Sport psychological characteristics of talented 13-year old adolescents

R Kemp

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Dissertation submitted in fulfillment of the requirements for the degree *Magister Scientiae* in Sport Science at the Potchefstroom Campus of the North-West University

Supervisor:	Dr A Kruger
Co-Supervisor	Prof AE Pienaar
Assistant- Supervisor	Dr A Nienaber

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Supervisor:	Dr. Ankebé Kruger
Co-supervisor:	Prof. Anita Pienaar
Assistant supervisor:	Dr. Alida Nienaber

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Foreword

I would like to express my sincere appreciation to the following people:

- My supervisor, Dr. Ankebé Kruger, who have guided me very patiently through my master's study. Thank you so much for your dedication, contribution and never giving up on me.
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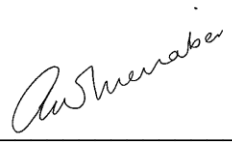
- To my family, especially my parents, whose support and motivation made this time easier.

Declaration

The co-authors of the two articles, which form part of this dissertation, Dr. Ankebé Kruger (Supervisor), Prof. Anita Pienaar, Dr. Alida Nienaber, hereby give permission to the candidate, Ms. Ri-Ellen Kemp to include the two articles as part of a Master's dissertation. The contribution (advisory and supportive) of the co-author was kept within reasonable limits, thereby enabling the candidate to submit this dissertation for examination purposes. This dissertation, therefore, serves as a partial fulfillment of the requirements for the Magister Scientiae degree at the North-West University (Potchefstroom Campus).

Dr. Ankebé Kruger
Supervisor and co-author

Prof. Anita Pienaar
Co-supervisor and co-author



Dr. Alida Nienaber
Assistant supervisor and co-author

Summary

SPORT PSYCHOLOGICAL CHARACTERISTICS OF TALENTED 13–YEAR OLD ADOLESCENTS

Sport psychological skills are associated with performance in sport. Furthermore it is stated that there are also gender differences with regards to sport psychological skills. The sport psychological profiles of successful and less successful athletes also differ from each other. One hundred and sixty two grade 8 learners with a mean age of 13.2±0.33 years from a High School in Potchefstroom in the North-West province of South Africa were tested. The participants were subjected to the Australian Talent Search Protocol as well as the Athletic Coping Skills Inventory – 28 (ACSI-28) and a demographic questionnaire which collected the general information of participants were completed. Firstly, the group was divided into two groups by means of a median split on the Australian Talent Search Protocol which resulted in a talented group of 16 adolescents and 146 less talented adolescents. The talented adolescents outscored their less talented counterparts in all seven sport psychological variables with statistically significant better scores in coping with adversity, peaking under pressure, goal setting, confidence and coachability. Secondly the group of 162 participants was divided into two groups according to gender which resulted in male group of 77 and female group of 85. The male and female adolescent sport participants did not differ significantly in any of the sport psychological skills. All sport psychological skills revealed a small practical significance. The male group obtained better scores in peaking under pressure, goal setting, freedom from worry, self-confidence and average coping ability. The female group obtained better scores in coping with adversity, concentration and coachability.

Therefore, although a relationship exists between sport performance and sport psychological skills there are a few factors such as maturation and cognitive development that can influence sport psychological skills and development.

Keywords: Talent identification, psychological characteristics, sport, psychology, adolescent

Opsomming

SPORT SIELKUNDIGE KENMERKE VAN TALENTVOLLE 13-JARIGE ADOLESENTE

Sportpsigologiese vaardighede speel ŉ rol in prestasie in sport. Verder is dit bewys dat daar ook geslag verskille is met betrekking tot sielkundige vaardighede in sport. Suksesvolle en minder suksesvolle atlete verskil ook ten opsigte van hulle sport sielkundige profiele. Honderd twee en sestig graad 8-leerders met ŉ gemiddelde ouderdom van 13.2±0.33 jaar van ŉ hoërskool in Potchefstroom in die Noordwes- provinsie van Suid-Afrika is getoets. Die deelnemers is getoets met behulp van die Australiese "Talent Search" protokol en het ook vraeslyste voltooi naamlik die "Athletic Coping Skills Inventory" - 28 (ACSI - 28) en ŉ demografiese vraelys waarmee die algemene inligting van die deelnemers ingesamel is. Eerstens is die groep in twee groepe verdeel deur middel van ŉ mediaan met die data van die Australiese "Talent Search" protokol wat gelei het tot ŉ talentvolle groep van 16 adolessente en 146 minder talentvolle adolessente. Die talentvolle adolessente het hoër waardes as hul minder talentvolle eweknieë in al sewe sportpsigologiese veranderlikes getoon. Statisties betekenisvolle waardes was getoon in die hantering van teëspoed, presteer onder druk, doelwitstelling, selfvertroue en afrigbaarheid. Tweedens was die groep van 162 deelnemers in twee groepe verdeel volgens geslag wat gelei het tot ŉ manlike groep van 77 en vroulike groep van 85. Die manlike en vroulike adolessente sport deelnemers het nie statisties betekenisvol verskil in enige van die sportpsigologiese vaardighede nie. Alle sportpsigologiese vaardighede het 'n klein praktiese betekenisvolheid getoon. Die manlike groep het beter waardes getoon in presteer onder druk, doelwitstelling, afwesigheid van bekommernis, selfvertroue asook die gemiddelde sport psigologiese profiel. Die vroulike groep het beter waardes getoon in die hantering van teëspoed, konsentrasie en afrigbaarheid. Daarom, alhoewel daar ŉ verband is tussen sport prestasie en sportpsigologiese vaardighede is, is daar ŉ paar faktore soos ontwikkeling na volwassenheid en kognitiewe ontwikkeling wat die ontwikkeling van sportpsigologiese vaardighede kan beïnvloed.

