationship Inventory which is designed to be transposed for use in different environments). Specifically, to an environment which formed a major part of the life experience of the participants yet had demands that were potentially very different than the rest of their life
sphere. See Appendix 9 for a copy of items on the sport-specific version of the NEO PI-R, hereafter referred to as the NEO-Sport.

Traditionally, a two stage approach to rational test construction is undertaken in the sporting domain (Jackson, 1975). In this study, a four stage process was used. The first stage involved the rational construction of items and the second, expert input to validate the items (see for example, Albrecht & Feltz, 1987; Bergandi, Shryock & Titus, 1990; Summers, Miller & Ford, 1991; Van Schoyck & Grasha, 1981). The most common reason for using expert validation is the difficulty in accessing a valid norming group without compromising access to potential subjects. This is an important issue in a difficult to access population where small sample size is a perennial problem and where having a non-equivalent norming group defeats the purpose of the exercise. In the case of the present study, the evaluation process was more considered and involved several stages.

The principal of minimal change was reflected in the fact that the wording of the items was maintained as far as possible with the main differences being to instruct players to 'Please answer each question as it relates to you in terms of your hockey'. This instruction was on the frontispiece to the questionnaire, and was also prompted at the top of each page of questions by the contextualising statement: 'In relation to my hockey, I...'. A second instruction was also added on the frontispiece: 'If you need to compare yourself with others, then compare yourself to your hockey team-mates and hockey friends'. It was unclear whether this instruction was needed given that none of the items
on the NEO PI-R (and hence on the NEO-Sport) explicitly request comparison with another. Rather, they are individual-centric, of a similar ilk as item two: ‘I really like most people I meet’, with response options of strongly agree to strongly disagree (as opposed to ‘more than others, less than others’ etc). The latter part of this instruction was included however, to minimise any potential for ambiguity whilst retaining the possibility for concurrent analyses of the dual lines of investigation: firstly, the peer-reference instruction allows us to optimise differentiation for within skill level comparison of higher and lower achieving groups; secondly, the comparison between NEO-Sport and NEO PI-R profiles offered idiothetic opportunities to explore the existence of contextual selves. Given that the individual-centric nature of statements however, and given that these instructions had not been used before, a short conversation was held individually with most participants (n=37) as they handed their completed questionnaire to me, to explore the ways in which they had made their responses to individual items. This conversation indicated that while all had read the instruction on the frontispiece, only 4 could recall the part of the instruction relating to peer reference. Even these four, indicated that they had been more influenced by the first part of the statement because it had been repeated at the top of each subsequent page of items. Their responses suggested that items elicited a style of responding in which comparison with others was not a salient feature. While this reduces the potential for complication in comparing NEO-Sport scores with the published norms for the NEO PI-R, it does suggest that significant differentiation between the profiles of more and less successful hockey players may be harder to attain.
Individual items on the NEO-Sport were changed only to make the item consistent with and relevant to the sporting context. Specifically, where items referred to a work context and utilized a term such as 'boss', the term 'coach' was substituted. Where the term 'job' or 'work' was utilized, it was changed to 'sport', and 'workmates' to 'team-mates'. All but one scale (Openness) had the same number of items as the original NEO PI-R and the ordering of items was faithful to the original.

The second stage of development involved input from a psychologist with expertise in psychometric assessment\(^8\). The National coach of the hockey team was also asked for input into the items. He was given a copy of the items grouped by facet scale and a copy of the final questionnaire with the items in order. Items that did not make sense to him or that did not seem to reflect the nature of the scale in a sporting context, were modified. The third stage of development involved further expert input. Four elite hockey coaches\(^9\), all of whom were former international players themselves were independently asked for feedback on the wording of the items and the face validity of items as representative of the facet scales to which they belonged. The fourth and final stage involved the completion of the resultant questionnaire by a former National hockey captain\(^10\) to ascertain face validity of the measure. At each stage helpful input resulted in the refinement of the scale. Feedback from each individual was shared amongst the other experts and verified from their perspective.

\(^8\) Thanks to Irene Styles, School of Education, Murdoch University
\(^9\) Thanks to Brian Glencross, Chris Spice, Tricia Heberle, Herb Haigh
\(^10\) Thanks to Wendy Pritchard
The most difficult factor to gain expert agreement on was the Openness scale. Specifically, there were four instances where it was felt by all experts that the questions could not be adapted without significant change to the structure and potentially, the intention, of the question. In these four instances the questions were excluded from the questionnaire and were replaced with a neutral response in scoring as is the practice for ‘missing’ items in the scoring of the NEO-PI-R. The missing items included: 38 (I am sometimes completely absorbed in music I am listening to), 68 (Watching ballet or modern dance bores me), 119 (I have no sympathy for panhandlers), and 172 (I love the excitement of rollercoasters). There are also, arguably, some instances where the ‘meaning’ of a scale is perhaps not optimally captured. Impulsiveness, for example, is measured largely in terms of eating behaviour where it would have been interesting to use game-based indices of impulsiveness in the context of sporting behaviour (e.g. I cannot repress my first impulse during a game). These limitations are acknowledged and, in keeping with qualitative methodology, rather than being mentioned as a general posthoc limitation of the study, is considered in each individual analysis to evaluate what potential effect it may have had. Specifically, the Openness scale, where used, ought be interpreted cautiously. Considering such modifications points to a rich vein of potential research opportunities for the future. Given that this was the first such attempt, a conservative approach, of minimal change, was maintained.

_Commitment, Challenge, Control, Optimism and Resilience_
As outlined in Chapter 2, measures of the proposed emergent stress-salient traits of commitment, challenge, control, optimism and resilience were extracted from the NEO, DfC and TEOSQ through a four stage process of inductive construction followed by deductive reconciliation.

**Task and Ego Orientation in Sport Questionnaire (TEOSQ) (Duda & Nicholls, 1992)**

The TEOSQ has 13 items comprising two subscales, one measuring task orientation (7 items) and the other ego orientation (6 items) (see Appendix 10 for item list). Before completing the questionnaire, participants are asked to think of a time when they felt most successful in their sport and answer the questions based on this. Answers are indicated on a 5 point Likert-type scale, where 1 = strongly agree and 5 = strongly disagree. A mean score is then calculated for each participant.

Duda et al., (1995) and Duda (1989) report high internal reliabilities for task orientation (alpha 0.62-0.83) and ego orientation (alpha 0.78 - 0.85). In a study of elite junior tennis players, Newton & Duda (1993) reported alpha levels of 0.78 and 0.81 respectively. The scales have been found to have low correlations with each other (r= -0.1; Williams, 1994). Duda (1992) reported test-retest reliabilities of 0.68 and 0.75 after a 3 week period. Concurrent validity was explored by comparison with a classroom motivation questionnaire. Duda (1992) reports high positive correlations between the two. White and Duda (1994) found that males were significantly higher on ego orientation than females regardless of competitive level, however these findings have not been robust (Duda et al.,
1995; Williams, 1994). Chi & Duda (1995) placed a caveat on the use of the TEOSQ after finding in their study of quite diverse populations (intercollegiate skiers, college students enrolled in physical activity classes, high school students enrolled in various sports and junior high school students in a regional state tournament) that each group understood the items differently. This suggests that the TEOSQ, at this stage in its psychometric development should only be used for intra group comparisons. A final limitation in the development of this questionnaire is the predominant involvement of child participants in the psychometric samples (due to its original development for classroom achievement). However, the items seem equally relevant to an adult sample.

Desire for Control Scale (DfC) (Burger & Cooper, 1979)

The Desire for Control Scale (DfC) (Burger & Cooper, 1979) is a 20 item scale that has been reported as having internal consistency (Kuder-Richardson reliability coefficients of 0.80 and 0.81 for two samples), test retest reliability (0.75) and discriminant ability from measures of locus of control (Rotter, 1966) and social desirability (Crowne & Marlow, 1960) (see Appendix 10 for a list of items). High scorers on the DfC Scale have also been shown to display a belief in personal control over chance outcomes (Burger & Cooper, 1979). Many subsequent studies have confirmed the psychometric merit of the DfC, as reviewed, and replicated by McCutcheon (2000).

Perceived control (or locus of control), rather than preferred control was also investigated by changing key words to reflect this orientation.
Stress-relevant measures

Given the importance of stressors in the lives of elite sportsmen and women and the proposed centrality of stress-salient traits in the pathways framework, it was decided to include two measures that target stress responses quite specifically. These measures were the Spielberger State-Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch & Lushene, 1975) and the Holmes-Rahe Life Events Checklist (Holmes & Rahe, 1967). Each is briefly described in turn.

Spielberger State-Trait Anxiety Inventory –Trait form (STAI-T)

The Spielberger State-Trait Anxiety Inventory is a 40 item inventory of which 20 assess trait anxiety. It is one of the most widely used measures in psychology and assesses a broad range of cognitive, behavioural and affective elements of anxiety. Its psychometric properties have been well established over several decades (Kaplan & Saccuzzo, 2005; Spielberger, Gorsuch & Lushene, 1975).

Holmes-Rahe Life Event Checklist (HRLEC)

The Holmes-Rahe Life Events Checklist is also known as the Social Readjustment Scale. It assigns stress values to an extensive series of life events. The additive severity of these events is taken to be an index of cumulative life stress. The development of the HRLEC
is based on the premise that good and bad events can impact on one's life by increasing stress levels and consequently increasing vulnerability to mental illness (Holmes & Rahe, 1967). Another important feature of this measure in terms of the current study is that it incorporates stressors that would be considered to be unexpected (adversities) as well as ongoing pressures. Basic psychometric properties of the scale have been established (Horowitz, Schaefer, Hiroto, Wilner and Levin, 1977) though there is some theoretical debate about the efficacy of assigning such ratings to particular events rather than considering perceived stress.

**Cognitive Ability**

Measures of cognitive ability were included in this study as a counterpoint to measures of personality in the factor analytic process of psychometric evaluation. Specifically, Kline (2001) suggests that the Openness factor on the NEO might represent intelligence as much as personality – this relationship required unpicking. Three measures of cognitive ability selected to contribute to a potentially factorable triad (Kline, 1994). In this case the measures were: Ravens Advanced Progressive Matrices and the Cattell Culture Fair Test, both are well respected non-verbal measures of cognitive ability which can be administered in a group format; and a measure of inspection time represented in a computer game format. The latter measure was selected given its focus on speed of information processing which might have particular relevance to sport. As these are standard measures and are not central to this study further description will not be given but the interested reader is referred to Anderson (1992) for a comparative discussion.
Procedure

Personality assessments, intellectual assessments and life event assessments were undertaken in group format where possible to prevent discussion about the content of the inventories and also to expedite data collection. In total, three sessions, each of one hour in length contributed to the gathering of this data. Sessions were separated by a minimum of one month so as not to tax the players. This did not compromise the data given its focus on dispositional characteristics and longitudinal effects.

TAIS profiles were also available on 31 of these sportswomen and were utilised to make a comparison between the measures as a check on the continuity and transferability of results from Study 1 (see posthoc considerations in Chapter 3).

RESULTS AND DISCUSSION

(relevant SPSS output files for all stages of Study 2 can be found in Appendix 11)

In presenting the results of this study, initial attention will be given to salient sample demographics, and psychometric evaluation of the measures used, after which the chapter will be separated into two complementary parts:

- Part I will report on quantitative analyses of player profiles, particularly, analysis of multivariate trait predictors of different levels of achievement; and
Part II will take a more qualitative approach to profile analysis, teasing apart some of the predictions made by the pathways framework in a more idiothetic and descriptive manner.

As discussed in Chapter 1, this dual approach offers the greatest opportunity for comprehensive analysis and theory development when undertaken with one sample.

### Demographics of the sample

(see Table 4.3)

#### Families

In contextualising these exceptional sportswomen in a broader frame, their demographic comparability to the general population (in areas other than their sporting ability), is perhaps pertinent. Complete datasets were available for 52 of 58 individuals and can be found in Table 4.3. At the time of initial data collection most players were aged 22yrs. The age of first selection into a National team ranged from 16-23years (mode=19yrs for ‘age squads’). Family demographics, often implicated in high achievement (Bloom, 1985) were also somewhat remarkable. In terms of birth order, approximately half were ‘last borns’ which is consistent with Sulloway’s (1996) notion that laterborns manifest revolutionary personalities as a way of securing a unique niche in their family system. More than 90% of the sample had family members who also played sport (notably, most were team sports) and 60% had at least one parent who played hockey. It is perhaps noteworthy, however, that there was at least one case in which an Olympian sprung from
a completely non-sporting family. The age of first joining a hockey club ranged from 4-12 yrs (mode=8yrs). When asked to identify people who had been influential in their hockey career, 81% nominated an early coach, 93% a recent coach, 80% a parent (though for reasons not necessarily directly relating to sport). A smattering of nominations were also included for grandparents, siblings, friends, boyfriends/girlfriends, team-mates, other (non-hockey) sporting coaches, school teachers and an uncle.

**Pressures and adversity**

In the *pathways framework*, stressful life events have been identified as a central feature of life as an elite sportsperson, and stressful events are, more broadly, considered an impediment to high achievement. However, a majority of players in the current sample scored in the moderate (42%) or high (35%) range on the Holmes-Rahe Life Event Scale. There was no significant difference between the mean scores for Olympians and non-Olympians in this sample. When asked to identify the ‘Top 5 stresses’ in the past year, 94% of players included events relating to hockey (despite being instructed not to confine themselves to consideration of their sporting life when considering the question). Notably only one person referred to on-field performance.

The most common responses to this question included selection – either making a team or missing out on selection; recovering from injury; geographical dislocation to take up a place at the Hockey Institute in Western Australia; managing strains on personal relationships (e.g. enduring long separations due to training commitments and touring);
and facing difficult decisions relating to work/study (i.e. either choosing unsatisfying but convenient positions to fit in with sporting commitments or deciding to commit to full-time training and manage the financial consequences). Managing the demands of both sport and work/study, and the associated feeling of not ‘keeping up’ in either domain, seemed to be a major source of perceived pressure.

These findings are consistent with the view emerging from the knowledge review that adversity (unexpected negative events) is only one form of significant stressor in the lives of elite sportspeople. Knowable stressors, both positive (eg selection into an elite squad) and negative (eg training demands) are additional, more chronic, forces. However, in this group of hockey players at least, stressful events have not proven a barrier to success. Rather, responses to open-ended questions would suggest that they have been seen as ‘obstacles to overcome’ – a test of character. Some explicitly state that learning to cope with such pressures had been pivotal to coping with the demands of elite sport, offering further support for the position taken in the pathways framework.

These results also highlight that if personality is having an impact on sporting success, it may relate to how well an individual copes with the impact of hockey on their life more broadly rather than impacting directly on their on-field performance. In turn, given that less than 10% of an elite hockey player’s life involves playing competitive matches, the impact of these ongoing stressors are likely to be more evident in enduring training commitment than on match performance in any given day. This sentiment is perhaps captured best by Mario Andretti, Formula One Racing Driver:
'Some succeed because they are destined to, but most succeed because they are determined to. Desire is the key to motivation, but it is determination and commitment to an unrelenting pursuit of your goal – a commitment to excellence – that will enable you to attain the success you seek.'

Table 4.3: Demographic information for a sample of 58 elite Australian women hockey players

<table>
<thead>
<tr>
<th>Personal Demog.</th>
<th>Mode(Range)(n=52)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>22yrs (18-28)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Family Demographics</th>
<th>Percent (n=52)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth Order</td>
<td></td>
</tr>
<tr>
<td>*First Born</td>
<td>20%</td>
</tr>
<tr>
<td>*Middle</td>
<td>29%</td>
</tr>
<tr>
<td>*Last born</td>
<td>51%</td>
</tr>
<tr>
<td>Siblings</td>
<td></td>
</tr>
<tr>
<td>Only child</td>
<td>4%</td>
</tr>
<tr>
<td>1 sibling</td>
<td>31%</td>
</tr>
<tr>
<td>2 siblings</td>
<td>35%</td>
</tr>
<tr>
<td>&gt;2 siblings</td>
<td>30%</td>
</tr>
<tr>
<td>Family Sport</td>
<td></td>
</tr>
<tr>
<td>At least one sib plays sport</td>
<td>90%</td>
</tr>
<tr>
<td>At least one parent plays sport</td>
<td>94% (*all team sports)</td>
</tr>
<tr>
<td>At least one parent plays hockey</td>
<td>60%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of achievement</th>
<th>Percentage(n=58)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olympians</td>
<td></td>
</tr>
<tr>
<td>*at beg of study</td>
<td>22% (n=13)</td>
</tr>
<tr>
<td>*at end of study</td>
<td>43% (n=25)</td>
</tr>
</tbody>
</table>

| Olympians (n=25)    |                  |
| *gold medallists    | 60%              |
| *dual Olympians     | 76%              |
| *multiple medallists| 36%              |

| Non-Olympians(n=33) |                  |
|*selected into National Senior squad | 73%            |
|*did not progress to Snr. Squad      | 27%            |

<table>
<thead>
<tr>
<th>Stressors: Pressure &amp; Adversity</th>
<th>Mean (Range)(n=52)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Event Scores</td>
<td>242 (60-518)</td>
</tr>
<tr>
<td>Holmes-Rahe Life Event Scale</td>
<td></td>
</tr>
<tr>
<td>&gt;300 (high risk)</td>
<td>35%</td>
</tr>
<tr>
<td>150-299 (moderate risk)</td>
<td>42%</td>
</tr>
<tr>
<td>&lt;150 (low risk)</td>
<td>23%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cognitive Ability</th>
<th>IQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattell Culture Fair Intelligence Test</td>
<td>110 (IQ 75-142)</td>
</tr>
</tbody>
</table>
Psychometric properties of personality scales

Before proceeding with the use of profiling with the Australian Women's Hockey Squad, particularly given the findings in Study 1, examination of the psychometric properties of the key measures for this sample of elite sportswomen seemed prudent. These measures include the NEO-PI-R, the Desire for Control Scale (DfC), the Spielberger State-Trait Anxiety Inventory (trait score) (STAI-T) and the Task-Ego Orientation in Sport Questionnaire (TEOSQ). In addition, a sport-specific version of each measure was trialled in this study (In the case of the TEOSQ, the alternate version was a non sport-specific version). Single construct measures are the most straightforward to evaluate and will be considered first, then the NEO PI-R and NEO-Sport followed by the derivative measures of Resilience, Optimism, Commitment, Control and Challenge.

Desire for Control (DfC)

Internal consistency analysis of the DfC scale both standard and sport-specific revealed several negative corrected item-total correlations, several of a very low order of magnitude (<.2) and alpha coefficients of 0.61 and 0.55 respectively. These are considerably lower than the ratings consistently reported by Burger and his colleagues, of 0.76 – 0.80 (McCutcheon, 2000). While in this study the response scale was reduced from the standard 7 point scale to a 5 point scale to make it compatible with the NEO PI-R (and thereby facilitate the development of the five derivative subscales), it is surprising
to find such a dramatically different degree of internal reliability. Reverse scoring of negatively correlated items did not improve the matrix. Modified versions were trialled utilising Cronbach’s alpha as a guide for improvement through item removal (Tabachnick & Fidell, 2001) and resulted in a set of 11 items (see Table 4.4 below) with substantially improved corrected item-total correlations and standardised alpha coefficients of 0.81 for the standard scale and 0.77 for the sport scale. There was a correlation between the sport and non-sport scales of 0.78. These 11 items consist of 6 positively oriented items and 5 negatively oriented items.

Table 4.4: Cronbach’s alpha, mean scores and corrected item-scale correlations for items on the modified Desire for Control Scale

| Item from DfC scale (Note: wording is from the standard version of the scale) | Corrected Item-Total Correlation |
|---|---|---|
| | Desire for Control | Perceived Control |
| | Standard | Sport | |
| 4. I would prefer to be a leader than a follower | 0.59 | 0.44 | 0.57 |
| 7. Others usually know what is best for me | 0.46 | 0.23 | 0.20 |
| 8. I enjoy making my own decisions | 0.54 | 0.42 | 0.40 |
| 9. I enjoy having control over my own destiny | 0.36 | 0.44 | 0.19 |
| 10. I would rather someone else take over the leadership role when I am involved in a project | 0.61 | 0.60 | 0.49 |
| 11. I consider myself to be generally more capable of handling situations than others are | 0.38 | 0.28 | 0.43 |
| 14. When I see a problem, I prefer to do something about it rather than sit by and let it continue | 0.52 | 0.59 | 0.34 |
| 15. When it comes to orders, I would rather give them than receive them | 0.32 | 0.21 | 0.32 |
| 16. I wish I could push many of life’s daily decisions off on someone else. | 0.39 | 0.37 | 0.09 |
| 19. There are many situations in which I would prefer only one choice rather than having to make a decision | 0.50 | 0.45 | 0.34 |
| 20. I like to see if someone else is going to solve a problem so I don’t have to be bothered with it | 0.56 | 0.49 | 0.45 |

Cronbach’s alpha (standardised) | 0.81 | 0.77 | 0.70 |

Mean (Range 0-44) | 28.8 | 28.9 | 27.0 |

SD=5.71 | SD=4.92 | SD=5.00 |
On both scales, the response range on some individual items was attenuated, however the response distribution for scale scores was symmetrical and normally shaped. Missing value analysis and outlier analysis revealed nothing of consequence. A measure of perceived control in sport using just these 11 items resulted in alpha of 0.70 and correlated with the desired control in sport scale at 0.58 suggesting that there is some discrepancy between desire for control and perceptions of actual control for a significant number of individuals. A discrepancy score was calculated which did not correlate notably with either of the parent scales. In this modified form, all three versions of the scale were considered satisfactory for further use and the discrepancy score, will also be considered.

**Task-Ego Orientation in Sport (TEOSQ)**

Internal consistency analysis of the TEOSQ was disappointing, with standardised alphas of 0.64 and 0.70 for the Task Orientation scale, general and sport versions respectively, and 0.58 and 0.59 for the Ego Orientation scale, general and sport scales respectively. This is considerable lower than those reported by Duda and Nicholls' (1992) which are in the order of 0.89, or Newton & Duda (1993) who reported alphas of 0.78 – 0.81 with a sample of elite adolescent sports participants. In the current study, corrected-item scale correlations were less than 0.1 in some cases and removal of any particular item was shown not to improve the alpha coefficient for the Ego scales. Removal of three items would have improved the Task scales but would have resulted in a 4-item scale. On this
basis, it was decided not to persist with the TEOSQ. It is possible that a fatigue effect hampered performance on this inventory as it was completed after the NEO PI-R, a test with 240 items. Unfortunately due to time restrictions, they needed to be completed concurrently. This result is nevertheless reported here as an antidote to the bottom drawer problem in research, particularly in sport psychology test development.

**Spielberger State-Trait Anxiety Inventory –Trait form (STAI-T)**

The trait scale of the STAI was assessed for internal consistency for standard and sporting contexts (see Table 4.5). Cronbach’s alpha for both scales reached 0.89 with CIT’s ranging from 0.12 – 0.75. Item 6 in the standard version of the questionnaire was the only potentially removable item but given the acceptable alpha levels and the theoretical arguments for retaining all items where possible (i.e. methodological comparability between studies), this questionnaire was utilised in its standard form. Pearson’s correlation between the sport and standard version of the STAI-T for a sample of 35 hockey players was 0.70 with a paired samples t-test revealing a significant different between the means of the two scales in the direction of higher levels of trait anxiety in the sporting context (t(34) = -5.35, p<.001). The clinical cut-off for anxiety using the STAI-T is 42 (Spielberger et al., 1970). In this sample, 10 players exceed this level on the standard measure, 3 were Olympians. On the sport version of the STAI-T, 23 of 35 players exceeded this criterion, 9 were Olympians, though obviously caution ought be exercised in making interpretations based on context non-specific norms. Nevertheless, where there was a difference of greater than one point between scores on
these two versions of the STAI-T, players responded to items in such a way as to indicate higher levels of anxiety-related symptomatology in the sporting context in all except two cases. That is, for the vast majority of individuals as we might expect, and as also suggested by the Holmes-Rahe results, the elite sporting context seemed to be experienced as one in which there are chronically high levels of personal challenge and anxiety though the direction of cause and effect is unclear. Nevertheless, these data also provide evidence that individuals high in trait anxiety can make it to the top of their sport as suggested by the pathways defined by *controlled vulnerability* and *mental toughness* (Type II) in the proposed *pathways framework*.

Table 4.5 *Paired Samples t-test for Spielberger STAI-T answered in relation to 'general life' compared with 'sporting life' for elite athletes*

<table>
<thead>
<tr>
<th>STAI-T</th>
<th>Mean</th>
<th>Range</th>
<th>N</th>
<th>Std. Deviation</th>
<th>T value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>38.57</td>
<td>24-53</td>
<td>35</td>
<td>7.49</td>
<td>-5.13</td>
<td>.000</td>
</tr>
<tr>
<td>Sport</td>
<td>44.00</td>
<td>24-57</td>
<td>35</td>
<td>7.98</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NEO PI-R & NEO-Sport**

In contextualising the NEO-PI-R profiling exercise, particularly given (i) the small sample size (n=57), (ii) change in emphasis on the instruction relating to the use of the ‘Neutral’ response category (as discussed in Chapter 2) and (iii) piloting of the sport version of the scale, four additional approaches were planned to supplement the range of psychometric assessments utilised in Study 1. Three approaches were prospective and the other post hoc. One has been reported already as a postscript to Study 1, the other three
will be reported at this juncture (despite some chronological inconsistency), reflecting the iterative nature of the analytical process and preventing the need for repetition where possible. Prospective approaches included:

1. Comparing the NEO\textsuperscript{11} profiles with TAIS profiles available for a subset of 31 players. Unfortunately given the psychometric problems encountered with the TAIS, this process was more damning of the TAIS than helpful with regard to the NEO (see postscript to Study 1 in Chapter 3);

2. Triangulating scale checks (as per Study 1) with validity checks on item series as defined in the NEO-PI-R manual to check whether the changed emphasis on the instructions had invalidated the profiles for comparison with published norms. Specifically to see whether the Neutral category had indeed been avoided and how this had impacted on response patterns and, consequently, scale distributions; and

3. Comparing self-ratings of personality with ratings by the National coaching staff and this researcher.

The post hoc approach involved combining NEO profiles of hockey players in this sample with the NEO profiles of Olympians from other sports (recruited as part of Study 3), thereby increasing the sample size of elite athletes to 125. This larger sample assisted in evaluating whether any psychometric limitations discovered in the NEO inventories were likely to be a function of the small sample size or a feature of their use in the elite sporting context more generally. All methods proved illuminating and salient features will be reported.

\textsuperscript{11} The expression ‘NEO profiles’ will be used when referring to the use of BOTH the NEO PI-R and the NEO-Sport
In discussing the psychometric evaluation of scales, it should be noted that domain scales will be distinguished from facet scales in the test by the following notation: A capital letter will be used for **domain** scale name and scores (e.g. Openness, $T$ scores) whereas **facet** scales will be italicised (e.g. impulsiveness, $t$ scores)

Outliers were identified for each domain scale and facet scale for both standard and sport versions of the NEO using stem and leaf, and box-plots as per Study 1. Individual outliers and extremes were checked for veracity at the item level and matched my clinical impressions of the individual on each occasion (rather than being obvious errors). Interestingly, in the larger sample (n=125) different cases were generally identified as outliers on the standard and sport versions of the NEO. It was thus decided to retain the few outliers identified to maintain the (already small) sample size. Preliminary analyses confirmed little effect of retaining outliers.

**Item-level descriptives**

Given the change in emphasis of the instructions to discourage use of the Neutral category, item distributions were typically bimodal. This is somewhat reassuring in evaluating the dataset for comparability with the published norms. Bimodal response sets, in an inventory with equal numbers of positively and negatively keyed items suggests that potential Neutral responses were distributed evenly between Agree and Disagree options counterbalancing the scoring to equivalence when using the standard scoring method. On the whole, Cronbach’s alpha, while extending below 0.70 in many instances,
was comparable to the internal reliability coefficients listed in the professional manual which, surprisingly, also failed to meet the 0.70 criterion in 13 of 30 cases. The lowest coefficient reported in the manual, in a sample of 1539 individuals, was the a6 facet (tendermindedness) at 0.56. This scale also resulted in the lowest alpha in the current sample at 0.20 for the standard version and 0.24 for NEO-Sport. This improved somewhat with the inclusion of the larger sample of 125 but was still disappointing. On the whole however, 14 of 30 facet scales met the 0.70 criterion in the NEO PI-R and 16 of 30 on the NEO-Sport with the remaining scales showing internal reliability comparable to Costa & McCrae’s (1992a) published sample. Given the altered instructions, item series assessment was also undertaken to ensure that each profile met Costa & McCrae’s (1992a) three validity criteria. Specifically, Costa & McCrae (1992a) state that:

a. 99% of all respondents in their sample check Agree or Strongly Disagree fewer than 150 times. In the current sample only 3 of 58 checked more than 150 acquiescent responses on the NEO PI-R and one of those also on the NEO-Sport. All three profiles were checked and seem to accurately represent the individual as I have rated them. They also meet criterion ‘c’ below.

b. 99% of all respondents in their sample check Agree or Strongly Disagree more than 50 times. All participants in the current sample do so for both standard and sport NEO versions.

c. There should be no consecutive strings of ‘Strongly Disagree’ greater than 6, ‘Disagree’ greater than 9, ‘Neutral’ greater than 10, ‘Agree’ greater than 14, or ‘Strongly Agree’ greater than 9. Outliers on criteria ‘a’ and ‘b’ were
checked against this criterion as well as a random subsample of 10 others - no violations of these rules were evident.

In addition, most $t$ scores showed standard deviations between 9-12 which adequately approximate the standard deviation of 10 for the normed sample. Taken together, it was decided that the evidence supported proceeding with scale evaluation, including normed comparisons.

**Scale descriptives**

**Published norms**

Visual inspection of domain scale score distributions in the boxplots in Figure 4.1 supports the comparability of the distributions with norms for the published scales\(^{12}\) (means are close to 50 and standard deviations approximate 10 with the exception of the Openness domain scale in the NEO-Sport which has the most restricted range and is elevated) but also perhaps surprisingly suggest that Conscientiousness is not markedly elevated nor Neuroticism suppressed. Indeed single sample $t$-tests of each domain $T$ factor score (calculated using the factor weights in the Professional Manual) against the NEO PI-R $t$ mean of 50 showed only Extroversion and Openness scores to be significantly different at the $p<.01$ level (the more stringent criterion was again adopted rather than .05, in recognition of the increased likelihood of Type 1 errors with repeated $t$-tests and will be maintained throughout the following series of analyses). Facet scales from the Extroversion and Openness domains also showed significant elevations as did

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\(^{12}\) Costa & McCrae (1992a) indicate that it is valid to compare clinical samples to the norms and utilize the same profile sheets on the basis of comparable standard deviations (p.32)
several facet scales from other domains, particularly with regard to the sporting context (however it ought be remembered that these norms were not developed for the sport-specific context) (see Table 4.6 below). In total, this sample differed from the norms significantly on seven of 30 standard NEO PI-R facets – in this sense it could be said that in daily life, they are more ‘like’ the norm group than different from them. However, this sample could be described as higher on achievement striving, excitement seeking, and the expression of positive emotion whilst being modest yet open to experiences in a number of ways. While these characteristics reflect differences on a minority of scales, the combination of these differences could produce quite powerful catalytic effects in terms of daily life experience. Indeed the even greater differences evident on the NEO-Sport may be one domain-specific manifestation of these exceptional trait combinations. Thirteen of 30 NEO-Sport facets were significantly elevated or suppressed compared to the norms. In addition to the positive characteristics described above, as a group, these sportswomen describe themselves as being less tenderminded, and showing more signs of depression and angry hostility.

When the sample size was increased to 125, these relationships remained and others also reached significance – specifically, 12 standard facet scales and 19 of 30 sport facet scales were significantly different than the norms at p<.01 (see Table 4.6). The expected relationship between sporting excellence and Conscientiousness was more apparent in the larger sample, particularly in the sporting context. Nevertheless, there was an adequate range of scores in all cases.
Figure 4.1 Median, quartiles, outliers and extreme values for the NEO factor scores on standard and sport-specific scales (n=58)

**General vs Sporting personality**

Figure 4.1 above supports the comparability of the standard and sport versions of the NEO scales. Paired sample t-tests (see Table 4.6) revealed no significant differences on domain scores (at p<.01). However, a number of facet scales showed significant elevations. Specifically, this group of sportswomen could be described as being more compliant in their sporting life than in life in general, though in absolute terms they were no more compliant than the average person. They were also more Open to Experience in a number of domains, yet less impulsive, less self-conscious, less tenderminded (in both relative and absolute terms), whilst being more dutiful, having a greater sense of competence and unsurprisingly, a stronger desire to achieve in the sporting domain than
in general life but also compared to the normal population. Nevertheless, as Figures 4.2 (a) and (b) show, there is considerable variability of scores on both inventories across all domains and facets.

