CHAPTER ONE

RESEARCH PROBLEM AND GOAL OF STUDY

1.1 INTRODUCTION

"Sport forms an integral and important part of today's society, not only in South Africa, but the world at large. Not only is it a physical outlet for the masses of participants who practice it for a variety of reasons and motivations, but also an emotional outlet for the even larger numbers of people who prefer to partake in the spectacle of sport from the comforts of their own homes, the so-called 'arm-chair specialists'" (Booysen, 2002:1).

Starkes (2003:4) concurs with the above sentiments when saying that *"Sport is unlike most human endeavours. It inspires poets and artists while it energizes armchair coaches and critics."* Starkes (2003:4) then emphasises the fact that *"Sport is so prevalent and so much part of our everyday lives that we take for granted the years of necessary preparation that underlie every great sporting feat."*

"Countries and individuals now base their level of pride on the achievement of their sports men and women, so much so that sport has become a multi-billion dollar industry worldwide" (Booysen, 2002:1). It goes without saying that sport as a mass-market product and as an industry generates vast sums of money, but it is also further a target for equally vast sums of money in the form of sponsorship and investment.

Sport as a commodity has grown incrementally in South Africa and the world over. In referring to estimates from the Associated Press back in 1991, Stotlar (1993) says that in the United States of America, sport is a massive concern that falls within the top 25 largest industries in that country and is worth approximately $180 billion. If this was the case in the early 1990's, one can only imagine what the scenario is like today, more than a decade and a half later.

While South Africa's sport industry pales in comparison to America's, primarily due to the comparative market sizes of the respective countries, it is no secret that sport is a major industry in South Africa. Millions, if not billions, of rands are spent on sponsorships, endorsements and the like, and so it is fair to say that a number of industries in South Africa, whether tied to sport however tenuously or not, see the value of associating their brands and services with the image of sport.

According to Koenderman (2007), the total amount spent on sport sponsorship in South Africa in 2006, including the outlay spent on leveraging this sponsorship, exceeded R4.8bn. This amount was an increase of 18.5% on that spent in 2005. These figures are confirmed by the Beeld Newspaper (19 April 2007:30) who state that according to the latest figures of 2006, R2.6bn was spent on actual sponsorship with an extra 85c for every rand of this sponsorship investment spent on further leveraging the sponsorship.

This increase in sponsorship expenditure mirrors trends across the world; in 2002, more than two thirds of the $26 billion dollars spent on sponsorship worldwide was spent on sport (Crompton, 2004). According to Ali *et al.* (2006), the worldwide spend on sponsoring sport and related events in 2004 amounted to $28 billion with the accompanying leveraging costs adding up to 70% more to this amount. In the United States of America alone, the total amount spent on sponsorship increased to $8.5 billion in 2002, from an initial $850 million in 1985 (Maher *et al*., 2006).

In 1998 cigarette companies in America spent $125.6 million on sponsoring sports and events. Up to 70% of the amount spent by tobacco companies on sponsoring sport is dedicated to motor sports, although growth in these figures will undoubtedly be affected by the sponsorship limitations placed upon the tobacco companies that came into effect in November 2001 (Siegel, 2001).

Sponsorship and endorsements are not the only avenues of revenue spend in the industry of sport. When the total money spent by sport participants, enthusiasts,

viewers as well as the sponsors and endorsers is tallied, the total amount is staggering. It is therefore for good reason then that those who spend money on sport for whatever purpose usually demand a satisfactory return on their investment.

Sport has seemingly become a commodity from which satisfactory results are a pre-requisite. This commoditisation of sport has had some fairly obvious results. The laid back approach to sport adopted in the past are well and truly behind us, with this point so eloquently highlighted by Cooke (2004:19) who, when describing the Australian sporting context, states that *"During most of the history of organised sport, recruitment was a matter of putting a notice on school bulletin boards, or placing an advertisement in the local newspaper, and waiting to see who showed up."* Cooke (2004:19) goes on to say further that *"…by the mid-1970s, it was becoming clear this was not enough and that reform, enabling sports to make the best of the nations' limited potential, was essential."*

Cooke's (2004) feelings regarding the maximising of limited potential dovetail Morris' (2000) outlook that sporting organisations are all seeking a competitive advantage over one another, with talent identification viewed as being able to contribute to furthering this advantage. Talent identification is also seen as a crucial element in the running of elite athlete programs (Hoare, 1998). And, the establishment of elite academies is also on the increase (Williams & Richardson, 2006; Button & Abbott, 2007), with these academies having as their aim the development and identification of future elite athletes to ensure sustainability. Therefore, sustained top performance and financial concerns are a reality faced by those participating in the sports industry.

In developing these stars of the future, it is apparent that certain major role-players are involved in this process. Significant others, such as parents and coaches, play an important role in the sustained participation of children in sport (Bloom, 1985; Côté, 1999; Williams & Richardson, 2006). Studies mentioning the specific role of mothers (Papaioannou *et al.,* in press) and fathers (Jodl *et al.,* 2001) in influencing

sport participation in children can be found. The interaction between the coach and athlete has also been further studied (Jowett & Cockerill, 2003; Philippe & Seiler, 2006), as has the influence of peers (Papaioannou *et al.,* in press). The impact of role players such as parents and family (Burnett, 2005) and the trainer and coach (De Villiers & Le Roux, 2005) in the development of elite athletes from a uniquely South African perspective has also been investigated.

But, an increased focus on excellence and performance does have a down side. Mitchell (2004:64) opines that *"Serious competition in almost any sporting discipline can quickly transform a pastime into work, and play into routine."* It has further been found that the (over) involvement of parents in their children's sporting careers can be detrimental to children and their participation in sport (Gould *et al.,* 2006).

It is also not always clear whether this evolution of sport to its currently held concept is a good or a bad thing. There is nothing wrong with participating in sport to make a living or to make good money, but, where does this pursuit end, or worse, begin? The desire for professionalism in school and amateur sport and the possible associative dangers inherent in such a desire are apparent. Some honest questions need to be asked: is school and amateur sport the new semi-professional environment? What about the oft-heard statement that the amateur leagues are the feeders of the professional leagues? Sport seems to be morphing into an environment where the true concept and meaning of the term amateur as this term was originally intended, is in today's milieu well and truly a state where the amateur participants are real "no hopers;" regarded as the dross of the sporting world.

It is interesting, though, that not everyone participates in sport solely for the tangible or financial rewards associated therewith. In a recent South African study aimed at investigating the reasons that motivate high school pupils to participate in sport, some pertinent factors were identified. These factors were identified as being those of *"…adventure/pleasure, recognition/achievement, team spirit/affiliation, ability/physical appearance, competition/challenges and energy release"* (Coetzee *et*

al., 2005:51). While certain competitive and prestige elements were evident in this study, the overall balance and mix seems to be quite even. This balance is rather encouraging when examined against the greater South African sporting landscape of high value and price attached to school and amateur sport.

From the literature it is evident that talent identification is a prominent topic of investigation worldwide, and for some time now. Helsen *et al.* (2000:728) make note of the fact that *"The search for specific talents that underlie certain sport or movement skills is not a new idea."* This is largely confirmed by Papadopoulis *et al.* (2006:239) who state that over the course of a number of years, the *"…programs of talent identification have been applied from an early age, in countries when diagnosis, control, and guidance are used to promote athletes to high-level sports."*

Within the particular South African context, this country is known for its incredibly competitive attitude worldwide. This "never say die" attitude is unfortunately not enough to consistently guarantee or ensure success in the sport arena. Fortunately this was realised early enough, and in 1992 du Randt made a major contribution to talent identification in South Africa. A number of studies have followed since then, adding to the wealth of local knowledge on this subject in South Africa. This study aims to add to the wealth of knowledge of talent identification in South Africa by reviewing and developing an alternative testing protocol for elite rugby in South Africa that is relevant, reliable and effective.

To further increase South Africa's pool of knowledge in a constructive and meaningful way, accurate methods of talent identification and development need to be developed. Abbott and Collins (2004) make their own sentiments known in this regard by saying that the requirements for accurate and reliable methods for identifying and developing talent in sport are a priority. Reliability, and for that matter relevancy, are not without their own unique challenges however.

Hyllegard (2005:362), in citing Lehmann (1998), states that *"…the performance required to be considered talented in many domains continually changes as individuals exceed past performances."* In quoting Schulz and Curnow (1998), Hyllegard (2005:362) further says that *"Sports history has shown that World and Olympic records are commonly broken and that remarkable performances from the past are eventually equalled or surpassed by any number of individuals."* It only stands to reason then that this continually improving achievement in sport presents a challenge to talent identification as well, and further creates a need to continuously review and update South African based norms and standards, with this being suggested by du Randt and Headley (1992d) in the early 1990's already. In achieving this goal, all avenues followed in the identification of talent need to be as scientifically based as possible. The days of relying on gut instinct, or to the more cynical of souls, the like or dislike of individuals by the coach involved, are over.

With all the science involved in talent identification, however, the human element so critical to sport can often be overlooked. Previously in this chapter it has been acknowledged that people participate in sport for many diverse reasons and these reasons need to be acknowledged and respected. Also, with the history of this country still playing a role in current day progress and achievement, one would do well to bear all this in mind when considering the preferred approach for the unique South African circumstances.

South Africa's history should be seen as a challenge and not an insurmountable obstacle. It would be all too easy or tempting to use this country's history as an excuse to be less scientific in the approach to talent identification in sport. Our history may in fact lead to South Africa succumbing to the temptation of foregoing scientific excellence in order to correct the injustices of the past, with the consequent lack of quality in approach and outcome. No one disputes that these injustices need addressing; South Africa as a whole and South African sport in particular will be much richer for it. But, a delicate balance needs to be maintained.

From reviewing the literature, the following factors are clear: 1) sport has evolved and is still undergoing change; 2) with this evolution has come the inevitable financial investment in sport and related matters; 3) people participate in sport for a variety of reasons; 4) there are many role-players in the development of talent, and; 5) within the South African context, advancement in research on talent identification and development, while satisfactory, needs to improve.

In the end, however, it must be remembered that often organised sport is seen as a business; a business that has a massive financial turnover and a business where success and failure are probably more painfully obvious and public than many other industries and sectors. Therefore, success and the sustainability of success are primary motivators and drivers of this unique industry. This serves to further underscore the need for scientific methods to detect, identify and measure talent and top performance in sport.

In conclusion of this section; while sport is a consideration in this study, the specific focus and application of this study is rugby, with particular reference to (age-group level) elite rugby. South Africa is widely regarded as being one of the so-called powerhouses or “Big Five” (sometimes also referred to as the Big Six when including Ireland) in world rugby and this status needs to be maintained. South Africa is a proud rugby playing nation and anything less than excellence cannot and should not be tolerated. This study aims to contribute to rugby in South Africa as a whole.

1.2 STATEMENT OF PROBLEM

Rugby is a dynamic sport that is played in a constantly changing environment. It is difficult to predict the exact circumstances in which players might find themselves within the context of an 80-minute game. In fact, sport as a whole is a phenomenon where the specific circumstances are difficult to pre-determine or even simulate. There are a number of inherent features to sport that makes this study area unique (Hodges *et al.,* 2006), but, these self same features can make the study of excellence in sport a challenging issue.