Sleutelwoorde: Talentidentifisering, psigologiese karakteristieke, sport, psigologie, adolessente

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List of Abbreviations

ACSI-28	Athletic Coping Skills Inventory – 28
TID	Talent identification
SPSS	Sport psychological skills
FIFA	FédérationInternationale de Football Association
SASCOC	South African Sport Confederation and Olympic Committee
NRC	National Sport Council
LTAD	Long Term Athlete Development
PHV	Peak height velocity
TG	Talented group
LTG	Less talented group
ES	Effect size
ISAK	International Society for the Advancement of Kinanthropometry
NWU	North-West University

CHAPTER 1

INTRODUCTION

1 INTRODUCTION

1.1 Introduction

Most children participating in sport, strive to perform at the highest possible level (Vaeyens *et al*., 2008:703). To achieve this high level of performance, the question arises whether good coaching, talented athletes, exposure to top class facilities or all of these factors and more, contribute to success (Spamer, 2009:111). Talent identification (TID) has long been of great interest to sport coaches and administrators (Regnier *et al*., 1993:291). TID is defined as "that process through which children are encouraged to participate in the sporting codes in which they are most likely to achieve success and that is based on the results of testing of selected components" (Peltola, 1992:7).

Identifying individuals with the potential to perform in sport however, is a challenge for sport organizations, coaches and national governing bodies (Abbott & Collins, 2004:395). According to St-Aubin and Sidney (1996:9), 22% - 37% of children between the ages of 13-15, drop out of sport. One reason for this is a loss of interest as children are not participating in the 'right' sporting codes that fit their physiological and psychological potential. Identification of possible future performers at an early stage will however give any organization an advantage by keeping costs to the minimum through minimizing drop outs and failure to perform (Abbott & Collins, 2004:395). It will also help sport related professionals not to waste time and money by investing in the 'wrong' players (Christensen, 2009:366). If identified sport participants can be exposed to top class coaching and facilities, their chance of becoming a top performer will also increase (Morris, 2000:715).

Reilly *et al.* (2003:322) states that TID is a complex process because it has to take many contributing factors into consideration namely physical, physiological, psychological and technical aspects. The process of talent development and -identification must also take the complexity of the development of children into consideration and the potential influence of these aspects on performance at any given time (Reilly *et al.,* 2003:322). Abbott and Collins (2004:396) are of the opinion that sport psychological characteristics should also be considered in identifying successful sport participants. Vaeyens *et al.* (2008:706) substantiated in this regard by identifying sport psychological characteristics as important predictors of sport performance. Although research accentuates the importance of sport psychological components in TID,

MacNamara *et al*. (2010:52) state that less than 15% of TID models include sport psychological characteristics.

1.2 Problem statement

Anshel (1997:104) reported a remarkable difference in the sport psychological characteristics of successful and less successful athletes. Successful athletes' sport psychological profile shows self-confidence, a high level of achievement motivation, mental toughness, intelligence, sociability, creativity, stability and high self-image to be the most outstanding sport psychological characteristics. Sport psychological characteristics which successful athletes lack or score low in were trait and state anxiety, tension, depression, mental fatigue, confusion and anger (Anshel, 1997:105). Katsikas *et al*. (2009:35) reported that the sport psychological characteristics that discriminate between elite and non-elite track and field athletes are emotional control, goal setting, imagery, activation, negative thinking and relaxation. Research on goal setting showed that athletes who set goals that are challenging will achieve optimal performance compared to those who set easy and undefined goals (Van Yperen, 2009:318). When sport participants are involved in a match or any competitive situation, a certain amount of anxiety is visible, although too much anxiety can have a detrimental effect on sports performance and the enjoyment of sport. High anxiety is also a characteristic of less talented sport participants (Gill & Williams, 2008:48). Furthermore, these researchers indicate that success in sport is a direct outcome of healthy mental skills according to the Mental Health Model (Gill & Williams, 2008:44).

A review on the available literature on talent identification and sport psychological characteristics, clearly indicate the importance of sport psychological determinants in TID. Research also outlines significant differences in the sport psychological profiles of successful and less successful sport participants. Despite the importance of sport psychological characteristics in TID models, only one study could be found that focused on youth sport participants where sport psychological characteristics were included in the study (Elferink-Gemser *et al*., 2007). According to Morris (2000:722) it is not ideal to study elite adult sport participants and then to use the sport psychological characteristics that characterize them in order to identify adolescent sport participants. There is no proof that these psychological characteristics will be the same for 10, 12 and 15 year old children who wants to reach success in sport. There is also no research that provides evidence that elite sport participants' sport

psychological profile is stable during growth from adolescence to adulthood (Regnier *et al*., 1993:301). In this regard Van den Berg (2010:155) indicated that the sport psychological skills of talented rugby players improved from 15-18 years.