Table 4.6: Significant results of (i) single sample t-tests of NEO domain and facet scale t scores when compared with the published norm of \( t = 50 \); and (ii) paired sample t-tests of NEO PI-R and NEO-Sport facet scale t scores.

<table>
<thead>
<tr>
<th>NEO scale</th>
<th>General or Sport</th>
<th>N=55-58</th>
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<td>Paired sample t value if p&lt;.01</td>
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* significant at p<.001
Figure 4.2 (a) Variability and range of scores on NEO PI-R facet scales for a sample of 57 Australian Women's Hockey players.

Figure 4.2 (b) Variability and range of scores on NEO-Sport facet scales for a sample of 57 Australian Women's Hockey players.
Olympians

Figure 4.3 suggests that Olympians and Non-Olympians in the hockey sample may also be more similar to each other on the NEO than different. Indeed a series of independent samples t-tests revealed no significant differences (at p<.01) between any of the mean domain or facet scales for the two groups.

![Image](https://example.com/image1.png)

**Figure 4.3:** Mean, standard deviations, outliers for NEO Domain T factor scores of Olympians (25) and Non-Olympians (33) in the Australian Women's Hockey Squad

**Reliability**

**Internal consistency**

Internal consistency of domain scales as measured by Cronbach's alpha (non-standardised as each facet scale has the same number of items – see Table 4.4) met the 0.7 criterion of adequacy for all scales on the standard NEO except Openness at 0.63. For the NEO-Sport, Neuroticism, Extroversion and Conscientiousness met this criterion,
indeed in both cases the Neuroticism and Conscientiousness scales had alpha greater than the more stringent criterion of 0.8. When the sample was increased to 125 with the inclusion of other Olympian profiles, all NEO PI-R scales met the 0.7 criterion and on the NEO-Sport the Openness and Agreeableness scales improved considerably in internal consistency, though did not reach alpha of 0.7. Corrected item-scale correlations suggest that no individual facet scale in either analysis accounted for this result. It is, however, worth noting that of the three items missing from the NEO-Sport, two items were from the Openness facet scale of aesthetics (from a total of 8 items on this scale) and one from the Agreeableness facet of tender-mindedness. Given the strong theoretical impetus for retaining all facets and scales in this analysis and given the still modest sample size, it was decided that these results were sufficient to support a decision to proceed to further consideration of the scales.

Table 4.7: Cronbach’s alpha for standard and sport NEO scales for three samples: 58 elite hockey players, 125 elite sportsmen and women from a number of sports (including hockey), and Costa & McCrae’s (1992a) norm groups.

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<th>125</th>
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<th>N=58</th>
<th>125</th>
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<td>0.70</td>
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<td>0.86</td>
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<td>0.79</td>
<td>0.78</td>
<td>0.44</td>
<td>0.62</td>
<td>0.57</td>
<td>0.65</td>
<td>0.87</td>
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<td>0.86</td>
<td>0.90</td>
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</tbody>
</table>

Test re-test reliability

Repeat NEO profiles, both standard and sport versions, were collected from a small subsample of hockey players (n=13, of whom 11 were Olympians), a period of 4 years after initial completion of the inventory. With the exception of the Openness scale,
Pearson's coefficient for the NEO domain scales were all strong and significant at \( p \) less than or equal to .01 (significance is of particular importance given the small sample size), ranging from 0.64 (Neuroticism) to 0.91 (Extroversion and Conscientiousness scales) on the standard form, and 0.79 (Neuroticism) and 0.94 (Conscientiousness) on the sport form. Costa & McCrae (1992a) report a range of longer term stability coefficients for inventories completed up to 6 years apart of 0.53 – 0.83. For the facet scales of the NEO PI-R in the current study, 25 of 30 had correlations that were in excess of 0.6 and significant at \( p \) less than or equal to .01 in all but 4 cases. For the sport version, 21 of 30 facet scales met this criterion. In both cases the majority of correlations met the more stringent \( p < .001 \) criterion. In this small sample, test-retest reliability was adequate in all but the Openness scale. Of the Openness facets on the standard NEO, only one fell short (o4 actions, \( r=0.19 \)) whilst three scales in the sport version fell short. It is notable and concerning however, that these three sporting facet scales were not those effected by missing items (o3 feelings, o5 ideas, \( r=0.34-0.53 \)).

Validity

Given the small sample and associated limitations in factor analysing the data, triangulation of methods was considered necessary to establish validity. This was particularly important for the NEO-Sport scale which is in an embryonic phase of development, but also for the NEO PI-R given the disappointing results with the TAIS.

Face Validity
Face Validity for the NEO-Sport was established by asking four national level coaching staff and two former Australian hockey players, to participate in the modification of items and to complete the final inventory to assess overall face validity as discussed earlier.

**Construct validity: Convergent and Divergent**

Appropriate internal convergence and divergence amongst facet scales was evident for both the standard and sport versions of the NEO. Of the NEO scales for the 58 hockey players, the domain scales most highly inter-correlated were Neuroticism and Conscientiousness (-0.46 for the standard NEO and -0.57 for the NEO-Sport). Costa & McCrae (1992a) report a correlation of -0.53 for these scales in a sample of 1,000 people. The Extroversion and Conscientiousness scale on the NEO-Sport also correlated at 0.43, somewhat higher than Costa & McCrae’s (1992a) 0.27. All other scale inter-correlations were similarly comparable with those published and ranged between -0.02 to -0.34. Correlations between the standard and sport versions of the NEO ranged between 0.72 for the Openness domain scale and 0.89 for the Conscientiousness domain scale.

When the sample was boosted to 125 Olympians with the inclusion of non-hockey Olympians from Study 3, intercorrelations between scales were not substantially changed. Facet scales in the NEO PI-R correlated with their counterpart scales in the NEO-Sport between 0.35-0.81 suggesting that in most cases they are not interchangeable though are strongly related. This was a promising preliminary sign for the validity of the sport NEO scales (though it proved problematic in factor analysing the scales together, producing a matrix that was not positive definite). The inter-scale correlations within
each measure were also largely unaltered by the increased sample size except for the NEO-Sport Extroversion scale which showed a higher correlation with Openness (r=0.42). The facet scales of depression (n3), impulsiveness (n5), vulnerability (n6) particularly reflected the elevated association between the Neuroticism and Conscientiousness domain scales. Correlations with this non-keyed scale were between -0.44 and -0.52 across sport and standard measures though they were always more highly correlated with their keyed scale (using corrected item-total comparisons). Once again these associations are of a comparable order of magnitude to those published by Costa & McCrae (1992a) in the NEO PI-R professional manual. The notable relationship between assertiveness (e3), activity (e4) and Neuroticism and Conscientiousness (r =-0.41 to -0.59) were similarly comparable with those in the NEO PI-R professional manual. All Conscientiousness facet scales except order (c2) correlated notably with either Extroversion or Neuroticism scales (r=0.44 to -0.57 across both standard and sport scales). However, once again, all remained correlated most highly with their keyed scale.

Self and other ratings of sporting personality

Construct validity of the pilot NEO-Sport measure was also approached through comparison of NEO-Sport facet scores with (i) self-ratings on summary descriptor statements indicative of (but not identical to) sport-specific attributes reflected in the NEO-PI-R, and (ii) ratings by coaches and ratings by me. Traits rated as salient by coaches on the adjective rating exercise provided the focus for statement construction. Self-rating was completed by players 4 weeks after completing the NEO-Sport. The correlation matrix containing self-ratings on these statements and the relevant ‘parent’
NEO facet scale t scores were littered with moderate sized correlations (0.3-0.5), significant at the p<.01 level, offering some evidence of convergent validity. That correlations with relevant parent scales were higher than those with other facet scales offers additional evidence of divergent validity. The highest and most salient correlations can be found in Table 4.8.

The items shown in Table 4.8 were also completed by the National Assistant Coach and the current researcher who both worked closely with the national senior and senior youth squads from which participants in this study were drawn. We had toured with the squads as well as routinely attending training sessions, tournaments and occasional social activities with both groups. This experience provided considerable opportunity to develop informed impressions of individual personality. Once again, the correlation matrix featured moderate sized correlations between these ‘other’ ratings and self-ratings on the parent NEO scales. Further, triangulation of self rating, coach ratings and psychologist ratings on these summary descriptors provided information about the consistency of impression of the sporting personality. As can be seen in Table 4.8, the more conservative single rater Intra Class Coefficient (ICC) (two way, mixed effects) for the three raters, ranged between 0.16 – 0.45 which is comparable with the peer/self intraclass correlations reported by Costa & McCrae (1992a) for the Conscientiousness, Agreeableness and Neuroticism facet scales of the NEO-PI-R from which these attributes were largely derived. Finally, it is interesting to note that the correlations between the
coach and this psychologist were all greater than 0.32 and significant\(^\text{13}\) at the \(p<.01\) level except in the case of 'competitiveness'. Moreover, in 7 of 12 cases there was considerably greater agreement in ratings between the coach and this psychologist than between either rater and the player's self rating. Nevertheless, the player’s self ratings seemed to relate consistently with more specific measures of related constructs on the NEO. That is, their self-presentation at least, could be said to be consistent and their individual NEO item ratings, considered, rather than random.

Table 4.8 Intra-class correlation between self ratings of personality and those ratings made by the National Assistant Coach and team psychologist

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<td>'This player is...'</td>
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<tr>
<td>Intra-class correlation coefficient-single rater</td>
</tr>
<tr>
<td>NEO-sport facet scale(s) with which the self-report rating of this item were most highly correlated</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>Quite an anxious person 0.45</td>
</tr>
<tr>
<td>N1: Anxiety (r=-0.35^<em>); a3: Altruism, (r=0.50^</em>)</td>
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<td>c4: AchieveStr, (r=-0.39^*)</td>
</tr>
<tr>
<td>A hardworker at training 0.30</td>
</tr>
<tr>
<td>N2: Angry Hostility, (r=0.44^<em>); a3: Altruism, (r=-0.45^</em>); c1: Competence, (r=-0.36^*)</td>
</tr>
<tr>
<td>c5: Self-discipline (r=-0.38^*)</td>
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<tr>
<td>A fierce competitor during games 0.24</td>
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<tr>
<td>C1(sport): Competence (r=-0.46^*)</td>
</tr>
<tr>
<td>c3: Dutifulness, (r=-0.40); c4: AchieveStriving, (r=-0.40^*)</td>
</tr>
<tr>
<td>Impulsive 0.29</td>
</tr>
<tr>
<td>N5: Impulsiveness, (r=-0.41^*)</td>
</tr>
<tr>
<td>o4: Actions, (r=-0.43^<em>); c6: Deliberation, (r=0.50^</em>)</td>
</tr>
<tr>
<td>Modest 0.26</td>
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<tr>
<td>o3: Feelings, (r=-0.38^*)</td>
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<tr>
<td>C1: Competence (r=-0.66^*); c5: Self-discipr=-0.61</td>
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<tr>
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<tr>
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<td>a3: Altruism, r=-0.36; e1: Warmth, r=-0.35</td>
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<tr>
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</tr>
<tr>
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<td>c4: Achieve Striving, r=-0.51*</td>
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<tr>
<td>Open to difficult feedback and new ideas. 0.24</td>
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<tr>
<td>A5: Modesty, (r=0.29)</td>
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</table>

\(^\text{13}\) Funder (1989) points to the multiplicative sources of unreliability and bias (error) associated with observer ratings of personality resulting in perennially low correlations. He concludes that small, but significant correlations are noteworthy given the stringency of this type of validity test.

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**Factor structure**

In exploring the factor structure of the NEO, the Desire for Control Scale (modified), STAI-T, Ravens Advanced Progressive Matrices (RAPM), Cattell Culture Free Intelligence Test (CCF) and a measure of Inspection Time (IT) were used as comparison scales to locate the NEO facet scales in conceptual space (Kline, 1994). We would expect trait anxiety to be most closely related to measures of Neuroticism, desire for control to be related to Conscientiousness and perhaps Neuroticism. The RAPM, as a measure of cognitive ability, ought to be poorly related to personality and most readily associated with other measures of cognitive ability – in this case the CCF and IT. As mentioned earlier, three cognitive measures were utilised to provide the potential for a factorable triad. Unfortunately, only a subsample of data could be collected for the STAI-T and inspection time precluding them from inclusion in a factor analytic procedure without further compromising the veracity of the procedure through reduction of an already under-sized sample (n=58). Hence examination of convergent and divergent validity in relation to these measures was restricted to post factor analytic correlation.

This sample size would still be considered too small for a factor analysis by many researchers, however MacCallum, Widaman, Preacher & Hong (2001) have demonstrated (with theoretical argument and worked examples) that communality is the ‘most important determinant of population factor recovery’ (p.626) and that only when communality is low, does sample size (and overdetermination) become important. Initial
In analyses of the facet scales of both the standard and sport version of the NEO, communalities were uniformly greater than 0.5. However, the sample size in the current study did preclude an item-level analysis for the 240 NEO items (even with the 125 participants in the larger sample of Olympians). Factor analysis of the facet scales was considered more justifiable, though is still conducted with caution and interpreted only as part of a triangulated data set. Kline's 3 minimum criteria for factor analysis were only partially met: There were more than 3 potential variables to define each factor, however the variable (facet scale) to subject ratio fell slightly below the 1:2 suggested by Kline (1994) until boosted by the addition of the larger sample. The factors to subjects ratio fell well below 20:1 until the sample size was increased. Tabachnick & Fidell's (2001) prerequisite of sizeable correlations in the matrix (>0.3) was met. The Kaiser-Meyer-Olkin statistic was in excess of the desired 0.6 and Bartlett's test of sphericity reached significance at p<.001 (which is particularly meaningful in instances where there are fewer than 5 cases per variable (Tabachnick & Fidell, 2001)). In addition, the scree test suggested that a 5 factor solution was supportable.

In this context, the robust nature of the factor analytic solutions generated was particularly promising. Specifically:

a. Oblique rotations were used as the most appropriate option given the presence of correlations greater than 0.32 between variables (Kline, 1994) but were comparable to results generated with the Varimax rotation solution. In such circumstances, given the relative lack of disagreement amongst scholars about interpreting Varimax solutions (compared to Oblique
(solutions), Kline (1994) suggests reporting these. This advice has been followed here.

b. The larger sample of 125 elite athletes produced comparable solutions to the subsample of 58 hockey players. This provides some confidence in the veracity of the solution, particularly given the reasonable communalities in each analysis. Results for the hockey sample alone will thus be presented here.

**NEO PI-R** (see Table 4.9)

Varimax rotation converged on the requested 5’ factors in 7 iterations accounting for 54.27% of the variance. Extracted communalities ranged from 0.21-0.77. All facet scales on the Conscientiousness scale loaded primarily on the first factor, the Extroversion facet scales also loaded higher than 0.3 on one factor although for e4 (*activity*) this was a secondary loading. For the remaining three scales, 5 of 6 facet scales loaded higher than 0.3 on the relevant scale, though these were not all primary loadings. The remaining scales loaded on other factors that made conceptual sense as secondary relationships and which had notable relationships in Costa & McCrae’s (1992a) published studies. The modified Desire for Control Scale, loaded on both the Neuroticism and Conscientiousness scales. The difference score calculated between desire for control and perceived control did not load greater than 0.3 on any factor and was thus abandoned. When the sample of 125 was utilised, a slightly stronger pattern emerged with only the Neuroticism factor having one facet scale not loading at greater than 0.3.
NEO-Sport (see Table 4.9)

Varimax rotation converged in 14 iterations and accounted for 54.20% of the variance. Extracted communalities ranged from 0.27-0.77. Once again, all of the Conscientiousness facet scales were strongly represented on the first factor. The Neuroticism facet scales all loaded greater than 0.3 on the second factor, and the Extroversion facets on the third factor, though these were not all primary loadings. Four Agreeableness facet scales clustered together on the fourth factor but only two Openness facet scales appeared on the final factor. The Desire for Control Scale, loaded on both the Neuroticism and Conscientiousness scales. When the sample was increased, once again a slightly stronger pattern emerged with five Agreeableness factors clustering together.
Table 4.9: Rotated Factor Matrices showing loadings >0.3 for NEO facet scales and the Desire for Control Scales (n=58 hockey players).

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Note: DfC = Desire for Control Scale, PCs= Perceived Control Scale; Diff C = Difference between desired and perceived control in sporting career.

Taken together these findings are encouraging with such a small sample and provide some support for the traditional domain factor structure and secondary relationships.

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between facet scales reported by Costa & McCrae (1992a). The factor solutions seem stable, and generally (though not totally) coalesce in expectable ways.

Posthoc correlation of STAI-T with all facet scales revealed that it was, as would be expected, correlated highly (0.56) with the Neuroticism scale and four of its facet scales. The STAI-T also correlated with modesty (A5) at 0.63 and negatively with assertiveness (E3) at -0.48. All other correlations were substantially smaller.

Divergent validity was supported by correlations between the NEO and RAPM, CCF & IT. Correlations among the cognitive measures ranged from 0.31 – 0.62, while the correlations between the Ravens (as the measure on which a larger sample was available (n=57)) correlated less than 0.3 with all facets on both NEO questionnaires except the vulnerability (N6) facet scale (r=-0.34) and values (O6) facet scale (r=0.45) of the standard NEO questionnaire.

In sum, the results for the NEO PI-R and NEO-Sport measures are better than might have been expected with such a small and homogeneous sample, particularly so for the NEO-Sport given its pilot status. Perhaps the least supported scale is the Openness domain scale, particularly on the sport questionnaire which was hampered from the outset due to missing items and difficulty in translation as discussed earlier. There was sufficient support for the domain and facet scale structure of the NEO in both forms to pursue analyses utilising both levels of assessment though perhaps the factor loadings suggest the facet level to be the most defensible level of analysis. However, while the factor
analysis suggests that the traditional domain groupings of the facet scales are not the strongest available combination for this sample, Cronbach’s alpha suggests they are workable (reliable) combinations and there is triangulated support for their validity. Given the theoretical impetus to utilise the traditional factors (to facilitate replicability), the standard domain scales were pursued as were the facet scales. These findings also support the value of looking to other combinations of these items as has been undertaken in the construction of the proposed Resilience, Optimism, Commitment, Control, and Challenge measures in the current study.

**Derivative NEO measures: Optimism, Resilience, Control, Commitment and Challenge**

As in Study 1, measures of Optimism, Resilience and the three scales of Hardiness: Commitment, Control and Challenge were conceptually constructed from the items available in the above questionnaires. Preference was given to items from the NEO for consistency’s sake, but consideration was given to the addition of supplementary items from other questionnaires where appropriate. These measures were considered comparable in the sense that all were measured using the same 5 point scale as the NEO. Items identified in the conceptual construction process can be found in Appendix 4. Cronbach’s alpha was used to explore the compatibility of these potential items. Items were deleted on the basis of negative correlation, poor CIT and poor contribution to the alpha coefficient (i.e. would alpha be improved through the removal of particular items). Results for the sample of 58 hockey players were closely paralleled in the larger sample of 125, thus the hockey results are reported below:
1. Optimism scale: An 8 item scale resulted, drawn from the *positive emotion* (E6) and *trust* (A1) facet scales. Standardised coefficient alpha for the standard and sport version of the NEO reached 0.79 and 0.74 respectively. CIT’s ranged from 0.26–0.65.

2. Resilience scale: A 14 item scale resulted, notably drawn entirely from the Neuroticism facet scales, with a standardised coefficient alpha of 0.74 for the standard scale and 0.75 for the sport scale. CIT ranged from 0.07-0.62. The solution would not have been improved significantly with the removal of further items. Unfortunately most items were negatively oriented to this scale.

3. Challenge scale: An internally consistent scale could not be constructed. The best attempt resulted in a 6 item scale with alpha of 0.66 for the standard scale and 0.36 for the sporting scale. On this basis it was decided not to pursue this measure.

4. Control scale: A 10 item scale resulted with standardised alpha = 0.71 (general) and 0.74 (sport). However, it was noted that 50% of items remaining in this scale were shared with the Resilience scale. Given the inclusion of the Desire for Control Scale in this study in combination with the Perceived Control version of the scale, it was decided not to pursue this measure.

5. Commitment: A 10 item scale resulted with no item overlap with the Resilience or Optimism scales. Items were drawn from the Extroversion and Conscientiousness facet scales. Standardised alpha was 0.83 for the standard measure and 0.85 for the sport version. CIT’s ranged between 0.39-0.63.

In sum, the posthoc analysis of the Optimism, Resilience and Commitment subscales drawn exclusively from items on the NEO questionnaires supported their potential
usefulness for further analysis. The Desire for Control scale will be considered as an alternative to a NEO-derived Control scale. The Challenge scale was abandoned. Correlations between the standard and sport versions of these indices were 0.72 for the Optimism scale, 0.81 for the Resilience scale and 0.78 for the Commitment scale in a sample of 58 players. Reliability assessment in the larger sample of 125 maintained these high levels of internal reliability.

Factor analytic assessment of the items was pursued with caution once again due to small sample sizes. The Desire for Control scale (modified) was used as a marker variable rather than in item form as a concession to sample size. Factorability requirements as set out in the previous analysis were met and the Varimax 3 factor solution, accounting for 31.94% of the variance, will similarly be reported in Table 4.10. For the items derived from the standard NEO, all items on the Commitment scale loaded primarily and greater than 0.3 on the first factor, except for item 175. The primary loading for all Optimism items was on the second factor, though item 214 did not reach 0.3. Eight of 14 Resilience items loaded on the final factor, an additional four did not load on any scale greater than 0.3 and two coalesced with the Optimism items. The Desire for Control scale loaded on the Resilience factor. While imperfect, these findings were sufficiently encouraging to warrant proceeding. On the sport scale the pattern of loadings was much less clear and on this basis it was concluded that the sport version of these derived scales were too unstable to utilise at this point.
Table 4.10 Rotated factor matrix for the Desire for Control scale (modified) and items on the Resilience, Optimism, and Commitment scales (n=58)

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<th>Factor 3</th>
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<td>C47</td>
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<td>O154</td>
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<td>R26</td>
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<td>R196</td>
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<td>R56</td>
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<td></td>
<td>.359</td>
</tr>
<tr>
<td>DfC modified 11 items</td>
<td></td>
<td>-.342</td>
<td></td>
</tr>
<tr>
<td>R6</td>
<td></td>
<td></td>
<td>.342</td>
</tr>
</tbody>
</table>

Note: Item numbers in the above table refer to the NEO PI-R item number and are prefixed with ‘O’ if keyed to the Optimism scale, ‘R’ if keyed to the Resilience scale and ‘C’ if keyed to the Commitment scale.
Summary of psychometric evaluation of scales

While none of the scales selected or constructed for this study produced flawless psychometric data, when the small sample size is compensated for by triangulating a wide array of data, the following measures have been evaluated as satisfactorily reliable and adequately valid for vigilant use in profiling this particular group of elite sportswomen:

1. The standard NEO PI-R domain and facet scales (with altered instruction)
2. The piloted sporting version of the NEO (NEO-Sport), both domain and facet scales with some caution about the Openness scale
3. A shortened version of the Desire for Control scale (DfC) and a modified version reflecting perceived control in the sporting context (PCS)
4. The Optimism, Resilience and Commitment scales (derived from the NEO PI-R)

Now that the veracity of the scales has been evaluated for this sample, a defensible profiling battery has emerged. Greater confidence is now justifiable in the use of these measures for both quantitative and qualitative consideration of the original questions of interest. Specifically, we can now consider whether any multifactorial combination of personality traits define successful sporting champions and differentiate them from those with potential who never ‘made it’. The four sets of measures above provide two profiling options: (i) The NEO and NEO-Sport provide a broad spectrum profiling opportunity; and (ii) The remaining scales can be combined to focus attention on a more
specific area of interest: the proposed stress-salient, emergent traits of optimism, resilience, commitment and control.

**Part I: Identifying high achievers through multivariate statistical analysis of profiles**

A series of discriminant functions analyses were conducted (following the protocol set out in Chapters 2 and 3) in an effort to evaluate the discriminating and classificatory powers of these profiling tools. This is followed by a more descriptive discussion, drawing upon quantitative and qualitative data, to assist in interpreting and unpicking the story of personality with several illustrative case examples.

As discussed earlier, the most statistically supportable level of data for the dependent variable in these inferential, multivariate, profiling exercises, is dichotomous. Discriminant functions analysis with a sample of 58 participants and a dichotomous dependent variable, potentially allows the concurrent consideration of all 30 NEO facet scales. While this case to variable ratio is far from ideal, it is theoretically supportable (exceeding the minimum criteria of more cases than variables) as long as the other assumptions of discriminant functions are met (Tabachnick & Fidell, 2001). In this instance Box’s M was used as a sensitive test of homogeneity of variance-covariance in small samples (Tabachnick & Fidell, 2001). Wilks’ Lambda was utilised for assessing univariate relationships and also for evaluating stability of the few discriminant functions that emerged. A more stringent significance requirement of $p<.01$ was once again adopted for all univariate and multivariate comparisons. As outlined earlier,
discrimination was attempted between groups separated on objective measures of achievement at 8 year follow-up, specifically

1. Olympic status; and
2. Chronicity of success as reflected in longevity of membership of the National hockey squad.

Three additional classifications, also finalised at 8 year follow-up, comprise ratings of the National coach’s perception of each individual’s:

1. Potential: Specifically, whether the individual was considered to have reached their hockey potential;
2. Effort at training: Whether an individual was a hardworker at training, maximising their opportunities for reaching their potential; and
3. Performance under pressure: Whether an individual excelled in difficult competitive situations.

Potential differences between personality characteristics of pre-elite and elite athletes were also considered by comparing those individuals who were members of the Senior squad when first profiled with those who were members of the Senior Youth squad or young members of the Senior squad.

*Discriminating power of the NEO facet scales*

While inclusion of the 30 NEO facet scales was theoretically justifiable, the SPSS (Version 11.0) DISCRIM procedure determined the sample size to be insufficient to
reliably support such an analysis. A decision was made to exclude the Openness facet scales from the analyses given their status as the least robust scales. This addressed the veto sufficiently to allow continuation. All eigenvalues for significant discriminant functions were greater than 1, however, loadings on the discriminant functions were, with one exception, lower than the 0.3 (10% variance) criteria usually set (Tabachnick & Fidell, 2001). This is an inevitable consequence of the small sample and large number of predictors. Hence these findings ought be considered tentative, for verification in future studies. Finally, prior probabilities were set in two different ways in parallel analyses:

1. Firstly, priors were set to group size for consideration of personality structure amongst elite Australian hockey players as this was an exhaustive, purposive, sample for investigating specific group differences within this squad from which were drawn an exceptional team during its most successful era. In this case, differences in group size that existed for some analyses (specifically, those comparing Olympians with non-Olympian) were known to reflect (indeed, to constitute) population parameters (Huberty & Hussein, 2003) relating to achievement; and

2. Subsequently, when considering the broader issue of personality amongst all exceptional sportspeople, there was no reason to suspect that differences in group size might be reflective of population parameters, but rather might arguably be the random result of sampling hockey players as opposed to other sports. Thus priors were set to equal (Huberty & Hussein, 2003).

In the end, there was only one analysis for which this distinction became relevant as all other analyses involved groups of equal size. Even in this analysis, it made no substantive
difference to results and so all analyses reported here will be those with equal prior probabilities set.

The overarching picture emerging from the series of analyses utilising the NEO PI-R and NEO-Sport scales was that:

1. Olympians (n=25) were not distinguishable from elite non-Olympians (n=33) on either the sport or non-sport measure,

2. Longer term members of the elite National squad (n=29) were not distinguishable from those who had more fleeting contact with the elite squad either through coach de-selection or self-selection (n=29).

3. Hockey players who were pre-elite at the time of profiling (i.e. members of the Senior Youth Squad, n=29) were distinguishable from elite hockey players (n=29) on a single facet scale. Elite players scored significantly higher on the dutifulness scale (c3) of the NEO-Sport (means for the groups were 54.40 and 46.39 respectively).

The lack of discriminatory power of the NEO PI-R continued when considering the remaining three measures of achievement: training effort, performance under pressure and maximisation of potential. However, when using the NEO-Sport, the 24 facets of the N, E, A, and C domains discriminated high achievers on each of these three subjective indices very effectively (see Table 4.11). In each case, approximately 90% of cases were correctly classified compared to 50% correct classification by chance. Notably in the case of performance under pressure, no significant univariate relationships contributed to the multivariate finding. While there is obviously over-fitting of the data because of the use
of posterior classification (Huberty & Hussein, 2003), these hit rates are certainly much higher than the previous sets of analyses in Study 1 and Study 2 which also used posterior classification. Thus, tentative interpretation of functions will follow.

Table 4.11: Discriminant summary of significant results for achievement measures and NEO Sport facets from N, E, A, C

<table>
<thead>
<tr>
<th>Achievement index</th>
<th>Sample size</th>
<th>Wilks Lambda (Equality/ gp means)</th>
<th>Wilks Lambda (Discrim Function)</th>
<th>Highest 5 loadings</th>
<th>Functions at group centroids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reached potential</td>
<td>(n=56) Df(1,54)</td>
<td>Potential Yes or No</td>
<td>P&lt;.01 d.f.=24</td>
<td>DF1(.369)</td>
<td>N1 (0.39) Yes -1.24</td>
</tr>
<tr>
<td>n1: Anxiety</td>
<td>0.79</td>
<td>47.10 No 57.00</td>
<td></td>
<td>A1 (-0.26) No</td>
<td>1.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C1 (-0.25)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N6 (0.25)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>N4 (0.24)</td>
<td></td>
</tr>
</tbody>
</table>

Classification by chance: 50%

<table>
<thead>
<tr>
<th>Performance under pressure</th>
<th>(n=56) Df(1,54)</th>
<th>P=.01 d.f.=24</th>
<th>Eigen=1.73</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DF1(.366)</td>
<td>E6 (-0.19)</td>
<td>Low 1.20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N6 (0.15)</td>
<td>High -1.38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A5 (-0.15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>E2 (0.13)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>E3 (-0.17)</td>
<td></td>
</tr>
</tbody>
</table>

Classification by chance: 50%

<table>
<thead>
<tr>
<th>Effort at training</th>
<th>(n=56) Df(1,54)</th>
<th>Effort Hi or Lo</th>
<th>P&lt;.01 d.f.=24</th>
<th>Eigen=1.84</th>
</tr>
</thead>
<tbody>
<tr>
<td>n6: Vulnerability</td>
<td>0.89</td>
<td>Hi 44.62 Lo 50.96</td>
<td>DF1(.353)</td>
<td>C1 (-0.29) Low 1.38</td>
</tr>
<tr>
<td>c1: Competence</td>
<td>0.87</td>
<td>Hi 58.24 Lo 49.82</td>
<td></td>
<td>N6 (0.27) High -1.29</td>
</tr>
<tr>
<td>c3: Dutifulness</td>
<td>0.89</td>
<td>Hi 53.97 Lo 46.67</td>
<td></td>
<td>C3 (-0.26)</td>
</tr>
</tbody>
</table>

Classification by chance: 50%

| Correct Classification (overall) | 91.1% |
| (Reached potential 96.6%; Did not reach 85.2%) |

| Correct Classification (overall) | 92.9% |
| (Performs well under pressure 92.3%; Performs less well 93.3%) |

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To assist in determining the substantive meaning of the significant functions, Table 4.11 also records the five facet scales loading most highly on the structure matrix for each function (as per Statsoft, 2005; Tabachnick & Fidell, 2001). Interpreting the functions must be tempered by the relatively low loadings, however Tabachnick & Fidell (2001) suggest that the same criteria for interpretation apply to discriminant analysis as to factor analysis, that is, interpretability is the final arbiter. Consideration of individual function profiles (see Figures 4.4 - 4.6) proved interesting, but were complex to interpret in and of themselves, given the paucity of significant univariate relationships and the lack of clear distinction between the importance of each loading. However, when graphical representation of the profiles were placed adjacent to each other it became clearer that the most salient feature of these findings was apparent only when the results were considered together. The thread that connects them is that in each analysis, facet scale n6 which measures vulnerability to stress, is both a core part of the discriminating function and is suppressed in all ‘high achieving’ groups...not relative to the lesser achieving group (hence the lack of significant univariate relationships in all but one analysis), but relative to the normal population. This was subsequently confirmed using one-sample t-tests for the high achieving groups. All reached significance at p<.01 whilst none of the lower achievement groups showed significant differences to the midpoint t score of 50. So, it seems, invulnerability to stress, compared to the average person, is an important contributor to: achieving one’s potential, performing well under the pressure of competition, and being able to consistently commit effort to a demanding training regime.
Further, in each of the three analyses, the n6 scale is accompanied by a different constellation, or ‘supporting cast’ of facet scales as can be seen in Table 35. Taken together, these findings point to the possibility that a low vulnerability to stress potentiates success in a number of different ways according to the other personal attributes of the individual. Specifically:

1. If the individual is also low on self-consciousness and has moderate levels of anxiety counter balanced by a high sense of competence, then they are more likely to have been reliably classified as having achieved their sporting potential (relative to their own ability) than their peers. Notably, this would mean that they may fit the criteria for mental toughness (Type II: adaptive vulnerability) as defined in the pathways framework. The group that were rated as not having met their sporting potential had greater variation in scores on n6 suggesting that some of these individuals may fit the criteria for controlled vulnerability.