Besides this challenge, the issue of accurate and reliable talent identification models and methods are high on the agenda, as touched on briefly in the previous section. Most countries that compete in the international arena are seeking for ways to accurately identify, predict and assess talent (Martindale *et al.,* 2005). But, this is difficult. Brown (2001: vii) states that *"Sports talent often depends on the eyes of the beholder. Millions of parents and thousands of youth coaches see their star athletes on a can't-miss path to full scholarships at major universities or even to careers in professional sports."* Brown (2001: vii) goes on further to say: *"In the eyes of trained coaches, recruiters, and scouts, however, sports talent is more difficult to assess. People who make a living recognizing and developing athletic ability understand that the potential to excel is sports depends on a combination of physical, environmental, mental and emotional factors. Talent, even when present and accounted for, does not guarantee athletic excellence."*

"Traditionally, TI models have measured children on physical and performance variables that are perceived to be a requisite for success within a given sport" (Abbott & Collins, 2002:158). But, research performed on children and adolescents with the express aim of predicting future success has been found wanting, with Vaeyens *et al.* (submitted) providing examples of the short comings of talent identification approaches that rely only on physical, technical, physiological and anthropometric variables. The critique of these methods is also shared by Abbott and Collins (2002:159) who say that *"The continued dominance enjoyed by physical and performance TI models in Eastern Europe, and their transfer to Western countries (e.g. Australia's Talent Search programme and the Scottish Sport Interactive programme), is particularly surprising since their inability to predict the future performance capacity of an individual was presented more than 30 years ago (Kunst & Florescu, 1971, as cited in Bompa, 1994)."*

There are many reasons for the critiques levelled at traditional talent identification models, and these reasons carry weight and are meritorious. Amongst these reasons are those of maturation (incorporating the relative-age-effect) and lack of a

multivariate and multidisciplinary approach to talent identification that have been selected for the purposes of discussion in this section. Other aspects worthy of consideration include the problem of early specialisation in sport. These aspects will be touched upon ever so briefly before the problem formulation for this study is provided.

It has been found that those children and adolescents who mature earlier do better at sports than those who mature later (Malina *et al.,* 2004a; Philippaerts *et al.,* 2006) and this presents a challenge for talent identification (Vaeyens *et al.,* 2006). The relative-age-effect, related to maturation, is where those born early in the year have a physical advantage over those born later in the year (Musch & Grondin, 2001; Baker *et al.,* 2003c; Hyllegard, 2005; Vaeyens *et al.,* submitted) with Vaeyens *et al.* (submitted) and others saying that this can have an impact on participation at higher levels and selection.

Furthermore, the more traditional methods of using motor and physical tests to determine and select talent are questioned due to the fact that these factors do not fully account for talented performance in sport. In their study on 405 handball players ranging in age from 12 to 13 years, Lidor *et al.* (2005) made recommendations that tests for cognitive aspects need to be incorporated into test protocols. In fact, Lidor *et al*. (2005) are of the opinion that the physical and cognitive aspects of sport are of equal importance and that reliance on cognition is often situation-specific.

The focus on the evaluation of game intelligence is also proposed by Falk *et al.* (2004). These cognitive aspects, along with others such as mental toughness, goal setting, perceptual-cognitive and perceptual-motor skills and abilities in sport have received extensive attention from researchers in the past as well as in the present day and are topics further investigated at length later in this study.

Early specialisation is another potential problem with talent identification and development. Earlier, the role that significant others such as family play in sport participation and achievement was mentioned. In a study on familial influence talent development in sport, Côté (1999) identified three specific phases that are prevalent in sport participation as the child advances from childhood to adolescence. These phases are the sampling, specialising and investment phases. While this theory is further discussed in chapter four, the following must be assumed; the three phases of Côté (1999) cannot be followed to a satisfactory conclusion if early specialisation has occurred. And, while the second phase of Côté (1999) and later Côté *et al.* (2007) is called the specialising phase, it is primarily associated with a narrowing of focus on one *or* two sports, but not at the expense of all else.

In taking a step back to maintain an objective perspective, this study acknowledges the *motives* behind the search for and identifying of talented children and adolescents. More often than not, the general consensus is that if younger athletes can be identified sooner, they can be properly channelled and developed so that by the time that they compete internationally, they would hopefully be world-beaters. This seems to offer tenuous support the "Deliberate Practice Theory" of Ericsson *et al*. (1993).

To summarise this theory, the general idea is that for an individual to achieve the level of "expert" in a domain of their choice, they need to deliberately and specifically practice the parts or sections that will enable them to achieve the requisite expertise required for top performance. Ericsson *et al.* (1993) state that a period of ten years or 10 000 hours of intense preparation is required to attain international level in chess and music and proposed that this would apply to other domains. This reason is sometimes proffered as motivation for the identification of talent at a young age as well as for early specialisation. While this reason does make sense, it will also be shown in subsequent chapters of this study that there are certain disadvantages to early specialisation.

It must be said though that understanding the motives behind early specialisation is not the same as endorsing these motives and this study therefore adopts an approach of that prefers personal preference and choice to pursue a particular sport; provided that these personal preferences are informed by the progression of the individual through the three phases as listed by Côté (1999) and Côté *et al.* (2007). This study is therefore pro-development and anti-early specialisation; although it is further acknowledged that some sports, such as soccer do have earlier specialisation ages than other sports such as rowing (Vaeyens *et al.,* submitted).

While this study stands in support of Abbott and Collins (2002), and others, who delineate the need to develop talent identification processes that measure the capacity of an individual to develop in the future as opposed to performance at time of testing, it is prudent to note that this study is about the establishment of an identification and selection protocol and associated norms to be applied at an age where specialisation in the specific sport, namely rugby, has occurred, is occurring or is the desired outcome.

Thus, the research problem for this study can be summarised as the need to develop testing batteries and protocols that accurately identify and select rugby players who are at, or past the requisite age of specialisation. These test protocols need to be highly rugby specific and as far as possible, position specific. The test protocols should be valid and reliable with the overall goal of identifying those who are currently capable and able to compete at the highest levels.

In fact, as will be seen, this study has established protocols that are to be used at an age where elite performance in a chosen sport, i.e.: rugby, is a reality and where the developmental concerns as these relate to the effect of maturation on physiological variables can be considered to be negligible or less. In effect, these protocols and associated norms can be used to identify and select those age-group level players who have the ability to “take the step up” so to speak, or, they can be applied as minimum standards for access to elite level age-group or senior teams.

An in-depth study of the literature has been done during the course of this study and as a result, the work of numerous researchers has been evaluated. The preceding concepts that have been briefly highlighted in the preceding sections are discussed at length throughout this study. Other aspects such as the nature versus nurture debate have also been extensively reviewed. Furthermore, the development of talent identification and development approaches over the years has been evaluated and current day perspectives have been provided. It must be noted that the literature provided within the preceding discussion is a miniscule representation of the full scope of literature covered for this study.

With specific reference to rugby and particular reference to the SANZAR nations, the methods of selecting (identifying) and subsequently developing talent in rugby have been reviewed. This was done through questionnaires and correspondence with the relevant rugby bodies via electronic mail and telephone. Before doing this, however, the opinion of experts in the form of interviews with successful South African, and where possible, international coaches was sought with regards to modern requirements and trends in rugby union.

Existing test protocols have been reviewed and adapted and these test protocols were then executed and analysed by means of the requisite statistical interventions. The results have been tabulated and discussed with conclusions reached and recommendations made.

1.3 GOAL OF STUDY

The goals and aims of this study are:

1.3.1 Primary goals and aims

- To have a sound theoretical basis provided by in-depth and up-to-date research, debate and discussion that provides a sufficient foundation and basis for this study;

- To establish reviewed and alternative sport and position-specific testing protocols as well as comparative results consisting of norms and scores that will adequately identify and select those capable of participating in elite age-group rugby union.

1.3.2 Secondary goals and aims

- To subject this study to the normal rigours associated with academic research and excellence as well as practical relevance and value, and;
- To stimulate further research in the future pertaining not only to this study but also to talent identification in South Africa in general.

The overarching goal of this study is to contribute to the equitable and sustainable identification and development of talent in youth rugby in South Africa. Therefore, this study envisages achieving this through the following sub-goals: to develop, implement and evaluate a new and modified testing protocol that is as sport and position-specific as possible for the identification and selection of players with elite rugby potential. The goal is further to provide methods of comparison in the form of norms and scores for those who choose to utilise this testing protocol in the future.

1.4 HYPOTHESIS

The goal and purpose of this study will be researched according to the following hypothesis:

1) The findings of this study will contribute meaningfully to elite rugby union by providing sport and position specific test protocols as well as norms and scores for comparison.

1.5 METHODS

1.5.1 Literature review

A literature review was conducted primarily to provide this study with a theoretical framework and background. Terrains that were focussed on were talent, talent identification, expertise and expert performance in sport. Some of the aspects classified under these terrains are the genetic versus environmental debate, maturation and related effects, psychological attributes of performance and others. The historical development of talent identification worldwide and within South Africa was a particular focus. Further considerations were the specific talent identification and development approaches of the SANZAR nations. This information was obtained via correspondence with the relevant organisations and through the utilisation of questionnaires.

Throughout this literature review comparisons are made, opinions are formulated and schools of thought are critically evaluated and commented upon. The domain of sport and the unique South African perspective was constantly considered. This was done so as to provide and exhaustive framework for this study.

The premise was made that as much background information as possible needs to be garnered to lay the foundation for this study. No study can proceed without fully evaluating the background and reasoning behind the study and in so doing fully taking into account all the factors involved. The complete literature review can be found in chapter's two to six.

1.5.2 Empirical investigation

1.5.2.1 Design

Phase 1: Just after commencement of the literature review, a concurrent interview process was initiated by interviewing experts in the field of rugby. The prerequisites for these experts were a proven and consistent track record of success in coaching of a team as well as a track record of progressive thinking and of innovation in the game of rugby union.

Once this interview process was completed the sample groups of talented players were identified and compiled. There are 3 sample groups, i.e.: the Vodacom Cup squad consisting predominantly of the Blue Bulls U/21 Currie Cup squad (n=26), the South Africa U/21 squad (n=29) and the TUKS Rugby Academy squad (n=23). This phase was completed in the following way:

The sample groups were all part of already existing elite rugby squads and academies. The Blue Bulls U/21 squad supplied the team that played in the Currie Cup national U/21 championship. Most of the players in the Blue Bulls U/21 squad also represented the Blue Bulls in the Vodacom Cup competition and this was the reason for the inclusion of certain other Vodacom Cup squad members for testing.

The Blue Bulls Rugby Union aim to provide their age-group (U/21) players with the opportunity to play at Vodacom Cup level, and it is for this reason that almost the whole Vodacom Cup squad consisted of those who were part of the Blue Bulls U/21 Currie Cup squad that participated in the U/21 Currie Cup competition in 2005. It is for this reason that the Blue Bulls sample group is referred to as the Blue Bulls U/21 group throughout this study. The Blue Bulls U/21 team were the eventual national Currie Cup champions in 2005 and the Blue Bulls Vodacom Cup team were eventual semi-finalists in the 2005 competition.

The South Africa U/21 squad provided most of the team that competed at the IRB U/21 World Championships later in 2005 and who subsequently became the U/21 IRB World Champions.

The third group were those players selected to be part of the training provided by the TUKS Rugby Academy. A number of these players were part of some of the junior (U/21) squads of various rugby unions competing in the Currie Cup at the time of testing.

A number of the players in all three of the sample groups have advanced to become occasional or regular members of the senior run on teams or reserves that played at senior Currie Cup, Super 14, and Emerging Springbok level, with one player receiving a Springbok call-up. In the total sample an accumulative percentage of 94.8% of all the participants were 21 years old and younger, with the remainder ranging from 22 to 25 years of age.

Phase 2: This phase consists out of the evaluation of the talented players according to the batteries/protocols set up specifically for them. They were tested on the following occasions: the Blue Bulls U/21 group were tested in January 2005, the South African U/21 group were tested in April 2005 and the Tuks Rugby Academy group were tested in October 2005.