Despite the differences regarding the sport psychological skills between successful and less successful sport participants, gender is also an important interpersonal factor in competitive sport that needs to be taken into account when dealing with sport participants of different genders (Katsikas *et al*., 2009:31). In this regard Elferink-Gemser and co-workers (2005) found that sport participants of different genders of similar ages (14.8 years, sd=1.5) outscored one another in sport psychological skills such as confidence, anxiety control and mental preparation where the males scored higher values. Furthermore, female youth sport participants outscored their male counterparts in concentration while youth male sport participants scored higher in self-confidence and anxiety control (Elferink–Gemser *et al.*, 2005:95, Grossbard *et al*., 2009:160). Male adolescent sport participants in field hockey, basketball, volleyball, speed skating, and swimming achieved a significantly higher score regarding the use of imagery compared to their female adolescent counterparts (Nicholls *et al*., 2007:1527, Elferink–Gemser *et al*., 2005:95). These results might be an indication that males and females develop sport psychological skills differently.

Although a substantial amount of research could be found about the differences of sport psychological skills between successful and less successful as well as male and female participants; limited research was available for adolescence in this regard. It is in the light of the limited research available that the following research questions are posed: Firstly, will the SPSS of talented 13-year sport participants differ significantly compared to their less talented counterparts, and secondly, will the SPSS of 13-year old male sport participants differ significantly compared to their female counterparts?. Answers to these research questions would be of value to sport in general as well as the Sport Science community and it could be used to address the shortcomings in current TID models.

2. Objectives

The objectives of this study are to determine:

2.1 If the SPSs of talented 13-year old sport participants will differ significantly compared to their less talented counterparts.

2.2 If the SPSs of 13-year old male sport participants will differ significantly compared to their female counterparts.

3. Hypotheses

The study is based on the following hypotheses:

3.1 Talented 13-year old sport participants will have significantly better SPSs than their less talented counterparts.

3.2 13-year old male sport participants will show significantly better SPSs compared to their female counterparts.

4. Structure of the dissertation

The dissertation will be submitted in article format as approved by the Senate of the North-West University and will be structured as follows:

Chapter 1: Introduction: The bibliography will be presented at the end of the chapter in accordance with the guidelines of the North-West University (Adapted NWU Harvard style).

Chapter 2: Literature overview: A sport talent perspective on sport psychological characteristics of talented sport participants during adolescence**.** The bibliography will be presented at the end of the chapter in accordance with the guidelines of the North-West University (Adapted NWU Harvard style).

Chapter 3: Article 1: The sport psychological characteristics of adolescents identified as talented. This article has been submitted for publication in the *Journal of Psychology in Africa*. This chapter and the associated bibliography will be compiled and presented in accordance with the guidelines of the journal (See Appendix B). Although not according to the guidelines of the journal, tables will be included in the text in order to make the article easier to read. Furthermore, the line spacing of the article will be set at 1.5 lines and the text will be justified in order to ensure consistency right through the document. The first line of each paragraph will not be indented.

Chapter 4: Article 2: Gender differences in the sport psychological skills profile of adolescent sport participants. This article will be submitted for publication in the *Journal of Psychology in Africa*. This chapter and the associated bibliography will be compiled and presented in accordance with the guidelines of the journal (See Appendix B). Although not according to the guidelines of the journal, tables will be included in the text in order to make the articles easier to read. Furthermore, the line spacing of the article will be set at 1.5 lines and the text will be justified in order to ensure consistency right through the document. The first line of each paragraph will not be indented.

Chapter 5: Summary, conclusions, limitations and recommendations.

Appendix A: Ethics form

Informed consent form

Physical activity questionnaire (Male and female)

Athletic coping skill inventory-28

Anthropometric, physical and motor performance data collection form ("Talentidentifiseringsprotokol")

Appendix B: Submission Guidelines for authors.

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CHAPTER 2

A SPORT TALENT PERSPECTIVE ON SPORT PSYCHOLOGICAL CHARACTERISTICS OF TALENTED SPORT PARTICIPANTS DURING ADOLESCENCE

2 LITERATURE OVERVIEW

2.1 Introduction

Sport enjoys a prominent position worldwide and has a unique impact on different facets of humans (Headley, 2000:1) Sport is not only a physical activity but also involves social interaction between people (Keim, 2006). According to Keim (2006) sport has a positive effect on numerous facets of humans such as improved health, fitness and education. Sport also creates business opportunities and this result in a higher employment number (Keim, 2006:100). Furthermore, sport promotes fair competition, teamwork, respect, less violence and eliminates the barrier that separates cultural and ethnic differences (Keim, 2006:100). Unity and tolerance are also positively affected by sport (Keim, 2006:100).

Sport might be a powerful tool in a community and is evident if we look at the impact that the 1995 Rugby World Cup and the 1996 Cricket World Cup had on the South African community and its unity. The important impact of sport in South Africa is also emphasized by the statement of Mr. Joseph Blatter, president of FIFA, that the FIFA World Cup would be a trigger for long-term and sustained social, cultural and educational development in South Africa (Blatter & Zuma, 2010). President Jacob Zuma confirmed the impact of the World Cup on different aspects such as bringing a nation together in a way that extends far beyond the outward manifestations of national pride (Blatter & Zuma, 2010).