2. If however, their most salient additional characteristics are a high level of activity, a high achievement striving tendency, and a strong sense of competence then they are more likely to be classified as a hardworker at training than their peers, and may be displaying something more akin to mental toughness (Type I: achievement striving) as defined in the pathways framework.

3. Finally, if the individual had low vulnerability to stress in combination with both assertiveness and modesty as well as an elevated tendency to express positive emotion, and a gregarious nature, then they were likely to have been classified by the National Coach as performing well under pressure. This description is perhaps
more akin to the open nature of the hardy individual described in the *pathways* framework.

In each scenario, a low vulnerability to stress perhaps makes it possible for the full effect of these other characteristics to be brought to bear in the sporting context. Costa & McCrae (1992a, p.16) suggest that individuals who score high on this facet scale ‘feel unable to cope with stress, becoming dependent, hopeless or panicked when facing emergency situations. Low scorers perceive themselves as capable of handling themselves in difficult situations’. Of all of the NEO scales, this is the one that most closely maps onto the notion of resilience. Indeed in refining the resilience scale as part of this Study, 4 items from n6 were retained.

Figure 4.4 *NEO-Sport facet scales that successfully discriminated hockey players who were considered by the National Coach to have reached their potential from those who were considered not to have reached their potential*
Figure 4.5 NEO-Sport facet scales that successfully discriminated hockey players who were considered by the National Coach to commit high effort to their training from those who were considered not to commit such high effort to their training.

Figure 4.6 NEO-Sport facet scales that successfully discriminated hockey players who were considered by the National Coach to perform well under pressure from those who were considered not to perform as well under pressure.
At this juncture, it is worth reflecting on the fact that the importance of the n6 facet scale in understanding achievement could well have been overlooked given the lack of univariate relationships with the outcome measures. Even in multivariate terms, had only one outcome measure been utilised and one analysis conducted, and given the low factor loadings in all analyses, it could well have been concluded that there was nothing of interest in the analysis or that n6 was only as important as the other most highly loaded facets. Triangulation of data has, in this instance, led us toward considering a more complex and interesting possibility, albeit one that requires further verification in unrelated samples to engender confidence in drawing generalisations.

The centrality of n6 is not the only significant feature marking the landscape of this trio of profiles. Another notable feature of the ‘high achieving’ groups in each analysis is the degree of inter scale scatter. The distributions of facet scores seem more distinct from one another in these groups compared to the less successful groups in which there seems to be greater dispersion of scores for each scale with a mean score hovering around 50. In this way, the less successful groups also seem more representative of the normal population. The successful groups in contrast are marked by the counterpoint of extreme scores across scales. This is consistent with the possibility that there is an exceptional emergenic quality associated with high achievement that has for its component parts, more extreme, or perhaps, more specifically, contrasting attributes, than contribute to that process within the normal population (Lykken et al., 1992).
In terms of gathering evidence to support a causal argument, it is worth noting that none of the individuals, when profiled, had reached their potential – this occurred sometime during the ensuing 8 years. We have previously in this study considered coaches’ ratings from just after the 1996 Olympics (at about the time these profiles were collected) to this effect, suggesting that no-one in the Olympic squad was considered by the National Coach to have ‘played as well as they can play’. Taken together it is perhaps reasonable to posit that these traits may have had some part in shaping the subsequent achievement trajectories of these players. Certainly it is an avenue worthy of future investigation.

Conservative interpretation of an analysis with such small numbers relative to variables is always warranted. However, achieving such high, conceptually sensible, discrimination across three analyses using 24 scales and only 58 individuals provides some degree of internal support for the reliability of the findings. Further, that each analysis coalesces different facets around one trait suggests a degree of cross-analysis validation. Additionally, posthoc analyses were conducted to provide a counterpoint for the previous analyses. The NEO domain scores were entered into separate series of discriminant analyses, covering the range of achievement indicators investigated above. Similarly, ratings of sporting personality completed by the Assistant National Coach (see Table 4.8) were examined. Neither combination of trait measures were able to discriminate significantly between any of the groups. This provides some further evidence to suggest that the NEO-Sport, particularly the facet scales of N, E, A, and C domains, have a superior degree of relevance to understanding sporting success.
Finally, it should be remembered that the norms utilised in interpreting some aspects of the NEO-Sport data were not constructed for a sport-specific context, hence a degree of caution is warranted in interpretations that focus upon absolute comparisons with the norm groups. However, as discussed earlier, it is relevant, that when asked, players indicated that they responded to the NEO-Sport items in an individual-centric way, suggesting that profile comparison with the norms is as valid as the comparison of other special population responses (such as clinical samples) with the published norms (a process validated in the NEO PI-R manual (Costa & McCrae, 1992a, p.32). Finally, some evidence has been presented earlier which verified that the sporting profiles also meet the validity criteria for normed comparison set down by Costa & McCrae (1992a).

**Discriminating power of the emergent stress-salient traits of Optimism, Resilience, Commitment, Desire for Control and Perceived Control**

Disappointingly, none of the five analyses involving the Optimism, Resilience, Commitment and Desire for Control scales met the criteria of p<.01 for significant functions using Wilks Lambda. The closest was the discrimination of those who had been deemed to have achieved their potential from those who had not, which was significant at p<.05. Notably, however, none of these five analyses met the Box's M criteria for homogeneity of variance-covariance which is an important prerequisite for the discriminant procedure when sample sizes are small. This would suggest that there were either (i) problems with the measures or (ii) too small a sample to be representative, rather than reflecting on the veracity of the hypothesised relationships.
There was one significant univariate relationship with the resilience scale (p<.01). Those who were identified as having achieved their potential were more resilient than those who were identified as not having achieved their potential (means were 19 and 23.45 respectively - remembering that the scoring of the resilience scale is negatively oriented to the construct). In an indirect way this finding offers some consensual support to the NEO-Sport findings. The facet n6: vulnerability to stress is conceptually the closest of the 30 scales to the construct of resilience. Indeed the resilience scale utilised above draws 4 items from this scale. Given the superior success of the n6 facet scale in discriminating high achievement, the Resilience scale will not be pursued further.

**Interim Summary**

It is perhaps warranted at this juncture to take stock before proceeding with more descriptive case study analysis to help unpick the current findings. Taken together, the evidence to date seems to be supporting the utility of personality profiling with a context-specific, broad-based instrument to explore high achievement in the sporting domain.

**NEO PI-R versus NEO-Sport**

Pilot testing of the NEO-Sport scales with this sample seem to suggest that they mostly have comparable validity and reliability to the well-established, and widely used, NEO PI-R, though further psychometric assessment with a larger sample is warranted,
particularly in relation to the Openness scales. The series of classificatory analyses summarised above have also provided support for the utility of the NEO-Sport in investigating both univariate and multivariate relationships between personality characteristics and a range of indices of sporting achievement. Further, this support is in preference to both the NEO PI-R as well as a range of other univariate measures (DfC, STAI-T) and derivative NEO scales which were singularly unproductive in identifying points of difference between high achieving and lower achieving individuals within this elite setting.

**Complementary measures of achievement**

The NEO-Sport has been most successful in discriminating the progress and achievement of hockey players who had already reached the elite level in terms of (i) effort committed at training (ii) performance under pressure and (iii) an overarching consideration of whether they have achieved their hockey potential, 8 years after they were first profiled. Classification of individuals into high and low categories on each index, occurred with approximately 90% accuracy compared with a classification rate by chance of 50%. Nevertheless, a verificational sample is required to further assess these relationships given that the classificatory sample was the sample from which the classification rule was derived (Huberty & Hussein, 2003)
**Invulnerability to stress, resilience and the supraordinate traits**

When rated by an informed expert coach, 'achievement' on each of the three indices summarised above seem to be inversely related to vulnerability to stress as measured by n6 on the NEO-Sport. The n6 facet scale is the NEO scale that most closely approximates the construct of resilience. It relates to the perception that one can cope with, manage and respond to, difficult situations, irrespective of whether they are expected or unexpected, positive or negative, short term or enduring. Notably however, while the stress-responsiveness element of resilience is targeted, the element relating to the perception or appraisal of stress (specifically, the high threshold for identifying an event as stressful) is not evident in any items ((R) denotes reverse scoring):

a) I often feel helpless and want someone to solve my problems  
b) I feel I am capable of coping with most of my problems (R)  
c) When I am under a great deal of stress, sometimes I feel like I am going to pieces  
d) I keep a cool head in emergencies (R)  
e) It's often hard for me to make up my mind  
f) I can handle myself pretty well in a crisis (R)  
g) When everything seems to be going wrong, I can still make good decisions (R)  
h) I'm pretty stable emotionally (R)

Notably, as mentioned earlier, four of these items were retained on the NEO-derived scale of Resilience utilised in this study. Elements of the constructs of commitment, challenge, control and optimism are also apparent. Taken together, the significant
relationships found when considering Resilience and n6: vulnerability to stress, in relation to multiple markers of achievement, support the central thesis of the pathways framework, that an ability to adapt to stress is an important attribute in achieving excellence in sport. However, perhaps theoretically the most important finding was that n6 is only important insofar as it potentiates (or is potentiated by) other characteristics. For each index of achievement, a different constellation of complementary traits was apparent. Moreover, these constellations seemed to be aligned with two of the three supraordinate traits in the model: hardiness and mental toughness. Two different pathways to mental toughness identified in the pathways framework were also apparent: the first, a strong drive to achieve, and the second, an adaptive expression of a potentially maladaptive tendency (anxiety).

Olympians versus non-Olympians

The lack of difference found in the personality of Olympians and non-Olympians is a curious outcome of this study and suggests perhaps some mediatary relationship exists between personality effort at training, performance under pressure and Olympic selection. It seems that the ability to perform under pressure is almost always a necessary, but not sufficient, pre-condition for selection (24 of 25 Olympians were in the high category) with effort at training being only slightly less so (20 of 25 Olympians were in the high category). Twenty of 25 Olympians were in the high category of both achievement indices. Non Olympians were largely though not exclusively (22 of 33) classified both in the lower training effort and lower performance under pressure categories. In the counter-
intuitive exceptional cases, the main issues influencing selection seemed to be related to (i) exceptional sporting ability compared to elite peers; and (ii) achieving positional balance within the team.

**Controlled Vulnerability**

Of eight individuals high in training effort but whose performance under pressure was not outstanding, none were selected in an Olympic team and 5 were also considered not to have reached their potential. In exploring these profiles more closely, high levels of anxiety may have impeded their progress and may suggest a personality profile akin to that of controlled vulnerability as defined in the pathways framework. Mean scores on the standard STAI-T for these individuals was 39 (clinical cut-off is 42, range in the sample of 58 hockey players was 24-53). Perhaps it is at this level that this vulnerability to stress, or lack of resilience in the face of energy-sapping defenses (such as unrealistic optimism and denial cf. Apitzsch, 1995), begins to take its toll.

**Finding a niche – the importance of context and goodness-of-fit**

Of the six players whose performance under pressure was good but their training commitment low, four made Olympic selection. In examining these cases more closely, each of these individuals were considered to have either exceptional physical gifts or specific skills that were required to complete the balance of the team. None were unproblematic selections but notably all improved their training commitment over time.
Making the transition to elite sport

The singularly differentiating power of dutifulness when considering pre-elite and elite hockey profiles is worthy of further consideration by those involved in facilitating the successful transition of athletes between pre-elite and elite status. High scorers on this scale are 'governed by conscience' and 'stick to their ethical principles' (Costa & McCrae, 1992a, p. 18). Encouraging self-responsibility in promising players may enhance this attribute.

The normal population

When considering each different type of achievement, high achievers seem to be more different from the normal population than lower achievers with respect to multiple personality attributes. That is, there seems to be more extreme and contrasting characteristics for this group as a whole than for the lower achievement group who more closely resembled the normal population on most attributes contributing to the discriminant functions.

In sum, attributes of the successful hockey players in this sample were, as a group, able to be better understood through comprehensive profiling and multivariate analysis which has in turn shed a light on the construct of resilience and invulnerability to stress, as a
central feature in that success, specifically, as a conduit for the engagement of an array of other potentially facilitative traits. These findings are also consonant with the idea of successful sportspeople finding a ‘niche’ that draws upon their own personal resources which will, in all likelihood differ from the resources of their teammates. Rather than being constrictive in identifying a particular ‘type’ that is required to succeed at the highest levels, these preliminary findings hint at an expansive model of personality engagement, wherein a stable foundation (low vulnerability to stress) makes endurance possible in an environment defined by a non-stop series of personal challenges.

This series of analyses has also strongly supported the importance of multivariate consideration of personality and of triangulating multiple outcome measures. In this instance, each analysis and each outcome measure has revealed something of significance that would have been invisible in a single univariate analysis, or even a series of univariate analyses. Finally, the value of utilising informed coaches’ ratings as a primary measure in a longitudinal study design has been vindicated by its comparably greater productivity relative to objective measures such as Olympic status or longevity of membership of the team. These coaches’ ratings seem to better capture nuances in ability, performance and development.

Part II: Descriptive observations regarding the NEO profiles

We will now turn our attention to more descriptive and qualitative interpretation of the NEO data to tease out the relationship between general and sporting personality,
particularly keeping an eye to further exploration of (i) the relationship between high achievement and vulnerability to stress, and (ii) the extant extreme scatter of personality traits in the high achieving population. Remembering that power in the previous analyses was stretched to its limits, this exercise will also provide an opportunity to identify key relationships that may have gone unnoticed. It should be noted that the selection of cases and labelling of graphs in this section is constrained by the commitment to maintain anonymity of participants except in the final case study where permission for identification has been kindly granted by the individual involved.

**Sport specific and general life profiles**

The existence and salience of quite different sporting and non-sporting personalities is supported by the fact that all players have a minimum 10 point (one standard deviation) difference between NEO PI-R and NEO-Sport t scores for at least one facet scale. This is considered to be a clinically significant difference—a difference that we would expect to see manifest as a noticeable difference in behaviour patterns (Follette & Callaghan, 1996; Jacobson & Truax, 1991; Tingey et al., 1996). If the Openness facets are removed from consideration, this general feature remains. Indeed in the vast majority of cases, there are a scattering of several clinically significant differences between the profiles for each individual according to this criterion. This can be seen in Figure 4.7 and in the series of figures to follow. McCrae (1994)\(^\text{14}\) has proposed a more stringent *Index of Profile Agreement* (IPA) that takes into account score extremeness in addition to score differences. Whilst use of the associated nomograph produces fewer significant

\(^{14}\) Thank you to Professor Robert McCrae for providing a copy of this paper.
differences between an individual’s profiles, it is still the case that all players, except one, have a significant difference on at least one facet scale between their sporting and life personalities. Often these differences map onto salient features of that individual’s clinical presentation – the on-field or training persona, for example, may differ notably from the one who attends team social activities.

Figure 4.7: Profile of an Olympian Hockeyroo illustrating the recognisability of sporting from non-sporting profiles but also the significant differences on some facet scales.

These findings provide some support for the idea of multiple or contextual selves (Barrett-Lennard, 2003, 2005), and possibly points to the survival value of developing a niche in critical environments (cf. Sulloway, 1996) – a niche that draws upon accessible and perhaps even otherwise less salient features of personality. It is noteworthy, for example, that in this dataset, we do not see sporting profiles for any individual that are
totally unrelated to their general life profile, though the degree of concordance does vary considerably. Rather we generally see an exaggeration or notable suppression of a few key characteristics in the sporting environment as compared with their general life. Nevertheless, these, in some senses, ‘confined’ differences, sometimes translate into emergent characteristics that dominate the individual’s presentation in the sporting context. A classic example of this is the generally introverted athlete who becomes an unselfconscious, assertive, even aggressive opponent during competition – the strength of this transformation sometimes earning the tag of ‘white line fever’. This common feature of the sporting vernacular is indeed predicated on a lay recognition of differences between on-field and off-field personality.

**Extreme scoring and psychopathology**

Given the previous speculation about extreme profile scatter for high achievement groups, it is notable that only one of 58 hockey players in this elite group had a NEO profile without any facet scores lying in the extreme (‘very high’ or ‘very low’) range compared to the normal population. An additional two players had such profiles on the NEO-Sport. Of the remaining 57 players, 9 had one or two extreme scores and the remaining 36 had multiple and multi-directional extreme scores. On the NEO-Sport, 33 of 56 had multiple and multi-directional extreme scores. In making sense of this observation, there are four potentially relevant benchmarks: Firstly, in the NEO PI-R Professional Manual Costa & McCrae (1992a) indicate that approximately 38% of all people score in the average range, 24% in the high range and in the low range, and 7% in
the very high and in the very low range. This could be taken to suggest that the hockey players are indeed very unusual. However, the multifactorial probabilities are unspecified and in contrast, all of the case exemplars provided in the NEO PI-R professional manual have some extreme scores, set against a backdrop of predominantly average scores. Thirdly, when these NEO profiles were evaluated for the existence of psychopathology, according to DSM-III translations for personality disorders, no participants in this study met the criteria for Obsessive Compulsive Personality Disorder, Narcissistic Disorder or Histrionic Personality Disorder. These three disorders were chosen for evaluation as they represent extreme versions of some of the attributes often ascribed to athletes, specifically, obsessionality, self-absorption and over-dramatisation. Finally, Costa & McCrae (1992a) are careful to note that extreme scores on the NEO are not necessarily signs of pathology, nor is a high score somehow ‘good’ and a low score representative of something ‘lacking’. Rather, extreme scores merely represent a greater likelihood of displaying the characteristic features of that particular trait. In some situations this trait may prove helpful and adaptive whilst in other circumstances it may prove problematic. It seems from visually perusing these hockey profiles that the degree of (extreme) scatter on individual profiles seems comparable on both sporting and general profiles, rather than being a feature inherent to one or the other type of personality. That is, the degree of variability seems to be a within-person factor.

It is also interesting to note that the three profiles with the greatest number of extreme scores (see Figure 4.8 for two of the profiles) are all multiple Olympians and all present (and are experienced as) as quite different individuals. It is interesting to note that n6 is
suppressed in both of the examples below, though a distinctive feature of the profile only in the second case. Nevertheless, it may be providing a stable base from which to manage, or counterbalance, the combination of several strong attributes that might otherwise prove quite stress-producing. Note that the figures are reproduced in small scale – it is unnecessary to read individual scale scores but rather to appreciate the topography of the profiles. This practice will be continued in the pages to follow in instances where it is unimportant to focus on details of the graphs.

Figure 4.8 (a & b): Extreme NEO profile scatter for two multiple Olympians

Further insights into psychological robustness can be gleaned from the three profiles overlayed in figure 4.9, each of which have clinically high scores on the STAI-T and for whom anxiety is a core part of their personal presentation. All three are Olympians. The profile scatter here is of interest – each has a quite different profile of neuroticism facets, each with counterbalancing elements. Their profiles more broadly are also quite different from one another. A clinical interpretation of these profiles is that each individual has different means at their disposal for counterbalancing the effects of their anxiety. Each has successfully done so to the extent that is required to succeed at the highest levels in
their sporting career. Recalling that all AIS coaches rated anxiety as a strongly undesirable characteristic in an elite hockey player it is worth reflecting on the way in which some individuals manage to transform high levels of anxiety to productive (motivational) ends. In this case, there seem clinically to be three quite different pathways to achieving this outcome. The first managed her anxiety by harnessing it to an over-riding level of achievement striving which facilitated considerable commitment to training (mental toughness Type II). For another, the potentially destructive symptoms of anxiety are counterbalanced, indeed largely masked, by a low concern with orderliness and compliance which in total, contribute to an apparently ‘laid back’ presentation except in times of acute stress when the strong substrate of anxiety became more apparent (mental toughness Type II or controlled vulnerability?). A third case presenting with high trait anxiety in combination with a tendency to depression, is successfully able to keep these symptoms at bay with the aid of a counterbalancing tendency to excitement seeking (mental toughness Type II or controlled vulnerability?). Each individual has found a way to harness the energy that comes from high anxiety without succumbing to its costs in a way that would preclude continuation of their career. Notably none of these individuals are particularly low scorers on n6 despite being high achievers according to at least one of the criteria outlined earlier. One possibility is that the protective effects of (in)vulnerability to stress are catalysed not just if absolute levels are low, but if vulnerability to stress is low relative to other salient features of personality such as, in this instance, trait anxiety.
Figure 4.9 NEO PI-R profiles of three Olympian hockey players with high trait anxiety illustrating the diversity of other personality traits that enable the adaptive management of trait anxiety

Stability of profile

Given that we have just discussed the powerful effect that elite sport seems to have in engaging a particular constellation of a player’s more general personality and producing an emergent sport-specific personality profile, it is of interest to know whether long term participation in this intense life context results in ongoing personal development effecting the psychological substrates of personality either specific to the sporting domain or more broadly. Given the chronically high levels of pressure that defines this environment it is unclear whether the individual would respond to each life crisis in this domain by undergoing marked personal adjustment (as most of us do when experiencing a life
crisis), or whether a degree of habituation occurs after which stability of personality is largely maintained. In the small sample of 13 players with NEO profiles completed 4 years apart, it is notable that all profiles are 'recognisable' after 4 years, but all have evidence of clinically significant change.

The sporting and non-sporting profiles below in Figure 4.10, are the later profiles of one individual in Figure 4.9 above.

![Graph showing sporting and non-sporting profiles of a dual Olympian Hockeyroo 1](general_vs_sport_2000.png)

Figure 4.10: *Sporting and non-sporting profiles of a dual Olympian Hockeyroo 1 after more than one full Olympic cycle in the national squad.*

When the two general life profiles are superimposed (see Figure 4.11 below), the overall closeness of fit is apparent as are two significant points of departure (after excluding the Openness facets), specifically a4 (compliance) and n4 (self consciousness). The sporting
personality graphed in Figure 4.11, also shows evidence of specific difference after 4 years (specifically a1: trust and c1: competence) but these differences are of no greater or lesser apparent magnitude. Interestingly, in this profile, there is no overlap in the areas of difference for the two profiles. Some profiles show considerable overlap suggesting perhaps generalization of change across significant life domains.

Figure 4.11 Sporting (right) and non-sporting (left) profiles of Hockeyroo1 completed 4 years apart.

The profiles in Figure 4.11 are for a player who was selected for both the 1996 and 2000 Olympic Games. That is, she was ‘chronically successful’, and already successful when first profiled. The profiles in Figure 4.12 are of a player who was not selected in 1996 though had been part of the squad for some time. She was selected in 2000. That is, she underwent a considerable change in her level of achievement.
Figure 4.12: Sporting and non-sporting profiles of a hockey player who was a new member of the squad on the first testing occasion and an Olympian on the next testing occasion 4 years later.

There are notable differences on the profiles but not to any greater extent it would seem than on the profile of the chronically successful player above in Figure 4.9. If profile differences reflect change, or self-development over time, then it seems that this is a continuing process throughout the career of the elite athlete, at least in women’s hockey in Australia, and that it is not confined to the sporting context.
Effort at training and performance under pressure

Figure 4.13 shows the combined sporting profiles of a number of players identified by the National Coach in a recent book as exceptionally hard workers:

'Some Hockeyroos whose practice ethic was outstanding were Rechelle Hawkes, Kate Starre, Juliet Haslam, Liane Tooth, Jenny Morris, Lisa Carruthers, Renita Garard and Louise Dobson and, of the more recent players, Melanie Twitt and Carmel Souter. More often than not these players needed to be dragged off the pitch as the end of a session... These players came to training to learn and they infected the whole team with their enthusiasm' (Charlesworth, 2001, p.101)

Figure 4.13: Profiles of hockey players identified as 'hard workers'

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The feature that is most salient in this graph is the variability in scores in the Conscientiousness domain, which we might have expected to be uniformly high. Instead the traits that show uniform elevation are the facets of Extroversion and to a large degree, Openness. Notably however, vulnerability to stress, does not exceed the midpoint for any individual, and, of the constellation of other facets identified as relevant to this outcome in the preceding discriminant functions analyses, activity (e4) and competence (c1) are uniformly high, and dutifulness (c3) and achievement striving (c4) are generally elevated though there are exceptions in both cases.

Interestingly when these exceptions are examined in the context of general personality profiles, dutifulness and achievement-striving whilst not being as high as we might expect, are relatively high in the sporting context for these individuals, compared to life more generally. This observation provides an important extension to the hypothesized process of potentiation elicited from the previous analyses. Perhaps in the elite sporting context, relativities within profiles are as important as absolute elevations of particular traits, insofar as triggering motivated, suitably oriented behaviours is concerned. Minimally they might be sufficient to trigger such behaviours if not optimally so. At present, the tolerances in the effective constellation of these traits is unclear and warrants further exploration. Another possibility is that these exceptions constitute part of the 8% misclassification rate of individuals in the high effort group. A similar point could be made in relation to profiles of individuals who perform well under pressure.
Olympians deemed not to have reached their potential

Figure 4.14 combines profiles for those Olympians deemed not to have reached their potential. The salient feature, once again, is the variability of profile - every facet spans more than a clinically significant difference from the highest to lowest scorers. Just as the principle of equifinality seems to apply to success, so it seems to apply to limitations in levels of achievement. It seems that there is no single feature that has ‘capped’ the achievements of these players, rather each one has a quite different array of personal resources at their disposal. While each profile has a story to tell, and meaning can be made of each attenuation of development when the individual’s particular personality and life story is known, it seems that there is no unifying thread to this story, at least not at the level of personality. However, there are two individuals here who have relatively high n6 scores compared to others in the squad and compared to the norm. These cases plausibly reflect examples of controlled vulnerability as defined in the pathways framework. Indeed they are individuals who are very talented and who perhaps, like Apitzsch’s (1995) soccer player, have not had their ability tested before entering the elite domain.
Courage

The profiles in Figure 4.15 are of two individuals routinely, indeed primarily, described as ‘courageous’ by their elite hockey peers. Both are dual Olympians. I have included them here to illustrate how different these two individuals look on almost every trait and yet they are strongly identified by the same, defining, personal characteristic. Interestingly, the one point of commonality is their score on the vulnerability facet. For both, this belief in their ability to handle whatever life throws at them, translates into immense courage on the field and off the field. A case study of one of these individuals will follow. It is also noteworthy that one of these individuals in low on agreeableness
scales and the other high – one is known for being somewhat self-contained, the other for her openness to life. One is perhaps more appropriately described as hardy and the other as mentally tough.

Figure 4.15 NEO-Sport profiles of two hockey players noted for their exceptional courage on the field

_Vulnerability and courage: What does resilience look like? A case study_

The following case study draws upon several types of data: profiling, self-report, expert coaching input and clinical interpretation to draw together some of the issues raised throughout this study in the case of one quite remarkable individual.
Kate Allen is an interesting individual in many regards. She is a dual Olympian and also a gold medalist, but has, formatively, suffered the distress of missing an Olympic selection (in 1996) which came down to the wire. Richard Charlesworth describes her as: ‘Perhaps the most physically courageous athlete I have ever known, she earned a spot by her performance and played throughout the Olympics as if her life depended on it’ (Charlesworth, 2001, p.13). He also identifies her as ‘one of only two field players selected without the speed and agility that are usually essential ingredients of the game’ (p.141).

In an excerpt from Charlesworth’s (2001) book, Kate Allen says with regard to her non-selection for the 1996 Olympics, ‘In some ways it was like having your wisdom teeth come through; there’s a lot of pain and not enough room’ (p.243). After hearing about her non-selection, she comments ‘Before this I’d never really thought about missing out or not getting what I’d worked for…. Believing wholeheartedly that if I wanted something badly enough and did everything I could to get it, it would happen’ (p.244) – a case study in mental toughness (Type I: achievement striving) as defined in the pathways framework. Why then her unremarkable (average) c4 (achievement striving) score (see Figure 4.16)? Kate’s profile, completed several months after her non-selection, reflects, in my clinical opinion, a significant, transformation that took place as a consequence of this life-jarring crisis:

…but ‘disappointment and sadness overwhelmed me for days’ (p.244) … ‘I cried and cried and when I stopped crying I started hating myself and when I grew tired of that I took up
hating the coaches for losing faith in me and putting me through this hell’ .... ‘the next couple of years were full of incidents like this. I seemed to be questioning every aspect of myself and what I was doing or feeling.... I either tried desperately to prove myself or didn’t try at all’ (p.245). ‘At the beginning of the year our psychologist Corinne had questioned me about the year ahead. She’d asked me whether I would still go through with it if I knew then that I wasn’t going to go to the [2000] Olympics. As well as making me squirm (my typical response to a question from our shrink), it forced me to look at why I was doing all this... Maybe I needed to judge my success on something more than this. That’s when I made a commitment to myself to value those moments and hours and days between selection, the ones that usually get forgotten’ (p.246) ‘So, why do it? Why put yourself on the line when the outcome is uncertain ... Well, all I can say is why not. It takes courage to know you might fail at something and still do it.’ (p.247) ‘The words ‘value every incident’ will remain forever etched in my memory’ (p.247)

Through this journey, it seemed to me that Kate was developing from quite a driven person to someone that was more connected with both the good and the difficult elements of life – from an individual defined by achievement striving to one defined by a greater openness to the range of experiences that life had to offer, and a stronger belief in her ability to traverse whatever circumstances may come her way (i.e. resilience based on an understanding of the importance of all experiences in life, good or bad, rather than resilience shored up by unrealistic optimism about likely life outcomes) – the dual hallmarks of the hardy personality (Kosaka, 1996). During this time, Kate was ‘shaky’ in her ability to engage with her sporting goals, and considerably more vulnerable than she
had been to the daily pressures of elite sport. However, over the ensuing months an interesting process became apparent - she transferred her distress from one domain to another such that its impact remained within manageable limits ('I cried and cried and when I stopped crying I started hating myself and when I grew tired of that I took up hating the coaches for losing faith in me') – the strategy of a very resilient individual indeed. Similarly, her commitment to new sporting challenges may have been compromised for a time, but her openness to new life possibilities became more salient in the non-sporting domain as she contemplated a range of alternate life paths (including driving across the Nullarbor desert in a Kombi van!). These observations can be understood within Mearns (1994) person-centred notion of self-configurations, which focus on 'the extent of integration within the human personality wherein parts which may have been wounded are supported and protected by other parts in such a way that all can survive, albeit meagerly in some cases' (p.12). Notably, Kate's domain scale profile for general and sporting contexts are closely aligned. The schism evident on the facet profile while certainly appearing considerable, reflects perhaps a very adaptive process of working within overall limits of productive degrees of 'self' concordance while allowing some considerable degree of personal 'shifting' to take place (Interestingly, in this time of stress, the most salient feature of Kate's personality, her abhorrence of orderliness was maintained, a point of stability in both domains!).

Thus, while her relative vulnerability to stress in the sporting domain (compared to her usual presentation) was evident at the time of this profiling exercise, her dispositional score on n6 still reflects a greater degree of invulnerability to stress than the average
person. Moreover, this temporary vulnerability seems to have been a necessary part of a process of growth in which the nature of her resilience, or invulnerability to stress, transformed from one incorporating a degree of denial (‘Before this I'd never really thought about missing out or not getting what I'd worked for.... Believing wholeheartedly that if I wanted something badly enough and did everything I could to get it, it would happen’ (p.244)), to one based on an honest and realistic appraisal of her circumstances (It takes courage to know you might fail at something and still do it.’ (p.247)). In terms of the pathways framework, this significant life event seems to have prompted a process of morphogenesis resulting in a shift from the motivational primacy of mental toughness (Type I), to hardiness, and a self-actualising stance. Notably this transformation did not ultimately diminish the courageous nature of her on-field performances, though at times it threatened to do so.