This test protocol was experimental in nature and was therefore under constant development and refinement. Henceforth, there were three versions of this test protocol as it was refined from test one to test two and test two to test three. This study has also provided a fourth and final version of the protocol with serving as the official protocol of this study. This final protocol can be found in Appendix C.

Therefore, since this study aimed to create alternative, sport and position specific tests and norms that were suited for field work with regards to ease of execution and practicality, certain tests were done by all the groups whereas other tests were done by certain groups only. This was primarily due to the developmental nature and the refining process of the protocols under discussion.

1.5.2.2 Measuring instruments

As stated before, one of the primary aims of this study is to develop test protocols that are sport specific and secondly position specific for the game of rugby union. Protocols exist in the literature and in practice that test for talent in rugby. Reilly and Gilbourne (2003) and Reilly *et al.* (2000b) acknowledge the use of a multivariate approach to identifying talent in team games such as rugby done by Pienaar *et al.*

(1998). Pienaar and Spamer are regarded as groundbreaking researchers of talent identification in South Africa and are held in high regard.

In fact, this effective approach to talent identification was pioneered as far back as 1995 by Pienaar and Spamer (1995) in Pienaar and Spamer (1998). Similar test protocols/batteries were used by Pienaar and Spamer (1998), Pienaar *et al.* (1998; 2000), Hare (1999), Booysen (2002), Van Gent (2003), Van Gent and Spamer (2005), Plotz and Spamer (2006) and Spamer and De la Port (2006).

The protocol developed for this study is therefore broadly based on the preceding test protocols of Pienaar and Spamer (1995) in Pienaar and Spamer (1998) that were used by the subsequent studies mentioned prior. It was the intention of this study to develop, implement and review new, self-devised as well as existing alternative tests that lend themselves toward specific skill, physical motor, anaerobic capacity and vision measurement.

This reference test protocol consists of anthropometric measurements, rugby-specific skill tests and physical and motor ability tests. The revised test protocol for this study consists of anthropometrical measurements, physical motor ability tests, rugby-specific skills and a vision test. For the large part, however, the tests in some of the categories were alternatives to those more commonly used or were either self-devised and/or modified.

Included hereafter is the final version of the test protocol as it evolved during the course of this study. This protocol is the final version for this study. For an in-depth discussion as to how the protocol evolved to the final draft as indicated hereafter, as well as the motivation behind the choices and/or modification of existing tests, the development of new tests and reasons for discarding tests, please consult chapter seven of this study.

1.5.2.2.1 Final test protocol

a) Anthropometrical measurements consisting of the following:

- Body mass (Norton *et al.,* 1996; Van Gent, 2003).
- Height (Norton *et al.,* 1996; Van Gent, 2003).
- Skinfolds (4-site system of skinfold measurement)
    - Biceps, triceps, subscapular and suprailiac skinfolds (Durnin & Womersley, 1974; Hazeldine & McNab, 1991).

b) Physical-motor measurements consisting of the following:

- Vertical jump (Harman *et al.,* 2000).
- 10/40m dash (Hazeldine & McNab, 1991).
- T-Test (Harman *et al.,* 2000).
- 3x5x22m Anaerobic Capacity Test (self-devised and modified from the "Ten x 22m shuttle run" test of Krüger *et al.,* 2001).

c) Rugby-specific self-devised skills tests consisting of the following:

Core-skills

- S-Test (self-devised and modified from the (1) "pass for accuracy over 4m" and (2) the "catching while moving forward" tests of Pienaar & Spamer, 1995 in Pienaar & Spamer, 1998).
- Combination kick for distance and accuracy test (self-devised and modified from the "kick for distance" test of Pienaar & Spamer, 1995 in Pienaar & Spamer, 1998).

d) Sport vision test consisting of the following:

- The Accuvision1000 "30 accurate lights in total time" test (Venter & Maré, 2005; du Toit *et al.,* 2006b).

Note: the final test protocol can be found in Appendix C

1.5.2.3 Data analysis and assimilation

The subjects participated in the protocols/batteries of tests that were developed over three testing sessions, with the protocol shown precedent serving as the final protocol for this study. The analysis of the data relied heavily on description. The information followed a systematic description of the concepts needed to understand the aims and objectives of this study, namely the development of a revised, alternative testing protocol for talent identification and selection.

This involved working with the data, organising the data, systematically ordering the information into understandable and easily read components, searching for patterns and links between the concepts, determining the relative importance of concepts and information under review, identifying key principles that are applicable to the concept, formulating and re-formulating revised protocols for testing, establishing norms and standards for the final test protocol and finally, making conclusions and formulating recommendations for this study and subsequent future research endeavours.

The information obtained from the sample was captured onto a computer and analysed by means of the Statistical Product and Service Solutions package. Since the envisaged sample is relatively small, non-parametric statistics were used to analyse the data. Non-parametric tests, also known as distribution-free tests, are a class of tests that do not rely on a parameter estimation and/or distribution assumptions (Howell, 1992).

At this juncture it is pertinent to note that this study experienced challenges relating to access to elite age-group rugby teams. Due to these challenges, the sample size of this study is relatively small and as a result of this relatively small sample size, truncated simulations were carried out to establish norms for future reference. The function of these simulations were to simulate the scores obtained on these variables as if they were obtained from a much larger sample as well as to simulate the normal distribution of these variables. For these simulations to be successful

and accurate, the means and standard deviations of the simulations need to be closely comparable to the original sample.

This was in fact the case, enabling the norms to be simulated by means of 250 iterations and in so doing simulating the results as if they were completed by 250 individuals. For more information on the specific statistical methods and inferences used in this study please consult chapters seven and eight of this study. The results of this study are discussed in chapter eight with the specific conclusions of this study described and the related recommendations made in chapter nine.

CHAPTER TWO

TALENT IDENTIFICATION: ORIENTATION OF TERMS AND CONCEPTS

2.1 INTRODUCTION

In any study or discussion on talent, ability and the identification thereof, the correct use and application of terminology is critical. The difficulty with accurate terminology in sports related excellence and expert performance studies is that there are differing criteria for excellence (Wrisberg, 2001). There are also greatly divergent views regarding the origin and nature of talent, with this having a resultant impact on the definitions and terminology in use (Tranckle & Cushion, 2006).

This highlights the importance of clarifying the terms and concepts applicable to this study. During the course of this study, various terms and concepts are referred to and as a result the study-specific definitions of the most commonly used of these terms and concepts have been included in this section. This does not preclude the use of other terms however.

Furthermore, an attempt has been made at providing conceptual definitions applicable not only to this present study but to future studies as well. So, with every term or concept the literature based definitions are provided while in certain circumstances further definitions are conceptualised, often in the form of an attempt to holistically combine those definitions from literature, while in some cases providing what this study views as the “more correct” definitions of the terms.

An obvious challenge in this regard, especially within the light of the divergent definitions and terminologies encountered in literature, is that when conceptualisations pertaining to standardised terminologies for specific and applicable concepts in this field are proposed, that these proposals be acceptable to all parties engaged in the study of talent, excellence and expertise. As a result of this consideration regarding the all-round acceptability of these definitions, the

conceptual definitions provided by this study aim to be as generic, as all-encompassing and as inclusive as possible.

Therefore, this chapter should be regarded as a clarification of the terms inherent to this study as well as a primer for the debate that lies ahead in the following chapters with superficial discussions of many of the main issues under review later in this study being conducted in this section.

2.2 TERMS AND CONCEPTS

2.2.1 Talent

Talent is a term that is oft used to encapsulate any manner of ability or achievement in a particular domain. It is, however, a term that has elicited and provoked great debate amongst talent and expertise researchers worldwide, as will be seen in the discussion that follows.

When reviewing the definitions of talent in literature a common theme arises time and again. This theme has to do with the origin and nature of talent, i.e.: the nature-nurture debate. Therefore, while this section is not intended to debate the nature-nurture issue in-depth, since this has been done in chapter four; it is inevitable that the definitions of this concept will entail a certain level of superficial discussion along these lines.

2.2.1.1 Talent vs. giftedness

Central to the argument of the origin and nature of talent (the nature vs. nurture debate) is whether talent is an inherited ability that is genetically endowed or rather something that is developed over time as a result of an individual's exposure to proper training methods and opportunities as well as their interaction with an optimal environment. Some views of talent ascribe to the extra concept of *giftedness* as an explanation of the inherited nature of ability and then refer to talent as the developed function of giftedness or high performance. Others are found to use these concepts synonymously.

Major proponents of the separateness or distinctive nature of these two terms or concepts are Van Rossum and Gagné (2005:283), who in espousing the Differential Model of Giftedness and Talent (DMGT) credited by these authors to the original work of Gagné (1985; 2003; 2005), define giftedness as *"…the possession and use of high natural ability (called aptitudes) in at least one of four ability domains, so that the level of performance places the person among the top 10% of same-age peers."* In elaborating on this DMGT model, a distinction is made between intellectual, creative, socioaffective and sensorimotor as domains of natural abilities (Van Rossum & Gagné, 2005). They then go on to define talent as *"…the demonstration of systematically developed and trained abilities in any field of human activity at a level such that the individual belongs to the top 10% of peers having had equivalent training"* (Van Rossum & Gagné, 2005:283). Others found to be proponents of this specific model are Gagné (1993), which is to be expected. But, there are also those such as Tranckle and Cushion (2006) and Vaeyens *et al.* (submitted) who hold the DMGT model in a highly favourable light.

Others, such as Tannenbaum (1993:3) regard the concepts of talent and giftedness as being synonymous, however, and define them as *"…publicly valued abilities possessed by no more than one to two percent of people at each developmental stage."* Tannenbaum (1993), it seems, makes no judgment as to the innate nature of talent or giftedness.

Heller (1993) defines talent as a gift or ability that is domain specific (i.e.: ability that is limited to a specific domain) while giftedness is described as being the potential to achieve in one or more areas. In the discussion section of Detterman (1993), Heller in Detterman (1993) once again refers to the DMGT model of Gagné (1991) that refers to giftedness as being aptitude or potential whereas talents are seen as realised abilities that are specific to a domain, with these talents and abilities reliant on development.

2.2.1.2 Centrist and interactionist views of the nature and origin of talent

The definition of talent provided by Howe *et al.* (1998) has been cited by many studies and researchers. In this definition, Howe *et al.* (1998:399-400) assigned *"…five properties to talent: (1) It originates in genetically transmitted structures and hence is at least partly innate. (2) Its full effects may not be evident at an early stage, but there will be some advance indications, allowing trained people to identify the presence of talent before exceptional levels of mature performance have been demonstrated. (3) These early indications of talent provide a basis for predicting who is likely to excel. (4) Only a minority are talented, for if all children were, there would be no way to predict or explain differential success. Finally, (5) talents are relatively domain-specific."*

In their subsequent discussion of the possible mediating factors pertaining to talent and high ability it is clear that Howe *et al.* (1998) hold the view that talent and excellence are as a result of a number of factors with innate talent playing a negligible role in the development of excellence. In the peer review responses to the definition and discussion provided by Howe *et al.* (1998) that followed, as well as subsequent discussions contained in many later studies, it is clear to see that the opinions on this topic vary greatly!

While still other examples of nature-based views of talent such as those of Eysenck and Barrett (1993) who ascribe to talent as being inborn and genetic can be found, there does seem to be consensus, at least by some researchers, that talent and excellence is as a result of the combination of genetics (giftedness), environmental influences and development.

In once again referring to the definition of Van Rossum and Gagné (2005) for further clarification, it is the concept of giftedness that is heritable and it is therefore talent that is regarded as the end product of the development of these inherited abilities. To further expand on this concept, the definition of talent provided by Myburgh (1998:5), who quotes Simpson and Weiner (1989), can be noted as being *"…mental endowment; natural ability; power or ability of mind or body viewed as something*

divinely entrusted to a person for use and improvement; a special natural ability or aptitude; and a natural capacity for success in some department of mental or physical activity."