The importance of sport and performance in many countries and the effect it has on different facets of humans cause adolescents to get involved in sport at even younger ages (Mero *et al*., 1990:57). Identifying talented adolescents at an early stage will give any organization or country an advantage by keeping costs to the minimum by minimizing drop outs and failure to perform (Abbott & Collins, 2004:395). If the identified sport participants can be exposed to top class coaching and facilities, their chance of becoming a top performer will also increase (Morris, 2000:715). Talent identification (TID) is a dynamic and multi-dimensional process (Abbott and Collins, 2004:175). According to Abbott and Collins (2004:175) not only a top physical profile will give a child the capacity to become an elite athlete, but various other factors are also important. Booysen (2007:220) concurred in this regard that performance in sport is dependent on physical, morphological, environmental, perceptual-motor factors as well as psychological factors.

Numerous research studies exist emphasizing the important role of psychological factors in elite sport performance (Macnamara *et al.*, 2010:52). These studies focused mainly on psychological

characteristics exhibited by elite adult athletes. The major approach towards sport psychology research is supported by the assumption that adolescents, who possess the same psychological characteristics than elite adult athletes, will retain those characteristics and become successful elite adult athletes (Morris, 2000:716). Furthermore, Morris (2000:716) stated that the psychological characteristics of elite adult athletes can be used to identify potentially talented adolescents. Despite the benefit of the aforementioned adult approach, Morris (2000:716) suggested that the adult approach and the adolescent approach should be separated. Researchers' interest in the sport psychological profile of adolescents has recently become a topic of high priority.

Despite the universal acceptance of the importance of psychological characteristics in sport performance, the impact of these characteristics during TID and talent development is often neglected (MacNamara *et al.*, 2010:53). The important role of psychological factors in TID is highlighted in publications as early as 1971 by Kunst and Florescu (as cited by MacNamara *et al*., 2010:53), suggesting that psychological factors accounted for more than 50% of the variance in the ability to progress effectively in sport. Kunst and Florescu (1971) (as cited by MacNamara *et al*., 2010:53) further indicate that psychological factors accounted for less than 15% of TID models at that time. Unfortunately, the situation does not seem very different in current TID models, which emphasize physical and anthropometric characteristics to identify potentially talented adolescents (MacNamara *et al.*, 2010:53). Current TID models seem to ignore the identification and development of the psychological factors that enable adolescents to cope with the 'ups and downs' of the road to excellence (Durand-Bush & Salmela, 2002:155).

From the above mentioned literature the important role that sport plays in numerous facets in the individual's life is evident. From the literature it is also clear that sport psychological skills (SPSs) play an important role in elite performance and based on Morris' (2000:716) adult assumption approach, should therefore be included in current TID models. Thus, the aims of this study are to compile the SPSS profile of talented adolescents and to determine the SPSS which differ between 13 year old males and females.

In this literature overview a short discussion will follow regarding the current sport situation in South Africa. It is also deemed important to define and describe the terms *talent identification* (TID), *sport psychological skills* (SPSS) and *adolescence* in this literature overview.

Literature on existing TID models will also be briefly discussed in order to obtain an indication of the content of the models and to determine the relevance of SPSS within the models where after a brief discussion of the Long Term Athlete Development will follow. Since there are various factors which need to be taken into account during TID these factors will be discussed in detail. The literature overview will also include a discussion on the SPSS which is regarded as important for successful participation in sport. Studies which include various sports and included adolescent participants will mainly be reviewed. Finally, gender differences in the sport psychological skills profile of sport participants will be discussed.

2.2 Sport in South Africa

South Africa emerged from sporting isolation in the early 1990s. The apartheid era left many negative legacies, such as divided social communities and wide inequalities regarding access to education, sport and facilities. Sport, and in particular sport events, played a significant role in the early transformation of the South African society. Hosting, and winning, the 1995 Rugby World Cup and the 1996 African Nations Cup (football) revealed the power of sport to bring people together and heal the wounds of the past. In 2004 South Africa was awarded the right to host the 2010 FIFA World Cup. This was the first event of this magnitude to be held on the African continent, and one of very few hosted by a developing country.

In 2004 the National Sports Commission was dissolved and replaced with a new body namely the South African Sport Confederation and Olympic Committee (SASCOC). While SASCOC is now responsible for coordinating elite sport, the Department of Sports and Recreation administers recreation and leisure programs at national level. The provincial sport academies still exist alongside private academies, but no strategic approach is implemented to coordinate sports development initiatives among the various stakeholders.

In the past decade the South African government announced a number of policies and acts with the aim to promote sport initiatives amongst young South Africans (Government Gazette, 1998). The National Sports and Recreation Act (110) of 1998 (South Africa, 1998), the South African Sport Commission Act (109) of 1998 (South Africa, 1998) and the National Youth Policy (Government Gazette, 1997) all promote the social upliftment of young South Africans from previously disadvantaged, rural communities by means of sport development programs.

Statistics from BMI Sportsinfo indicated that in 2007 an estimated 8.1-million youths between 13 and 18 years participated in sport. However this figure included double counting which means that if each participant took part in two sports, there would have been an estimated 4.1-million high school youths who participated in sport. At that stage there were more than 18-million children under the age of 18 in SA. This shows the enormous potential of new recruits to sport through the compulsory school sport policy draft gazetted by the Department of Basic Education published November 2011. The South African government and SASCOC have been striving to improve the participation of the previously excluded majority in competitive sports, but so far with limited success, due to resistance on part of numerous federations.