Elements of Kate’s statement above are particularly salient in picking apart some of the relationships that have been discussed throughout this study. For example, Kate identifies a strong initial sense of invulnerability in her life which had seemingly contributed functionally to high achievement in a number of life domains. Yet this is not apparent in her profile. It seemed to me that, at the time of profiling, she was processing her intense disappointment at non-selection, away from the sporting domain as a way of maintaining her training commitment. Kate processed her sense of loss of control as a challenge to her broader life beliefs (i.e. ‘life is fair’, effort will be rewarded) rather than her sporting beliefs relating to achievement (i.e. ‘it is important to work hard so that you can be the best that you can be’). This allowed her to continue with her training and maintain her
work ethic. That is, the experience of non-selection resulted in the development of a much more clearly differentiated athletic identity or sporting personality. Hence, Kate became much more proficient at quarantining her sporting disappointments. Prior to this, Kate’s presentation in hockey life and in her broader life were far less distinguishable. I imagine that her previous profiles (sporting and general) would have shown almost entire concordance. In the profile below, we see evidence of marked elevation in *angry hostility* and *depression* specific to the sport context. There is considerably lower *impulsivity* in the sporting domain (she was keeping her feelings reasonably in check at training) and, as mentioned, she was less *trusting* in the sporting environment, for a time, than she had been and less open to her experiences there. The impact of this was somewhat moderated by her relatively high levels of achievement striving and self-discipline in the sporting domain (compared to her life more broadly).

Perhaps most impressive, in its implicitness, is evidence of Katie’s developing resilience in the face of stress and distress. Specifically, her story reflects a gradual but remorseless process of searching for meaning that would make it possible for her to survive what was a considerable period of grieving, so that she might continue in her sporting ambitions. She eventually reconciles her experience and concludes *'Why put yourself on the line when the outcome is uncertain ...Well, all I can say is why not. It takes courage to know you might fail at something and still do it'*. It is indeed testament to her courage, perhaps her low vulnerability to stress, that this experience triggered a time of personal growth and an impetus for her future achievements rather than marking the start of her sporting demise. The fact that this transformation took place over the ensuing two years, gives
some indication of the depths of her personal struggle and of the deep changes to her character that resulted.

Figure 4.16 NEO PI-R and NEO-Sport profiles of a hockey player after missing Olympic selection

By the time of her selection for the 2000 Olympic team, Kate had moderated some of the response sets illustrated in the profile above (which had been stable features of her presentation over the ensuing two years). Nevertheless some elements of her transformation remained. She was more able to separate her ‘sporting self’ from her ‘whole self’ and to be accepting of both, which proved productive during times of stress. She was, however, able to allow the openness to experience retained in her general life persona to spill back over into her sporting life, moving from mental toughness toward
hardiness, though perhaps she remained a little more guarded than she had once been. In Barrett-Lennard’s (2005) terms, perhaps the key point to make is that there developed relatively open communication between these two ‘selves’, an awareness of the differences in self-expression in the two domains, but sufficient points of contact to result in a state of wellbeing.

Another feature worth noting in this process of profile interpretation is that some elements of this sporting story, seen as snapshots at particular points in time, might suggest anything but a highly courageous individual and yet everyone who knows her would agree with her coach’s description. Her courage indeed sustained her through deep despair that, as she states above, lasted for more than a year. In sum, this individual’s profile shows differences between sporting and general life domains that are verified by the individual’s self report and my clinical impression. There were changes to her baseline behavioural style as a result of a significant life event (indeed, by her reckoning, the most significant life event she had experienced at that time) which had aftershocks and permanent effects on both her sporting presentation and her self presentation more generally. Yet, she maintained, indeed recovered, her baseline invulnerability to stress – it is indeed fundamental to her character – but it was underpinned by a quite different constellation of traits before and after this event. Over time, but indeed, over a considerable time, this invulnerability coalesced with different elements of her personality seemingly to make it possible to deal with her distress by combining any available resources. Over time she enhanced her belief that she could cope with any challenges that life may present. This case study drawing upon both qualitative and
detailed quantitative (profiling) information has mapped out in more fulsome way the process of engagement-disengagement and re-engagement hinted at by Bryceson & Herbert’s (1992) interviewees. Invulnerability to stress, far from manifesting as a lack of contact with distress (through deflection or avoidance), reflected for this individual, as for Bryceson & Herbert’s interviewees, a full engagement with that distress in, firstly, a struggle for survival, and then a period of enormous personal growth and perhaps, in the person-centred sense, the freeing up the self-actualising tendency.

**Synthesis**

In drawing together the different parts of these analyses, this study of 58 elite hockey players has produced several noteworthy findings that have consolidated and extended some of the findings from Study 1. This synthesis and discussion will start with the most salient findings with respect to the initial questions of interest (i) is there evidence of intra-individual difference in personality when comparing the sporting and non-sporting domains?; and, following from Study 1 (ii) are there inter-individual differences in personality according to levels of achievement?

**Sporting personality vs. life personality**

A key discovery in Study 2 is that there does seem to be such a thing as a ‘sporting personality’. However, it does not take the form of what has traditionally been called a sporting ‘type’ (a constellation of particular traits that best meets the demands of the elite
environment), nor even a type specifically adapted to the needs of one sporting discipline. Rather there seems to be a sporting personality for each individual that exists in contrast to their more general ‘self’. That is, these hockey players seem, without exception, to have ‘contextual selves’. Notably, one self is generally recognisable from the other rather than there being a complete disjuncture between them. Specifically, sporting profiles, for most individuals, are marked by a few points of departure from an underlying general personality ‘template’.

Moreover, profiles of both the general self and sporting self seem to change, perhaps develop, or mature, over time, in a way that reaches clinically significant, and behaviourally noticeable levels. However, this is specific change against a backdrop of remarkable stability of overall personality. It seems plausible that, in addition to normal developmental shifts, one of the catalysts for personality change in this elite group are the chronic life stressors identified by players as an integral part of their hockey experience. Moreover, as Rogers (1961) points out, personal change occurs more quickly in group contexts, such as those that define team sports. The case study of Kate Allen makes clear that these events (in this case non-selection), recurrent in the life of an athlete, can have deep and lasting influences on both sport-specific and general notions of self, and beliefs about the world. Moreover, that the events which for her created such a seismic shift, are common, indeed in some sense integral, to the career experience of most sportspeople. The experience of non-selection after years of commitment and sacrifice is an inevitable part of the career trajectory of all but the most exceptionally gifted of athletes, as they continue to advance through the higher echelons of their sport.
Finally, there is some descriptive evidence in Study 2 to suggest that a sort of contrast effect, relating to points of intra-individual difference might make these traits particularly salient for the individual in motivating behaviour. Perceiving that one is more confident in the sporting context for example, may result in more extroverted behaviour in that context even if, generally speaking, the person’s scores on extroversion in their sporting profile, are low.

**Heterogeneity, normality and equifinality**

Another key (and unexpected) finding from Study 2 is that, sport-specific personality (but notably, not life personality) differentiated this group of exceptional sportswomen from one another according to whether (i) they reach their potential (i.e. relative to their ability); (ii) have a high work ethic at training and (iii) perform well under pressure. On closer examination, these relationships are not the result of strong univariate differences between groups, but rather of multivariate difference - those who excel with respect to each of these three criteria, are more clearly defined by multiple, significant, trait differences compared with the norm, than they are defined by significant differences from their less successful peers. This perhaps suggests that it is a longer-term and broader-based experience of ‘being different’, that is associated with high achievement – with longer term, asynchronous development contributing to reaching one’s potential, being a hardworker and/or performing well under pressure. This picture would fit with Barrett-Lennard’s (2005) perspective that we primarily, from birth, define ourselves in terms of
our inter-relating with others' and that the effect of being different would thus be cumulative and non-linear across the lifespan. It is worth noting that this feeling of 'being different' is unlikely to be solely related to having an exceptional talent (i.e. exceptional sporting ability) as all people in this sample, have been identified because they share this characteristic.

In contextualising the previous finding it is also relevant that while these exceptionally high achieving women as a group are somewhat different from the normal population on multiple personality facet scales, most individual profiles are marked by a few extreme scores against a backdrop of many less salient aspects. This is the hallmark of a normal profile (Costa & McCrae, 1992a). Within this group there is also considerable variability with respect to personality attributes – taken together, there are extreme scores on each facet scale (in both directions) for Olympians and non-Olympians alike. So, it would seem that, like in Study 2, there is considerable evidence to support different pathways to success.

*Invulnerability to stress*

A related set of findings in Study 2, speak to the particularly enabling elements of personality. It seems that different types of achievement draw upon different constellations of traits, yet in each case, the engagement of these traits is potentiated by the existence of low vulnerability to stress which provides a solid platform from which to take the risks necessary to excel. Moreover, the definition of 'low' seemed for some
individuals to mean *relative to the norm*, for others to mean, *relative to their own level of vulnerability to stress in the non-sporting ('life') context*.

In either case, a low vulnerability to stress is manifest in a belief that no matter what happens, an individual has the ability to cope with it — this may be reality based or supported by denial. Irrespective of its origin, this belief would seem to be a precursor to safely or successfully placing oneself in a chronically stressful environment that involves ongoing personal evaluation and uncertainty. Under such circumstances, this adversity may well be the key that unlocks the potency of the ‘resilience trait’, which in turn engages hitherto unexplored strengths and characteristics. Again, Kate Allen’s thesis is that her experience has contributed not only to her success as a hockey player but also to her maturation as a human being.

*Motivational traits in the pathways framework*

This profiling exercise has provided preliminary support for the salience of the three primary personality pathways to success identified as suprordinate traits in the *pathways framework*: hardiness, mental toughness and controlled vulnerability. Some evidence even points to the hypothesised distinction between different types of mental toughness: one the result of adaptive expression of potentially pathological traits such as anxiety, and the other underpinned by a high drive to achieve, both in the presence of dispositional resilience. Finally, there is preliminary evidence that controlled vulnerability, whilst
sufficient to enable a highly talented sportsperson to reach the elite level, may be insufficient to prepare them for performing under pressure at the highest level.

**Methodological issues**

*The NEO-Sport*

A particularly promising outcome from this study is that, from a battery of personality indices utilised across two studies, the one left standing at this point is the NEO-Sport, constructed and piloted for the purpose of this study. The fact that this measure successfully predicted three different indices of achievement amongst these hockey players, and classified cases to 90% accuracy, suggests that it warrants further development. Specifically:

(i) The Openness scales proved psychometrically problematic and could be enhanced to better reflect the sporting environment now that all other domain and facet scales have been demonstrated to be psychometrically adequate and clinically useful with this population. This is a particular priority given the conceptual relationship between openness to experience and hardiness, and given that considerable evidence in amassing to suggest that hardiness might be a critical personality trait in understanding ultimate exceptional achievement;

(ii) Whilst the NEO-Sport was developed with an eye to equivalence with the NEO PI-R, and used tentatively in this way in the current study, norm comparability needs further exploration; and
(iii) The development of a generically contextually responsive inventory might be a feasible aim that would allow comparison of personality across multiple contexts rather than just sport and ‘life’. Work contexts and family or relationship ‘selves’ might also prove fruitful for comparison. More broadly, measures transferable to other domains of exceptionality might prove interesting for comparison between high achieving groups (e.g., musicians, artists etc). Development of such a measure from an existing broad-based and comprehensive profiling tool such as the NEO PI-R would be advantageous (as it was in this study) in the sense of capitalising on extensive existing psychometric and conceptual research.

Comprehensive profiling, multivariate analysis and triangulation of data points

The critical importance of using comprehensive profiling instruments in combination with multivariate analysis was again underlined in Study 2. Univariate analyses of single constructs would not have revealed the potency of the vulnerability to stress factor in potentiating achievement. Even with multivariate analyses, it was triangulation of several analyses targeting related conceptualisations of achievement (i.e. work ethic at training; performance under pressure; and whether a player reached their potential relative to ability) in the one sample, which illuminated the central relationship of interest. Further, a mixed methods approach, triangulating quantitative and qualitative analyses, based on nomothetic and idiographic approaches, further teased apart the newly discovered relationships in a very productive way. Only one study was found in the review of 425
literature in Chapter 1 that made any attempt at combining quantitative and qualitative profiling approaches using a comprehensive measure.

Measuring achievement

It also became clear in this study, that expert coaches, informed by multidisciplinary and multivariate information about performance, are a potentially invaluable source of data concerning the nuances of achievement for each individual sportsperson under their tutelage. In this instance, the National coach’s impressions of an individual’s standing in relation to effort at training, performance under pressure, and their own potential, was a more productive index in exploring the role of personality in exceptional achievement, than the arguably more objective measures used in Studies 1 & 2, such as Olympic status or length of membership of the National training squad. These measures are, for example, more subject to the vagaries of selection policies that must consider team composition as well as absolute ability or performance levels.

Participant observation

Finally, it is worthwhile reflecting on the unique and valuable perspective offered to this research process by the intimate understanding of the context and the participants. Working closely with the coaches ensured that data was based on the impressions of informed experts. Much preparatory work provided essential underpinning to what seemed, in the final analysis, to be simple, though not simplistic measures of
achievement. As described above, these measures proved to be pivotal in illuminating the core findings of this study. Similarly, in relation to interpretation of findings, reporting significant group differences would have been justifiable, yet clinical knowledge of these participants, and an awareness of the existence of quite fundamentally different personalities in this group, provoked a nagging awareness that this was not the ‘full story’, resulting in the decision to use classification as a measure of clinical significance. This insider knowledge also provided pointers to likely areas of exploration that might help clarify some of the key issues. This clinical impression was then productively used as both a data source (as in the case of personality ratings); a validation check before extrapolating from core findings; and to guide descriptive idiographic consideration of profiles.

Conclusion

In conclusion, there is a considerable body of triangulated evidence from this study of exceptionally high achieving sportswomen that points to the value of further exploring the potentiating value of resilience, or low vulnerability to stress in achieving at the highest levels in the sporting domain. Moreover, of the value of understanding the elite sporting experience as an unfolding process of self-discovery and self development entered into, and maintained voluntarily, in spite of, or perhaps because of the incredible stresses inherent in the pursuit of the ultimate prize, Olympic selection. Low vulnerability to stress seems to potentiate many pathways to achieving success as an elite hockey player. In this study, through multivariate statistical analysis, we have identified three
constellations of traits that seem to be associated with different elements of success, yet in viewing profiles it becomes clear that:

1. These constellations stand within very different individual profiles. Moreover, that there may be other core constellations in high achieving individuals that have not been targeted in this study.

2. Rather than being associated with a particular ‘type’ of persona, this model merely, yet powerfully, posits that low vulnerability to stress, a strong belief in one’s ability to cope, is a necessary but not sufficient condition for success. Success also requires the marshalling of other available resources to forge an accessible pathway to achievement.

3. The tolerances of these potentialities are unclear but there is some evidence to suggest that relativities in an individual’s personality trait structure may be important in addition to absolute scores on traits as compared with the normal population. Indeed, some elements of pathology (e.g., clinically high trait anxiety) can even be tolerated, against this resilient backdrop - the harmful effects perhaps moderated by a self-efficacy in relation to outcome.

4. Several pathways to achievement seem salient. One involves high levels of effort at training resulting in skill improvement. Another pathway involves ‘stepping up’ in the heat of competition. Within the domain of skilled individuals, this seems to make one almost indispensable to Olympic competition with 24 of 25 Olympians in this study having this quality. But ideally, and mostly, Olympians seem to have both of these qualities (20 of 25).
5. Wherever there is a rule, there is an exception. Both the rules and the exceptions can assist us in providing better services to elite sportsmen and women but more importantly, they remind us that uniqueness itself may be a necessary prerequisite for attaining heights not attained by others. A sense of being ‘different from the crowd’ may make ‘different’ (exceptional) things possible. Conversely, meeting all of the requirements outlined above does not ensure Olympic selection – only the likelihood of filling one’s own potential.

In extending these findings, and making sense of these relationships, more detailed understanding of the process by which personality develops and engages personal attributes in the sporting context would be helpful. To this end, Study three will take a more exploratory, qualitative approach to understanding, from the sportsperson’s perspective, how they bring personality to bear upon their sporting endeavours. Moreover, to explore these relationships across different sporting disciplines, in a larger, sample with more diverse achievement experiences. The fact that the 58 hockey players in this study were all part of the most successful era of women’s hockey may make them systematically different to the ‘average’ exceptional sportsperson!
CHAPTER 5

STUDY 3:

Reflections of 65 Australian Olympians

'There are absolutely masses of people born with natural talent, masses of them. Only a very few of them have got the stickability to go on and try and make something of it'

Olympian from Study 3

The purpose of Study 3 was to further elucidate the nature of personality structure and process through conversations with sportsmen and women who have reached the pinnacle of their sport - competing at the Olympic Games. This general investigatory process was defined by the themes emerging from Studies 1 & 2. Indeed, Study 3 emerged out of the methodological limitations identified in Study 2. Specifically, it seemed clear that phenomenological information available through my participant observer role in Study 2, in combination with published biographical documents, was helpful in interpreting personality profiles and in exploring core elements of the pathways model, however, maintaining confidentiality meant that observational data and commentary from key informants was only utilised as background information. Therefore, Study 3 centred upon a group of Olympians who had no established, current, professional relationship with the researcher (i.e. samples in Studies 2 & 3 are mutually exclusive). It is worth clarifying that this decision was taken, not to generate an illusion of objectivity in the gathering of the data (Lowes & Prowse, 2001) - I was, as researcher, still very much a participant observer in the more classical sense. Rather, this setting was chosen such that my
participant observer status was a facilitative factor rather than a constraining force with regard to merging phenomenological information (interview data) with standardised (profiling) assessment data. In addition to making it possible to ethically collect such interview data, the extra distance between researcher and participant did also provide a check against potential preconceptions influencing interpretation of individual material. Specifically, it facilitated inductive exploration of the relationship between personality and achievement in a different way, that is, without the potential interference from having pre-existing impressions about the particular personality of each individual. It was a method less open to imposing implicit (or indeed explicit) interpretations onto profiles, of 'seeing what you want to see'.

**METHODOLOGY**

**Profiling exercise**

**Participants**

Sixty seven Olympians representing 22 disciplines agreed to participate in the profiling element of Study 3 in response to a mailout and newsletter advertisement to 352 Olympians, facilitated by The Western Australian Olympic Council¹ (WAOC). This constituted a response rate of 19%, with the final sample including 29 sportsmen and 38 sportswomen from both team and individual sports. 35% were multiple Olympians.

¹ I would like to thank WAOC for their support and particularly Tania Sullivan for her invaluable assistance
Participation at the Olympic Games spanned the Olympiads from 1948-2004. Further demographic details are reported in Table 5.1 with the presentation of Results.

Measures

Personality

The NEO PI-R and NEO-Sport were used in this study for the reasons outlined in relation to Study 2. The TEOSQ, DFC, and STAI were not included as they were uniformly unproductive in Study 2 and thus, unnecessarily time-consuming for participants.

Olympic experience and personal history

A survey was also constructed to collect relevant demographic information from participants about themselves and their family of origin to contextualise their achievements and sporting trajectory. Open-ended questions also asked about their formative and exceptional sporting experiences as well as enquiring about mentors, Olympic performance and perception of their overall achievement relative to potential.

Procedure

A notice was posted in the WAOC newsletter stating that this study was being conducted, that individuals would be invited to participate via a letter, and that participation was
entirely voluntary. Questionnaire packs were sent by mail. Each questionnaire pack contained an introductory letter, consent form, the NEO PI-R and NEO-Sport, and an open-ended questionnaire inviting commentary on their sporting experiences and on the role of personality in those experiences. A copy can be found in Appendix 12. An additional form provided an opportunity to submit contact details to the researcher if the respondent was prepared to participate in a follow-up interview. Reply paid envelopes were provided.

Interviews

Participants.

A subset of 20 Olympians indicated a willingness to be interviewed: 15 sportswomen and 5 sportsmen. Their Olympic selections included Olympiads 1956-2004. They participated in both team and individual sports and 9 sporting disciplines. The particular sporting disciplines will not be listed to prevent identification of interviewees. Suffice it to say that the sample was diverse enough to conclude that their responses might be considered representative of a broader sample of Olympians.

Interview design

The current study meets Mahoney’s (1997) criteria for contexts when indepth interviews are considered particularly appropriate, specifically:
1. There is a complex subject matter
2. Detailed information is needed
3. Respondents are high status individuals, and
4. The study involves a highly sensitive subject matter

Biddle, Markland, Gilbourne, Chatzisarantis & Sparkes, (2001) note that the combined protocols of semi-structured interview and content analysis are increasingly being used with high level sportsmen and women to pick apart performance variables (topics have included state-based attributes, mental skills, coping skills and motivational issues (e.g. Gould, Dieffenbach & Moffett, 2002; Jones, Hanton & Connaughton, 2002 etc)).

However, Patton (1990) argues that different interview techniques are suited to different stages in the evolution of a subject matter – that less structured techniques are preferable when the an area is not well researched, or when it is stagnant. Similarly, Dale (1996) has suggested that the phenomenological approach may have some advantages in interviews of sportspeople but a review of the literature failed to find any studies utilising this method. Thus, a more hermeneutic, phenomenological approach to interviewing was utilised in this study in order to allow greater flexibility in questioning (and responses) so as to prevent premature foreclosure in considering what topics might be relevant to understanding the impact of personality on sporting achievement.

The core purpose of phenomenological interviewing is being able to report on how something is seen from a particular individual’s viewpoint but also, ‘to collect examples of possible experiences in order to reflect on the meanings that may inhere in them’ (van Manen, 2002; see also Kvale, 1983, 1996). The methodology underpinning this task is an
interview process that is 'oriented' to the topic but open-ended in style. Particularly, the hermeneutic approach to phenomenological interviewing is an 'interpretive conversation wherein both partners reflectively orient themselves to the interpersonal or collective ground that brings the significance of the phenomenological question into view. The art of the researcher in the hermeneutic interview is to keep the question (the meaning of the phenomenon) open: to keep himself or herself and the interviewee oriented to the substance of the thing being questioned.... By setting up situations conducive to collaborative hermeneutic conversations, the researcher can mobilize participants to reflect on their experiences... in order to determine the deeper meanings or themes of these experiences' (van Manen, 2002).

Often this process occurs over several sessions to allow for checking and further elaboration of discussion, however given the time commitments of these participants, access was restricted to one visit and so the hermeneutic approach was married with the practice of person-centred counselling increasingly utilised in my clinical practice. In this tradition, the 'client' (in this case, participant) is supported in unpicking their beliefs, behaviour and emotions in the moment by providing an environment of unconditional positive regard, by close tracking of the conversation and empathic responsiveness, and by reflecting back the conversational themes to the individual for further checking (validation) and comment as they arise (Barrett-Lennard, 2003; Mearns, 1994; Rogers, 1957). This technique is used in preference to traditional 'questioning' techniques which are more driven by the counsellor/interviewer. In the current context, such an interviewing style provided an alternative source of validation in the service of
establishing the ‘trustworthiness’ of the data – important thematic elements emerging in conversation were verified through reflection of what has been heard. This was particularly valuable given the unavailability of participants for member checking of interview transcripts (Patton, 1990). However, the primary purpose of such a style is that it engenders deeper questioning by a process of continual tracking of emergent key themes as a driving force in the interview process. This is not to say that there was an absence of interviewer driven questioning, but rather this was a secondary technique.

It was decided to undertake more than one interview in recognition of the fact that while single case studies are ‘able to identify issues which illustrate discrepancies and system failures – and to illuminate or draw attention to ‘different’ situations – more general inferences are less easy to make without a small sample of participants. In multiple participant research, the strength of inference which can be made increases rapidly once factors start to recur with more than one participant.’ (Lester, 1999, p.1). Moreover, it is a central hypothesis in this dissertation that there may be multiple personality pathways to success. This view was balanced by Sear’s (1992) principle that ‘The power of qualitative data…lies not in the number of people interviewed but in the researcher’s ability to know well a few people in their cultural contexts’.

**Procedure**

Each interview was scheduled for one hour. Some went over the allotted time, but most were completed in approximately one hour. Most interviews took place at Murdoch 436
University (n=9) to emphasize the research focus of the project rather than being a journalistic 'popular interest story' or a therapy session. However, not all participants could attend the University campus. The location for these interviews were decided according to the need for a comfortable, non-threatening setting that provided privacy and was free from distractions. Participants were given a choice of suitable options to accommodate their preference – these included their home, their work office, or a non-sporting neutral space (n=5). Those participants, who were not in Perth at the time of the interviews, were contacted by phone (n=5) or email (n=1).

Given their participation in the first part of this study, all participants had read an information sheet and consent form outlining the purpose of the study and the confidentiality arrangements that pertained to their participation. Additionally, respondents who participated in an initial focus group were provided with an additional request that any personal information that emerged in the session ought to remain in the session. This is a concept very familiar to elite sportspeople and seems to have been respected in this instance. All interviewees were told the reasons for audio-taping the sessions and accepted these conditions.

Interviews were tape-recorded where possible and phone interviews relied on note expansion immediately after contact. Transcription was word-for-word wherever possible. The interviewer also made notes concerning the participant's enthusiasm, body language, mood and any other features that seemed relevant.
One focus group was conducted given its potential for capitalising on the opportunity to use group dynamics to generate new insights. It was hoped that a group of peers might provide a supportive environment in which to consider some difficult issues. Rather, at this session, the researcher’s familiarity with the ‘native language’ of the participants alerted her to the fact that the group interaction seemed to inhibit responses in some ways. Two primary factors seemed to be playing a role in this process: Firstly, two of these media-savvy participants were tending at times to respond in ‘media-speak’ or what Carlstedt (2004b) refers to as ‘meaningless slogans, platitudes and notions’. Others were quiet participants, nodding heads but not contributing much unless explicitly asked a question. All AIS sportspeople are bound by a code of conduct which includes restrictions on making comments that might reflect badly on their sport or sporting organization. Olympians are bound by an even more stringent Olympic Athletes Agreement. The consequences for breaking such a code can be severe and include financial penalty, public disgrace and rescinding of scholarship. Such consequences in association with intensive media training, force sportspeople to begin filtering or processing their experiences in ways that are deemed ‘appropriate’ by these governing bodies. It has been my experience that these ways of talking about their lives become internalized to a degree. Jones, Hanton & Connaughton (2002) in their study of mental toughness also recognised a similar phenomenon and refer to the importance of moving beyond the macroconstructs of ‘popular sport psychology’ such as confidence and coping with adversity to the microcomponents of this experience. Indeed, in this focus group the effect of resorting to media-speak was possibly escalated by the presence of other sportspeople who were not previously known to each other – perhaps an implicit
agreement that the ‘code’ would not be broken. However, it also seemed that this process and reaction was not a fully conscious one – rather, somewhat superficial responding to difficult issues, and cautious silences, had become automatic or stylistic. As the interview progressed, these participants seemed to relax and spoke more freely but still monitored each others reactions, seemingly to assist in deciding how much information to reveal.

A second factor contributing to socially desirable responding was the very significant nature of the topic being discussed. For sportsmen and women, issues of success (and failure) and responsibility for personal achievement (or perceived lack of it) are inherently personal. It seemed that, even for those that had been retired for some time there was considerable emotional vulnerability when discussing some aspects of their sporting career. Paradoxically, the ‘tone’ of the focus group session was not excessively emotionally laden (or ‘heavy’) but rather excessively light. Experience in working with elite athletes suggested that what was being ‘left out’ was equally problematic, with participants skimming over, or avoiding, challenging topics. Thus, to put participants at ease, an individual interview format was adopted in place of the focus group format for subsequent conversations.

Subsequent interviews began with a general introduction to my role as researcher but also my familiarity with the elite sporting experience to move the tenor of the conversation to a deeper starting point. Interviewees were then invited to speak on their experiences in relation to the psychological demands of their sport. Inviting a conversation at a very general and broad level seemed to promote greater relaxation and openness (Spradley, 439)
1979). This is an approach utilized in my clinical work, whereby clients (interviewees)
are explicitly invited to lead the conversation and implicitly encouraged to do so through
the judicious use of silences, reflective listening and non-verbal cues, so as to immerse
the participant in their retelling of their experiences. This sometimes meant meandering
into un-targeted topics of conversation but was amply compensated for by profound
revelations in other areas, often in the latter half of the interview. As salient issues were
raised, reflection or probes were used as re-orienting devices, to encourage further
exploration and expansion. Sometimes such cues or invitations occurred later in the
interview process so as not to distract or detract from the thread of a conversation.

A strength of the interviews conducted in this study was the shared understanding
between respondents’ and interviewer of the social, political and cultural context within
which their experiences had occurred. Thus, questions could be aimed at an appropriate
‘expert’ level and in the ‘native language’ of the athletes.

RESULTS AND DISCUSSION

(Relevant SPSS output files for all stages of Study 3 can be found in Appendix 13)

Sample demographics

As mentioned earlier, 67 Olympians participated in this study. Details gathered about
their sporting and non-sporting lives are summarised in Table 5.1.
Table 5.1 Demographic characteristics of Olympians in Study 3 (n=67, though there were some questionnaire items incomplete for some individuals)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Unit of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Range 16-76yrs)</td>
<td>Mean=42.61 years, SD=15.80</td>
</tr>
<tr>
<td>Gender</td>
<td>Male n=29; Female n=38</td>
</tr>
<tr>
<td>Birth Order</td>
<td></td>
</tr>
<tr>
<td>First born</td>
<td>21 (31.3%)</td>
</tr>
<tr>
<td>Middleborn</td>
<td>22 (32.8%)</td>
</tr>
<tr>
<td>Lastborn</td>
<td>22 (32.8%)</td>
</tr>
<tr>
<td>Only child</td>
<td>1</td>
</tr>
<tr>
<td>Age at which individual became interested in their sport (Range 1-27yrs)</td>
<td>Mean=11.41 yrs; SD= 5.71</td>
</tr>
<tr>
<td>No. of Olympic sports(^2) represented</td>
<td>22 (9 individual sports, 13 team sports)</td>
</tr>
<tr>
<td>No. who played other sports competitively</td>
<td>37 (55.22%)</td>
</tr>
<tr>
<td>No. of Olympics attended</td>
<td></td>
</tr>
<tr>
<td>One</td>
<td>42 (62.7%)</td>
</tr>
<tr>
<td>Two</td>
<td>17 (25.4%)</td>
</tr>
<tr>
<td>More than two</td>
<td>7 (10.5%)</td>
</tr>
<tr>
<td>Olympic medal tally</td>
<td></td>
</tr>
<tr>
<td>No medal</td>
<td>50 (74.6%)</td>
</tr>
<tr>
<td>Bronze medal</td>
<td>1 (1.5%)</td>
</tr>
<tr>
<td>Silver medal</td>
<td>4 (6.0%)</td>
</tr>
<tr>
<td>Gold medal</td>
<td>8 (11.9%)</td>
</tr>
<tr>
<td>Multiple medals at one Olympic Games</td>
<td>0</td>
</tr>
<tr>
<td>Multiple medals across more than one Olympic Games</td>
<td>3 (4.5%)</td>
</tr>
<tr>
<td>Parents competed in international sport</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>50 (74.6%)</td>
</tr>
<tr>
<td>Yes</td>
<td>16 (23.9%); 8 in same sport as Olympian</td>
</tr>
<tr>
<td>Siblings competed in international sport</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>39 (58.2%)</td>
</tr>
<tr>
<td>Yes</td>
<td>27 (40.5%); 19 in same sport as Olympian</td>
</tr>
<tr>
<td>Children participating in competitive sport</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>5 (7.5%)</td>
</tr>
<tr>
<td>Yes</td>
<td>25 (37.3%)</td>
</tr>
<tr>
<td>Performance at the Olympics</td>
<td></td>
</tr>
<tr>
<td>Better than I expected</td>
<td>12 (17.9%)</td>
</tr>
<tr>
<td>As well as I expected</td>
<td>23 (34.3%)</td>
</tr>
<tr>
<td>Not as well as I expected</td>
<td>28 (41.8%)</td>
</tr>
</tbody>
</table>

\(^2\) The particular sports will not be listed to protect confidentiality of participants who may be identifiable by the combination of this information and other information to be presented.
Of 42 responses to an open-ended question investigating reasons for retirement, 25 Olympians indicated that they had no regrets about retiring. Of those who did have regrets, these included not reaching individual potential, a feeling that they deserved further opportunities or wishing they could ‘go on forever’. Others related feelings of having a big void in their life in terms of friendships, life structure and clear expectations.