Simonton's (1999:436) view of talent is that it is *"…'any innate capacity that enables an individual to display exceptionally high performance in a domain that requires special skills and training'"* with Simonton (2006:2) later noting that someone can be seen as possessing talent when they have *"…inherited a set of genetic traits that (a) accelerate the acquisition of domain-specific expertise and/or (b) improve the manifestation of expertise already acquired."*

What is apparent about the definition of talent supplied by both Simonton (1999) and Simonton (2006) is that the capacity to develop high levels of performance is assumed as innate or inborn and that this capacity needs training and coaching for excellence and expert performance to be observed and developed further. Therefore, although not explicitly expressed as such, it can be deduced that the concept of innate capacity (Simonton, 1999) and the ability to acquire expertise in a domain (Simonton, 2006) can be equated to the concept of giftedness (innate ability/capacity) and talent (this innate ability developed; the ability to acquire expertise through development has to be assumed in this regard) respectively, as proposed by Van Rossum and Gagné (2005) and others.

So, while genetics and heredity are acknowledged as components of talent and ability (giftedness), the important role of developing this talent is underscored time and again. The notions of most of the previous definitions supplied frames the approach adopted by Starkes (2007:90) with this approach best described by the author as being *"…somewhat more centrist"* than others, hence the adoption of the term in this section and for this study. This perspective can also be seen as being an interactionist perspective. Morgan and Giaccobi (2006) say that an interactionist approach is one that takes genetics, practice, psychological attributes and social support into account in the development of talent and high ability.

Both the centrist and interactionist approach acknowledge the role of genetics and heredity but *also* acknowledge the critical role played by factors such as opportunity, early experiences, early maturation, motivation, training and development highlighted by other studies (Howe *et al.,* 1998; Helsen *et al.,* 2000; Starkes 2000). Where these approaches differ however is that while these cited studies assign these afore-mentioned factors as *the* primary or main reasons and causes for the development of excellence and high ability, and in turn delegate the role of genetics and heredity to that of secondary importance, or on occasion, relegate it to insignificance altogether, the centrist/interactionist approach more than readily acknowledges the role of genetics and heredity.

Baker *et al.* (2003c) is a good example of a centrist/interactionist perspective in that while they acknowledge the large role that genetics and heritability play in the variation encountered when comparing the performances of individuals, they also acknowledge the equally large and important role of training and practice in the development of expertise and talent.

A balanced, centrist/interactionist approach to talent and it's origins and structure is probably the best approach to adopt since great volumes of literature abounds from the different schools of thought that, quite understandably attempt to further justify the views held by the respective proponents. This study therefore adopts the centrist/interactionist viewpoint of talent, its origin and its development.

2.2.1.3 Nurture-based views of talent

In-spite of the appeal and intuitive common-sense view of the centrist approach, strict nurture-based views are held by a number of researchers. Baker and Horton (2004:211), who themselves are centrist/interactionist regarding talent and who refer to genetics and the environment as primary influences on high performance, refer in turn to Pinker (2002) who describes the environmentalist (nurture) position as being one of adopting a "blank slate" position whereby development is seen as being the result of *"…experience and learning"* only.

Deakin *et al.* (2006:305) for their part state that the *"…predominantly genetic explanation of expert performance has given way to the pervasive belief that practice and other forms of preparation are essential prerequisites for the development of expertise."*

Ericsson and Charness (1995:803) are firmly on the side proclaiming the exclusive role nurture and environmental factors playing the overriding role in excellence and expert performance when they proclaim that *"…no firm evidence exists for the effects of domain-specific talent on the acquisition of expert levels of performance."* They go on to highlight the common feeling that performance and abilities in domains gradually emerge *"…as a function of individuals' interaction with the environment"* (Ericsson & Charness, 1995:803).

In the many studies, reviews and publications of Ericsson, done on occasion with colleagues, the strictly nurture view is upheld and forwarded as being the main determinant of excellence and expert performance. The seminal work of Ericsson *et al.* (1993) highlighting the notion of deliberate practice as the primary function in the development of expertise and high performance is one such example.

Therefore, with the general arguments briefly framed, arriving at a definition for talent can be attempted. To do this, consultation of the literature is once again paramount.

2.2.1.4 Further definitions of talent in literature

The definition of talent provided by the Oxford Talking Dictionary (1998:npn) is that talent is *"A special natural ability or aptitude for or for a given thing. Also (rare), a thing for which one has a natural ability. Superior mental powers, skill, or ability."* It goes on to say that often talent can be seen as being *"…skill cultivated by effort."*

Reber (1985:758) describes talent as *"A high degree of ability for a particular skill"* whereas Booysen (2002:13) refers to talent as *"…that ability, be it in whichever field*

or practice, that is (far) above the normal or average, that which stands out and makes a powerful statement about the possessor's ability in their chose arena." The contribution of Hunt (2006) is simply that talent is channelled by an individual's interests.

The researchers and their opinions presented in this sub-section are but a microcosm of the total corps of researchers debating the issue of expertise and talent being as a result of either nature or nurture. It is possible that this debate that might never be settled or adequately resolved.

2.2.1.5 Conceptual definition of talent

Referring specifically to sport, Brown (2001:3) laments the fact that dictionaries *"…do not define talent as it relates to sport."* In agreement with these sentiments, Tranckle and Cushion (2006) opine the need for and the value of a proper definition of talent within the domain of sport that is acceptable to all.

What is clear is that any definition of talent undoubtedly has to contain elements of both the heritable (nature) as well as developmental (nurture) components pertaining to this concept.

Spamer (1999:75), however, addresses both the sport specific problem mentioned by Brown (2001) and the nature-nurture issue in general literature by providing a comprehensive description of talent that states that: *"…firstly it seems that talent in sport has its origin in genetic structures, but that practice is important to develop these structures. Secondly there are early identifiers among sportspersons which can help classify these people. It is true, in the last instance, that there is a small group of talented sportspeople and that talent is related specifically to kinds of sport."* This definition of Spamer (1999) is the perfect platform from which to conceptualise a definition of talent for this study and beyond.

Talent in sport can be defined as: *1) unambiguous potential or current expressed superior ability/levels demonstrated or possessed by an individual in a chosen sport type; 2) encompassing superior levels in all the attributes, variables or parameters necessary for success in the particular sport domain involved; 3) having genetic and inherent components and characteristics, and; 4) with these genetic and inherent components heavily reliant on specific, constant and consistent developmental interventions and interactions with the immediate as well as broader environment and influences so as to improve current or future performance.*

To conclude the discussion on this concept, it is clear that talent is multi-faceted, multi-influenced and complex. This much is acknowledged by Geladas *et al.* (2007:128) who, in endorsing the definition of talent provided by Howe *et al.* (1998), then go on to say that this definition serves to *"…highlight the complex and multidimensional nature of talent."*

2.2.2 Skill

Lee *et al.* (2001:115) define skill as an *"…underlying capability or potential to perform at a certain level."* Skill is further defined as the *"Ability to do something (esp. manual or physical) well; proficiency, expertness, dexterity; an ability to do something, acquired through practice or learning"* (Oxford Talking Dictionary, 1998:npn). Once again, the issue of the ability to acquire skill through practice and learning are highlighted as being essential to the concept of skill. As can also be seen from this definition as well as the definition of talent, these two concepts are closely interrelated with the concept of talent integral in defining the concept of skill and vice versa.

For example, a talented individual is often referred to as being skilled at performing a certain function and conversely, a highly skilled individual is regarded as being talented and with high ability in their domain of choice. Therefore, it stands to reason that a talented individual has the ability to learn or to acquire skills or a skill at a

more efficient and effective rate than those regarded as being less talented, as has been noted earlier in this chapter.

2.2.3 Identification

Identification is described as *"…establishment, finding out, ascertainment, diagnosis, selection, choice"* (Oxford Talking Dictionary, 1998:npn). Reber (1985:341) refers to identification as *"An act of recognising similarity or identity between events, objects or persons."*

2.2.3.1 Conceptual definition of talent identification

In considering the conceptual definition of talent identification, some of the views and findings of the related literature have been taken into consideration.

Booysen (2002:13) defines talent identification as *"…identifying those individuals who possess a quality of execution or ability to perform, that is (far) above the normal or average, that stands out and makes a powerful statement about the individual's ability, with the intention of future development and nurturing of this talent, to the benefit of the individual as well as the country."* In a study on swimming, Myburgh (1998:4), in referring to Mouton and Marais (1993), defines talent identification as a process whereby factors that have been *"…identified as components of swimming talent are observed, measured and recorded in an objective and verifiable manner."*

In their study on kayaking, Olivier and Coetsee (2002) refer to talent identification as assessing and evaluating those capacities and attributes that are essential to success in sport and that the process of talent identification can have a positive effect on the achievement of success in international competition. Williams and Reilly (2000b:658) refer to talent identification as *"…the process of recognizing current participants with the potential to become elite players."*

Pearson *et al.* (2006:278) define talent identification as *"…the recognition of natural endowment or ability of a superior quality."* Hodges *et al.* (2007:173) in turn refer to talent identification as *"…a search for abilities and characteristics that differentiate across skill levels."*

In the talent identification (and other non talent identification) studies found in literature, the multidimensional and multi-factorial nature of sport is often emphasised. It is plain to see that numerous factors and skills contribute towards achieving success in sport. In emphasising this multidimensionality of sport, Krüger *et al.* (2001:53) note that success in sport is dependant not only on morphology, but is reliant on other factors as well, such as *"…physiological characteristics, ball coordination, hand-eye-foot co-ordination, biomechanics and the player's psychology dispositions."*

Others, such as Ericsson and Lehmann (1996) confirm that these and other factors play a role in excellence, with Duncan *et al.* (2006) in turn being of the opinion that it is the physical and anthropometrical factors of an individual that are important requirements for the attainment of success in sport. Young and Pryor (2007) seem to share the outlook of Duncan and colleagues (2006) while making specific mention of the fitness aspects associated with success in sport, while Pyne *et al.* (2006) note the importance and value of anthropometric and physical fitness aspects in the process of selection and recruitment to elite sport teams that participate at the highest levels of competition.

Janelle and Hillman (2003), with Ollis *et al.* (2006) for the most part concurring, list the domains or categories needed for success in sport as consisting of physiological aspects along with technical aspects, cognitive, mental and perceptual attributes and abilities, with these attributes and abilities incorporating that of decision making. Janelle and Hillman (2003) further name the other aspects required for success in sport as being those of the control over emotions and the associated ability to cope with these emotions.

Ericsson (2007a) summarises his view that expert athletes are superior in a wide array of aspects and skills and refers to the superiority of experts in the mental representations that they acquire over time while noting the skills that experts are found to be superior in as those of anticipation and motor control. He also emphasises the consistency in performance that characterises experts when compared to others. Physically, he points out that experts and elite athletes are stronger and have higher levels of endurance and flexibility.

Pienaar and Spamer (1996b) also affirm the physical aspects inherent to sport and the need for the testing of these aspects within talent identification protocols and on their part make specific mention of du Randt (1993) who notes the importance of testing sport-specific skills in talent identification protocols. In the numerous studies focussing on rugby union by Pienaar, Spamer and various colleagues over the years (1995-2006), protocols consisting of these afore-mentioned categories have been used with great success.