The national policies of the South African government, in collaboration with the Department of Basic Education, Sport and Recreation South Africa and the National Sports Council (NSC) emphasizes TID in sport and it stipulates that talented learners from all backgrounds must be identified early, be nurtured and have the opportunity to progress to the elite level (Department of Basic Education & Sport and Recreation South Africa, 2009:5). In South Africa, several researchers namely Du Randt (1992), Du Randt *et al.* (1993), Pienaar and Spamer (1996a, 1996b, 1998), Hare (1999), Badenhorst (1998) and Nieuwenhuis (1999) (as cited by Booysen, 2007) investigated TID and development. Despite the fact that the above mentioned South African researchers as well as Gimbel (1976) (as cited Du Randt-bush & Salmela, 2002), Bompa (1985) and Hoare (2000) support the inclusion of the sport psychological aspect during TID and development, it is still neglected in current TID models (MacNamara *et al.*, 2010:53).

2.3 Terminology

2.3.1 Talent identification (TID)

Mohamed *et al.* (2009:257) defines talent identification (TID) as ‘choosing the most appropriate individual or group of individuals who can best carry out the task within a specific context’. Different components (physiological, psychological, motor abilities, etc.) as well as a unique combination of these components need to be present for children to be regarded as talented in a certain sport (Peltola, 1992:7). These components cannot always be identified by competition and the naked eye, therefore scientific measurements are necessary (Kruger 2006:13).

Research indicates that the dropout rate in sport is 22% - 37% between ages 13 and 15 years (St-Aubin & Sidney, 1996:9). Reasons for this high dropout rate might be that children lose interest in sport because they are not participating in the 'right' sporting codes which fit their physiological and psychological profile (Abbott & Collins, 2004:395) or too much emphasis is placed on the outcome of competition (Cox, 2007:135). Consequently children do not achieve success and therefore get discouraged and as a result they quit.

Cox (2007:135) also emphasizes the importance of sport psychology in adolescent sport because of the negative effect SPSS can have on the dropout rate of adolescents in sport. In this regard, Cox (2007:135) stated that adolescent sport participants with the necessary sport psychological skills will be able to deal more effectively with worry and stress caused by the over emphasizing of the outcome of competition and therefore might result in a smaller percentage dropout among adolescent sport participants. Dropout in adolescent sport also has a negative impact on the quality of a country's national side as adolescents can be seen as the athletes of the future and good athletes might get lost to sport due to this high dropout rate. Coaches will also benefit from TID in such a way that they invest their time and energy in athletes with a physical and psychological profile required to achieve success in a specific sport (Morris, 2000:716).

According to the above literature it is clear that TID plays an important role in the future of sport. TID is also of great use for countries, organizations, coaches, athletes and individuals involved in sport. Bompa (1999:33) emphasizes the complexity and diversity of TID and suggests a multi-dimensional approach including physical, technical, tactical and psychological aspects.

2.3.2 Sport psychological skills (SPSS)

Gill and Williams (2008:7) defines sport psychology as "the branch of kinesiology that involves the scientific study of human behavior in sport and exercise as well as the practical application of that knowledge in physical activity settings". Burton and Raedeke (2008:40) distinguish between mental tools (goal setting, imagery, self-talk and relaxation and energization) and mental skills (motivation, energy management, attention, stress management and self-confidence). Mental tools are used to develop an athlete's mental skills and each mental training tool can be used to develop more than one mental skill (Burton & Raedeke, 2008:40).

From the growing interest in sport psychology, especially in youth sports, it is evident that this is a topic of great value to sport that needs to be recognized in the sporting environment (Weiss & Bredemeier, 1983:216). Youth sports takes place in varying social contexts and the outcomes of the sport psychological aspect can be influenced by coaches, parents, siblings and peers in these social contexts. Each has a different impact on the sport psychological aspect of the sport participant (McCarthy *et al.,* 2010:158, Partridge *et al*., 2008:270). According to Gee *et al.* (2010:31) a combination of SPSs might be the reason for top performance in youth sport and the absence of any sport psychological skill has a negative influence on performance. For youth athletes to thrive in competition especially in high-pressure situations they need high quality SPSs (Harwood *et al.,* 2004:328). Gee *et al.* (2010:31) suggests approaching a young athlete with a holistic view with regards to SPSs in order to maximize performance. From the above mentioned discussion the importance of the application of SPSs in youth sport in order to perform, is clearly indicated.

2.3.3 Adolescence

Adolescence is the development phase between childhood and adulthood. The term originated from the Latin word 'adolescence' which means to 'grow up' or 'to develop to adulthood' (Louw *et al.,* 2005:388). Papalia *et al.* (2009:254) defines adolescence as 'a developmental transition that involves physical, cognitive, emotional, and social changes and takes varying forms in different social, cultural and economic settings'. The start of adolescence is between the ages 11-13 years and the end of the adolescence phase is between ages 17-21 years (Louw *et al.,* 2005:388).

Against this background of the clarified meaning of TID, SPSs and adolescence, TID models will be discussed.

2.4 Talent identification models

2.4.1 Gimbel (1976)

Gimbel's TID model (as cited in Booysen, 2007) proposed that TID should be approached from four different perspectives, namely motivational aspects, trainability, physiological variables as well as morphological variables. Gimbel emphasizes that talent consists of genetics (internal) and environmental (external) factors and these factors play an important role in the development of the child (Malina *et al.,* 2004:553). Headley (2000:24) substantiates in this regard that the genetic factors will not develop to its full potential if the environmental factors are not optimal and therefore the child will not excel in sport. Gimbel also states that peak performance in sport should be reached between the ages of 18-20 years and be the result of 8-10 years of training. Consequently children should be identified at 8-9 years of age, before reaching their growth spurt (Headley, 2000:25; Malina *et al*., 2004:62).