When asked to identify the highlights of their sporting career, 41 referred to Olympic selection or participation, 20 gave priority to personal best performances that were not necessarily achieved at the Olympic Games. When asked to identify the most difficult times, responses included poor performance (12), the stress of Olympic competition (9), injury/illness (8), non-selection (7), retirement (6), comeback attempts (2), conflict with coaches (2), the politics of sport (2), and training away from home (1). People identified as being the most influential in their sporting career included coaches (22), parents (22),
family and partners (7), other sportspeople (5), God (1) and friends (1). Eleven noted that their own desire had been the most influential factor in their success rather than the influence of anyone else.

When Olympic medalists were considered as a subgroup, they did not notably differ on any of these personal, family or sporting characteristics. Most, while influenced and supported by their families, did not have internationally competitive sportspeople for parents or siblings. As in the larger group of Olympians, there was a smaller proportion of lastborns in this group than might have been expected according to Sulloway’s (1996) thesis that laterborns have more rebellious personalities which incline an individual toward high achievement. There were comparable numbers of generally ‘sporty’ individuals and individuals whose only competitive sporting interest was in the sport for which they had gained Olympic selection. Notably, still only 11 of 16 Olympic medalists felt that they had reached their potential at the Olympics, 7 felt they had performed better than expected, 7 as well as they had expected and 2 had performed less well than expected.

Psychometric evaluation of NEO scales

Psychometric evaluation of the scales when used with this sample have been reported in parallel with Study 2 and, given their adequacy and the non-centrality of this issue in the current study, they will not be reported on further here. The Openness scales were once again excluded from all analyses (except descriptive considerations) given their status as
the least robust scales and the preclusive effect of such a high number of variables on the viability of statistical analysis.

**Personality descriptives**

**Olympians and the normal population**

In a series of single sample t-tests, these 67 Olympians differed significantly from the norm group (at p<.01, in recognition of increased likelihood of Type II error) on a number of NEO PI-R domain and facet scales as illustrated in Figures 5.1 & 5.2. The N, E and C domains were significantly different from the norm, with the *anxiety* (n1), *angry hostility* (n2), *self-consciousness* (n4) and *vulnerability to stress* (n6) facets being suppressed, while *assertiveness* (e3) and *activity* (e4), *feelings* (o3) and *values* (o6), and *competence* (c1), *dutifulness* (c3), *achievement striving* (c4), *self-discipline* (c5) and *deliberation* (c6) were significantly elevated. Interestingly, *vulnerability to stress* (n6) had the lowest mean t score (43.23) and tightest distribution of all facet scales (standard deviation = 8.45). All other scales had distributions with standard deviations comparable to the norm group (Range was 8.45 – 12.95).

On the NEO-Sport all domain scales showed significant departures from a t score of 50, with Neuroticism and Agreeableness scales having significantly lower scores and Extroversion, Openness and particularly Conscientiousness showing significant
elevations (see Figure 5.1). Most of the facet scales also showed significant departures from the normal population, specifically, *anxiety* (n1), *depression* (n3), *self-consciousness* (n4), *impulsiveness* (n5), *vulnerability to stress* (n6), *assertiveness* (e3), *activity* (e4), *excitement-seeking* (e5), *aesthetics* (o2), *feelings* (o3), *actions* (o4), *ideas* (o5), *compliance* (a4), *modesty* (a5), *tender-mindedness* (a6), and *competence* (c1), *order* (c2), *dutifulness* (c3), *achievement striving* (c4), *self-discipline* (c5), and *deliberation* (c6) (see Figure 5.3). Once again n6 (*vulnerability to stress*) recorded one of the lowest mean scores (t = 41.76). Once again standard deviations for scales were comparable with the norm group in almost all cases (Range 6.77 – 13.86).

![Figure 5.1 NEO PI-R and NEO-Sport Domain t scores for a sample of 67 Olympians representing 22 disciplines](image)

Figure 5.1 *NEO PI-R and NEO-Sport Domain t scores for a sample of 67 Olympians representing 22 disciplines*
Figure 5.2 NEO PI-R facet scale t scores for 67 Olympians representing 22 sporting codes

Figure 5.3 NEO-Sport facet scale t scores for a sample of 67 Olympians representing 22 disciplines
Notably, every facet scale on both the NEO PI-R and NEO-Sport had a wide range of scores within this sample of Olympians. Despite extreme scores on many scales, no individual in this sample met the Diagnostic and Statistical Manual of Mental Disorders (DSM) criteria for Obsessive-Compulsive Personality Disorder, Depressive or Narcissistic Personality Disorder as translated from the NEO PI-R Professional manual.

**Sporting personality versus general life personality**

Domain and facet scores on the general and sport NEO were often significantly different when compared in paired sample t-tests. Significant results are summarized in Table 5.2. 

_Vulnerability to stress_ (n6) was significant at p<.05, and approached significance at the .01 level of probability. It is included in the table because of its primary interest value.

Table 5.2 Significant Paired Sample t-tests for NEO PI-R and NEO-Sport domain and facet scales

<table>
<thead>
<tr>
<th>Domain &amp; facet scales</th>
<th>General &amp; Sport NEO (n=64)</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>t value (df. 63)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extroversion</td>
<td>General</td>
<td>54.42</td>
<td>10.19</td>
<td>-.3299</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>Sport</td>
<td>56.58</td>
<td>10.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agreeableness</td>
<td>General</td>
<td>50.16</td>
<td>11.34</td>
<td>5.290</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Sport</td>
<td>45.84</td>
<td>10.93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>General</td>
<td>56.03</td>
<td>10.67</td>
<td>-7.758</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Sport</td>
<td>61.48</td>
<td>9.95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n2: Angry hostility</td>
<td>General</td>
<td>46.03</td>
<td>10.19</td>
<td>-4.453</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Sport</td>
<td>50.77</td>
<td>8.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n5: Impulsiveness</td>
<td>General</td>
<td>47.80</td>
<td>10.44</td>
<td>4.953</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Sport</td>
<td>43.27</td>
<td>7.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n6: Vulnerability *</td>
<td>General</td>
<td>43.05</td>
<td>8.45</td>
<td>2.128</td>
<td>.037 n.s.</td>
</tr>
<tr>
<td></td>
<td>Sport</td>
<td>41.73</td>
<td>8.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e4: Activity</td>
<td>General</td>
<td>56.13</td>
<td>10.80</td>
<td>-3.182</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>Sport</td>
<td>59.16</td>
<td>8.32</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As a group, there are considerably more significant differences between general and sporting personality in this sample compared with the sample of hockey players in Study 2. Indeed seven additional scales showed divergence. Only a small sub-sample of these divergent scales, however, were common to both studies suggesting that while it is clear on individual profiles that there are differences for each person, there is a wide range of patterns of difference – possibly as many combinations as there are participants which speaks to several issues emerging from the knowledge review, specifically,

1. The principle of equifinality, at the level of source traits;
2. The adaptive function of creating a unique niche to minimize competition for resources; and.
3. Possibly of self-actualisation, specifically of increasing self-awareness – that with retirement from sport and with the passage of time (during which non-sporting life
begins to become a stronger force once again), the differences between sporting and non-sporting personality may become more salient or more knowable to the individual. In Barrett-Lennard’s (2005) terms, the individual may have experienced changes in relation between these different ‘selves’, that is improved ‘self’-communication and ‘self’-understanding.

**Personality and achievement**

Given the absence of external ratings of performance for these individuals and the predictably small number of cases in some cells when utilizing objective measures of achievement (such as the number of Olympic selections or individual medal tally), two self-ratings of achievement were included in the original questionnaire (see Table 5.1):

1. *Performance at the Olympic Games:* Approximately, 41.8% sportsmen and women believed they had underperformed at the Olympics, while the remaining 52.2% reported that they had performed either as well as they had expected or better;

2. *Achieving individual potential:* 38.8% individuals believed that going to the Olympics was an indication that they had reached their potential, and 55.2% did not.

These two measures of achievement each produced groupings at the edges of what might be considered comparable size in the context of discriminant functions analysis. Thus, both grouping were used, albeit tentatively, to explore possible multivariate relationships between personality and Olympic achievement.
When considered in separate discriminant functions analyses, neither of these self-ratings of achievement produced significant functions either with facet scales or domain scales, for either the NEO PI-R or the NEO-Sport. Significant univariate relationships were identified however, for the NEO-Sport scale. These were followed up with independent samples t-tests summarized in Table 5.3. Notably, only two traits showed significant differences. *Vulnerability to stress* was significantly higher in less successful groups in both instances. Additionally, *self-consciousness* (n4) showed significant differences between the groups in terms of self-rated Olympic performance. Those who felt they had performed as well as, or better than expected scored lower on *self-consciousness* than those who felt they had underperformed. However, these findings ought be considered carefully given the retrospective nature of these personality ratings (unlike in Study 2). That is, these retrospective trait interpretations may be a consequence of underperforming at the Olympics (a critical life event) rather than pre-existing characteristics.

**Table 5.3 Independent sample t-tests for facets relating to self ratings of Olympic achievement in a sample of 67 Olympians representing 22 disciplines**

<table>
<thead>
<tr>
<th>NEO-Sport facet</th>
<th>PERFORMANCE AT OLYMPICS</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev</th>
<th>T</th>
<th>d.f</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>n6 (vulnerability)</td>
<td>As well as, or better than I expected</td>
<td>35</td>
<td>39.400</td>
<td>8.582</td>
<td>-2.63</td>
<td>56.43</td>
<td>.011</td>
</tr>
<tr>
<td></td>
<td>Not as well as I expected</td>
<td>26</td>
<td>44.961</td>
<td>7.840</td>
<td>-2.83</td>
<td>52.2</td>
<td>.007</td>
</tr>
<tr>
<td>n4 (self-conscious)</td>
<td>As well as, or better than I expected</td>
<td>35</td>
<td>41.25</td>
<td>8.37</td>
<td>-2.83</td>
<td>52.2</td>
<td>.007</td>
</tr>
<tr>
<td></td>
<td>Not as well as I expected</td>
<td>26</td>
<td>47.62</td>
<td>8.89</td>
<td>-2.83</td>
<td>52.2</td>
<td>.007</td>
</tr>
<tr>
<td>n6 (vulnerability)</td>
<td>Reached peak at Olympics</td>
<td>26</td>
<td>41.42</td>
<td>8.83</td>
<td>-3.04</td>
<td>52.77</td>
<td>.004</td>
</tr>
<tr>
<td></td>
<td>Did not reach peak at Olympics</td>
<td>37</td>
<td>44.78</td>
<td>7.93</td>
<td>-3.04</td>
<td>52.77</td>
<td>.004</td>
</tr>
</tbody>
</table>
If the difference found in self-consciousness ratings and vulnerability to stress were due to memory or reflective interpretation then we might expect other elements of personality recall to also show such differences. To increase confidence in the noteworthiness of these significant univariate relationships, additional t-tests were conducted on facets found to be of significant interest in differentiating high achievers in Study 2. No significant differences were present on these measures in the current sample.

**Gender**

Given the somewhat less striking findings in this study compared with Study 2, an obvious question was whether the findings in Study 2 were specific to sportswomen. This avenue of inquiry was pursued, once again through discriminant functions analysis. Interestingly, gender did produce a significant discriminant function with facets of the NEO PI-R and with facets of the NEO-Sport (see Table 5.4). The loadings in each analysis differed but both analyses contained loadings greater than 0.3 for the vulnerability to stress scale (n6), despite both gender groups scoring significantly lower than the norm on this scale (NEO t(1, 37) = 2.6, p<.01; NEO-Sport t(1,36) = -3.70, p<.001). Results from each analysis are discussed below, firstly the NEO PI-R:
Table 5.4 Discriminant summary (significant results) for gender by NEO PI-R and NEO-Sport facets N, E, A, and C.

<table>
<thead>
<tr>
<th>Facet scales showing sig. univariate relationships (p&lt;.01)</th>
<th>Wilks Lambda (Equality/group means)</th>
<th>Group Means</th>
<th>Wilks Lambda (sig. Discrim. Function)</th>
<th>Loadings &gt;0.3</th>
<th>Functions at group centroids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender NEO PI-R (n=66) Df(1,64)</td>
<td>Male (n=28) F (n=38)</td>
<td>P&lt;.01, d.f.=24</td>
<td>Male 1.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n1: anxiety</td>
<td>.873 M: 42.14 F: 49.50</td>
<td>DF1(377) n6 (0.46) Male 1.48</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n3: depression</td>
<td>.889 M: 43.68 F: 49.87</td>
<td>a1 (-0.35) Female 1.09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n4: self-conscious</td>
<td>.854 M: 42.12 F: 48.82</td>
<td>n4 (0.32)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n5: impulsiveness</td>
<td>.880 M: 43.56 F: 50.97</td>
<td>e3 (-0.30)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n6: vulnerability</td>
<td>.744 M: 38.29 F: 46.87</td>
<td>n1 (0.30)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e3: assertiveness</td>
<td>.871 M: 59.96 F: 52.79</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a1: trust</td>
<td>.834 M: 56.61 F: 48.76</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Correct Classification: 90.6%
[96.4%(M), 86.8%(F)]

Classification by Chance: 50%

| Gender NEO-Sport (n=65) Df(1,64) | Male (n=28) F (n=38) | P<.01, d.f.=24 | Eigen=1.58: | | |
|---------------------------------|---------------------|----------------|-------------| | |
| n1: anxiety | .719 M: 39.21 F: 51.34 | DF1(388) n1 (0.50) Male 1.42 | | | |
| n2: angry hostility | .902 M: 47.64 F: 52.84 | n6 (0.46) Female 1.07 | | | |
| n3: depression | .879 M: 41.64 F: 47.88 | n4 (0.36) | | | |
| n4: self-consciousness | .832 M: 39.68 F: 46.94 | e3 (-0.35) | | | |
| n5: impulsiveness | .888 M: 40.21 F: 45.38 | n3 (0.30) | | | |
| n6: vulnerability | .751 M: 36.96 F: 45.38 | | | | |
| e3: assertiveness | .837 M: 62.43 F: 54.14 | | | | |
| a1: trust | .882 M: 55.68 F: 48.73 | | | | |

Correct Classification: 90.8%
[89.3%(M), 91.9%(F)]

Classification by Chance: 50%

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Gender and the NEO PI-R

The NEO PI-R produced Box’s M test of sphericity significant at p<.05. Vulnerability to stress (n6) was the highest loading facet scale with trust, self-consciousness and assertiveness, all loading >.3. Whilst both male and female Olympians were significantly lower that the norm group on vulnerability to stress (n6), men also scored significantly lower (i.e. were less vulnerable) than women. Male Olympians scored higher on trust (a1) than their female counterparts and higher than the general population. Men were also less self-conscious (n4) than women and significantly lower on this scale than the norm group. Conversely they were more assertive (e3) and scored lower on anxiety (n1). Interestingly, sportswomen did not differ significantly from the norm group on any facet other than vulnerability to stress. Posterior classification was evaluated with prior probabilities set to equal in the absence of any theoretical guidance to the alternative. Gender was correctly classified in 90.9% of cases, with a particularly high success rate for classifying male Olympians relative to chance.

Gender and NEO-Sport

The NEO-Sport produced Box’s M test of sphericity significant at p<.01. Male Olympians, in the sporting context, reported significantly lower levels of anxiety than female Olympians and than the general population (nsp1), lower levels of angry hostility (n2), and less vulnerability to stress (nsp6) than female Olympians (who also scored
significantly lower than the general population), were less self-conscious (nsp4), more assertive (esp3), and less depressed (nsp3). Olympians were correctly classified (with equal priors) in terms of gender in 90.8% of cases.

A series of one sample t-tests using a significance level of .01 confirmed that, in this sample, Olympic sportswomen only differed from the normal population on the suppression of scores on the NEO PI-R vulnerability to stress scale. On the NEO-Sport, significant differences were also found on the impulsiveness scale.

**Gender and differences in sporting and non-sporting personality**

When compared in terms of the types of differences evident in sporting personality and general personality, there was remarkable concordance between the genders – nine of 14 scales that showed significant differences in the sporting domain were common to both male and female groups. Specifically, in terms of domain scales, both male and female groups showed lower levels of Agreeableness in their sporting life than life more generally (p<.001 and p<.01), particularly reflected in the tendermindedness facet scale (a6). Similarly there were elevations on the Conscientiousness domain scale for both sportsmen and sportswomen (p<.001) in the sporting context, particularly reflected in elevated achievement striving (c4) and self-discipline (c5). Men also showed significant elevations in their sense of competence in the sporting domain (c1) while women showed significant elevations in deliberation (c6) in the sporting context. Other elevated facet scales in the sporting context for both men and women included angry hostility (n2) and
excitement seeking (e5) while impulsiveness (n5) was significantly suppressed in the sporting context for both groups. Interestingly vulnerability to stress (n6) showed no significant differences between the sporting and general contexts for either group suggesting that these individuals show comparable levels of invulnerability across a range of life domains. This was also true for the hockey sample in Study 2, perhaps suggesting that an ability to handle stress facilitates the progression toward elite status from early sporting experiences, that it is a critical point of similarity between sporting and non-sporting personality for most high achieving sportmen and women.

Taken together, these findings suggest that elite sportmen and sportswomen show remarkable similarities in the ways in which they are different in the sporting context from the general life context. However, the absolute levels of these traits in male and female groups are somewhat different, with sportswomen more closely approximating the population norms. Unfortunately, there were too few cases to allow each gender group to be separately considered in terms of relationship to the achievement self-ratings. Comparisons between the sportswomen in Study 3 and the female hockey players in Study 2 are considered in the next section.

**Posthoc comparison of female Olympians from the current sample and Olympic female hockey players.**

Several factors prompted a comparison between the female Olympians in this study (n=38) and those from Study 2 (n=24):
1. Firstly, the unexpected gender difference in personality amongst the sample of Olympians in Study 3;
2. Secondly, the nature of those differences: in strength of trait differences despite both groups showing similar directional differences between sport and life profiles;
3. The similarity of sportswomen in this sample to the normal population on the NEO PI-R and the NEO-Sport;
4. The lack of a discriminating function for the group according to self-ratings of achievement; and
5. Finally, an observation that the predominant function loadings in this analysis closely matched those on the functions which discriminated hockey players in Study 2, in the analyses considering whether players had reached their potential or not.

What was notable from this posthoc comparison (see Table 5.5), is that on all facet scales that loaded highly on the discriminating function in the current study, female hockey Olympians looked more like the current sample of female Olympians than male Olympians except in the trust facet of the sporting scale which was more elevated in the hockey team than in the 38 female Olympians in this sample. This perhaps reflects the fact that hockey is a team sport and that this was a very successful team. It is plausible that in such a context, the ability to trust one's teammates is a particularly necessary prerequisite for success.
Table 5.5: *Hockey Olympians: Mean scores on relevant NEO PI-R and NEO-Sport facets*

<table>
<thead>
<tr>
<th>NEO PI-R facets (n=24)</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>n1 (anxiety)</td>
<td>51.88</td>
<td>10.76</td>
</tr>
<tr>
<td>n3 (depression)</td>
<td>52.76</td>
<td>11.06</td>
</tr>
<tr>
<td>n4 (self consciousness)</td>
<td>50.76</td>
<td>11.92</td>
</tr>
<tr>
<td>n5 (impulsiveness)</td>
<td>52.08</td>
<td>11.12</td>
</tr>
<tr>
<td>n6 (vulnerability)</td>
<td>49.92</td>
<td>9.81</td>
</tr>
<tr>
<td>e3 (assertiveness)</td>
<td>52.28</td>
<td>12.43</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NEO-Sport facets (n=24)</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>nsp1 (anxiety)</td>
<td>50.16</td>
<td>10.75</td>
</tr>
<tr>
<td>nsp3 (depression)</td>
<td>52.33</td>
<td>8.98</td>
</tr>
<tr>
<td>nsp5 (impulsiveness)</td>
<td>47.58</td>
<td>10.67</td>
</tr>
<tr>
<td>nsp6 (vulnerability)</td>
<td>45.33</td>
<td>6.88</td>
</tr>
<tr>
<td>esp3 (assertiveness)</td>
<td>55.04</td>
<td>10.48</td>
</tr>
<tr>
<td>asp1 (trust)</td>
<td>53.16</td>
<td>8.77</td>
</tr>
</tbody>
</table>

These findings provide some indirect and tentative evidence to suggest that the differences in Olympian personality profiles in Study 3 are indeed reflecting gender differences rather than being an artifact of skewed (perhaps socially influenced) recollections of Olympians (both male and female) who are long since retired in some instances. However, it is also possible that sporting type may be a confounding factor in considering gender, and so groups were split into individual and team sporting ‘types’ for further analysis.

*Personality and sporting type:* As can be gleaned from Table 5.6 below, male Olympians in this sample, were much more represented in team sports than individual sports.
Table 5.6 Individual and team sport participation amongst Olympians, by gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Individual</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>8</td>
<td>22</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>38</td>
<td>67</td>
</tr>
</tbody>
</table>

While discriminant functions analyses using the NEO PI-R and the NEO-Sport produced no significant discriminating functions for sport type, several univariate relationships were noted and followed up with independent samples t-tests (see Table 5.7). Taken together, the results below suggest that Olympians from individual sports are less differentiable from the normal population than are Olympians from team sports. Further investigation is warranted into the interface between gender, sport type and personality. Unfortunately the cell sizes in the current study preclude further analysis. It is worthy of note however, that irrespective of whether gender or sport type is the most influential consideration, vulnerability to stress is invariably involved in the equation.

Table 5.7: Group differences between individual and team sports in NEO facets

<table>
<thead>
<tr>
<th>NEO facet scales</th>
<th>Sport Type</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>t</th>
<th>Df</th>
<th>Sig. (equal var. not assumed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>n6 (vulnerability)</td>
<td>individual</td>
<td>30</td>
<td>46.4</td>
<td>8.00</td>
<td>-2.94</td>
<td>61.8</td>
<td>.005</td>
</tr>
<tr>
<td></td>
<td>team</td>
<td>36</td>
<td>40.58</td>
<td>7.98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nsp6 (vulnerability)</td>
<td>individual</td>
<td>28</td>
<td>45.57</td>
<td>8.75</td>
<td>3.33</td>
<td>50.4</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>team</td>
<td>37</td>
<td>38.86</td>
<td>6.96</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n1 (anxiety)</td>
<td>individual</td>
<td>30</td>
<td>50.26</td>
<td>9.50</td>
<td>-2.98</td>
<td>62.6</td>
<td>.004</td>
</tr>
<tr>
<td></td>
<td>team</td>
<td>36</td>
<td>43.13</td>
<td>9.87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nsp1 (anxiety)</td>
<td>individual</td>
<td>28</td>
<td>50.25</td>
<td>13.14</td>
<td>-2.51</td>
<td>63.8</td>
<td>.016</td>
</tr>
<tr>
<td></td>
<td>Team</td>
<td>37</td>
<td>43.00</td>
<td>8.90</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e3 (assertiveness)</td>
<td>Individual</td>
<td>30</td>
<td>52.43</td>
<td>8.86</td>
<td>-2.68</td>
<td>44.9</td>
<td>.009</td>
</tr>
<tr>
<td></td>
<td>Team</td>
<td>36</td>
<td>58.66</td>
<td>10.05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>esp3 (assertiveness)</td>
<td>Individual</td>
<td>28</td>
<td>53.92</td>
<td>9.61</td>
<td>-2.72</td>
<td>59.2</td>
<td>.009</td>
</tr>
<tr>
<td></td>
<td>Team</td>
<td>37</td>
<td>60.56</td>
<td>9.90</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Interim summary & synthesis

Taken together, the findings above, in conjunction with the findings from Study 2 confirm the importance of vulnerability to stress, particularly as measured by the NEO-Sport, when considering achievement amongst sportspeople at the highest levels. However, in this study, stable multivariate relationships have been more elusive to establish in relation to self-ratings of achievement. This may be due to the gross level of measurement of achievement (possibly heightened by the effect of recall on self-evaluation of achievement), and/or the somewhat uneven and small cell sizes in some analyses. Dichotomous measures were necessary to accommodate the small sample size in the classificatory process. Even more specifically, the distillation of effect may be due to the combining of different gender groups and different sporting ‘types’ within this small sample. When considered separately, individual and team sports have shown significant, albeit univariate, differentiability on the NEO-Sport as well as the NEO PI-R.

It is possible (though beyond the scope of this thesis) that each sport at this elite level draws upon a different constellation of traits for success. It is however, premature to draw strong conclusions in this regard given the current confound between gender and sport type. Gender it seems, affects the absolute level of personality traits in both the sporting and general contexts but less so, the relativities between the two. Interestingly, both sportsmen and sportswomen in this sample showed low levels of vulnerability to stress (compared to the norm) in both life contexts. If the sporting and non-sporting personalities are considered as different, contextual, ‘selves’, then vulnerability to stress
is a point of contact and communication between these selves. Whether on the field of play or off, whether male or female, in a team or individual sport, the capacity for dealing with stress, it seems, is a salient feature of the Olympian psyche. This is also reflected in responses to the open-ended questionnaire items. A feature common to both sportsmen and women from individual and team sports, was the identification of circumstances, on-field and off-field in which they have had to face difficult circumstances to succeed in their chosen sport. *Vulnerability to stress* will thus provide the focus for further exploration, specifically, for analysis of interview data resulting from conversations with a sub-sample (n=20) of this Olympic group, representing nine disciplines. It should be noted that the scope of these interviews extended beyond the topic of adversity and the centrality of stressors, yet it was a primary theme to emerge. Indeed every interviewee, unsolicited in the first instance, discussed multiple events that might be considered stressful by the average person, whether they be ongoing pressures or adverse circumstances met on their path to the Olympic Games, or indeed on their journey after the Olympic Games. This primary theme will be investigated in greater detail to explore similarities and differences in the perception and appraisal of pressure and adversity as well as the range of responses to it, with a view to better understanding how invulnerability to stress is manifest in elite sport.

Moreover, it is of particular interest to see how those Olympians who are more like the normal population with regard to *vulnerability to stress* (i.e. those few who scored in the average range or above for the scale), have managed the seemingly inevitable and multiple moments of adversity on their journey to Olympic selection. While these are a
minority of the sample, they are over-represented in the interview case studies for two reasons. Firstly, we have established that they are likely to perceive themselves as having underperformed at the Olympics, yet nevertheless they have reached a level of success well beyond the grasp of most sportsmen and women. Moreover, it is often through examining the extremes of a population that we gain glimpses into the parameters relevant to defining the core characteristics of the population.

A unique feature of this analysis is that clinical impressions of personal and interpersonal style gleaned from the interviews will be mapped onto individual NEO profiles to assess consistency and to help further unpick the nature of the relationship between manifest behaviours, recollections and underlying traits in this population. Following the clinical tradition, data from the interviews will be presented as case studies rather than drawing upon de-contextualised quotes to support unidimensional thematic analysis. This holistic approach is intended to provide the reader with a deeper appreciation of both the process of the investigation and how the parts of a complex and emergent puzzle fit together to ‘make an Olympian’.

A focus for this discussion will be provided by the relationship between vulnerability to stress and the three supraordinate traits constituting motivational forces in the pathways framework: hardiness, mental toughness (Type I: achievement orientation; Type II: adaptive expression of vulnerability), and controlled vulnerability. The five emergent stress-salient traits outlined as having the theoretical potential to differentiate these
constructs will provide a lens for evaluating each Case Study. These include resilience, optimism, control, commitment and challenge.

Case studies

Profiles

As a bridge to the interview data which follows, eight Olympian NEO profiles have been selected (see Figure 5.4) to provide an immediate visual impression of the diversity of individuals in this somewhat exclusive sample. Notably, some profiles are quite compact, others full of extremes. Some show large differences between sporting personality and general personality, others remarkable concordance. Some show intra-domain scatter, others show greater consistency. Keeping in mind that personality is considered configural in this study, an elevation in one facet scale can have a ripple effect in relation to its interaction with other traits resulting in marked differences in manifest behaviour.

The diversity of personality between Olympians is as remarkable as the degree of consistency within individuals. The profiles have been reduced to fit on one page, compromising legibility of labels, to enhance visual impressions of patterns which is the primary feature of interest. Pink profile lines represent sporting personality and blue lines, non-sporting personality.
Figure 5.4: A selection of NEO PI-R and NEO-Sport profiles of Olympians
A decision was taken to limit the number of case studies presented to allow greater depth of analysis given the space limitations of this thesis. The following series of case studies have been selected to highlight differences and similarities among Olympians on the dimension of vulnerability to stress and are representative, in most senses, of the remaining interviews conducted. However, as mentioned, there will be a disproportionate focus on individuals with greater vulnerability to stress so as to explore the nature of coping under such circumstances. Specifically, Case Studies 1 to 3 were selected as exemplars of low scorers on vulnerability to stress scales on the NEO-Sport and /or NEO PI-R. Cases 4 to 6 were comparison cases that showed greater vulnerability to stress (although still scoring in the average range for the normal population).

Case Study 7 encompasses a number of the issues raised by other Olympians and also gives a sense of the defining journey of coming to terms with the enduring nature of stress and the inevitability of adversity in the elite sporting context. In addition to the content of the interview (i.e. what was said), it will become evident from the prompts of the researcher, that the presentation of the participant and the process of the interview, are integral to interpretation of these data. That is, both implicit and explicit data sources are drawn together in this thematic and conceptual analysis (c.f. Glaser & Strauss, 1967).

The following transcripts have been modified where necessary to prevent identification of the individuals involved. Given the somewhat exclusive club of Olympians in
Australia, information such as gender, age, relevant Olympiad, and sport may all provide obvious clues. Where necessary, alternative text insertions have been made [in square brackets] with the goal of maintaining the sense of the conversation as closely as possible. It is worth observing at this point that gender does seem to have been a salient feature of the interpersonal presentation of these participants on one particular dimension, though it cannot be explored in the following case studies without risking the identification of the individuals. Thus, comments in this regard will be confined to discussion of this point in the broader context of the sample of 20 interviewees. Caution is warranted in any case in making observations in this regard given the greater number of female interviewees (n=15). Additionally, beyond this one feature, in the small sample of interviewees, there were diverse presentations on interview for each gender.

Prompts from this researcher have been included in the text where these are relevant or facilitate interpretation. Where comments have been attenuated, they will be joined at the juncture in the traditional way, by a series of dots. Where comments are placed together that were originally temporally separated, this is indicated by a forward slash. This has only occurred where statements are strongly, thematically, linked. The ‘Openness’ scales have been included on the NEO profiles for completeness and because there are some instances where behavioural presentation and interview responses seemed to validate Openness scores. Only where triangulated interview and profiling data supports the veracity of the scale scores will they be interpreted given their uncertain psychometric properties. Finally, it is worth remembering that each of these individuals is an exceptional achiever in their field – discussion of features such as denial in this
exceptional population then, speak to the potential adaptability of these processes, rather than seeing them as inherent limitations.

**Case Study 1**

![Figure 5.5 NEO PI-R and NEO-Sport profiles for Olympian Case Study 1.](image)

The most salient feature of this interviewee’s presentation was her/his high energy levels. She/he describes her/himself as ‘having ADHD’ (Attention Deficit Hyperactivity Disorder) and these irrepressible energy levels were also evidenced in a high rate of speech and that fact that she/he found it hard to sit still! The next most notable feature of this interview was this sportsperson’s supreme and unwavering confidence and optimism that doing the work will result in success. The maintenance of this belief is facilitated by
a definition of success that encompasses the ‘bigger picture’ rather than focusing on instant success. These features map onto the combination of predominant and elevated conscientiousness facets in combination with high extroversion scores and are captured in the following exchanges:

**R:** You said 160 times out of 200 you walk away feeling that you’ve done really well. What about the other times?

**S:** Even if I lose, it doesn’t matter. All I aim to do is achieve learning one thing, just something small. Something small or just learn something, that’s it, that’s all I need to do. If I’ve really [performed] my heart out and the other [competitor] has out[performed] me, ..., I don’t have a problem with that. That proves to me that I’ve got to learn more, I’ve got to change my approach to training to be able to beat somebody like that. To beat the best you’ve got to, well you have to [compete] against the best people, it’s as simple as that.

With regard to injury:

**S:** I’ve broken a few[bones], I can’t remember which one it was, yes that one,... I broke the bone across here so what I did was, he had to plaster it and this was about nearly six weeks in plaster. I heal very quickly, very quickly. So what I did was I sat in a lowish chair, had my arm up on the table so when he plastered it he plastered it from there to there and across the hand. So I thought okay, so I cut the inside piece of this out and I
was [training] about three weeks later. He found out and he says, /.... 'I'm going to break [your] other damn [body part].'

R: What did [your parent] think about what you were doing?