Papadopoulis *et al.* (2006) list a number of studies on talent identification that are found using test batteries and protocols aimed at evaluating individual and team sports and with these protocols consisting of some or all of the of the following testing categories: anthropometrical, physiological/physical-motor and *mental skills and abilities.*

It is true, mental skills and abilities are just as important as physical skills in attaining success in sport. While Olds (2001) stresses the significance of cognitive (and other) factors in sporting success, Andrew *et al.* (2007) make mention of the need to use psychological profiling in conjunction with the physical and skill related aspects and considerations when selecting players. Abbott and Easson (2002), however, claim that there has not been a lot of focus on psychological or mental measurements in the process of talent identification and selection.

As will be seen in chapter four and five, there are growing calls for the inclusion of psychosocial considerations and mental skills tests in talent identification and development. Abbott and Collins (2004) make the case for the role of psychological and behavioural elements when considering talent identification and development, whereas Williams and Reilly (2000b) propose that sociological measures (along with other considerations) be incorporated within multi-disciplinary talent identification protocols. And, with Coetzee *et al.* (2001) correctly acknowledging the role of psychological and sociological influences in the development of talent and excellence, Falk *et al.* (2004) further drive home the point that when accurately measured, these aspects provide information on the abilities of the test subjects. They also suggest assigning relative weightings to the tests for technical ability, motor performance and cognitive aspects of performance within talent identification protocols to in so doing further assist in future predictions of performance.

Therefore, when evaluating the numerous studies on talent identification in a variety of different sports, it is clear that in practice, talent identification most certainly acknowledges the multidimensional and multi-factorial nature of sport and adopts methods of measuring these in its research designs. As stated in chapter one, Reilly *et al.* (2000b) and Reilly and Gilbourne (2003) mention the use of a multivariate approach to identifying talent in team games such as rugby and cite the work of Pienaar *et al.* (1998) in this regard. Many studies using protocols designed to identify talent contain tests that address some or all of the dimensions and categories mentioned earlier.

Furthermore, a number of studies using a multivariate approach in talent identification have as their research design a comparison of more talented groups versus less talented groups to determine the factors that discriminate most between these groups. This research design is undoubtedly a common practice; Plotz and Spamer (2006) make mention of numerous rugby-specific studies designed to concentrate on different aspects of talent within the game and in their analysis they make note of longitudinal studies focused on those players with talent potential, the

development of practical models to identify talent and a host of others. It is clear that many of the studies mentioned by Plotz and Spamer (2006) have made use of multivariate and talented vs. less talented research designs.

But, on the side of the expertise and expert performance proponents, Ericsson (2007a) expresses his own reservations regarding the traditional methods and practices that test for differences between (skilled versus less skilled) individuals in various performance characteristics; this includes the role that anatomy plays in elite performance. Ericsson (2007a:9) describes his concern as being that these approaches do not provide an *"…explicit theoretical account for how the measured characteristics could explain the observed differences in representative performance."*

In a dual defence of both Ericsson's (2007a) views as well as the research designs common to talent identification as described previously, it must be mentioned that while Ericsson's (2007a) approach (and that of the expertise and expert performance perspective) is that of explaining the nature and the acquisition of expertise, expert performance and ability, talent identification is focused solely on testing for the presence of ability (talent) or, conversely, the absence thereof. The former approach can be viewed as a qualitative and descriptive approach describing and defining ability, expertise and excellence whereas the latter can be seen as being more quantitative or confirmatory in nature. See later in this chapter (two) for an elaboration on the concepts of expert performance and expertise.

This study recognises that these reservations have certain merit, but also recognises the undeniable efficacy of current talent identification methods in use. Aitken and Jenkins (1998) make note of Bompa (1985) who said that 80% of the Bulgarian medal winners at the Olympic Games in 1976 were those who were previously identified as having talent potential. Nieuwenhuis *et al.* (2002) had a prediction accuracy of 90.5%, Pienaar *et al.* (1998) achieved a success rate of 88% in predicting talent while Spamer and Winsley (2003b) make note of a prediction

accuracy also exceeding 80%. Gabbett *et al.* (in press) developed a prediction function that had a 78.6% accuracy, while Falk *et al.* (2004) found a lower yet still impressive 67% accuracy of prediction in their study. Booysen (2002), when comparing the types of prediction functions commonly used in talent identification protocols, found them to be highly accurate and effective for their intended purposes as well as comparable with one another. The efficacy and successful implementation of current talent identification approaches is further supported by Hoare (1998) and Van Rossum and Gagné (2005).

A number of studies adopting different research approaches and methods have been performed on a wide array of sports with these studies focusing on various aspects of talent and the identification thereof. Selected examples of these studies include those of Myburgh (1998) on swimming, Keogh (1999) on Aussie Rules, Hoare (2000) on basketball, Hoare and Warr (2000) on women's soccer, Reilly *et al.* (2000b) on soccer, Coetzee *et al.* (2001) on swimming, Olivier and Coetsee (2002) on kayaking, Keogh *et al.* (2003) on female field hockey, Falk *et al.* (2004) on water polo, Lidor *et al.* (2005) on team handball and Elferink-Gemser *et al.* (2007) on field hockey.

In rugby league, the studies of Gabbett (2002b; 2005; 2006) provide norms as well as performance standards for the future selection of players of varying ability. And, in rugby union the studies focussed on the identification of talent in this sport are those of Pienaar and Spamer (1996b; 1998), Pienaar *et al.* (1998; 2000), Hare (1999), Spamer and Winsley (2003a; 2003b), Van Gent (2003), Van Gent and Spamer (2005), Plotz and Spamer (2006) and Spamer and De la Port (2006).

Before the definition of talent identification is provided for this study, an important distinction needs to be made between the process of talent identification and methods utilised in talent identification. The overall approach to talent identification is included in the definition provided directly hereafter and subsequent to that,

whereas specific methods and models of talent identification are provided, discussed and evaluated further in chapter six of this study.

So, by incorporating and considering the above definitions, this study will summarise the approach to talent identification by formulating a conceptual definition for future reference:

Talent identification in sport can be defined as: *1) objective, valid and reliable observation, measurement and recording of specific physiological, motor-ability, sport-specific, psycho-motor and mental skills, attributes, abilities and variables that have been identified as being required components for success in a sport; 2) with the stated goal being the identification/selection of those individuals exhibiting superior levels or skilful performance in these skills, attributes, abilities and variables; 3) occurring in either cross-sectional (selection for participation) or longitudinal time-frames; 4) with the overall purpose of this process being to responsibly and ethically differentiate those who are talented from those who are less talented in a particular sport and to either a) retain those individuals identified as suited to the sport under review or, b) channel those unsuitable individuals toward the sport they are most suited to for the purpose of further development; and 5) with this future development of these individuals being to their own benefit, to the benefit of the country and to the benefit of society at large.*

To be effective in talent identification as proposed above, a multivariate approach is admittedly needed, but, a multidisciplinary approach that incorporates psychological and other dimensions within talent identification is important. The case has been made for the inclusion of these factors in test protocols throughout this study. Furthermore, in the definition above, the concept of guiding or channelling youngsters to the sport they are most suited to is noted. This concept was originally mentioned by Régnier *et al.* (1993).

2.2.3.1.1 Talent identification vs. talent detection, selection and development

In reviewing the opinions within the literature as these relate to the terms under discussion, certain pertinent aspects are emphasised. These aspects relate to; 1) the target population under consideration, and; 2) the time frame within which these processes occur.

In referring to the target population of these concepts, the following is found: talent identification is commonly regarded as the process of identifying or recognising talented individuals or those possessing the potential for future success and who are *currently participating* within the specific sports type under consideration, whereas talent detection is primarily regarded as the process of finding those individuals who possess the potential to be successful but who are *not currently involved* with the sport under consideration. (Williams & Reilly, 2000a; 2000b; Olivier & Coetsee, 2002; Wolstencroft, 2002; Tranckle & Cushion, 2006; Vaeyens *et al.,* submitted).

Talent selection is the process of choosing participants for their inclusion into representative teams and squads (Régnier *et al.,* 1993; Williams & Reilly, 2000b). From a practical perspective, the selection of talent can be regarded as an ongoing process, since representative teams or individuals are constantly required for competition during the normal course or duration of a season.

Other definitions of these terms as these relate solely to the time aspect of these concepts under consideration are to be found in Spamer (1999), who, in citing Salmela and Régnier (1983) states that the issue of talent selection and talent detection revolves primarily around the time frame attached to either endeavour. Talent selection is referred to by Spamer (1999:72) as *"…the prediction of achievement over a shorter period"* whereas talent detection is referred to as *"…prediction of talent over a longer period…usually followed by a development program."* Therefore, both time frames and specific target populations are essential to the processes of talent identification, detection and selection.

Still other definitions to be found include the oft quoted and cited work of Régnier *et al.* (1993:290) who refer talent detection as the process of matching *"…performer characteristics, which may be innate or subject to the effect of learning or training, to the task demands of a given sport activity to ensure the highest probability of maximum performance outcome."* Talent selection, in turn, is referred to by Régnier *et al.* (1993:290) as *"…'very short-term talent detection'"* which addresses the question of who will perform best in the eminent (short-term) time frame following selection. Furthermore, talent detection and development can be viewed as being mutual processes.

Undoubtedly, the concepts in this section must be viewed as being interrelated, but also applicable and certainly essential to one another. It is du Randt and Headley (1992a) who highlight this interrelatedness by saying that within the concept of talent identification, the concepts of talent detection, talent search and talent selection are to be found and that these processes are found at various stages of development of the sport participant.

Therefore, in expanding on these sentiments surrounding these concepts (du Randt & Headley, 1992a) and the definitions provided for these terms (Régnier *et al.,* 1993; Spamer, 1999; Williams & Reilly, 2000a; 2000b; Olivier & Coetsee, 2002; Wolstencroft, 2002; Tranckle & Cushion, 2006; Vaeyens *et al.,* submitted) and with specific reference to this study, the following definitions will apply:

a) Talent identification-(definition of the specific approach is provided prior), but the process can be defined as *the recognition of individuals currently involved in a sport who display promise or ability for excellence in this sport with the eye on further development.*

Du Randt and Headley (1992a), in referring to Régnier *et al.* (1982) mention that talent identification entails making a prediction over the long-term as to whether an individual in a general population has the ability to become an elite participant in a

target (sport-specific) population that has high levels of excellence. Enabling this process involves talent detection which entails detecting youngsters or novices who are in possession of what du Randt and Headley (1992a) refer to as "talent potential"; those with this talent potential have a better chance of future success in their sport of choice when this potential is combined with the requisite development and when the growth and maturity of these individuals is favourable.

Therefore, it is from this definition that the next definition for this study is formulated.

b) Talent detection-*the long-term, ongoing process of finding potential talent from novices and beginners and those not currently participating in a specific sport.*

c) Talent selection-*involves a process of selecting those considered to be of the required standard for competition who were identified from the process of talent identification and detection for their inclusion in a team or squad for the purposes of competition.*

d) Without any further need for elaboration, the summarised definition of talent development provided by Simpson and Weiner (1989) in Myburgh (1998) is accepted as being-*the gradual expansion and bringing to fulfilment through progressive stages the latent and potential talent previously identified.*

2.2.4 Expert

An expert is defined as *"A person with the status of an authority (in a subject) by reason of special skill, training, or knowledge; a specialist. A person who is expert or who has gained skill from experience"* (Oxford Talking Dictionary, 1998:npn). Ericsson (2006a:3) quotes *Webster's New World Dictionary* as describing an expert as *"…'one who is very skilful and well-informed in some special field.'"*

Singer and Janelle (1999:121) have the following to say when comparing experts in sport with novices; according to these authors, experts:

"… (1) have more elaborate task-specific knowledge;
(2) make more meaning of available information;
(3) encode and retrieve relevant information more efficiently;
(4) visually detect and locate objects and patterns in the visual field faster and more accurately;
(5) use situational probability information better; and
(6) make more rapid and more appropriate decisions."
The views held by these authors are further affirmed by Baker (2003), Baker *et al.* (2003c) and others.