Gimbel (as cited in Booysen, 2007:208) identified 3 reasons why talented children drop out of sport namely:

- In the same age group, children are different with regards to their biological age and development;
- Test batteries that predict performance are not valid, objective and reliable enough; and
- TID models do not acknowledge the role of psychological factors.

Gimbel proposed the following four stage model to reduce the dropout rate among youth sport participants. The first stage involves the identification of physical, morphological and psychological variables that are crucial for performance in a variety of sports. The second stage consists of the execution of the tests and according to the test results the child is guided to a sports development program he/she would most likely succeed in. In the third stage of this model the child is monitored and regularly tested for 12-24 months while development is recorded. After this period of exposure to the development program, a prediction is made in the fourth stage if the child will be successful or not. If a child is identified as successful, he/she will be directed to either a recreational program or a more sport specific program. An important characteristic of this model is that late developers are accommodated and this is important because TID is a process which takes place in a crucial development phase of the child (Malina *et al*., 2004:623-645)**.**

2.4.2 Hare (1982)

According to Regnier and co-workers (1993) as well as Headly (2000) Hare's TID model assumes that the prediction of talent is based on the effect of training. An important element of TID is firstly to expose as many children as possible to a training program. Hare proposed the following specific rules and principles for TID.

Rule 1: TID consists of two stages. The first stage involves the identification of general sporting abilities. In the second stage the identified children are classified into groups according to specific abilities shown towards a specific sport. The classification is done by objective testing of the abilities. After the testing the potential to improve those abilities is predicted while keeping their reaction to training in mind.

Rule 2: The factors in TID must be based on those aspects that play a role in top performance, and which is primarily determined by heredity.

Rule 3: Each child's abilities and characteristics should be evaluated according to their own level of biological development.

Rule 4: TID should not only focus on physical testing but social and psychological factors should also be considered.

Apart from the specific rules and principles for TID, the model of Hare consists of two stages. The first stage involves general identification of the important performance factors. Factors such as speed, height, co-ordination, "athletic versatility", endurance and game situation skills are included.

In the second stage confirmation is given about the child's sporting abilities during the junior training program. Four factors are used to determine the child's sporting ability, namely the response to the training demands; the degree of improvement in performance; the level of performance reached during the program; and the stability of performance when they are exposed to varying conditions. These factors are evaluated while the athlete participates in a sport specific program. After the evaluation of the four above mentioned factors a prediction is made whether the child will become a successful elite adult performer.

Because talent is evaluated continuously as it develops, this model recognized the strong relationship between TID and talent development.

2.4.3 Bompa (1985)

According to Bompa's TID model (as cited in Booysen, 2007:213) three factors play an important role in successful participation in sport namely morphological aspects, physiological aptitude and motor ability. TID does not occur instantly, but over a period of time and can be divided into 3 stages, namely the primary, secondary and final stage. Subsequently a brief discussion of the three stages.

Stage 1: The primary stage occurs between the ages 3-8 and is usually done by a physician to determine the health and general physical development of the child.

Stage 2: The secondary stage of TID takes place during and after puberty and is regarded as the most important stage of selection. The techniques used in the secondary stage must assess the dynamics of the biometric and functional parameters since the athletes have been exposed to a specific training program and adaptations already occurred. Sport psychologists form an important part of this stage. The sport psychologist compiles a sport psychological profile of each child to determine if the child has the specific profile to excel in certain sports (Booysen, 2007:213).

Stage 3: In the final stage the focus shifts to the TID and selection of the potential athletes for national sides. The main factors in this stage are the ability to cope with stress, the athlete's general health, the potential for future performance and the physiological adaption that took place during competition and a specific training program. According to Bompa's model each sport has to have its own ideal profile (physiological and psychological) and in later stages of the athlete's development coaches can evaluate and compare the athletes to the ideal model.

2.4.4 Regnier (1987)

Regnier's model is of great value to the sport science industry as well as various different sporting codes (Regnier *et al*., 1993). This model comprises of two main stages.

The first stage of this model involves a task analysis in order to verify the performance criteria (consists of objectives and serves as measurements for performance) (Booysen, 2007:220). The second stage involves the identification of sport-specific requirements. TID needs to be accurate and precise to reach its goal. For TID to be accurate and precise the performance predictors need to be accurate, specific and measurable (Regnier *et al*., 1993). When these factors are measurable and accurately predictable, the identified children would be successful (Booysen, 2007:219).

A multi-dimensional sport, where more than one action needs to be performed at the same time to reach a certain goal, is more complex and needs a concrete and detailed task analysis. This task analysis can be made more specific by consulting with the participants and also the observation of the game itself (Regnier *et al*., 1993). The 'top-down' and the 'bottom-up' approaches are mainly used during this stage. The 'top-down' approach is when science is used and data collection is done by scientific methods whereas the 'bottom-up' approach is when the specific requirements to perform in the sport are gathered from top performers in the specific sport (Booysen, 2007:207). In this regard Regnier *et al*. (1993:304) stated that "the underlying assumptions concerning the actual state of knowledge in a given sport discipline must be considered before developing a detection instrument". Booysen (2007:220) substantiates in this regard that to analyze and observe the sport together with advice and input from elite performers is the best option. When the sport specific criteria are identified, goals could be set and the identification of the performance predictors can be performed (Booysen, 2007:220).