S: He said, you're going to be in twice as much pain in about four weeks. Four weeks, I said, well having a state title three weeks after I've broken my [body part], I don't care how much pain I'm in in six weeks time, I don't care.

This sportsperson states that 'I get hell nervous' prior to competition yet her/his profile shows suppression of all Neuroticism facets, suggesting that perhaps minimisation or denial is a salient feature of this individual's processing of anxiety symptoms. When explored further, this 'nervousness' seems very specific to immediately pre-competition, with panic-like symptoms of high arousal and depersonalisation, which have been successfully interpreted by the person as facilitative arousal and hence perceived as helpful rather than stressful. One example of managing arousal related symptoms is outlined below:

S: I've had some, I don't know how to explain them but, I reckon they're kind of like out of body experiences, that's what I think they are. Where I can actually be ... [competing], ...and I'd be standing about 10, 15 feet behind myself just looking at me and going yes that's fine, that's fine. The other [me] is on automatic pilot, go do it, go do your stuff, I'll just sit here and watch.

R: So it's not scary at the time but it's scary afterwards
S: I know it's happening though, that's the thing, that's the problem. It does scare me a little. It scared the hell out of me the first time. .../I didn't have any control, no control over it at all. It just happened, that was it. I was thinking what, what am I doing.

R: Did it affect your actual performance?

S: No it was even better, even better. I had no control, just like pressing buttons and away you go.

R: It's almost like you're so intensely focussed that you can do it without any thought.

S: I couldn't hear any noise, I couldn't hear anything, absolutely nothing.

R: It interests me why, given that you found it scary, why did you keep doing it?

S: I had to find out what it was about. 100% of the way I do it is I want to [participate in my sport], I want to [do it] so much. So anything like that, any little, well I thought they were glitches at first but they're not obviously. I thought well anything like that that gets in the way I have to deal with this because I'm going to have to deal with it for the next ten years. So sort it out, don't muck around with it, sort it out.

R: So when you say 'sort it out' what do you do now?

S: I can control it .../ All I do is drop my heart rate.

This sportsperson refuses to let anything interfere with the achievement of the end goal. Obstacles, no matter how significant, are interpreted as 'glitches'. Interestingly this determination is accompanied by a ferocious belief in the 'right path' and a degree of impatience with other perspectives or different ways of doing things. An overarching theme throughout this interview was that she/he takes full responsibility for her/his performance to the extent of not trusting others to assist her/him. These features, salient
throughout the conversation, were reflected in suppressed scores on the trust (a5) and action (o4) scales.

Her/his exceptionally low vulnerability to stress was inextricably intertwined with extreme self-discipline, conscientiousness and achievement striving which is reflected in a NEO profile that has a low vulnerability score and high scores on all Conscientiousness facets. She/he has a firm belief that everything is within personal control. Rather than a belief that she/he could overcome adversity, invulnerability to stress in this case seemed more akin to a sense that adversity would not be visited upon those who take control of their lives. Inherent was a sense of remorselessly moving toward the goal of supremacy in this chosen sport, encompassing features of both task and ego orientation.

The language of adversity was not used by this interviewee even when discussing numerous broken bones. Rather these were spoken of in the same vein and tone as all events on her/his sporting journey – no more or less important, merely another opportunity to demonstrate personal control over the situation to assist in achieving her/his potential, perhaps, her/his destiny. In this instance, invulnerability seems to result from not ‘coding’ events as being stressful or adverse. Rather, the threshold for defining something as a ‘glitch’ is quite high! In some ways it is arguable that this style goes well beyond optimism to involve a degree of minimisation or denial. It is unclear what would happen if confronted with circumstances under which stress was actually ‘experienced’. This individual’s style seems consistent with mental toughness (Type II) identified in the pathways framework that encompasses the adaptive expression of potentially problematic
personality tendencies (in this case, extremely high activity levels). While this pathway to success has inherent in it the Achilles’ Heel associated with defense mechanisms (e.g. denial) as primary coping responses, to date, these defenses have remained adaptive, in the sense of contributing to enduring success (and happiness) under intense and protracted pressure.

**Case Study 2**

Beyond the similarly low scores on vulnerability to stress, Case Study 2 is more broadly reminiscent of the previous case insofar as both had low overall levels of Neuroticism and high Conscientiousness. However, that is where the similarity ends. The most salient feature of this sportsperson’s NEO profile are twofold: A distinct lack of minimisation or denial about stressful challenges associated with sporting participation (indeed an openness to all aspects of life); and the marked differences between her/his sporting and general life profiles across a number of facets and domains. This individual can be best described as someone who believes in the power of hard work in all domains of life and who has a very stable presentation but also a reflective nature. She/he has given primacy to ‘self’-development, particularly in relation to moral domains and wrestles with ongoing conflicts about some of the down-sides of competitiveness in sport and life. She/he is highly competitive in sport for instance, but does not believe in aggression, self-centredness or competitiveness in life more broadly. Indeed she/he has dedicated a considerable amount of mental energy to resolving this apparent conflict between, essentially, a task and an ego orientation.
S: ...there's probably a part of me that has always been uncomfortable with that. It worries me that we live in a .... society that sets people up against each other and a lot of what we do is competitive, which means that our success is often at the cost of someone else's. And that clearly worries me from a .... spiritual level ... Having said that I have a lot of fun with friends still being competitive, ... whether it's playing cards... having a game of tennis, and I am quite renowned amongst my friends for being very competitive. // So I'm very conscious of that... and so that all the energy that I put into sport, which was in many ways quite selfish, I'm now putting into being a XXXX [career that focuses on helping others].

Rather than being a depressive force, wrestling with this conflict just seems to be part of an ongoing questioning, openness to philosophical dialogue with him/herself about her/his place in the world - very much reflective of hardiness in the existential sense (Kobasa, 1979). This salient attribute is consonant with this individual’s NEO profile, particularly, her/his high deliberation (c6) scores, the gap between tendermindedness (a6) scores for sport and life more generally, and the lower levels of modesty (a5) in the sporting context.
Interestingly, her/his main experience of pressure and adversity came from within her/his family:

**R:** And what age did you start training?

**S:** Two, and I was training every day from six, and twice a day from the age of nine.

**R:** What was the motivation for your [parent]?

**S:** I think a combination of being a frustrated athlete [her/him]self,...and for whatever reason [she/he] never fulfilled the potential. And it was a way of keeping things quiet and safe through the teenage years, keeping everybody busy. And yes, keeping life orderly and keeping control in a very clear way. 5 o'clock in the morning go to...
5 o’clock at night go to [training], including coming home from training and doing more training at home, weights in the garage and going for extra runs.

R: How did that impact on your relationship with your [parent]?

S: It wasn’t good, it wasn’t good. The interesting thing is we still have a relationship and it could be better though it isn’t too bad.... We’ve all had to do a lot of work, have done a lot of work on it....we had [professional help]

Another feature of the sporting experience that proved difficult were peer relationships - often the undoing of elite athletes. It seems that, elevated excitement seeking (e5) and positive emotion (e6) in the sporting context, were still not sufficient to make for easy peer relationships (see also low e1: warmth):

S: The only thing I do regret is in my years of travel I was a bit of a loner and I guess I was coming from a slightly different set of values to most of my team mates and I was a bit judgemental and I probably didn’t allow enough interaction and being with them and enjoying them, this was in the international scene. Now I suppose that’s my only regret that I was moving to the beat of a different drum but wasn’t mature enough to say that’s okay when they go out...or whatever, I don’t have to do that, but we can have a laugh at other times. But then again I wanted to see places. We were having to train in the morning and play tournaments at night and they just said look we’ve just got to sleep or play cards or listen to music,... the Vatican Sistine, the Louvre is just round the corner. So over the years I struggled with that ..and I just refused to not see things if I could. The best [team-mate] I ever had was XXX...who had a similar mind set and we’ve got to
embrace this and do as much as we can and so it was good. So that's my only regret was relationship wise and it was more me than them.

Invulnerability to stress, for this individual, whilst an elite sportsperson, primarily manifested in being self-contained and very self-directed - more akin to mental toughness (Type I) driven by achievement striving, than hardiness. However there has been a longer term process of recovery from some elements of that self-containment suggesting that it was not a strategy without personal cost. This longer term process has involved ongoing consideration of the ways in which she/he might improve him/her self and relationships with others. Her/his sporting experience seems to have evolved into an ongoing focus on personal growth and using her/his talents to assist others – a shift toward hardiness, and it seems, a self-actualising stance. This salient process of transition illuminates an important process of maturation at the level of the supraordinate traits identified in the pathways framework. This process is akin to the one discussed in the Case Study of Kate Allen in Study 2. In adapting to one’s environment, those supraordinate traits that have inherent in them an Achilles’ heel relating to conscious or unconscious defenses (i.e. achievement orientation or avoidance of failure orientation), can, through being challenged by experiences, mature into a more robust orientation to self-actualisation.

**Case Study 3**

The most striking feature of Case Study 3 is her/his single-minded purpose and high level of time commitment for their sport relative to peers (see profile for low Neuroticism and
high Conscientiousness scales). Most of her/his story involved the recounting of events that would have been experienced as major hurdles by most, yet she/he merely presents them as problems to be solved to make success possible. In this way she/he is similar to Case 1. This individual is also reasonably extroverted but is perhaps most differentiable from Case 1 by her/his more serious demeanor and more intellectual mode of functioning compared to the high level of arousal that defined Case 1. This sportsperson was also somewhat less evangelical in conveying the superiority of her/his strategy for sporting success. She/he is however, very active (high e4) and assertive (e3) particularly in the context of her/his sporting career.

S: Very, very, very clear about all that. My nature is to be very persistent, drive some people mad my [partner] says. A fairly logical, persistent, organised person, I guess I get a bit of that from my [parent] but certainly very competitive... / [Another former Olympian] said how did you maintain your focus [across the course of an entire day] because the longer you are out there the harder it gets... I had to tell him that I just didn’t know. You did whatever it was you did because you had to do it and that was it. But I do recall that when I [performed to the level] that gave me the XXX medal, and I knew I got the XXX medal because [my competitor] had [already] failed, then I sort of went like this [clenched fist raised in victory], you know an involuntary action, and I didn’t hear the roar from the crowd until I was half way back, like a light switch coming on. Clearly it was happening from way back here ...but I didn’t hear anything.

/R: As you were going along did you notice any change in your approach to your sport?
S: I think I worked harder. I always worked hard but we even worked harder still. We were the sort of vanguard of the professional amateur ... always worked hard, we tried to improve the technique, it really wasn't possible we didn't firstly have quite enough knowledge in [home town] and certainly the [facilities] were basic ....So you'd carry a [tool] in the boot and make your own [training facility]

When asked why some do not succeed, despite natural talent:

S: It may be because it might be contrary to their personality, so I think a lot of champions are born and they have to be developed and honed to a fine cutting edge. But I think they're born, it's in their temperament. There are absolutely masses of people born with natural talent, masses of them, only a very few of them have got the stickability to go on and try and make something of it.

R: When you say that you notice lots of difference in the same sport, what kinds of differences did you notice? What other sorts of people were there?

S: Oh terribly different sorts of people, there were rude people, there were bastards, there were decent people. Some of them that had enormous natural talent but really didn't have the stickability to do the amount of work they should do but did very well anyway. There were others that really didn't have the killer instinct. When John Landy stopped to help pick up Ron Clarke, I mean he's acclaimed for eternity for that, if you fell over in front of Herb Elliott he'd leave sets of spike marks on you.
In sum, this individual, as a sportsperson and in life more generally seems to have a high threshold for identifying an incident as stressful, however she/he also actively and continuously pushes her/his boundaries, extending her/his potential and confronting that which is not yet possible, with a very strong task orientation. She/he believes strongly in the power of ‘stickability’ and has immense faith (but not conceit) in her/his own ability to control her/his destiny by solving any problem that may present itself. She/he enjoys the challenges that she/he sets for him/herself. This individual’s intense and narrow focus on developing her/his sporting technique seemed to clearly represent mental toughness (Type I) defined by achievement striving but there was also some broader flavor of hardiness in her/his approach to life.

Figure 5.7 NEO PI-R and NEO-Sport profiles for Olympian Case Study 3.
Case Study 4

Figure 5.8 NEO PI-R and NEO-Sport profiles for Olympian Case Study 4.

Case Study 4’s profile is, unusually, mostly within one standard deviation of the mean on all facets, including vulnerability to stress. This was matched by an even-tempered, grounded presentation and a reporting of a somewhat more reserved character in the elite sporting context than life more broadly (consonant with lower e6: expression of positive emotions in the sporting context). The sporting environment was also experienced as presenting some degree of intellectual challenge (o5; ideas is elevated in the sporting context). Perhaps the most salient feature of this individual during our conversation however, was the strong sense of what is ‘right’ and what is ‘expected’ which is reflected in an elevated score on the compliance scale (a4) (though, notably, not in the sporting
domain). Interestingly, this individual was on the periphery of a significant case of ‘misbehaviour’ but reports that ‘I bailed out’ at the last minute, despite what must have been considerable group pressure. These events resulted in the other participants being heavily disciplined. Similarly, in relation to training she/he states that:

*S:* ... when we were training we never ever scrimped... If we had to do 16 [technique] ...we didn’t forget and only do 15....we would never think ‘oh I can’t be bothered doing the last two’ we would always do every one. You just don’t do that [cheat]

There was also some considerable frustration expressed with others who do crib during training. Another critical incident emerged later in the conversation was reflective of the predominance of the *compliance* trait (a4), but also illustrative of its relationship to managing stressful or adverse experiences. Specifically, this athlete was disqualified from an important event, supposedly for using an illegal technique. Despite considerable evidence that the situation was handled extremely badly by officials, and despite this sportsperson’s ability to intellectually recount a series of events which might be considered by others to exonerate him/her, this individual has:

*S:* .....spent my whole life trying to avoid the issue of being a failure by disqualification. But it was just lovely to be able to talk about it after XX years [at a reunion] when back [then] if you had something that you were ashamed of, you didn’t speak out about it or object or vocalise, you just sort of, this is something to squash.
Well you sort of couldn’t continue to be chuffed about your achievement. I’m not saying that we all go round with a big label saying I was an Olympian on it. But in your inner self you think, well maybe I achieved something that was pretty okay. But when you’ve got that cloud hanging over it, it just took the shine off it. I would never ever say to anybody, or I would avoid the subject... if it ever came up.

R: Is that still the case? Do you still feel that hesitation?

Oh yes, probably. I don’t think I was justifiably disqualified and that’s probably as much of it. If I’d done something incorrect in my [technique] and believed that I had done it incorrectly I probably would have been a bit happier about it. But that’s life.

There is an incongruity between the intellectual knowledge that events were beyond her/his control, and an emotional impact so deep that she/he does not acknowledge being an Olympian many years later despite saying that over the years it ‘all faded into nothing really’. Coping with these events, has meant quarantining them, minimizing them. Avoidance had been both an acute strategy as well as the predominant longer term strategy (‘... I think just the support and friendship of club members and ... mum and dad and everybody, it just allowed me to block it out and just keep going’) until the recent reunion where some of the grief began to be (safely) processed. Nevertheless, this individual continued to compete for several more years and went on to achieve in a range of other life domains and presents as very well adjusted, concluding that:

S: It probably comes from a charmed life really, I mean that disqualification was probably the only upset in my life. I mean I’ve been very, very fortunate, nothing much
has gone wrong in my life except that. So I guess that having not had the knocks that a lot of people have had, I just know that if I just get on with it, it will happen.

R: So in terms of personality it sounds as though the things that you value or the thing that maybe defines you is a sense of getting on with it, a sense of, I guess, forward motion, quite active forward motion. You are not somebody who tends to stand still and see what’s going to happen but rather you have at least a vague idea about where you are going.

S: Yes pretty pro active I suppose, generally speaking that would be right

R: But that seems to come through as well in that you seem to have very strong-minded ideas about rights and wrongs and even when you talked about the experience of disqualification, a very powerful sense of ‘Oh, I must have done something really bad here’

S: Oh yes, I suppose that’s part of your upbringing too

Managing stress in this case takes a somewhat different form from the preceding three cases. The first three cases seem to be associated with having a high critical threshold for perceiving or appraising an event as ‘stressful’ which in turn decreases one’s susceptibility to adverse outcomes from that event when competence is high. A somewhat different feature of resilience discussed in Chapter 1, and illuminated by the current case example, is continuing in the face of circumstances that were unexpected and were known by the individual to be stressful, and experienced by the individual as stressful. In this particular instance, this sportsperson has an acute sense of the ‘disgrace’ of the situation, and has made a conscious decision to avoid the potentially negative impact of the
associated stress, by quarantining it. Nevertheless the awareness of the adverse nature of
the events, seems to be a key differentiating feature from the previous cases. Resilience in
the context of this individual seems to be achieved through high levels of *activity* (e4),
‘keeping busy’, continually moving forward, yet it also seems to have required the
minimization or repression of not just the distressing events, but also the exceptional
achievement that surrounds it which might draw attention to the distressing event.
Despite this avoidance of a significant, self-defining element of life experience, this
individual presents as a highly well adjusted, high achieving and contributing member of
society.

In terms of the *pathways framework*, this individual highlights a tension between all three
proposed motivational forces – *hardiness, mental toughness* (Type I: Achievement
striving), and *controlled vulnerability*. While openness to experience was evident in
stories of her/his childhood, there was perhaps, as a consequence of having lived ‘a
*charmed life*’, a latent vulnerability in the face of stress. That is, the resilience associated
with hardiness had not had cause to develop. As she/he became more involved in their
sport a stronger element of mental toughness (Type I: achievement striving) emerged,
particularly marked by competitiveness, conscientiousness and a desire for control over
her preparation. Yet still, given considerable sporting talent, resilience was a feature that
did not seem to evolve fully. This individual believes that she/he has not needed to be
resilient in any other area of her/his life before or since this event. Nevertheless, many
elements of her/his life story after sport are very much marked by the taking on of
continual challenges and an openness to diverse experiences – the features usually
associated with hardiness. Perhaps this individual is best described as having a blind spot when it comes to her/his distressing sporting experience. Once again, this case study is illustrative of a dynamic, emergent personality structure and process that evolved in response to the unusual and significant demands of the elite sporting context.

Case Study 5

Figure 5.9 NEO PI-R and NEO-Sport profiles for Olympian Case Study 5.

Case Study 5 scored in the average range on vulnerability to stress. Moreover, the predominantly high anxiety and depression scores in her/his profile (Figure 5.9) (in the absence of angry hostility and modest achievement striving), mapped neatly onto this individual’s presentation on interview as captured in the following exchange:
R: If you had to identify the key characteristics that contributed to your sporting experience positively, what might they be?

S: What, personality traits? Um, my big problem ones was just I think my self esteem a lot of the time, doubting myself for a lot of years that’s why I [performed at trials] so badly, just [peaked] too early. I just thought I can’t keep [performing] this badly it’s got to turn around at some point. I’m just a hard worker, work horse, have to do the hard work, can’t rely on natural sort of talent that some people have, train really well.

Anxiety is embedded in the rate of speech and disjointed pattern of speech as well as in the misinterpretation of the valence of the question (i.e. ‘positively’) and in the focal content (i.e. self esteem). There is also some manifest evidence of it in relation to stress management in training:

S: You do sort of get a sense of achievement though, if you train to a point where you’re on your hands and knees vomiting sort of thing. You feel like you can say I’ve done everything I could do today to sort of reach a particular goal

When the contrast between this individual’s low self-esteem and Olympian status were put to him/her a response was given that minimised personal agency to a degree suggesting instead that success is a natural consequence of habitual behaviour. Moreover, somewhat more implicitly, that the function, perhaps even the purpose of these habits is
less about aiming for success and more about the successful management of psychological vulnerabilities:

*S: Yes, I don't know, I think it sort of becomes a bit of a habit as well. You're so used to doing it, to [sport], sort of a big part of your life, provides that structure sort of. In a way [on retirement] you sort of go, what am I going to do now.

However, in another context in which the questioning was less directly targeting personal control, personal agency is acknowledged, though even here it is in a reactionary sense:

*S: Not sucking up to them [selectors and coaches] or anything, doesn't help, just have to take the decision out of their hands, just do all the qualifying times and what have you so they have to pick you. / I always found that if someone said to me you've got no talent why don't you just give it away. I'd just think, right, and I'd tend to [perform] a lot better than if someone said, wow you've got all the talent in the world, I want to help you out, I'd freak out at that point

These comments are also reflective of the low Agreeableness scores, particularly in the sporting context which seemed to provide an outlet for the emotionally derived energy of this highly trait anxious individual.

Interestingly, vulnerability to stress (n6) is the only Neuroticism facet on which this case scored in the average range. Perhaps this is a case where relativities in scores is the
salient profile feature, however there is also some evidence that coping with stressors in the short term was costly in having any energy remaining to follow through in the longer term:

\[ S: \text{we had our trials only the month before, that was a horrible, horrible time. I think because in the [trials] I couldn't [perform well due to injury], so I was stressing and going to myself, you have to [continue], you have to [continue]. I knew I had to [compete]. But [coach] was going, just don't worry about it, don't [compete], they'll pick you, you've [qualified]. I don't trust the selectors at all so I kind of knew I had to [do it], that's what stressed me. They gave me two local anaesthetic injections so it would be numb. But one just didn't work and I was trying to [move] and I couldn't, I was just, can't believe this is happening. Seven years of training and I can't [perform well] in the goddamn Olympic trials. It was really embarrassing because it was the first time I ever cried in public. I hate people that cry in public. You know when you're trying not to cry. My coach came up and was going, it's sore isn't it, I just went, mehhh. I didn't care,... these people must have been staring at me going what???. Gave me another injection, I just [did it] but I came [out of the placings] so knew I had to rely on the selectors to feel sorry for me...[The journalists were saying]... What does it feel like to know you're not going and I don't know, what's it like to be the favourite and then get done. Leave me alone. It was just bizarre walking down that tunnel bit...\]

R: **Coming out of that, how did you get yourself together and get prepared for the Olympics?**
S: That was the weird thing, I was just [exhausted] after that kind of thing. Because then like they didn't announce the team until, ...[later], and I just burst into tears....then I rang my dad, mum and dad... poor things they must have been so stressed putting up with me being a psychopath for the last few months .... Well it's just so much effort went into trying to get picked for those of us that aren't super stars obviously, didn't walk into [selection]. I remember being in XXXX at the camp afterwards, didn't really have any motivation to train. Can't be bothered now.

And at the Olympics:

I did really enjoy it, but sort of going into it I kind of knew I wasn't going to do too well because I just had injuries and stuff so I was a bit stuffed ...So it was kind of weird because I just really enjoyed it because I knew I wasn't fit and where I should have been at. So I just really enjoyed the [event]. I mean I was really nervous and everything. Obviously disappointed at not being able to [perform] your best and stuff.

There was some evidence that this individual, in forging a career after sport, was able to develop insight into the extent of her/his anxiety as a sportsperson and in life more broadly, and to gain a different perspective on the events that she/he had found so overwhelming:

S: Sort of got to remember at the end of the day you're just [description of sporting event], you're not creating a cure for cancer or anything. You get so hyped up and it's
just sport. Why am I getting so upset. Before the Olympic trials and that, the number of people who are like if I don't make the team I'm going to kill myself. That's it, I can't live, I don't want to live if I don't make this team. I mean I was guilty of that too, then I sort of thought how ridiculous, like it's just sport.

R: But it feels at times... really overwhelming and encompassing like its hard to step outside of it when you're in it.

S: Too involved. I guess when you've devoted so much time to something though, it's fair that it's that important to you... You've spent 10 years training for this one moment sort of thing ../It's funny because I'm working ..with [vulnerable group of young people], ..../Makes me feel really pathetic grizzling 'about oh I didn't [perform well in competition], oh so tragic.

And in terms of recent coaching experience with young athletes:

S: They look up to people and they want their approval sort of thing. I'm going to do all this hard work because I want to impress you sort of thing. I think I was a bit like that when I was young as well, you know, look at me I'm training really hard. Some kids just have that attitude that they just want to do more work, train hard and get results.../ they had a carnival the other day and I was almost a wreck because I couldn't watch them, go, go, go, I was stressing. I thought my poor coach, now I know how he felt. Coaching is harder you know, can't do anything about it we just have to sit there and watch. ....I was just nervous, I was jumping. I was doing like drills and things, warming up. Couple of the other coaches were just laughing at me.
This case study provides evidence that it is possible to be indistinguishable from the norm in terms of vulnerability to stress, indeed to be highly susceptible to distress and even hypervigilant to chronic and acute stressors in the sporting context, and yet to persist and succeed to a high level – that is, this individual represents the controlled vulnerability pathway in our framework. It is possible that low Agreeableness is the cornerstone of motivation in this context. This sportsperson certainly found focus and energy in being 'one against the world'. In sum, it seems that elite sport, for this individual was like a lightning rod for high trait anxiety. A sporting talent and sporting career allowed its expression and transformation into training energy while at the same time, within the ranks of Olympians, perhaps contributed to the attenuation of personal achievement in some ways. Resilience based on an honest and open appraisal of events, seems to have been something that developed after leaving the elite sporting context, though it seems clearly to have been potentiated by troubling experiences in her/his sporting career. Longer term resilience is reflected in this individual’s process of coming to terms with her/his anxieties through working in a context in which others are more vulnerable, providing a somewhat confronting mirror in which to view one’s own tendencies.

**Case Study 6**

Case Study 6 is remarkable in the sense that, in over one hour of conversation, her/his Olympic success never came up. Rather the conversation focused on what seems to have been a chronic feeling of ‘not fitting in’ in the sporting context which was associated with
increasing and possibly cyclical depression throughout her/his competitive career, even thoughts of suicide. This case study cleaves further apart the salient distinction emerging from these interviews, between pre-emptive avoidance of stress, and stress-responsiveness, as two different aspects of resilience, but goes one step further in highlighting the fine line between such attributes being healthy and facilitative of sporting success, as opposed to distilling into a form of unhelpful compulsion. This tentative formulation however ought be considered against the caution that these profiles were completed retrospectively, making the issue of cause and consequence opaque. This case has nevertheless been included here as it has parallels with the well-documented features of the retirement process for some elite athletes (see Lavallee, et al., 1996; Lavallee, Grove & Gordon, 1997; Lavallee & Wylleman, 2000). Namely, the persistence that was an essential feature of their resilience (or indeed invulnerability to stress) while competing, manifests as an unhelpful compulsion in making repeated, unsuccessful comeback attempts. It is also noteworthy that a significant number of individuals in this study, did not choose to retire from sport of their own volition, rather they continued well past the point at which others felt they were no longer capable of performing at the highest levels, also suggesting perhaps a degree of compulsivity, obsessionality, or a refusal to recognise negative change. A number also reported that it was difficult to stop ‘competing’ and that in adapting to retirement, this attribute has transferred to other life domains, for example, another interviewee stated that:

‘..I’m really competitive now and it scares me sometimes, like even just driving along if someone beats you taking off from the lights and that really shits me. And just at uni I [had] to get the highest scores and all that so that’s a bit of a worry.’
For Case Study 6, elevations in anxiety, angry hostility and depression scales in the sporting domain relative to general life seem to be consonant with her/his presentation throughout our conversation. This she/he attributes to a lack of balance between life and sport. She/he felt that there was pressure to give up study to become a full-time sportsperson, so that there would be a perception by coaches that she/he was ‘giving her best’. She/he also struggled with the need to fit into a particular training regimen, despite feeling that it did not fit her/his needs, either in terms of performance or personal style. This individual felt that there was a strong tradition in her/his sport that pain and suffering were a prerequisite for success whereas she/he believed that you ‘need to be happy to succeed. If you’re not enjoying training then you won’t do well’. There is some
evidence that coaches attempted to understand and provide support but 'I am perceptive and could tell the difference between what is said and what is believed'. This individual felt that the training environment ought 'allow for my normal personality which is to be laid-back, not worried about the outcome but just to do your best'. Some respite was found in eventually identifying another elite peer and a coach who shared her/his task-focus (rather than ego-focus or focus on beating others) and told him/her 'You’re one of the hardest workers I ever met'. At this she/he felt overwhelming relief that someone appreciated her/his way of doing things and reports improved performance and enjoyment. This led to a 'see saw effect', swinging from a strong belief that she/he was not good enough, to believing her/his way was best, to the more moderate belief that 'My way is best for me'. She/he relates that 'I spoke to a friend who had had depression and realised that this had been quite normal for me at the time. I was so involved in it that I couldn’t see clearly...though I got better at detecting it and taking a few days off from training'.

The chronicity of this emotional struggle is reflected in a comment from the athlete’s parent that 'It’s a shame you weren’t able to enjoy your success'.

In a somewhat similar fashion to the previous case study, there is reasonably high vulnerability to distress in this individual although in this case it seems to be specific to the sporting context. This individual persisted with training and competition in spite of multiple events that were experienced as distressing, perhaps to the overwhelming detriment of her/his psychological wellbeing. In this sense, whether the ability to
continue 'no matter what' is a desirable quality is arguable, but in this case it probably emanates from high achievement striving and a degree of compulsivity that is apparent in elevated scores on the order (C2) scale for the sporting context relative to general life.

This case study also illuminates clearly, the difference between high achievement and being a 'fully functioning person' as defined by Rogers' (1961). It illustrates, for example, the importance of considering vulnerability to stress and/or resilience as well as vulnerability to distress (anxiety or depression) when seeking to understand the factors necessary for a success that is 'safe' and supportable. While the public perception of Olympians is not typically one associated with psychological distress, indeed nor is it broadly representative of the individuals interviewed in this study, the last two case studies in particular provide evidence that it does exist as a chronic, personality driven force for some individuals. Moreover though, this case draws to our attention the potential importance of distinguishing adaptive stress-responsiveness from blind persistence or compulsion. Both provide impetus for forward motion, for continued participation in sport in the face of adversity, and would thus meet Masten et.al.'s., (1990) definition of resilience: the dispositional 'capacity for successful adaptation despite challenging or threatening circumstances and the development of competence under pervasive and/or extreme adversity' (p.27). However, it could be argued that the latter is associated with more costs than benefits, to psychological wellbeing.

Whereas a circumscribed point of distress of the type illustrated in Case Study 4 may be adaptively dealt with by suppression, in the context of an otherwise psychologically
robust profile, and while even a more generally distressful personality style may find
counterbalancing stability in sporting adversity (as in Case 5), this case would seem to
suggest that continuing in elite sport without the protective function of low
Agreeableness or high angry hostility (a fighting spirit) in the context of high anxiety and
high depression could prove potentially harmful. This case study, however, was also
chosen because it belies the notion that more highly successful Olympians will
necessarily be less vulnerable to stress or even more resilient. This individual by some
objective measures would be considered a more successful Olympian than some others
included in this series of case studies. Once again, while there may be ‘rules’ about
achievement and healthy personality, it seems that in sport at the highest level, there are
always exceptions - making knowledge of the individual paramount to the provision of
support and/or well targeted coaching.

Case Study 7

Case Study 7 takes an even more indepth look at the process of developing resilience on
the back of average vulnerability to stress. The conversation is recounted in more detail
and with less interpretive interruptions (apart from the prompts of the interviewer), than
those above so as to give a sense of the journey undertaken by the individual. In this case,
the process of coming to make sense of her/his experience was the most salient feature of
the conversation. Underlying this journey was a sense of having no choice over pursuing
success, yet not the sense of being ‘helpless’ rather just one of following your destiny
and committing yourself to that, whatever it may be. This attitude is reflected in the
profile (below) in which it is clear that the individual's sense of her/his own competence is only average but the combination of a sense of dutifulness, achievement striving in combination with self-discipline, a very deliberative style, and self-containment (low scores on e1: warmth and e2: gregariousness) combine to produce a very committed but not outwardly 'fierce' competitor.

Figure 5.11 NEO PI-R and NEO-Sport profiles for Olympian Case Study 7.

R: What kind of personal characteristics do you think you brought to being a [sportsperson] that helped to make you successful?

S: I suppose the first thing that just jumps out at me is perseverance in that it took me, I was [mid-twenties] when I made my first Australian team.

R: That's quite late
S: I'd been around, I'd been competing at National Championships since I was [X years old] and I'd always made the final without fail. So basically I was always in the top [group] for my age, and even like up through seniors I always made the final. I was always just hanging around there. But basically in 19XX when I had a good year, nobody even knew who I was. I'd been around competing at a national level for XX years and heaps of people said, who is she/he, where did he/she come from. It's like well I've been there forever. And so many people had written me off and said, oh well she/he's never going to get any better, that's where she/he's destined to stay. But I kept going and I think if I'd never persevered I would have given up years and years ago.... And I believed in myself, and you've got to have that when everybody else is telling you that you're not going to make it, if you don't have a great belief in yourself then you're not going to survive either.