In quoting Webster's New Universal Unabridged Dictionary (1996), Grigorenko (2003) describes an expert as someone who is regarded as a specialist who is in possession of special or superior knowledge, skill and ability that is essential to a particular field, with this knowledge accumulating as a result of practice. Cianciolo *et al.* (2006:614) in turn simply state that an expert is *"…someone whose level of performance exceeds that of most others."*

The implications, however, are clear from most of the definitions of this term provided; becoming an expert is something acquired through extensive practice and training and that an expert shows better ability in a task or domain in relation to others. The question that remains unanswered from these definitions, however, is that of what constitutes an expert in sport? The subsequent definitions attempt to address this question.

2.2.5 Performance

Performance is defined as *"The execution or accomplishment of an action, operation, or process undertaken or ordered; the doing of any action or work; the quality of this, esp. as observable under particular conditions"* (Oxford Talking Dictionary, 1998:npn). A sport-specific definition of performance is provided by Lee *et al.* (2001) as exhibited and measurable motor-behaviour on a task or action.

What differentiates the term performance in expertise from that of other endeavours is the context of application. In the case of expertise, performance is qualitatively and quantitatively judged according to outcomes, with the obvious outcome being that the performance is qualitatively and quantitatively better than that of others.

2.2.5.1 Conceptual definition of expert performance in sport

Expert performance in sport is defined as the superior performance of athletic and other endeavours that is consistent and that occurs over an extended period of time (Starkes, 1993; Janelle & Hillman, 2003). When further considering this aspect, the term superior usually indicates an action in comparison to another action, i.e.: superior performance of one individual over that of another. In sport the measurable aspect is even more apparent in outcomes and results. Games are won or lost, successful times run are less than others; sport performance and outcomes are inherently measurable.

What makes this concept difficult to define, however, is the issue of team sports vs. individual sports. Teams' results are measured corporately as opposed to individual sports types where the results attained are quite obviously measured individually. It has often been said that a team's whole is made up of more than the sum of its parts, with Eccles and Tenenbaum, (2004) also acknowledging this fact; what these authors further note is the importance of considering this issue within the context of a sport setting. For a team to be successful, excellent or expert performance within most or all positions is required, *along with* further aspects such as coordination, communication, cooperation and shared common goals between team members (Eccles & Tenenbaum, 2004; Hodges *et al.,* 2006).

Therefore, to simplify matters the conceptual definition provided below focuses on the performance of the individual within a team or solo context. Other factors such as team spirit, cohesion and the aspects mentioned in the preceding paragraph are not factored into this definition but, by their nature are vital to the performance of a/the team.

Expert performance in sport can be defined as: *consistent and exceptional superior performance of an individual in their sport of choice as this pertains to measurable results achieved within an individual or team context.*

The related definition of being an expert in sport can therefore be rephrased as: *an individual exhibiting consistent and exceptional superior performance in their sport of choice as this pertains to measurable results achieved within an individual or team context.*

2.2.5.1.1 Orientation of the terms "expert performance in sport" and "elite sport"

This study is focussed in talent identification in elite rugby. Therefore, the concept of elite sport needs to be clarified. To all intents and purposed, those who achieve expert performance in sport are elite performers selected for elite competitions or elite sport teams. Therefore, expert performance in sport is equivalent in definition to elite performance in sport and expert sports participants can be seen as elite sport participants.

Furthermore, since a number of talent identification and expert performance studies are performed on younger individuals the issue of exceptional performance in sport as compared to peers and other participants is relevant. Elite and expert performance and achievement in sport is relative to age as well as the sport under review. Grigorenko (2003:157) says as much when stating that a limiting factor to expert performance is that the *"…individual performance in the domain of expertise"* must be compared to the *"…performance of other individuals from a comparable group in the same domain."*

2.2.6 Expertise

Expertise is defined as *"Expert opinion or knowledge; know-how, skill, or expertness in something"* (Oxford Talking Dictionary, 1998:npn). The term expertise *"…refers to the characteristics, skills, and knowledge that distinguish experts from novices and*

less experienced people" (Ericsson, 2006a:3). As has been shown previously and as is once again enforced in these definitions, an expert exhibits expertise in their chosen field and conversely, expertise in a field can only be exhibited by experts in that specific field.

In the definition of expertise as expounded by Grigorenko (2003), she summarises that expert performance is constituent to the knowledge component(s) essential to the domain and further comments on the fact that there is a requirement of a large amount of training to facilitate the development of this constituent knowledge. Furthermore, expert performance is limited to a specific domain and that the performance regarded as being expert in nature must in fact be superior to the performances of other individuals within the same domain. As a result, the definition of expertise and expert performance in sport can be seen as being identical.

In summary, the terms and concepts contained in this chapter by and large reflect the concepts found in literature. Further conceptualisations have been provided where necessary to adequately reflect the views of this study. This chapter also serves as a precursor to the ensuing debates contained within the subsequent chapters of this study. The concepts of sport and rugby have been examined as separate entities within the next chapter (three) of this study.

CHAPTER THREE

SPORT AND RUGBY

3.1 INTRODUCTION

Sport, with the term derived from the word "disport/dysport" (Van Gent, 2003), can be defined as *"…institutionalized competitive activities that involve rigorous physical exertion or the use of relatively complex physical skills by participants motivated by personal enjoyment and external rewards"* (Coakley, 2001:20; Wuest & Bucher, 2006:294). In the contributions of Coakley (1998; 2003), this definition of sport is also encountered, with very little amendment.

Sport has an indelible effect on both participants and spectators alike (Williams & Reilly, 2000b; Booysen, 2002; Starkes, 2003). In the arena of sport, it is the almost "super-human" feats of its stars that elicits marvel and wonder (Starkes, 2000) and it is here where legends are born (Gould *et al.,* 2002). Sport comes a long way; in fact, the earliest cave drawings depicting spear throwing have been found in Spain and France with these drawings dating back to the Ice-Age (25 000 to 10 000BC). Historians surmise that the spear was, at least initially, used for hunting and protection and served this purpose for a half a million years throughout prehistoric period (van der Merwe, 1994).

Sport has evolved steadily since then, and is now a part of life for children worldwide (Malina *et al.,* 1982; Pienaar *et al.,* 2000), particularly in the West (Pienaar *et al.,* 1998). It could be argued that this immense popularity has contributed meaningfully to sport becoming, as Williams *et al.* (2004:328) claim, the *"…largest entertainment industry in the world."* They go on further to claim that the final of the 2002 soccer World Cup had a worldwide viewership in excess of three billion people, an astonishing figure in anyone's estimation.

Concomitant with this increase in the popularity of sport has been the rise of financial interests within sport, most notably that of sport sponsorship. Worldwide, the amount spent on sponsorship reached $28 billion (excluding sponsorship leverage costs) (Ali *et al.,* 2006) in 2004 and in South Africa this figure fell just short of R5 billion in 2006 (Koenderman, 2007).

It is no surprise then that within sport there is such an interest in talent identification and development and the potential role that these practices can play in directing scarce resources towards those individuals with the greatest potential to succeed (Morris, 2000; Williams, 2000; Williams & Reilly, 2000b; Abbott & Collins, 2002, 2004; Pearson *et al.,* 2006; Button & Abbott, 2007).

By now it is clear that this study is on talent identification in rugby. What this chapter serves to do is to present the concepts of sport and rugby so as to sketch a background and provide a foundation from which to progress to the next issues up for discussion in this study i.e.: the physical, genetic, environmental and psychological perspectives as these pertain both to sport in general, rugby specifically and thereafter the talent identification approaches applicable to these domains and issues.

3.1.1 Chapter outline

This chapter consists out of three sub-sections and progresses as follows:

Section one: characteristics of sport

This chapter provides a brief description of the characteristics and features of sport and how these impact on the study thereof.

Section two: sociological and societal trends in sport

Following this, a brief description of sport related sociological and societal trends is presented.

Section three: historical development and current day perspectives of rugby union

The historical development and modern day considerations of rugby worldwide and in South Africa are provided in this section.

3.2 CHARACTERISTICS OF SPORT

Sport can be characterised by the need to perform consistently, optimally and skilfully and to excel in an environment best described as dynamic and constantly changing. Furthermore, with the ever-increasing demands and multiple constraints on performance and ability that are inherent to sport, stress and tension can be regarded as ever-present companions (Williams & Ericsson, 2005; Hodges *et al.,* 2006; Jones *et al.,* 2007). By factoring in further considerations such as the *"…moving objects and opponents"* (Hodges *et al.,* 2006:472) encountered in various sports types, this dynamic and complicated nature of sport is further entrenched within the description of this endeavour.

Due to the nature and value attached to sport (Williams & Reilly, 2000b; Booysen, 2002; Gould *et al.,* 2002; Starkes, 2003), it is only logical that the specific issue of superior performance and excellence within this discipline would attract an increasing amount of research of late (Starkes *et al.,* 2001; Starkes & Ericsson, 2003; Williams *et al.,* 2003; Abernethy *et al.,* 2005; Williams & Ericsson, 2005; Williams & Hodges, 2005; Hodges *et al.,* 2006; McPherson & Kernodle, 2007; Vaeyens *et al.,* 2007) with some older and more recent calls for research into these aspects of expertise and excellence in sport to be more multidimensional and multidisciplinary in nature (Wrisberg, 1993, 2001; Ward & Williams, 2003).

It is obvious that the dynamic nature of sport provides some unique challenges to the study thereof, with Hodges *et al.* (2006) highlighting a number of these challenging features inherent to sport.

These are named specifically and subsequently summarised in general terms in the following section:

1) Movement (Hodges *et al.,* 2006:473)

The most inescapable feature of sport is that movement plays a vital role in the execution thereof. In addition, these movements differ in terms of relative simplicity or complexity. Other principle aspects of movement within sport to be considered are that this movement often incorporates the interactions between team-mates (Hodges *et al.,* 2006).

A further aspect only hinted at by Hodges *et al.* (2006) but that requires further elaboration is that movement needs to be considered as this relates to the interaction between opponents; while this movement is often not complementary in nature and could probably best be described as adversarial in its essence, it is movement in relation to others nonetheless.

2) Time constraints (Hodges *et al.,* 2006:473)

The authors note that the time available in sports serves to limit performance. Hodges *et al.* (2006:473) refers to *"…movement choice (response selection) and completion (response execution)"* when describing the impact of time on performance in sport.

A possibility not seemingly considered by the authors is the total length of an activity, event or match. Surely this can also serve as a limiter on performance? Decisions and courses of action are often influenced by the time available (or not available) to the competitors. An example of this in rugby could be the captain's possible decision between the options of kicking for posts as opposed to the lineout and maul when there are only five minutes left on the clock before fulltime.

3) Different abilities develop at different rates (Hodges *et al.,* 2006:473)

Perceptual-cognitive and perceptual-motor skills are needed for excellence in sport. Performance is dependant on the development of these skills but these skills are not always at the same level as this relates to their development. A typical scenario noted by the authors is one of a participant knowing what they need to do, but not

yet knowing how they need to do it; this knowing how to do it is something that comes as a function of practice and increased exposure to the domain (Hodges *et al.,* 2006).

4) Differing roles (Hodges *et al.,* 2006:474)

Individuals within the same sport or even team often play totally different roles. Examples of this are the position and role requirements of a goal keeper versus a striker in soccer (Hodges *et al.,* 2006), or, of an inside centre or fullback versus a prop or hooker in rugby.