The second stage in Regnier's model is the identification of performance determinants (underlying factors to reach the previous objectives – performance criteria) and another analysis is done, but in this stage the performance predictors need to be verified (Booysen, 2007:220). In this stage a task analysis is done to determine the factors that have an influence on performance outcome. Psychological, morphological, environmental and perceptual-motor factors have a great influence on performance. Professional knowledge and previous studies is used during this stage to determine the performance determinants (Booysen, 2007:220).

This model also makes use of the 'sliding population' approach. During this approach different age groups are tested simultaneously with specific and adapted test batteries for each age group (Booysen, 2007:221). The talented athletes are identified after they were subjected to a test battery which will predict the success for the next age group.

When dealing with this approach, exclusion must be closely monitored so that late developers are not left out (Booysen, 2007:221).

After the review on this model it seems that it has principles and guidelines that are of great value for TID, namely:

- The multi-dimensional approach in TID is underestimated and needs to be emphasized;
- Every step in the model needs to be defined and explained in detail;
- When there are specific predictions for every age group, maturation and the development of the child should be taken into consideration; and
- The interaction between the sport specific predictors and the other role playing factors (psychological, sociological, environmental, etc.) needs to be taken into account.

2.4.5 Du Randt (1992)

Du Randt (1992:32) reviewed 12 conceptual models for sports talent identification and development and suggested the following three consecutive stage model specific to South Africa.

Stage 1: This stage usually takes place at the age 8-10 years, after the child was exposed to a balanced physical and motor development program. TID is done by mass screening and includes field tests for general abilities as well as observation while competing. Norms and criteria have a wider range and are not too rigid to ensure that talented children are not excluded. The identified children are then subjected to a program that develops the general sporting abilities (Du Randt, 1992:32).

Stage 2: This stage is executed 18-24 months after the first stage, usually at age 11-12. This stage consists of observation while competing and the rate of improvement in performance field tests while taking the child's development (biological age) in consideration. Continuous monitoring of the improvement is done where after the identified children are exposed to different sports and a general motor and physical development program is conducted (Du Randt, 1992:32).

S**tage 3**: At the age of 14 years the third and final stage of TID takes place. To select this group of athletes more scientific and specific tests are used. The identified athletes is then exposed to

an advanced (more sport specific) program as age and performance progresses (Du Randt, 1992:33).

2.4.6 Hoare (2000)

From the discussion of the previous models it is clear that a perfect TID model does not exist. Hoare (as cited by Booysen, 2007) agrees in this regard that the infrastructure and certain demands of the sport determines the model that should be used. According to Hoare (as cited by Booysen, 2007) there is a difference between TID and talent selection. TID is defined as 'the search for undiscovered talent outside the current player base looking for new recruits' whereas talent selection is defined as 'focusing within the current player base and concentrates on improving the validity of the choices already made' (Headley, 2000:54).

The two above mentioned concepts (TID and talent selection) also involve different approaches and specialists to execute. During TID mass screening and recruiting is used and follow-up trials might also be part of this concept. With talent selection experienced coaches and scientists perform the tests and implementation of sport specific programmes (Headley, 2000:54).

Genetics play a very important role in sport performance but environmental factors also need to be taken into account. With talent selection and TID there need to be an evaluation to determine which part of the performance is measureable. According to Headley (as cited by Booysen, 2000) when evaluation is done on a sport and most of the performance predictors are measureable, TID and selection would be appropriate. On the other hand, if a sport is mainly skill based a different model should be used and more refined solutions should be found. When a continuum is created with genetic and environmental factors on performance and development of elite athletes it is often placed on opposite ends and it is actually the relationship between these two sets of factors that has an influence on the sport performance outcome (Headley, 2000:56).

From the discussed TID models Headley (2000:56) identified the following essential elements and criteria for TID models.

- TID models should be a multi-dimensional process;
- The detection instrument should be constructed by following specific steps;

- TID models should be performed during the stage at which the optimal age is reached specific to the sport;
- TID models should be fixed with a talent development programme; and
- Evaluate specific concerns that relate to the selection criteria.

The criteria should:

- Be a multi-stage process;
- Include psychological and sociological factors;
- Be of a dynamic character;
- Have a genetic basis;
- Consider a developmental index;
- Evaluate the rate of development; and
- Consider the coach's recommendation.

From the abovementioned discussion it is clear that a perfect TID model does not exist and that there are numerous factors which need to be taken into account when choosing an appropriate TID model. Five of the six models that have been discussed emphasized the importance of the psychological aspect, but still, very few, if any, current TID models do include sport psychological measures.

A discussion of the Long Term Athlete Development model (LTAD) which gives insight in to the optimal training, competition and recovery schedule for each stage during athletic development will follow.

2.5 Long Term Athlete Development (Athletics Canada®) (LTAD)

The LTAD model was compiled from research done by the Canadian Sport Centres LTAD expert group. Youth and adolescent growth and development has critical periods of accelerated adaptation to training and the principles of this research that has been adopted by Athletics Canada give proper management during these phases.