R: Do you think that's more generally something about you? Do you have that in other areas of your life?

S: Yes I've always, [parent] says even as a little kid it never occurred to me that I wouldn't win and a lot of the time I didn't, but that never mattered. And [parent] used to say to me, like when things went downhill a bit, .. I had a couple of bad years and [parent] said when you were a kid you had this unfailing belief in yourself and it never ever occurred to you that you wouldn't win. [She/he] said a lot of the time you didn't win and that was irrelevant and you never linked the two up really, it's just that that was what I was out there to do.

//R: What do you think have been the most relevant experiences for you in terms of selection?
S: I think the thing that I found most difficult is that our team is selected [early]. The team is selected but then you have ... trials and you have village entry standards and the pressure is right on. I've covered the whole lot where I've been selected and I've made it all the way through; I'm selected and I've made it to here, I'm selected and I've made it to here.... to be selected and then get dropped from the team when you're in [pre-Olympic training location] is just soul destroying. It's like you're a leper and you're not part of anything. It's horrendous, it really is horrible. I think even if they just changed the terminology and they selected the 'squad' here and the final team wasn't announced until [pre-Olympic training location] that would be mentally much easier.

R: Yes, different sorts of expectations go along with it.

S: Yes, and because too once the team is selected there's like the expectations at home and people don't understand that okay this team is picked but that doesn't mean to say you're going to make it to the end. Certainly that was something we learnt as a family along the way. I mean in [Olympic city] we had [someone] who got dropped at that last minute like out of our team, literally as we were getting on the plane to fly to [the Olympics]. So it became quite open then that this does happen, this is how it operates. And it's really hard doing XXXX trials when there's no competition and it's freezing cold. It is so much harder to do it at that point than at this point. But I mean you've got to be [performing] well and up there to go, I mean I don't disagree with having to do that because you have to. But certainly it's so much easier when like for the Olympics this time when they had the trials right before the Olympics, so then that's it. I mean it worked against me because I was injured but you know,... practically no selection theory works for me!
R: You were out [injured] for a year, how did you manage that?

S: Well see at that stage of the game that was just, it’s just what I had to do. I mean I’d got to the point where I couldn’t walk up a hill. ... So it just got to the point that I didn’t care if I never [competed] again, I just wanted to be able to live a normal life. My [body part] had got to that point. So I didn’t care about everything else. At that stage, I had the op... and I was back training by [two months later] but I’d missed the whole season. So I actually competed at the XXXX that year, I said, what are you, desperate, are you feeling sorry for me [is that why you selected me?]. ... but I knew there was no point in going to Nationals I wasn’t ready and I would be better off to just rest... So that was a really good thing and that was really the beginning of when I started to do really well... I mean I suppose for me a lot of it is that the show is not over until the fat lady sings. I thought well I’m not going to give up now, I just fought it the whole way. I went to trials and basically I hadn’t [competed]. I’d done stuff in the pool, I used to go down into the gym and I set up this harness and I used to run in the air. I was just like, well I can’t physically [train], so we got there. It was quite funny really because I was basically one of the oldest in the team and sort of been around for the longest. I walked into medical and I said, right, you just have to pander to me for three days, I’m going to be a prima donna for three days.

R: I mean when you talk about it now, its almost like you know, that you just did it and it wasn’t too much of a deal. Was it distressing at the time?

S: It was the most traumatic period of my life.... It was, I mean after 19XX I made World [championships], didn’t make Commonwealth Games, made XX in [19XX] and got dropped from the side so I had sort of a reasonably ordinary few years by an elite
standard. And [then] I was up, I was [performing] like even PBs again and I was up there [performing] really well, and then this happened and it was like my whole world came crashing down. But I just had to be there and I had to give it a go and I sort of knew well that's what the sport is all about, it's whoever is best on the day. If you're not, well you're only as good as your last race....But I said what else could I do.

R: Well you could have had a complete panic attack and break down and decide not to go.

S: Well I knew I would regret it for the rest of my life if I didn't go. Like I had to know, like I was only one place out, I just had to beat one more [person] to have made the team, and I didn't. I was in the worst state of mind I've ever been. The morning of the [competition] I was shaking, I was pacing, I remember just sitting there with [my psychologist] going, oh my god this is it. Like this is really it and I've never been like this in my life and the reason I was like that was because it so important. Like this was it, sink or swim. Wasn't like I could go home and try again next year. But I survived. I didn't make the team but, basically for me I knew trials were over by the Friday and I wasn't going to make the team. But I [competed in the other event] anyway. I sort of said, we tried to get out of selectors what's the deal. They basically said well there's going to be no exceptions for anyone. So that was fine, I thought well I'll [do it] ... I survived it and at that point I was quite happy.... I [barely made it to the end of competition] and I had a smile on my face. I cried lots and lots for the next few days...

[When asked, her parent] goes, oh [she's/he's] pretty upset but [she's/he's] okay, [she's/he's] philosophical. It was like no one believed her and I couldn't understand
how people had expected me to react. Like was I just supposed to be rocking back and
forward in the foetal position in the corner or something.

R: You wouldn't be the first athlete to be doing that.

S: That was sort of life, it was something I'd wanted to do and I didn't make it and it took
me six months to decide what I was going to do. The plan was to go to the Olympics and
retire. Then I didn't know what I wanted to do. .../So I was having a bit of an identity
crisis about who I was and what I wanted to do and where I wanted to go. So I was at a
bit of a cross roads in my life really. I got to the end of the six months and I decided that
I wanted to have another crack at it. That I couldn't make a decision to retire from a
position of not[competing]. That I had to go back and train and I might last two months
and say, nup, nup, that's okay. But I felt that I couldn't make the decision to retire from
the devastation of not making the Olympics but I needed to come back and start training
again and give it a go and I might last two months, I might last six, I might last two years.
That didn't matter but I had to make the decision to retire from that position.

R: Very brave.

S: So I decided I'd start training in the April and I didn't have a clue how long I'd
survive but I'm still there.

R: Horrible, but it actually sounds like you found out a lot of things.

S: Yes, I learnt a lot about myself.

R: What were the things that came out of it?

S: I suppose it confirmed a lot of things. I learnt that I was fiercely independent and I
sort of always knew that but I did learn that I was fiercely independent. I learnt that I
don't tell people anything. I'm one of those people...I tell people enough so that they
actually think they know a lot about me, but they actually don't know anything. So I tell people enough to sort of appease them and they think they know things about me when in fact they don't know anything. I always thought that I was quite an open communicator but I'm not at all.

**R:** But in finding that out, have you decided to live with that or have you decided to do it differently?

No that's me. It's interesting being aware of it I suppose I'm probably prepared to open up a little bit more.

In relation to the importance of life balance:

**R:** Do you think it helped you to have that job because it sounds like at that moment what it did was increase your stress levels.

**S:** Yes but I had another life to go to. My whole day has never been consumed by my sport. I have something else to think about, I have something to distract me, I have something that I love to go and do. If my [sporting] world falls into a big heap, I have another life and I just think that's so, so important. I look at so many other [sportspeople], they haven't retired because they don't know what else to do and when they do they're just in a rut. I mean I think about what I was like and I think well I had another life, what are you like when you don't have another life. I just think it must just be absolutely horrendous. Whilst my job caused me a lot of stress in that respect, I've always worked ...where they are extremely supportive... I mean I'd always try to give them as much notice as I could because I felt that was only fair, so it used to really annoy me when [National Sporting Organisation] wouldn't give me notice or they'd say you
have to be here, so I'd organise things to be somewhere and not everybody else had to be there.

**R:** How do your experiences influence whether or not you encourage kids to go down that path?

**S:** I would always encourage them to go down the same path. Like any kid to get out there and be the best that they possibly can. I would always encourage any kid but there's a lot of kids that I reckon won't make it. And I feel very bad in sort of labelling them in my own mind, saying they're not going to make it because I know people did that to me, and I did make it. But I base it all on their mental attitude.

**R:** How do you know which one to put in that basket?

The kids that aren't going to make it are the kids who they stress and worry over every little thing, and they fall in a big heap over small things. I think you're not going to survive, if you're falling in a big heap over this, you're not going to make it. You're going to end up in a big heap and surely you can't perform when the little tiny things get to you. You've got to be able to go out there and perform no matter what the weather, no matter what. There's so many circumstances, you can't find something to eat, you've had a really bad night's sleep, it's pouring with rain, it's cold, you haven't got a second pair of socks. If you can't put all that behind you and just go out and perform you're not going to survive, because they're the things that are going to happen. So you've got to be able to survive when all those things happen.

**R:** Have that kind of resilience.

**S:** Yes you've got to be really resilient. You've got to be independent too. In a lot of ways you've got to be able to do it on your own. I mean in your training and your
preparation you need all those people but when it comes to the crunch you've got to be able to do it on your own. If you have to have your coach there, or you have to have the physio do this, if you have those structures in place that you have to have before you compete then when it doesn't happen are you going to fall in a heap. Because chances are it's going to happen.

R: At some point

S: It doesn't always work the way you want it to. So you've got to know that you can survive without those dependencies, that it doesn't matter if you don't have them there. If you've got them there, yes that's great, but you've got to know if they're not there you'll be okay... I suppose that's all about the attitude that I'm a winner even if I haven't won and investing that attitude. Because if you continually think that you're a loser unless you come first then you're not going to survive. Whereas if you can realise that every time you've done better than before, you're a winner. If you can run faster, if you can run better, then that's what's important and you can survive. But there's too many other issues and unfairnesses.

There's things that you don't have control over and I think you just have to accept that. You don't have to like it, and you don't have to be in favour of it, but you have to accept that, that that's the way it's going to be and it's a really hard, horrible lesson to learn. But it's sport.

I remember sitting in the stands with dad at the Olympics and I said to him, it's just another track meet dad. ...I was sitting there just looking at it, and it was. It's just
another meet in the big, and as an athlete because you come up through the system. I mean making the Olympics is a big thing but in some ways too it’s not like you jump from here to here. Like you climb a ladder and it’s just the next thing on the list, it’s just the next thing that you do.

R: That it’s not everything, that its not the “be all and the end all”.

S: I mean it’s fantastic and it’s one of the greatest moments of my life, and I treasure it all and a lot of the time I have to sit back and say yes, I really was there, I really did do it. But when I sort of go back and look at it, I was just living day to day, like I was just going about my business living what I lived and we didn’t compete until the last day, so there was no partying, we just kept training.

Mental toughness in this individual is perhaps best represented as an ‘evenness’ of approach to life, before and after stressful events, of ‘seeing things through’. This required a degree of denial about the emotional impact of some events. However, over the longer term, a process of maturation has been an emergent property of her/his conscientiousness, or diligence, not just in training, but in seeking meaning and trying to make broader ‘sense’ of her/his experiences. That is, a primary component of longer term resilience for this, and indeed, the majority of other interviewees, has included increasingly honest self-evaluation. For most interviewees this seemed to become a more central feature of the search for success, as they are confronted with significant events such as: non-selection in spite of optimal effort; or ‘uncontrollables’ such as injury. These events provoke soul searching as the realization dawns that there are only a certain number of dimensions of their achievement that they can control – somewhat
paradoxically, this realization ‘frees them up’ and they move closer to greater openness to experience and hardiness.

For some athletes, high levels of trait anxiety preclude this kind of self-assessment until retirement, when the necessary emotional distance has been gained from the situation (as in Case 5). Even then, some incidents are experienced as so difficult or personally confronting that they remain an emotional hotspot for years to come (as in Case Study 4). In sum, freeing up the self-actualising tendency in the face of a continual, often self-imposed, drive for performance enhancement, is a challenging task indeed. It is made particularly difficult in the face of an intermittent reinforcement schedule of exceptionally high achievement which dissuades stylistic change.

Synthesis

In this study, the unique combination of personality profiling and hermeneutic interview has been brought to bear on the intriguing question of how personality enables sportsmen and women on their Olympic journey. This synthesis will draw together findings from Study 3, but will also consider these findings in the light of the two preceding studies. This synthesis then, as the penultimate reflection on findings in this thesis, will provide the platform for the final chapter which will discuss the implications of these findings for sport psychology practitioners, and more broadly, for understanding and studying human exceptionality in other domains.
Adversity and chronic stressors as integral to the Olympian experience

It is clear that the lives of the elite sportspersons in this study are littered with events that most individuals would consider to be stressors. These occur, not coincidentally, nor randomly, but are a defining feature of the road to sporting excellence. Indeed, all Olympians in Study 3, and all hockey players in Study 2, have, inherent in their life stories, descriptions of recurrent stressors including continual evaluation of performance, and pressure (often self-imposed) to do more than has been done before. In addition, they have identified a range of less obvious stressors such as difficulties in managing relationships with coaches and peers, the frustration associated with navigating the treacherous politics of selection and competition, and the exhaustion of international traveling schedules and media/public commitments. Often they have endured financial pressures associated with full-time training and had to make choices between sport and personal relationships. Yet each has chosen sport as a primary life context for a considerable number of years.

Many, but not all Olympians interviewed in Study 3, reported times of wavering commitment to, or engagement with, their sporting pursuit. This stands in stark contrast to the image of the ‘totally focussed’ sporting champion that forms part of popular culture – an image that also constitutes, in some professional quarters, an explicit goal for intervention. For most, these times of disengagement and questioning of their chosen path, have been formative in enabling them to re-commit to their goal. Each individual, by virtue of their selection for this study, has been successful in reaching the highest
levels of their sport and each has survived the experience, though some, arguably, more successfully than others, in terms of their sense of wellbeing. Notably, all Olympians interviewed in Study 3, indicated that, given the choice, and with the benefit of hindsight, they would still choose to do it over again.

**Sport and non-sport personality**

In adapting to the demands of their sporting environment, the Olympians in Study 3, as the elite sportswomen in Study 2, evidenced sporting personalities that differed significantly from their non-sporting or ‘life’ personality. This was apparent in their quantitative profiles but also in their conversations about themselves. It seems that those traits that are marshaled by an individual in facing sporting challenges, distil over time to form a sporting personality that is built upon (and recognizable from) the basic substrate of more general ‘life’ personality, but with heightened potency of particular elements (elevated or suppressed).

Interestingly, the *vulnerability to stress scale* (n6) on the NEO, seems to be a touchstone between these different ‘selves’ for many individuals - no significant group differences were found between the sporting and non-sporting scale scores in Study 2 or 3 (though it approached significance in Study 3). Rather it seems, on many individual profiles, but not all, a consistent (in)vulnerability to stress is the conductor of interactions between the two selves.
Finally, it important to note that the interview data from Study 3 adds weight to the re-test profiling data from Study 2 which suggested that both contextual selves (sporting and life personalities) undergo a process of change over time. This maturational process will be discussed further at a later point.

**Motivation and vulnerability to stress**

Another core outcome from Study 3, supporting the key finding of Study 2, is that low vulnerability to stress is an important trait in achieving success at the highest levels in sport. In both samples, low vulnerability to stress functions as the core of some kind of protective factor in the face of adversity and chronic pressures. In Study 2, different constellations of supporting traits mirrored the conceptualizations of different motivational forces in the *pathways framework* and were strongly predictive of different outcome measures: hardiness with exceptional performance under pressure; mental toughness (Type I: achievement striving) with exceptional work ethic at training; and mental toughness (Type II: adaptive vulnerability) with reaching one’s potential. In Study 3, the substantive nature of these constellations were less robust perhaps reflecting the diversity of sports represented – yet vulnerability to stress was still central.

*Vulnerability to stress* as measured by the NEO, reflects, at an item level, the *stress-responsiveness* element of resilience as it was defined in Chapter 1, and as distinct from the *stress appraisal* element. However, interestingly, it was those interviewees in Study 3 who seemed to have a high threshold for perceiving and appraising events as stressful,
that had the lowest n6 scores. These individuals presented, on interview, as literally having an 'invulnerability' to stress. In contrast, it seemed that those individuals with more average vulnerability scores, focused, in their interview responses, on 'rising to the occasion' once a stressful event had been experienced. Perhaps believing that you can always cope effectively in a crisis (low scores on n6) is necessarily indicative of the same type of denial associated with never perceiving or appraising an event as stressful. These examples point to a complexity in understanding the nuances of each individual’s sense-making processes in response to life challenges. Each style provides the individual with sufficient forward momentum to gain Olympic selection, but each may have associated costs. In the few case studies presented here, there have been examples of:

1. Individuals with such high invulnerability to stress (even involving a degree of denial) that stress-responsiveness possibly remains untested (Case 1), and potentially constitutes a point of vulnerability. This description perhaps most closely relates to mental toughness (Type II: adaptive expression of vulnerability);

2. Individuals with low vulnerability to stress scores, yet evidence of unremarkable stress appraisal processes, and stress-responsiveness underpinned by a strong sense of general competence (Case 2). Perhaps it is this 'grounded' profile that relates most closely to the construct of hardiness;

3. Individuals with only average vulnerability to stress scores who nevertheless seem to draw upon other constellations of personality traits (which differ in each case) to continue in the face of experienced stress (Case Studies 4, 5, 6, 7). These case studies seem to speak to both mental toughness and controlled vulnerability and
indeed, to the maturational struggle to develop resilience in the face of adversity and/or chronic stressors;

4. Individuals who have persisted (been resilient?) in the face of stressors to an extent that might be considered unhealthy (Case Studies 5 & 6) suggesting a substrate of somewhat obsessional or compulsive tendencies. Indeed, many sportsmen and women interviewed point to this element of their personality in both sporting and non-sporting contexts.

Thus, while the vulnerability to stress scale is closely related to the construct of resilience as defined in the pathways framework, the two require further unpicking to clarify the points of overlap and distinction. Nevertheless, it is also apparent, that in considering this one emergent stress-salient trait (resilience), the principle of equifinality is amply illustrated and, indeed further illuminated. There are perhaps four key findings in this regard:

1. Firstly, salient features of personality, literally, ‘personal strengths’ seem to be harnessed to the job of adapting to stressful life circumstances. These biological potentials seem to differ in nature for each individual, yet combine in each case to maximize forward momentum. On interview, the diversity of manifest personalities drew attention to the distillation of problem-solving energy from a range of divergent sources, for example,

   i. Both task and ego orientations were apparent;

   ii. Conscientiousness was salient in several cases, more specifically, self-discipline;
iii. Extroversion, more specifically, high generic levels of activity;

iv. Anxiety insofar as it manifests as high arousal or 'pure' energy;

and

v. (dis) Agreeableness manifest as defiance.

In each case, the resultant energy has ensured forward movement, preventing the individual from getting 'stuck' or becoming permanently disengaged at any critical point.

2. Study 3 also offers some preliminary evidence that gender, or sport type (team sports versus open skilled sports and closed skill sports), may draw upon personality in quite different ways which may require the individual to adapt in different ways, yet still requires a substrate of resilience or low vulnerability to stress. Some support for this explanation was provided by the significant univariate relationships that differentiated participants who competed in individual sports from those who competed in team sports.

3. Conversely, the rich material from interviews with 20 of these Olympians suggest that even within the same sport, the principle of equifinality applies, but it is not, it would seem, 'anything goes'. At the level of source traits there is very great diversity. At the level of emergent traits, there are still multiple pathways to success, but these converge upon the three motivational traits identified in the pathways framework: hardiness, mental toughness and controlled vulnerability.

4. Finally, the conversations with Olympians in Study 3, enriched the preliminary evidence garnered in Study 2, that there seems to be a developmental trajectory associated with the expression of these motivational traits. Being confronted by
adverse events, seemed, in these cases, to engender greater self-reflection which led to greater responsibility being taken for performance, less reliance on unconscious defenses and greater openness to experience (e.g. Case Study 7). This kind of maturational process suggests that the supraordinate traits identified in the pathways framework, may not be equally effective in achieving success once at the elite sporting level. Specifically, that this maturational process has a tendency away from controlled vulnerability and toward hardiness, which, in turn, seems to be the stress-salient trait most akin to the self-actualising tendency described in the person-centred tradition (Rogers, 1961, 1980). Perhaps hardiness then, is axial to the notion of a ‘fully functioning person’ (Rogers, 1961, 1980). Wellbeing seems to be facilitated, at least in retirement, if those individuals manifesting vulnerabilities become more self-reflective, and relinquish their sense of control, in favor of greater openness to experience, or hardiness. Given the retrospective nature of these reflections (most Olympians interviewed were retired from sport), it is unclear whether, for these individuals, this transition also facilitated sporting success. Individual perceptions however, seemed explicitly to suggest so in several cases. In this sense the tension between homeostasis and self-actualisation is played out, with optimal sporting performance perhaps being related to the individual’s full immersion in exploring what is possible.
An additional observation from interview data was that resilience, and more specifically, its constituents, optimistic stress appraisal and vigilant stress-responsiveness, can become unhelpful attributes unless harnessed to a modicum of self-reflection. Self-awareness is essential lest the individual risk either attribute evolving into blind persistence. Some individuals seem to have possessed this characteristic before beginning their career in elite sport, for others it has been more of an emergent property of their elite sporting journey. In both cases, their sporting careers have provided rich and challenging material to stoke the process.

In most instances, as individuals progressed through their career and beyond, they seemed to develop a greater understanding of their sporting and non-sporting ‘selves’, a greater degree of control over the expression of those selves and a greater degree of vigilance as to their impact on psychological wellbeing. Notably as part of this process, often on retirement, or as the fear of ‘emotionally unraveling’ lessened, a process of grieving was evoked. These individuals recounted becoming aware of various events that they had only partially admitted to consciousness, only partially processed during their sporting careers, lest they interfere with their pursuit of excellence. Such a fear is not baseless given the evidence for the link between rumination and depression – however, a balance is necessary.
On retirement, these Olympians relate that they are more able to acknowledge how distressing the events were, how non-selections seriously challenged their sense of themselves as worthy human beings, how injuries challenged their core identity as an sportsperson, how comments from coaches had cut them to the quick. They recount feeling isolation, anger, and even depression before moving on to (in most cases) a greater acceptance of what had happened and an appreciation of the context in which it had occurred. This process parallels Kubler-Ross’ (1969) stages of grieving. This framework is helpful in locating these emotions as part of a dynamic journey (such as that illustrated in Case 7) rather than an immutable outcome (Reid, 2004). Moreover, these Olympians seemed to feel that this journey had contributed in a profound way to their personal (character) development.

It is evident however, that the process of self-discovery and increasing mindfulness occurred at different rates and was actively pursued to different extents in each individual case. Distance from the furnace of the elite sporting context certainly seemed to accelerate the process for most. The relaxing of control was a gradual process for most, and a case of continual approximation of a manageable degree of obsessiveness (a weighing up of acute discomfort versus the potential for subsequent wellbeing). This process was manifest in that many Olympians did not choose to retire, but waited until they were ‘dropped’ by selectors, only to attempt several unfulfilling comebacks. Others have found the transition out of sport manageable only by transposing their competitiveness to another domain.
Many, perfectionists to the end(!), berated themselves for not doing the transition to retirement 'perfectly'. Nevertheless, for almost all, their elite sporting career had been central in evoking a journey of self (or 'selves') discovery. For almost all interviewees this turbulent journey had provided a necessary rite of passage out of elite sport and into a 'new life'. For most, the journey continues and has, ultimately, been a balm for the pain of career termination. When asked whether they would recommend a career in sport to promising juniors, all responded in the affirmative.

**Methodological issues**

Methodological points to emerge from Study 3 include further support for the NEO-Sport as an instrument worth developing. Further, the impact of triangulating interview and profiling data (moreover with a clinician as an interpretive point of reference rather than an academic) was profound. Either data source by itself would have limited conclusions to the level of 'hunches' about how individuals respond to stress, with no point of verification. Specific, multivariate interpretations of salient features of interview data, were made possible with reference to comprehensive profiles, which were themselves informed by reference to each element of the pathways framework. The drawing together of research, practice and theory development in this way, is a unique feature of this study.

In addition to the findings of cross-method, intra-study consistencies (described above), *inter*-study consistencies (and divergences) were able to be evaluated. Specifically, the combination of (i) a more diverse sample of key informants, and (ii) multiple qualitative
and quantitative data sources, provided a bias checking vantage point for the more ‘ethnographic’ observations made in Study 2. Through a process of converging evidence, Study 3 has added weight to the observation that dualistic vantage points are required to capture the essence of personality effect in elite sporting achievement. Specifically, inter-individual and intra-individual differences were profitably considered; and in both cases, consideration of both personality structure (at each level of the pathways framework) and personality process (specifically, maturation) has proven informative.

Limitations of this Study 3 include:

1. The inadequacy of the sample size for confident inferential analysis of the personality data at a more fine-grained level;

2. The retrospective nature of the personality ratings meaning that caution was necessary when interpreting the data. However, there are enough points of similarity between sportswomen in this study and in the previous study to offer some confidence that these profiles are reasonably valid;

3. The limitations of achievement measures to gross objective outcome measures such as Olympic success, and somewhat simplistic self-report measures of Olympic performance and potential.

Conclusion

In conclusion, several core elements of the pathways framework have been supported by the unique combination of profiling and interviewing of Olympians in this study,
particularly when considered in conjunction with the findings from Study 2. This cumulative process of model evaluation, was also progressed by the overwhelming lack of evidence of homogeneity of personality types found in Study 1.

Studies 2 & 3 have also contributed to theory development by further elaborating the original pathways framework, specifically, through:

1. Strengthening its developmental component to include the possibility for directional maturation of the motivational traits toward hardiness (and away from controlled vulnerabilities), in addition to the original conceptualization that life experiences might effect the strength of expression of each trait as an individual difference variable; and

2. Elaborating the difference between stress appraisal and stress-responsiveness in operationalising the construct of resilience. Both elements would seem important for further investigation.

The final chapter to this dissertation will now draw these findings back into the broader conversation on human exceptionality and in so doing, will also attempt to inform the theory-practice nexus in sport psychology.
CHAPTER 6

DISCUSSION

'Olympism is an overall philosophy of life, exalting and combining in a balanced whole the qualities of body, will and mind...Olympism sets out to create a way of life based on the joy found in effort, the educational values of good example and a respect for universal, fundamental ethical principles.'

IOC Olympic Charter (1994)

The above excerpt from the International Olympic Charter reflects the essence of Roger's (1959, 1961, 1980) notion of man's self-actualising tendency as a powerful, predominant, life force. The resonance between Olympism, exceptional sporting achievement and person-centred personality theory, is perhaps, at once the most significant, and the most surprising finding emerging from this dissertation. Sport personology, at least in recent history, has been embedded in the strongly pragmatic performance-enhancement model in sport psychology, with little explicit attention given to the broader development of the person. Further, it has exclusively drawn upon static, trait models to illuminate the contribution of personality to exceptional achievement. This discussion will reflect upon the ways in which a broader, person-centred conceptualization of personality has informed and enriched the exploration of personality when harnessed to the pathways framework. But first, to the pathways framework itself.

The pathways framework, derived from the synthesis of diverse profiling research and autobiographical commentary of elite sports performers (cf. Bryceson & Herbert, 1992; Heads and Armstrong, 2000), has been evaluated favourably in this foundation series of
three studies. Together these studies involved consideration of the personality profiles of more than 5000 elite sportsmen and women, including more than 150 Olympians - over 100 elite sportsmen and women were profiled in considerable detail using a combination of quantitative and qualitative profiling methods. In accord with the lines-of-argument synthesis methodology, the findings emerging from this triangulated series of studies will be summarized briefly here, rather than recounted in any depth - they have been discussed in some detail, and in concert, in interim syntheses, as this dissertation has progressed. This final chapter will build upon the foregoing accrual of evidence. Specifically, key supported elements of the pathways framework will be discussed in terms of their ability to (i) inform the research-practice nexus by bringing both an evidence base and a conceptual framework to guide practice, and (ii) inform, and be informed by, the broader study of human exceptionality. Finally, reflections on the limitations of the current study will be presented and future directions proffered. To orient us toward this conversation, the key findings of this series of studies will now be summarised.

In sum, all core elements of the pathways framework have garnered support from analysis of data, albeit some more explicitly, directly and extensively than others. Specifically, triangulation of data from these three studies, provide evidence to support the framework’s key constituent understandings that:

1. Heterogeneity, rather than homogeneity, more accurately defines the topography of personality amongst exceptional sporting achievers. This was found to be true across three different samples of elite sportsmen and women, using both nomothetic and
idiographic methods, and at all levels of investigation, from sporting type comparisons, to comparisons between levels of sporting achievement. The principle of equifinality seems supported;

2. Considering stress as the most salient feature of the elite sporting environment is productive when seeking to understand the role of personality in exceptional achievement. Moreover, stressors can be either positive or negative events, and both acute adversities (unexpected negative events) and chronic daily pressures;

3. Contextually responsive ‘selves’ exist within each elite sportsperson. That is, each individual has, minimally, a sporting and a non-sporting or ‘life’ personality that will be related but differentiable. Moreover, the NEO-Sport measure developed in this study holds much promise in illuminating the sporting personality in counterpoint to the more general NEO PI-R profiles. Finally, for some individuals, manifest personality seems to reflect relative difference between contextual selves (intra-individual differences) in addition to being constrained (or defined) by absolute levels of a given trait (inter-individual differences);

4. Personality exists as configural arrangements of source traits that coalesce to enhance an individual’s adaptation to his or her primary environments. Once at the elite level, there are two levels of coalescence that have been particularly informative in this study. Specifically, the emergent stress-salient traits and resultant motivational traits.

5. Resilience is a core differentiating feature of the motivational traits of hardness, mental toughness (Type I & II), and controlled vulnerability. In turn, there is more than one pathway to resilience – in some instances, defense mechanisms such as denial are implicated. Evidence from two studies suggests that resilience is a
multidimensional construct involving both stress appraisal and stress-responsiveness, and is at least partially captured by the vulnerability to stress (n6) measure on the NEO PI-R and NEO-Sport measures. Moreover, there is evidence that low vulnerability to stress, or resilience, can potentiate different aspects of success (performance under pressure, a high work ethic at training, and reaching one’s sporting potential), through combination with different constellations of supporting traits.

6. There are times when lesser engagement with sport is needed by many elite sportspeople to prevent burnout in the face of enduring stressors;

7. Psychological health (wellbeing) and psychopathology can both be found amongst elite sportsmen and women; and finally,

8. Personality is developmental in nature and characterological maturation can be quite a profound part of the elite sporting journey.

**Implications for psychological intervention with elite sportsmen and women**

The findings from the current series of studies have several implications for psychological interventions with elite sportsmen and women. First, implications for current practice will be discussed, followed by consideration of a new direction for working with elite sportsmen and women.
Current practice

Profiling for selection and talent identification

Perhaps the clearest finding with implications for psychological practice is that there is no evidence to support the use of personality profiling for selection or talent identification purposes. The debate about the use of profiling for this purpose keeps resurfacing (e.g. Karp, 2000; Koo, 2003), perhaps most recently driven by the current zeitgeist of physical talent identification programs in sport. Differences have been found between group means in several multivariate analyses of traits in this study. However, when classification is used as the final arbiter of clinical significance, the ability to identify Olympians from within these elite samples has been poor. Similarly, there has been no success in classifying exceptional competitors into their particular sporting discipline on the basis of their profile. Both results are particularly striking given the use of posterior classification methods in the current study, which maximize the possibility for correct classification in this sample and over-represent the likelihood of correct classification in a verificational sample (Huberty & Hussein, 2003; Tabachnick & Fidell, 2001). It is also noteworthy that in the multi-group discriminant functions analyses in Study 1, there was often more than one significantly discriminating function identified, suggesting more than one pathway to success.

Process measures of sporting outcome (rather than absolute measures such as Olympic selection) have been more productive in the process of explicating the nature of the
relationship between personality and achievement. Specifically, expert coach classification of an individual’s ability to (i) commit themselves to an arduous training program, (ii) perform under great competition pressure, and (iii) reach their potential, have been found to be reliably predicted on the basis of different constellations of traits, centred, in each case, around the vulnerability to stress index on the NEO PI-R and NEO-sport. Posterior classifications into these achievement groups were accurate in more than 90% of cases for the sample of elite hockey players in Study 2. However, these particular constellations of traits were not the most salient constellations when subsequently considered in an unrelated (verificational) sample of Olympians in Study 3. While the vulnerability to stress scale was common to predicting successful outcomes in both cases, it was supported by quite different traits. Moreover, in Studies 2 & 3, several case studies have been presented, of Olympians who do not have low scores on this trait, suggesting that it is very possible to make it to the highest echelons of the sporting endeavour without this characteristic.