5) Teams are more than a group of individuals (Hodges *et al.,* 2006:474)

As mentioned in chapter two, a team's whole is made up of more than the sum of its parts (Eccles & Tenenbaum, 2004). The characteristics of team play and team sports are quite understandably different to those of individual sports types (Jowett & Meek, 2000b) and for a team to be successful requires excellence in the execution of both position-specific and team-orientated tasks coupled with effective communication between and the coordinated action of all team members (Hodges *et al.,* 2006).

Therefore, as illustrated above, while sport attracts an inordinate amount of research, it is a challenging and unique concept to investigate.

3.3 SOCIOLOGICAL AND SOCIETAL TRENDS IN SPORT

In the Old Greek educational period, contrasts were evident between the educational approaches and social structures of the two rival city states, i.e.: 1) Sparta, with their rigid educational and social system that placed the burden of education on the government, and 2) Athens, with their less rigid educational and social system that placed the responsibility of education firmly in the hands of the family (Cordasco, 1965). These contrasts could not preclude the fact that they had some things in common, such as a focus on discipline and training (Gwynne-Thomas, 1981) as well as a focus on the physical aspects of education in the form of participation in sport,

most notably that of gymnastics (Cordasco, 1965). It is true that sport has played a valuable role throughout the ages in society, with Van Gent (2003:9), in quoting Frey and Massengale (1988), highlighting the traditional values inherent to sport as being those of *"Striving for excellence, achievement, humility, loyalty, self-control, respect for authority, self-discipline, hard-work and deferred gratification."*

This value of sport to society in general and South Africa specifically was emphasised by Nieuwenhuis *et al.* (2002), who in quoting the findings of the Human Sciences Research Council (HSRC) of 1982, state that sport should not be viewed as being a superfluous endeavour bereft of meaning or value, but, should be considered as being of important benefit to society and to the development of the individual. This is also the opinion of Coakley (2001:2) who refers to sport as a *"…social phenomena"* that has a deeper meaning that stretches way beyond the obvious. Subsequently, Coakley (2003:4) airs his views that sport should be regarded as being fundamental to society and that sport can be viewed as being *"…integral parts of the social and cultural contexts in which we live."*

But, as du Toit *et al.* (2006a:42) so aptly and accurately state *"Modern sport is no longer a recreational activity, but has been transformed into a profession for many top sportsmen and women."* The question can then quite rightly be asked; are the traditional values of sport still applicable to today's time and age? With the advent of professionalism and the impact of incredible financial investment in sport, can sport still be seen as the striving after deferred gratification and are the attributes of loyalty, humility and self-control still applicable.

Chapter one of this study made the case for the evolution of sport into the concept it is known and recognised by today. This sub-section of this chapter serves to briefly outline this evolution in the form of analysing the societal trends that have influenced sport.

Hollander and Burnett (2002) have described the most influential societal trends and their impact on sport. These are named specifically, followed by broader summaries and discussions of the relevant concepts. The input from other studies and publications are also considered as these relate and add value to the sentiments of the afore-mentioned authors.

Therefore, the main societal trends are those of:

1) Manipulation (Hollander & Burnett, 2002:28)

This entails the use of sport to serve the purposes and ideologies of society's leaders. These purposes and ideologies pertain to those of politics, religion and other social concerns. This is far from a recent phenomenon; sport was used as a manipulative tool as far back as Greek and Roman times (Hollander & Burnett, 2002). Coakley (2003) in particular draws attention to the increase in prominence of the role that religion plays in sport in America and Canada and also speaks of the relationship between sport and politics as well as the effect of sport on other sociological realms and domains.

Hollander and Burnett (2002) are of the opinion that the main promoters of this manipulation through sport are the military, sport and educational institutions. It can be said that the sport and physical education professions have allied themselves to governmental policies of success in sporting endeavours (Green, 1998). The other role-players mentioned by Hollander and Burnett (2002) are governmental agencies, the media and business corporations with Coakley (2003) in turn stressing the significant impact of sport on the economies of many countries.

Sport is used for the purposes of nation-building and the promotion and stimulation of national pride (Hollander & Burnett, 2002; Coakley, 1998, 2001, 2003). Hollander and Burnett (2002) even go as far as to say that sport is used as a propaganda tool. Whatever the case may be, that manipulation is found within the South African context is self evident; South Africa's victories at the IRB Rugby World Cup in 1995

and the CAF African Cup of Nations in 1996 all served as vehicles to promote unity and reconciliation (Hollander & Burnett, 2002), not to mention the recent victory at the 2007 IRB Rugby World Cup and the subsequent celebrations countrywide.

2) Institutionalisation (Hollander & Burnett, 2002:28)

According to the authors, the industrial revolution ushered in an era of production and industry on a large scale coupled with recreation that was structured and organised; sport underwent similar changes, morphing into something that could also be regarded as an institutional phenomenon (Hollander & Burnett, 2002). The industrial revolution can be defined as broad-scale technological, social and economic development and progression that stimulated the development of modern industry and the practices and processes associated therewith (Giddens, 2001; Amirault & Branson, 2006).

The founding in 1896 of the Modern Olympic Games serves as an example of the institutionalisation of sport. The sport organisations and structures that were established at national and international level to cope with the rapid spread of sport worldwide are said to have provided momentum to the ever increasing development of a societal hierarchy that was present in sport participation. Due to this hierarchical societal structure, only the more well off members of society could afford participation in free time and leisure activities, whereas those of lesser means and lower social standing often viewed competitive sport participation as an opportunity to progress up the social ladder (Hollander & Burnett, 2002).

3) Professionalisation (Hollander & Burnett, 2002:29)

Though professionalisation, sport has become a commodity of great commercial value and appeal. Granted, new and exciting opportunities for economic gain have arisen, but this is, as some would say, often at the expense of the sports participants (players) who are at the behest and service of the team owners, who are considered to be the true beneficiaries of this associated economic gain (Coakley, 1998; Hollander & Burnett, 2002). Treasure *et al.* (2000:571) put it nicely when they note

the views of Ackford (1998), who in commenting on professionalism in rugby union, suggests that it is *"…the major 'players' (owners, investors, sponsors, television companies, players)"* who are all after *"…a bigger share of the profits and opportunities that professionalism has brought."*

These concepts of professionalisation, commodification and commercialisation can certainly be seen as having a direct impact on talent identification and development programmes and processes. As noted earlier, the resources assigned to the development of sport are scarce; talent identification contributes to the effective use of these resources (Morris, 2000; Williams, 2000; Williams & Reilly, 2000b; Abbott & Collins, 2002, 2004; Pearson *et al.,* 2006; Button & Abbott, 2007).

There are other noteworthy aspects surrounding the professionalisation of sport that require attention. These include the fact that athletes now have a value attached to them in monetary terms (Hollander & Burnett, 2002), much in the same way that assets have a value in general business terms. Furthermore, the ability of sport and the associated events to raise a profit is also a very real consideration (Hollander & Burnett, 2002) with the previously mentioned issue of the effect of sport on the economies of many countries (Coakley, 1998; 2001; 2003) being worthy of a mention once again. In citing Branch (1990), Hollander and Burnett (2002) note that tertiary institutions have gone on to develop curricula and study programmes aimed at capitalising on this increased significance and value in sport.

4) Segmentation (Hollander & Burnett, 2002:30)

Through segmentation the establishment of so called "niche markets" occurs, with these niche markets comprising anything from social status to aspects such as gender and age. The authors also call attention to certain niche markets that accommodate those with varying physical and mental abilities such as the Paralympics and Special Olympics. Furthermore, the adaptation of the traditional rules of sport brought about adapted versions of traditional games such as mini-golf for juniors or senior and veteran events (Hollander & Burnett, 2002).

Finally, Hollander and Burnett (2002) point to the adaptation of sports to cater for different target audiences. They include the distinction between Rugby Union, Rugby League, Australian Rules and American Football or Gridiron. Each of these forms of the game caters for a unique and specific audience.

5) Demystification (Hollander & Burnett, 2002:30)

This pertains to the expansion of personalised, sport-related knowledge. This process stimulated an ever increasing narrowing of focus in tertiary institutions from a generalist outlook to a specialist focus in the sport-related programmes on offer. This process was also facilitated by the expansion in media coverage of sport, improved technology and globalisation (all aspects discussed previously) as well as an increased ability of the world's populace to travel (Hollander & Burnett, 2002). It is a fact that over the years, travel has become cheaper and more accessible. This has allowed a larger spectrum of people to travel not only nationally but also internationally, with this serving to make the world a smaller place, so to speak, and contributing to this overall process of demystification.

Therefore, in summary, as can be seen, societal trends heavily influenced and still influence the development and progression of sport. Hollander and Burnett (2002) also argue that it is entirely possible that sport and related industries could themselves in turn have an impact on society.

There have been many occasions where sport has been used in a positive sense for social change. While the 1995 IRB Rugby World Cup and 1996 CAF Africa Cup of Nations victories have been mentioned previously (perhaps cynically) as tools in the course of societal manipulation and propaganda, their positive and constructive impact on South Africa at large cannot be underestimated. So too the gold medal of Josiah Thugwane in the Atlanta Olympic Games in 1996 (Cooper & Goodenough, 2007) and the recent crowning of South Africa as two time world champions at the IRB Rugby World Cup. These achievements and others still serve to unify and to make South Africans proud, irrespective of race, culture or creed.

3.4 HISTORICAL DEVELOPMENT AND CURRENT DAY PERSPECTIVES OF RUGBY UNION

3.4.1 The beginning

The literature on rugby and the origins thereof is unanimous in the assertion that the origin and development of rugby can be characterised by, as Smith (2006a:5) describes it, *"…mystery, conjecture and no little myth."* As far back as the Han Dynasty in China more than 2000 years ago, a football type game called "tsu-chü" was played as a military activity. In about 644 AD a Japanese game called "kemari" was popular; this game consisted of passing and kicking a leather ball between team mates without letting this ball touch the ground (van der Merwe, 1994).

Later, from ancient Greece through to Roman times the game of "Harpestum" (to snatch) was popularised. In this game, two teams wrestled for possession of a ball in a demarcated area, with the object of the game being to carry the ball over the opposition's line. The ball would be passed in the air between team mates (van der Merwe, 1994; Smith, 2006a).

While these games can be seen as antecedents to current day rugby, other games more "representative" of rugby football can be traced back to medieval (Middle Ages) times where a ball was carried, kicked or thrown by the participants and where the players could do just about anything they liked, including full contact tackling (Smith, 2006a).

The violent nature of this game is evidenced by the fact that there are documented cases of individuals who lost their lives while participating (van der Merwe, 1994; Hattingh, 2003; Evert, 2006; Smith, 2006a). This, however, did nothing to detract from the popularity of the sport that was banned between twenty and thirty times between 1314 and 1667 (van der Merwe, 1994; Evert, 2006). This game was commonly referred to as "folk-football" or the "game" and sports such as rugby,

hockey and soccer can trace their origins back to this sport (van der Merwe, 1994; Hattingh, 2003; Evert, 2006).

Later, in the nineteenth century any game where a ball was kicked or thrown was referred to as football (Smith, 2006a). It was at this time, however, that rugby (rugby union) and soccer (association football) started their separate, gradual paths of evolution and development. In broad terms, these games could be classified by the different social classes and strata of players participating in these activities. Soccer, regarded as a simpler game, was traditionally preferred by the masses while rugby, considered the more complicated game, was played by the middle-class and the aristocracy (van der Merwe, 1994).

It was at Rugby School that the version of football known today as rugby union had what can be considered its genesis. While the dribbling-only soccer game was progressing in other public schools, Rugby School concerned itself with its own version of this football game. This football game was only played at Rugby School itself or by former scholars of the school, but it was as a result of the spread of the game outside of Rugby School that it further developed and ultimately flourished (Smith, 2006a).