In sum, there is more evidence to support the use of profiling for exploring the myriad constellations of personal resources available to each individual, than there is for using profiling to select individuals who are likely to be successful in elite sport.

*Mental skills training*

Given the ubiquitous use of a mental skills training approach in sport psychology, the implications of the pathways framework for this form of intervention would seem
important. Specifically, given the finding of heterogeneity of personality amongst Olympians, it would seem that, minimally, Carlstedt’s (2004b) position seems to be supported. He suggests that practitioners should seek to understand an individual’s disposition to inform the selection of relevant, personality-consonant, forms of learning. However there are broader implications of these findings, particularly for the construct of mental toughness, the vanguard of modern mental skills approaches (e.g. Gordon, 2004, 2005).

In the existing research literature, with the exception of Jones et al., (2002), mental toughness has been considered almost exclusively from the vantage point of being a set of skills, with, generally, somewhat tardy and perfunctory lip-service paid to dispositional contributions. Most studies of mental toughness seem to emanate from the primary reference work by Loehr (1986) who identifies seven ‘mental skills’ associated with mental toughness: self-confidence, negative energy control, attention control, visualisation and imagery control, motivation, positive energy and attitude control. He also developed the most widely used measure of mental toughness, the Psychological Performance Inventory, to measure these skill sets. However, there is evidence from the current series of studies that mental toughness can be fruitfully considered, primarily, from a dispositional standpoint. Moreover, that, rather than the multidimensional but singular construct proposed in the literature, there is evidence to support the existence of different types of mental toughness – at least one that is underpinned by achievement striving (Type I) and a quite differentiable one defined by the adaptive expression of psychological vulnerabilities such as anxiety (Type II). There is also accruing evidence
from this series of studies, that mental toughness may not be the only, *nor the most effective*, dispositional pathway to sporting success. Hardiness has been proposed as a potentially preferable alternative in terms of psychological wellbeing (based on the conceptual link with Rogers' notion of self-actualisation), and also, importantly, in terms of performing well under the pressure of competition (as in Study 2).

On a closer inspection of the existing mental skills literature on mental toughness, it seems that hardiness has been subsumed in many definitions of mental toughness (Gordon 2004; Gordon, 2005; Gordon, Terry & Tan, 2004; Jones et.al, 2002) adding further weight to its relevance in the sporting context, but muddying the waters of conceptual investigation. Gordon (2004) describes mental toughness as including resilience, self-belief, optimism, handling pressure and motivation as well as focus and sport intelligence. As discussed in the introduction to this thesis and ratified by the data gathered in Studies 2 & 3, several of these constructs differentially relate to hardiness and mental toughness. The additional strengths of hardiness over mental toughness are (i) openness to, and full engagement with, experience, and (ii) lack of dependence on defense mechanisms such as denial, to manage potentially stressful or threatening situations. Mental toughness as defined in this study, while providing a greater singularity of purpose, creates potential vulnerabilities through the cognitive (and often behavioural) avoidance of difficult situations (e.g. through denial), and the consequent lack of opportunity to develop stress-responsiveness. Interestingly, one study of 115 international rugby league players provided some evidence for hardiness being a more relevant construct for success when considered in the same study as mental toughness. Golby,

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1 Thanks to Sandy Gordon for providing copies of these papers and presentations.
Sheard & Lavallee (2003) found that hardiness was more differentiating of relative sporting success between teams than were scales of skill-based mental toughness – only 2 of Loehr’s (1986) seven scales showed significant differences².

Mental skills training then, may benefit from the further operationalisation of the different types of mental toughness undertaken in the current study, and the conceptual differentiation from hardiness. Each trait seems to have benefits but also possibly different limitations with regard to promoting both psychological wellbeing and sporting success. As pointed out by Gordon (2005), such conceptual refinement and theoretical development would assist in the process of identifying what to teach talented sporting individuals, and how to teach it. Understanding the dispositional and developmental (maturational) contribution to each would seem to be even more informative in terms of matching interventions to individual need and ‘readiness’.

The Test of Attentional and Interpersonal Style

Perhaps the most serendipitous finding from this study, was of converging evidence that the TAIS, widely used for counseling purposes in sport, should not be utilized in the sporting context in light of its poor psychometric properties with this population. This finding was a timely reminder that careful evaluation of measures is essential to evaluate contextual suitability.

² This study was excluded from the earlier literature review as a comprehensive personality profiling measure was not used, however, it is informative now that a theoretical framework has been established which implicates both mental toughness and hardiness.
New possibilities:

A person-centred model for working with elite sportspeople

Finally, and perhaps most importantly, the utility of taking a person-centred approach when working with elite sportspeople seems clear, given the conceptual convergence between this model and the pathways framework. The person-centred model of personality, in its strong process-orientation, has afforded considerable insights during this investigative process in terms of:

(i) providing a conceptual understanding of the plurality of normal personality;

(ii) facilitating the translation of hardiness, as defined in the pathways framework, into the broader conceptualisation of Rogers’ self-actualisation (Mearns & Thorne (2000) speak of particular configurations as ‘vehicles’ for the self-actualising tendency (p.114));

(iii) illuminating the potential for stressful life circumstances to attenuate or divert the natural unfolding (maturation) of the self, and insodoing, making clear the difference between exceptional achievement and self-actualisation;

(iv) additionally, recognizing that the tendency toward growth and the tendency toward homeostasis are important and complementary features of successfully responding to stressful life circumstances; and

(v) identifying the potential for person-centred approaches to therapy to facilitate the ‘freeing up’ of the individual such that both achievement, and connection with a self-sustaining process of self-actualisation, are possible concurrently.
Notably, the adoption of a person-centred framework would mark a return to Coubertin’s Olympism which centred upon the development of the whole person rather than performance enhancement for its own sake. Two aspects of the person-centred approach that are of particular relevance to elite sport, will now be discussed.

**Contextual selves**

Strong evidence has been garnered from Studies 2 & 3 that most elite sportsmen and women have a sporting personality that differs from their life personality. Whilst this seems to be primarily an adaptive response to the different demands of each environment, there are many clinical moments when it seems apparent that an individual sporting client is struggling to reconcile their ‘off-field’ self with the self required to be a successful competitor. A salient example involves the expression of emotion. Some individuals are quite aggressive or competitive on the field of play (or, conversely, wish to be so) but are not so in everyday life (or wish they were not). As we saw in the second case study in Study 3, this creates considerable personal conflict for some individuals. Another example relates to the sportsperson’s frustration with their own varying levels of motivation and commitment – it is not uncommon to hear a sportsperson (or indeed their coach) berate themselves for not being more committed or for having times when they feel they have been distracted from their task. Modern person-centred theorists emphasise the importance of both growth, but also recovery from times of stress, as complementary aspects of the long term successful ‘unfolding’ of the fully functioning person’ (Barrett-
Lennard, 2005). Mearns & Thorne (2000) talk about the ‘not-for-growth’ configurations of self that are ‘sometimes of crucial importance in helping to stabilise and define his existence, not to mention protecting him from other dangers’ (p.116). They suggest that therapy is an opportunity for reviewing all aspects of the self, to accept and embrace them and appreciate their function, whilst at the same time ensuring that the overall orientation of the individual is toward personal growth. In terms of the pathways framework, this view emphasises that there may be times when the singularity of focus afforded by mental toughness (even when supported by denial) may be the most productive way for an individual to meet the time-pressured demands of training in the stressful lead-up to a big competition, whilst time between major competitions may be better facilitated by the more open and engaged stance associated with hardiness. Each motivational trait, applied in the appropriate context, may maximise performance. Ideally, there would be within-context stability of expression of these emergent trait configurations, but between-context responsiveness.

Points of transition in sport are often times when these intra-personal conflicts become most manifest. The transition from junior to elite sport, form slumps, injury, and ultimately, retirement are all times when self-doubts and uncertainties percolate (Lavallee & Wylleman, 2000). These are times when there is great uncertainty about one’s future and plenty of time for reflection – a challenging combination. Transitions are also times of great opportunity for growth. Barrett-Lennard (2005) suggests that ‘We live in each context of our lives both equipped and variably constrained by the self-patterns we bring to these contexts’ (p.13, italics added). The person-centred framework can provide a
model that emphasises these moments as rites of passage, as offering important opportunities for personal growth. Facilitating the unfolding of the self at times of critical change may prevent the experience of being ‘stuck’. Mearns (1994) has suggested that bringing different selves from peripheral to central awareness, may result in changes to the relative strength of expression of the selves, and the degree of comfort one feels with those element of self.

Barrett-Lennard (2005) highlights that changes in relation between contextual selves for an individual can be as helpful as changes in relation with another person with whom we are in conflict. He suggests that ‘a key axis and potential of therapy is to open and free up dialogue within the manifold self’ (p.11), to be accepting of the many different elements of ourselves and acknowledge that they can each be adaptive or maladaptive depending on context and depending on one’s free development and maturation. Mearns (1994, p.12) also suggests that in therapeutic contact, we ought ‘be attentive to the voices of all the different aspects of the client, endeavouring to extend the therapeutic conditions to all these aspects’, that we should work with the whole person. Further, that ‘It is useful for the counsellor to remember that all aspects of the client’s personality will have been important in survival’ (p.15) and therefore, ‘It is absolutely critical that the counsellor values each of these aspects of the client’s personality, listens to each of them carefully, and is congruent in her relationship with them’ (1994, p.12). He or she should not align with one against the other.
**Self-actualisation**

The person-centred notion of self-actualisation resonates strongly with the *pathways framework*. Firstly, there are theoretical substrates connecting the notion of a self-actualising tendency and the construct of hardiness. Secondly, understanding self-actualisation as a *process* (a stance) rather than an endpoint, provides a dynamic model of change to facilitate courageous growth in sportspeople who feel bound by their training programs, and who are fearful of the consequences of change. Re-interpreting ‘letting go’ as ‘being freed up’ rather than ‘losing control’, would seem to be a central element of this process. The evidence from Study 2, that hardiness is related to exceptional performance under pressure, rather than ‘just’ psychological wellbeing, would be particularly persuasive to the committed sportsperson. To this end, research that might further explicate the relationship between hardiness, sporting achievement and psychological wellbeing would be beneficial.

Providing an opportunity for an individual to re-orient themselves toward self-actualisation when diverted from this stance or ‘stuck’, is at the heart of the person-centred approach to therapy (Barrett-Lennard, 2003, 2005; Mearns, 1994). I have found in my own practice that this often defuses the ‘battleground’ so commonly experienced between athlete and coach, in favour of a self-driven tendency toward growth and exploration of potential. This fundamental re-orientation has proven productive in freeing up self-determination in individuals who, though highly successful in sporting terms, were not, it seemed, reaching their sporting or human potential. Rather, in maintaining an
oppositional stance with their coach, or even in buttressing their own resolve and determination to succeed, they were becoming increasingly rigid in their behaviour and well defended against the world, in some instances resulting in burnout and disengagement from sport.

Rogers (1957) outlines several conditions for therapeutic change, which facilitate the freeing up of the individual’s innate life tendency toward growth and the reaching of their potential: genuineness (or congruence) on the part of the therapist in trying to attend to the individual’s experiences; unconditional positive regard or lack of judgement toward the individual’s experiences; and empathic understanding of the client’s internal frame of reference, their way of making meaning of the world (see Bozarth & Brodley, 1991, for a summary of therapy relating to self-actualisation). These conditions would seem to be very relevant in the sporting context, which is by its very nature, defined by constant evaluation (e.g. fitness, skill development, tactical awareness, etc) and ‘judgement’ (i.e. selection or non-selection). Providing a safe and accepting space during therapeutic contact can provide brief respite from a challenging, enervating existence. However, equally importantly, an opportunity, free of evaluation, to discuss concerns and explore the individual’s reactions to critical events may assist them in maintaining an honest and open stance in the face of constant evaluation and demands for improvement, thereby facilitating sporting performance and personal growth.
Individual profiling and the pathways framework

Finally, the person-centred approach offers great potential for informing the utilisation of the pathways framework as a guide for comprehensive profiling of exceptional sportspeople. Rather than using profiling for the purpose of selection or talent identification, profiling in this context would be for the purpose of informing personal development. In this approach, testing with a standardised personality measure would merely constitute the starting point of individual profiling, rather than the totality of profiling. The entire process, might fruitfully involve 5 stages:

1. The original personality test would illuminate the extant personality structure - identifying the salient features (and constraints) of one’s base personality. Comparison with published norms or with the profiles of other team members might prove informative for the sportsperson and their coach;

2. Overlaying a comparable assessment of one’s sporting personality would add another dimension to understanding the strengths and potentialities of any given individual. Intra-individual differences between the two profiles might inform us as to the salient features of adaptation for that person in surviving the elite sporting environment, and, certainly, their perception of themselves in each context. It might also tell us, from which platform the individual typically responds when engaged with off-field sporting commitments such as team meetings, coaching meetings etc (i.e. their sporting personality or their life personality).

3. Once the two profiles are compared, a third component of the framework could be assessed through interview and observations from coaches, specifically, salient points
of engagement of that individual with their sporting experience. The events that seem to have been experienced as most stressful are of particular interest, as well as their reactions to those events. When triangulated with the sporting and non-sporting personality profiles, this historical data can identify: the relative strengths of emergent stress-salient traits and motivational forces. Mapping outcomes of these events is also important – the relative degree of engagement and disengagement from sport, as well as other indices of psychological wellbeing, inform our understanding of an individual’s tolerance for particular kinds of stressors and the ways in which they have achieved recovery.

4. Assessing the individual’s perception of salient personality changes over time (through interview) would add further richness to this profile. Coaches’ perceptions of such changes would also be informative. Engagement of the individual sportsperson and coach as collaborators in this profiling exercise, begins the process of inducting them into an appreciation of the dynamic nature of personality expression and maturation.

5. Finally, this 3-dimensional, dynamic profile can provide a richly interwoven map from which to interpret, with the individual, the strength and nature of their orientation toward self-actualisation, their manifest and latent potential for self-determination.

Such a multi-level profile, illuminating interweaving forces, provides a dynamic heuristic from which the clinician and client(s) can better appreciate cyclical patterns as well as indications of change, complementary self-aspects and the myriad ways in which they
have influenced their journey to exceptional achievement. Such profiling has proven a powerful tool in my own clinical work.

In sum, the person-centred approach to psychological work, guided particularly by the notions of self-actualisation and contextual selves, would seem to offer deeper opportunities for self-reflection and dispositional growth for elite sportspeople. Given that sport is a chronically stressful environment, such interventions might be expected to result in considerable resilience through self-awareness and self-appreciation. It has also been my experience that this facilitates a reconnection with greater enjoyment of sport, as well as continued success. The person-centred framework also, however, has the potential to enrich work with coaches and other support staff. It provides an opportunity for coaches to understand the individual needs of their players in a dynamic, holistic way. Certainly this framework, which emphasises personal agency, individual differences and also the innate tendency toward growth, has proven productive in working with the coaching staff of the Australian Women’s Hockey Team. We will now turn our attention to the implications of this study for the broader study of human exceptionality.

The pathways framework and human exceptionality

Given the support for the pathways framework in this series of studies, attempting a reciprocal conceptual reconciliation process as the final stage of evaluation, seemed timely. Three literatures have been considered: giftedness (and talent), expertise, and genius. While these areas are conceptually related, they are associated with quite
independent research programs. There were several ways in which this literature resonated with the philosophical underpinning the *pathways framework*: firstly in identifying adversity as a necessary part of the journey to great achievement; secondly, in emphasizing character *development* as a key feature of exceptionality (perhaps reflecting the child-focus in the giftedness literature and the ‘nurture’ models of achievement pervasive in educational practice); and finally, by focusing on individual differences as influencing achievement outcomes. There are also methodological synchronies including an emphasis on ecological validity through restriction of samples; a call for judicious combinations of mixed methods and longitudinal design (see for a range of opinions, Sternberg & Davidson, 2005; also Csikszentmihalyi, Rathunde & Whalen, 1993; Gardner, 1993). These philosophical and methodological synchronies across domains, provide further support for the methodological choices made in the current study. However, there are several critical points of departure that might require more diligent attempts at reconciliation through further data gathering. Perhaps this process will inform both sport personology as well the study of human exceptionality more broadly. The points of departure between these sub-disciplines of human exceptionality and sport personology will now be discussed.

*Individual differences in personality and human exceptionality*

As in the sporting literature there is considerable evidence of comprehensive personality profiling in the early giftedness literature with a lull in more recent times. The investigative models were invariably predicated upon the same conceptualization of
personality as being relevant to inter-individual differences between exceptional achievers and others. The variability in findings are reminiscent of the state-of-play in sport personology as reviewed in Chapter 1 and have similarly resulted in a range of theoretical streams of thought ranging from: personality being a positive and enabling force in the development of natural gifts into talented achievement (Gagne, 1993); to personality being just one of a number of manifestations of being 'out-of-sync' developmentally and thus a source of vulnerability to be vigilantly managed (Gross, 1993; Plucker & Levy, 2001; Winner, 1996); to a position which considers psychopathology to be an inherent, characterological feature of genius (Gardner, 1993).

Perhaps the most important qualitative difference from the pathways framework as it has been enunciated to date, is that, in most cases, adversity seems to be considered, primarily, as a self-generated experience resulting from inherently asynchronous development, with theoreticians differing as to whether that asynchrony results in greater maturity or immaturity (Sternberg & Davidson, 2005). In either case, gifted children are seen to be very active agents in the creation of a chronically stressful life experience. Whilst self-determination and individual differences in appraisal processes are inherent features of the pathways framework, the emphasis in this thesis has been on the application of personality to aspects of the environment that might reasonably be considered stressors by many individuals. This difference in emphasis might reflect the closer integration between intellectual gifts and cognitive appraisal processes (compared to physical gifts and cognitive appraisal processes), however, in future studies, both contributions to individual differences in experience would be worthy of investigation.
Interestingly, there seemed to be an absence of literature in other domains that has considered the possibility that exceptional achievement is related to intra-individual differences, that is, the successful adaptation of the individual to the particular domain in which their talent is expressed. The notion of contextual selves, as reflecting a healthy adaptation process, might provide impetus for fruitful investigation. Perhaps the development of other contextually responsive version of the NEO PI-R would also facilitate this process.

Finally, where it has been considered at all, the notion of self-actualisation has been considered in other domains of human exceptionality from a Maslowian perspective, that is, as an ultimate state of being, an endpoint to be pursued and to be reached — often linked to the moment when natural gifts are translated into exceptional achievements (e.g. Lewis, Karmes & Knight, 1995). In recognizing high achievement as but one part of an individual’s life story, the person-centred definition of self-actualisation as a ‘tendency’, or general stance toward life, would seem to offer as much potential in facilitating growth amongst those with intellectual gifts, as in considering sporting achievement.

*Psychopathology*

With regard to the notion that psychopathology is an inherent, characterological, often intractable part of genius (Gardner, 1993), the evidence from the current study is informative. Given the inclusion of controlled vulnerability and mental toughness (Type
II: adaptive vulnerability) in the pathways framework, it is clear that this model acknowledges the potential for maladaptive psychological characteristics to be salient features of the psyche of sporting champions. This has also been my professional observation. There were even in this study, instances of extreme psychological distress reported by a small number of interviewees including, in some cases, suicidal ideation. However, while extreme personality profiles were apparent, no profiles met the criteria for DSM personality disorders. It is also important to note that person-centred theorists vary on the extent to which they even hypothesise a continuum between healthy personality and personality disorders in this regard – most do not see ‘plural selves’ for example, as in any way related to the multiple selves associated with Dissociative Identity Disorder (see Rowan & Cooper, 1999 for a range of views on this issue). Rather, person-centred theorists tend to consider psychological distress (or mal-adaptation) to be the results of (i) the self-actualising tendency being suppressed by an unsupportive (stressful) environment, (ii) by associated discrepancies between one’s ideal self and perceived self; or, (iii) a lack of acknowledgement of (or conflict between) one’s different contextual selves. Given that the development of gifts into high achievement generally requires working at the edges of one’s abilities and capacities, over a protracted period (Gardner, 1993), that is, working in a chronically stressful environment, such a framework offers (i) a more optimistic interpretation of an individual’s extreme reactions, and of (ii) the potential for change or amelioration of symptoms. This framework may prove to be equally informative when working with the psychological sequelae of the pursuit of exceptionality in other domains.
Resilience

Transactional models of stress, popularised by Lazarus & Folkman (1984), seem to be ubiquitous across all domains (Sowa, McIntyre, May & Bland, 1994; also see Sternberg and Davidson, 2005, for a range of manifestations), and have been developed by a range of theorists in the sporting domain (for recent examples, see Richards, 2004; and Uphill & Jones, 2004). These models resonate with the operationalisation of resilience in the current study as involving both stress appraisal and stress-responsiveness, translating to primary appraisal of stress and secondary appraisal in the transactional models. However, in the these models, coping is seen as fundamentally deliberate and effortful in nature – that is, coping processes are generally considered primarily skill-based or learned responses (Richards, 2004). Resilience, as proposed in the pathways framework, is considered a more dispositional, and therefore more automatic, version of this ability to rebound from experiences that others may have found impairing. It is perhaps more closely aligned with the concept of coping styles (Richards, 2004). Unfortunately coping styles have lost their place in the literature for reasons similar to the demise of sport personology - on the grounds of palpable changes in behaviour across contexts. Given the ability of person-centred approaches to explain such contextual differences in behaviour (Barrett-Lennard, 2005; Mearns & Thorne, 2000), the resistance to both concepts may wane. Interestingly, the summary chapter in a recent edited volume on coping and emotion in sport pointed to the need to research antecedents to emotion and coping to better understand individual responses to stress – perhaps pointing at least in part to the importance of dispositional features in determining predictable individual reactions.
(Jones, Lavallee & Thatcher, 2004). Similarly, a recent edited book on giftedness pointed to the centrality of responding to individual personalities and working with individual strengths to maximise coping amongst vulnerable gifted children (Sternberg & Davidson, 2005). It seems that, in all domains of human exceptionality, there is an increasing momentum toward an appreciation that dispositional factors influence the lifelong process of adaptation to one’s exceptional talents and exceptional circumstances as argued for some time by behaviour-geneticists (Lykken et al., 1992; Plomin et al., 1997).

**Interim conclusion**

Taken together, this preliminary attempt to reconcile the *pathways framework* with salient elements of the broader literature on human exceptionality, identified more points of convergence than divergence. However, it also seems that the insights gleaned from the study of exceptional sportspeople with regard to the existence of contextual selves and the salience of intra-individual differences in personality manifestation may well enrich existing understandings in other domains and perhaps offer opportunities for reconciliation of apparently variable findings (as was the case in the review of literature in this study). In this way it is hoped that these contributions from the *pathways framework*, may translate into productive lines of future research.

It is also pleasing that the *pathways framework* seems to *integrate* several elements of the broader literature in a unique way that offers the potential for more multivariate consideration of these factors across domains. In turn, the application of this framework
to other domains will test the robustness of the model as a potentially universal model of personality in exceptional achievement. As discussed, there may be features of exceptionality in other domains that makes it more or less applicable. Exploring these research possibilities affords rich opportunity for future theoretical development.

Methodological issues arising from this series of studies

Having considered fruitful conceptual synergies between domains of study of human exceptionality, we will now turn to a consideration of primary methodological issues emanating from the current studies. Careful methodological decision making has been a central feature of this series of studies in an attempt to clarify some of the disparate findings in the existing literature. Those methodological features that have proven particularly informative are discussed below along with associated limitations.

Design features

Creating a study design from a research taxonomy

The preliminary step taken in this study to synthesise a diverse literature not just conceptually but in terms of developing a research taxonomy, provided a strong base from which to choose an informed path along which to progress. Interestingly, the taxonomy developed in the current study seems equally applicable to exploring exceptionality in non-sporting domains.
**Converging evidence from triangulation of mixed methods**

Planned triangulation of mixed methods, including triangulation of data sources, participant groups and analytical methods, has provided a robust means for advancing and considering a tree of hypotheses in an integrated way. Participant observation provided richly informative data that was strengthened through verification of findings using a less involved researcher stance, longitudinal and cross-sectional designs produced complementary results, as did nomothetic and idiographic analyses. Prospective and retrospective designs illuminated different questions and possibilities which, through consideration and reconciliation, further enriched the dataset. Each method has its weaknesses or limitations and these were helpfully counterbalanced by considering converging (and diverging) evidence from other methodologies. It seems in published literature relating to the study of human exceptionality in non-sporting domains, that there is an increasing recognition of the importance of planned triangulation of mixed methodologies in advancing multiple hypotheses, yet little evidence of it within one study or across a related series of studies. Perhaps the current thesis will add weight both to the utility, also the possibility of such an approach.

**Ecological validity, longitudinal design and careful participant matching**

There has been a particular call for longitudinal designs in the study of sporting excellence that parallels the push in the broader study of expertise and giftedness
(Sternberg & Davidson, 2005). The current series of studies adds weight to this call. Insights gleaned from Studies 1 & 2 were further strengthened by combining prospective profiling with longitudinal follow-up. Consideration of long term achievement outcomes in all three studies with carefully matched comparison groups is another unique feature of this research which strengthens the veracity of the findings. The restriction of the sample to elite sportsmen and women has negated the somewhat ubiquitous qualification that these results may not apply to the highest achievers – quite the reverse. We can say with confidence, that the pathways framework has been found to be relevant to understanding exceptional sporting achievements in three large samples of elite sportsmen and women representing a diverse range of disciplines.

**Reflective and responsive research**

It was originally intended that a semi-structured focus group format might be the most informative way of eliciting information about the relationship between personality and exceptional sporting achievement. Interview guides were prepared to help standardize interviews and minimize bias. However, in responding to the limitations of this method in the first interview, a more hermeneutic, phenomenological approach to interviewing was adopted. It certainly seemed, in this case, that the latter approach afforded deeper opportunities for consideration of each individual’s experiences. Matching interview type with the needs of the study was greatly facilitated by my participant observer status, access to profiling data on participants as a point of response comparison, and familiarity with the native language of the participants. This outcome points to the importance of
methodological responsiveness; a reflective researcher stance and triangulation of methods, in maximising data quality and interpretive power.

**Measures and measurement**

*The NEO PI-R*

As already stated, the TAIS did not stand up to psychometric scrutiny. The NEO PI-R was more productive, and as psychometrically sound when applied to this group of individuals as in the norm groups reported in the manual. Even so it was less sound than one would like according to the psychometric criteria of Kline (2001) and Ware & Gandek (1998). Results from both the TAIS and the NEO PI-R highlighted the importance of checking the psychometric properties of any instrument used when applied to an exceptional group of individuals. However, this series of studies would suggest that the NEO PI-R can be productively used in the context of studying human exceptionality.

*NEO-Sport*

Development of comparable sport and non-sport profiling instruments, capturing different ‘contextual selves’ allowed for (i) fuller understanding of the individual, and (ii) a different vantage point from which to appreciate the heterogeneity of personality manifestation in groups. In sum, this approach facilitated and enriched the comparison of
inter-individual differences as well as intra-individual differences and may be a productive approach for use in other domains of human exceptionality.

The inadequate psychometric properties of the Openness scales on the NEO-Sport, was however, a limitation of the current study and resulted in their exclusion from some analyses. Further development of these scales would seem to be warranted, particularly given the conceptual importance of the Openness construct to differentiating hardiness from mental toughness. Defining the nexus between these two motivational traits is pivotal in further delineating the pathways framework, particularly given the newly proposed maturational component of the model, where greater maturation is supposedly evinced by a move from a predominantly hardy style from a singular stance of mental toughness.

Similarly, attempts to measure the emergent stress-salient traits of resilience, optimism, challenge, commitment and control using items drawn from the NEO (and from the TAIS in Study 1), were variable, but generally poor. Future research will need to explore different possibilities for measuring these constructs to support the data gathered in this regard from interviews.

Achievement

Measuring achievement was a time-consuming but critical endeavour in the current series of studies to avert criticisms leveled at previous studies which have relied upon single,
often gross measurement of achievement outcomes. In each study in this series, multiple complementary measures of outcome were adopted. In the prospective studies, these included (i) absolute (static) measures such as whether an individual achieved Olympic selection; in addition to (ii) more encompassing, dynamic, measures such as whether an individual was considered to have reached their potential, whether they performed well under extreme competition pressure and whether they performed at their best during an Olympic campaign. Self-reports were also fruitfully compared with expert coaching reports. On the whole, the arguably, more subjective measures, proved to be most related to personality. But all measures proved illuminating when considered in concert – absences of relationship were often as informative as identified relationships.

The review of literature relating to giftedness, expertise and genius, revealed a paucity of multi-factorial measurement of achievement with the exception of historiometric approaches to the study of genius. Measuring achievement from multiple perspectives would seem to be beneficial in capturing the complexity of this phenomenon. The most differentiating measures in the current study when considered in the context of longitudinal data, were work ethic at training, performance under pressure and the reaching of one’s potential.

Analysis of data

Multivariate analysis (rather than univariate or bivariate) proved to be important in this series of studies. On several occasions, significant multivariate relationships were
apparent in the absence of univariate relationships. Consideration of classification as an extension of prediction (using discriminant functions analysis) was also central to informing the ethical use of profiling in practice. Specifically, the sensitivity and specificity of significant personality constellations (discriminant functions) in accurately identifying exceptional achievers, seems to be the most relevant clinical indicator of profiling veracity in the context of talent identification or counseling. While group differences existed in several analyses in this study, only one set of analyses exceeded 80% reliability, indicated by the correct classification of more than 90% of the sample. Even in this case, replication of these findings in a subsequent verificational sample of Olympians, revealed some points of similarity (low vulnerability to stress scores) but also some points of difference, pointing again to the advantage of triangulation.

**Future directions**

The combination of these studies has not answered all of the questions about the role of personality in elite sport, much less about high achievement more generally, but this was beyond expectations and indeed several possibilities for future research have already been outlined. What these findings have shown is that methodological richness and diversity, in combination with a theoretical framework, can greatly enrich the area of study through advancing a tree of hypotheses concurrently. A dynamic process of asking and answering questions, inductively and deductively, seems to have been far less constraining than previous attempts to embark on a research journey with hypotheses already set, yet such a process, paradoxically, also required greater discipline. Discipline
was required in reading the data carefully and openly, iteratively interpreting results at every stage, evaluating the complementarity of research methodologies, and, additionally, addressing traditional conceptualization about what is most ‘valid’.

While several potential foci for future research have been outlined as this discussion progressed, perhaps the most productive focus in the immediate sense would be the exploration of different sources of salience in personality presentation. These might emanate from inter-individual differences as well as intra-individual differences. In this study, notable differences from the general population have proven informative, as have differences from lesser successful sporting peers. In the case of intra-individual differences, diversity in scale scatter has been highlighted as a potential point of future interest as well as further exploration of the nature of differences between sporting and non-sporting ‘selves’. Further, the salience of these two information sources (inter- and intra-individual differences) for an individual’s manifest personality, may also be personality driven. It is plausible for example, that responses on self-reported personality measures, may be more oriented by intra-individual (self) comparisons when profiling individuals with a dispositional task orientation, whilst individuals with an ego orientation, might be more vigilant to perceived differences between themselves and others. Interesting possibilities for future exploration.

Finally, in addition to the issues highlighted in the foregoing discussion, small sample sizes constrained some analyses in this thesis. Further replication with larger samples would be desirable and perhaps with more diverse representation of sporting disciplines
for some analyses. Nevertheless, in this instance, this organic process has led to the development of a heuristic framework that seems to hold promise for the investigation of personality in elite sport, and perhaps, beyond this, to the broader study of exceptionality. It has also drawn person-centred accounts of personality into a conversation that has been previously dominated by trait models. Now that a framework has been proposed that has the potential to guide practice, evaluation of practice using that framework would seem to be indicated as a routine part of accountability to clients, and of the scientist-practitioner model.

**Conclusion**

In summing up, by definition and by dint of the extensive engagement of the sportsperson with their sporting world, personality is likely to be a pervasive force in the forging of sporting achievements by Olympians. All evidence from the current study would seem to suggest so. Perhaps the last word should go to John Wooden, famed UCLA basketball coach in the 1970’s,

‘They are all different. There is no formula. I could name players, all who were spirited, but in a different way. You can’t work with them exactly the same way. You’ve got to study and analyze each individual and find out what makes them tick and how you can get them under control. Some you may have to put on the bench more. Others you’ve got to pat on the back more. I wish there was a formula’

(in Gallimore & Tharp, 2004, p.126)

The *pathways framework* will hopefully provide a heuristic for further illuminating the myriad personalities of exceptional achievers and for celebrating individuality.
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