Three catalysts have been identified by Smith (2006a) as having contributed toward the rise and spread of Rugby. In the first case, he mentions that public schools such as Cheltenham, Marlborough, Haileybury, Wellington and others were being established to educate the growing middle-classes with many of them adopting the educational model first proposed Dr. Thomas Arnold, headmaster of Rugby School in the 1830's. In this model, religion was held at centre of school life and education, with this model placing an emphasis the development of both the mind and the body (Smith, 2006a). This philosophy is sometimes referred to as "muscular Christianity" (Evert, 2006; Smith, 2006a) Furthermore, former staff and pupils of Rugby School went to different parts of the country and took with them the principles and practices of the Rugby School football game (Smith, 2006a).

A second major contributing factor of the development of this game, as proposed by Smith (2006a:9), was *"…the first ever written rules of any football code, drawn up at Rugby School in 1845"* and that ensured that the Rugby School football game spread more easily than before. These were not detailed "how to play the game" rules but referred to the most dubious or disputable areas of the game that needed clarification or revision (Smith, 2006a).

The final catalyst noted by Smith (2006a) as contributing to the spread of Rugby School football was the novel entitled "Tom Brown's School Days" published in 1857 and written by Thomas Hughes, a former scholar and football captain at Rugby School. Many well-known features of rugby were described in this book (van der Merwe, 1994; Smith, 2006a) and it went on to become very popular (Smith, 2006a).

In the newly established schools of the time there were no uniform rules and many different types of football (including rugby) were played in many forms and ways, often dictated by the facilities and the size of the playing fields that were available to the participants (van der Merwe, 1994). The game at Eton, as dictated to by the space available, was characterised by a stronger leaning toward the dribbling form of the game (Evert, 2006), whereas Rugby School had a larger area in which to play and as a consequence showed preference to a game approach in which the ball was picked up and run with (van der Merwe, 1994; Evert, 2006).

As a result of the frustrations that arose during university football games due to different interpretations of the rules and approaches by the old-boys of the respective public schools, the Cambridge Rules of 1848 were established (van der Merwe, 1994; Smith, 2006a). Since there were more representatives of Eton at the meeting to establish the Cambridge rules, the dribbling aspect of the game was favoured in these rules (Evert, 2006). Those boys who were leaving university established football clubs around the country. Some clubs experimented with both association football and Rugby football; Richmond was a prime example of an

institution experimenting with both of these, as well as with another version, called Harrow football, before deciding on rugby (Smith, 2006a).

The final separation between rugby and soccer was cemented in October of 1863 when the Football Association was established (van der Merwe, 1994; Evert, 2006; Smith, 2006a), basing the laws for their game on the 1848 Cambridge Rules (Evert, 2006; Smith, 2006a). The Football Association outlawed many of the "barbaric" features inherent to the game of Rugby, further driving home the now obvious chasm between the two games. For a time still some were hopeful that the two games would come together, but it was not to be (Smith, 2006a).

In January of 1871 the Rugby Football Union (RFU) was founded (van der Merwe, 1994; Evert, 2006; Smith, 2006a). There were 21 rugby clubs present at this founding meeting that was held at the old Pall Mall restaurant in London (Evert, 2006; Smith, 2006a). The first set of laws was drafted by Leonard Maton (from the Wimbledon Hornets Rugby Club) present at the meeting, but who at the time was immobilised with a broken leg. It was not the intention of the RFU to limit membership to English clubs and schools only, hence the decision not to include the word "England" in the name (Smith, 2006a).

In 1871 the first international rugby match was played between England and Scotland (Smith, 2006a; Quarrie & Hopkins, 2007) in response to a challenge by Scottish rugby clubs (Smith, 2006a). The game was played in Edinburgh and the Scots used their home advantage to the full; four thousand home supporters, a narrow pitch that the English were unaccustomed to and a Scottish referee all served to assure the Scots a hotly disputed victory, thanks to a controversial Scottish try (Smith, 2006a).

In 1873, in spite of the fact that five clubs in Scotland and Ireland were members of the RFU, the first breakaway Union was formed in Scotland and subsequently other unions soon followed. The RFU started to evolve into the English national union,

although it was still joined by member clubs from New Zealand, South Africa, Hong Kong, India, Wales, USA, Canada and Australia with the result being that four years after its inception it had over a hundred member clubs (Smith, 2006a).

But it was to be another disputed try, this time an English try against Scotland in 1884 that led to a face-off that changed the face of rugby. As a result of the RFU's refusal to compromise with Scotland over the issue, Scotland, Ireland and Wales set about establishing their own independent body called the International Rugby Football Board (IRFB) which came to life in 1886 (Smith, 2006a).

Initially the RFU refused to join or even accept this new body but later an agreement that was acceptable to all parties was reached and England took their place on this board (Evert, 2006; Smith, 2006a). The sole responsibility of the IRFB lay in the administration of the laws regarding international matches; they also introduced a standard points scoring system to remove any further irregularities in the game. In 1998 the IRFB dropped the "F" for football to become the IRB (Smith, 2006a).

3.4.2 Rugby in South Africa

Rugby in South Africa is an interesting affair and could be said to be a microcosm of the society, i.e.: excellent, with the potential to *consistently* be the best in the world, but not quite there yet and with many challenges still to negotiate.

Going back a bit; the first rugby match played in South Africa occurred between the army and the civil-service in Cape Town in 1862 and ended in a nil-all draw (Evert, 2006). Subsequently, the game spread throughout South Africa with the first union formed being that of Western Province in 1883, followed by others. South Africa played its first international game in 1891 against a British touring side (Evert, 2006; Smit, 2007). South Africa only became known as the Springboks on the tour of Britain in 1906 (Evert, 2006) and from then on South Africa established themselves as a major force in world rugby (Evert, 2006; Unknown Author, 2007e), with their

most fiercest rival being New Zealand, whom they played against for the first time in 1921 (Evert, 2006).

The South African Rugby Football Union (SARFU) was established in 1992 (Pienaar & Spamer, 1996b; Evert, 2006). This was as a result of the merging between the then SA Rugby Board (SARB) and the SA Rugby Union (SARU). This unification opened the door to South Africa's readmission to international rugby. SARFU was established to serve as guardian of the game in South Africa and to administer the sport in this country (Evert, 2006). Subsequently, SARFU underwent another name change by dropping the "F" to become the simply the South African Rugby Union (SARU).

South African rugby has a tradition of excellence and top performance. Up and till readmission, the Springboks had a positive win record against all the rugby playing nations of the world, racking up a winning percentage of all tests played up and till that time of 72.2% (Smit, 2007). After readmission they admittedly struggled but in 1995 became world champions by winning the Rugby World Cup held in South Africa. They subsequently managed to amass a seventeen game winning streak in 1998 that also included the Tri-Nations in that same year with another title in 2004. In 2004 Jake White was named IRB World Coach of the Year with Schalk Burger named as IRB World Player of the Year and the Springboks named IRB World Team of the Year, with these results succeeding in erasing or at least softening the memories of the infamous "Kamp Staaldraad" fiasco just prior to the 2003 IRB Rugby World Cup (Unknown Author, 2007f).

In 2005 the Springboks managed to move to number two on the International Rugby Board's charts and the South African U/19 and U/21 won their respective age-group world titles (Colquhoun, 2006). Incidentally, many of the squad members of the 2005 South African U/21 team formed part of the sample group for this study.

In 2007, two South African Super 14 franchises in the Bulls and the Sharks made it to the Super 14 Final with the Bulls the eventual winners of South Africa's maiden Super 12/14 Rugby title. Later in that same year, South Africa were once again crowned World Champions at the IRB Rugby World Cup. They also achieved the accolade of being named the IRB World Team of the Year, with Bryan Habana being named the IRB World Player of the year. Jake White was also once again named the IRB World Coach of the Year. After the IRB World Cup, South Africa was also officially the number one team in the world rankings.

South African Rugby seems to constantly have issues that plague it in the boardroom (Colquhoun, 2006; 2007) with this having the potential to be translated onto the field. Hopefully the administrators are able to resolve these issues so as to put the country in the strongest position possible to successfully retain its position as the number one ranked team in the world.

3.4.3 Modern perspectives

It is an undisputed fact that rugby has undergone a significant evolution since the earliest changes where teams initially consisting of twenty a side were later reduced to fifteen a side in 1875 (Evert, 2006; Smith, 2006a). Further modifications to the game are described by Smith (2006a:18) as consisting of the shift from the initial team setup fielding *"…two full backs, two three quarters, two half-backs and a pack of nine forwards"* to the changes brought about in 1894 where *"…England copied the Welsh example by moving a forward backwards to play with four three-quarters."* According to the author, this setup has not been altered since this final modification was made to the game. Since then, positions have become specialised (Evert, 2006). And, in recent years, the laws of rugby have undergone regular changes to make the game more exciting to watch (Evert, 2006; Quarrie & Hopkins, 2007).

The impact of the IRB Rugby World Cup cannot be overstated. With the commencement of the first ever IRB Rugby World Cup in 1987, rugby not only had a

lasting effect on the existing rugby nations of the world (Pool, 1997), but also undertook the first steps toward making the game a global sport (Millar, 2006).

Rugby can be regarded as having great prominence worldwide; in fact, it is played in over one hundred countries (Van Gent, 2003; Spamer & De la Port, 2006) and its "flagship," the IRB Rugby World Cup, now ranks as the third most watched event after the FIFA World Cup and the Olympic Games (Grant *et al.,* 2003).

Undeniably, the advent of professionalism in rugby in 1995 had a massive impact on the game (Treasure *et al.,* 2000; Garraway *et al.,* 2000; Hattingh, 2003; Van Gent, 2003; Quarrie & Hopkins, 2007). This embracing of professionalism within rugby has impacted upon many aspects of the game, including the way the game is governed, the structure of international competitions and even the value of the players (Quarrie & Hopkins, 2007). Professionalism has also resulted in an increase in pressure to perform at optimal levels with a subsequent and associated increase in injuries as a result (Garraway *et al.,* 2000; Hattingh, 2003).

The literature shows that to participate and to be successful in rugby requires mental (Hale & Collins, 2002), rugby-specific (Hale & Collins, 2002; Durandt *et al.,* 2006; Duthie, 2006), physical and tactical (Durandt *et al.,* 2006; Duthie, 2006) skills and abilities. Also, in the last century alone there have been substantial increases in the sizes of physiques in rugby players, with marked changes visible in the last twenty five to thirty five years in particular (Olds, 2001; Luger & Pook, 2004; Quarrie & Hopkins, 2007), further emphasising the constant evolutionary nature of the game.

From the preceding discussion it can be seen that sport and rugby have undergone incredible changes and evolution not only with regards to their historical and modern development but also regarding the amount of investment, personal and otherwise, that is required to achieve and attain success. Furthermore, in the study of these concepts there are obvious experimental challenges that need to be overcome.

That numerous successful studies have been completed in rugby and other diverse sporting domains is evidence that these challenges can be successfully negotiated.

In summary, this study adopts and endorses the views held by James *et al.* (2005:63), who in their opening paragraph mention that *"The continuing development of professional sport has led to an increased emphasis on the provision of technical scientific support to aid the coaching process."*

Talent identification can certainly contribute to the coaching process by facilitating the identification and selection of talented and able players for coaching, as this study endeavours to do; with this coaching occurring over the short term when coaching for competition (selection), and over the medium and long term when coaching for development (identification). Added to the afore-mentioned is that this present study has as a further aim the contribution of knowledge to the already burgeoning knowledge base underpinning rugby and in so doing hopefully helping to improve a much loved sport.