In the early stages of development, it is essential that training programs are designed around the critical periods of the vigorous adaptation to training. These critical periods represent the time

when the child is ready to learn the fundamental movements of sport such as running, throwing and jumping. These fundamental skills, which will be the difference between a gold medalist and a 16th place, need to be develop by the age of 12, if not, the child might not reach the full genetic athletic potential. When children develop fundamental motor skills at an early age the relationship with sport and activity becomes positive because of the achievements they reach in sport. The LTAD strives to consistent performance, elite athletes and ultimately confident, healthy and active adults. This model consists of nine stages:

- Active start;
- FUNdamental;
- Learning to train;
- Training to train;
- Learning to compete;
- Training to compete;
- Learning to win;
- Winning for a living; and
- Active for life

Consequently a brief discussion of the different stages of the LTAD.

Stage 1: Active start (Chronological age = males 0-6; females 0-6)

The objective of this phase is to make play and physical activity fun and exciting and an essential component of an individuals' daily routine throughout life.

Parents are the primary supporting system in the child's early years and daycare, kindergarden, and other community programs play a very important role on a later stage. Nutrition and physical activity are very important in the early stages of the child's development and it is therefore very important that the adults working with children are educated regarding nutrition and physical activity.

Growth and development should be promoted with exploration and risks in a safe environment and children should not be sedentary for more than 60 min at a time except when sleeping.

Coaching is not present in this phase but the emphasis is on development of the fundamental skills such as running, jumping, throwing, catching and kicking.

Stage 2: FUNdamental stage (Chronological age = males 6-9; females 6-8)

The objectives of this phase are to continue with the importance of daily play and physical activity and to start teaching agility, balance, coordination and speed. The fundamental skills in the previous phase should be taught in movement and incorporated with a well-structured gymnastic or swimming program in order to develop agility, balance, coordination and speed. Flexibility and optimal range of motion are also very important and an introduction to full body strength takes place. During this phase which is 4-10 weeks, the child must be encouraged to participate in a variety of sports, to participate in team games and enhance decision-making. This phase should consist of a total of 10 hours per week of which 2 hours should focus on running, jumping and throwing. This will build the foundation to support the general athlete. The importance of this phase is that there should be no formal competition or periodization and the activities must take place in a safe environment. The activities should also be all-inclusive and simple safety and etiquette rules can also be implemented during this phase.

Stage 3: Learn to train (Chronological age = males 9-12; females 8-11)

The first objective for this stage is to continue developing the fundamental and general sporting skills. Integrating physical, mental, cognitive and emotional components in this stage is the second objective and the third objective is to develop physical literacy.

For trainability of motor learning this is a crucial stage for both males and females. Due to growth, gender differences become noticeable. The individual development of the musculoskeletal system also becomes apparent and should be used to guide the coach regarding the training activities and monitoring of the development pattern. Furthermore, strength should be combined with bounding exercises and flexibility is very important as the child enters a vigorous growth and development phase. Agility, quickness and the change of direction speed, not longer than 5 seconds, should be the main focus of speed development. Aerobic fitness should be developed by means of fun and games and should complement speed development. Other aspects required for successful performance such as nutrition, mental skills, warm up, cool down and mobility should be introduced in this stage. The total hours spent on physical activity

in this stage should be 11 hours with 2-3 hours of group sessions of general athletics as part of it. The child needs to be encouraged to take part in different activities but can scale down on the variety to the end of this stage. General TID starts in this stage.

Stage 4: Train to train (Chronological age = males 12-16; females 11-15)

The development of endurance, strength and speed as well as the development of athletics-specific skills and fitness is the objectives of this stage. This stage includes both opportunity and vulnerability because of growth and development and is therefore a very challenging and critical stage. During this stage the physical change in the child is faster than during the previous stages. The peak height velocity (PHV) takes place during this stage. PHV is when the skeletal structure (bones) grows first at a fast tempo and consequently put strain on the connective tissue. This rapid growth causes a reduced range of movement and will therefore affect flexibility, posture and technique and can lead to abnormal movement patterns. Regular musculoskeletal screening and medical monitoring of growth and development is very important and will target the deceleration of the late developer.

An increased emphasis on anaerobic alactic power and capacity training will take place as a result of speed development (females 11-13; males 13-16). At the onset of PHV the focus should shift to aerobic training and should be formal at growth deceleration. When menstruation cycle start with females and males reach puberty 12-18 months after PHV, formal weight training can start. Towards the end of this stage, periodization of training starts and training is more structured with taper and peak periods integrating physical, mental, cognitive and emotional aspects. This stage also requires ongoing evaluation and modification. During this stage the amount of sports the individual participate in should be reduced to 1-2 depending on the duration of the program and the total hours spend on training should be 12. The time should be divided into 4-7 sessions of which 3-5 should be event specific (Canadian Sport Centres, 2011).

Stage 5: Learning to compete (Chronological age = males 16-18; females 15-17)

The first objective of this stage is to develop sport specific physical preparation. The introduction of event specific protocols in order to identify strengths and weaknesses is the second objective. The third objective is to implement event specialization and the fourth and final objective is to integrate physical, mental, cognitive and emotional development. During this stage competition

and specialization become more regular. Because of more competitions, periodization (single and double) is implemented to make sure peak performance is reached at the right time. As the advanced motor skills become more apparent the athlete can be advised to become more specific with regards to their skills. Speed endurance should be developed according to the specific event's requirements, whereas power, strength, speed and aerobic capacity development should be optimized as required. During this phase the number of sessions spend on a specific sport will increase to between 5-9 sessions and a decrease to 2 sessions spend on other events will occur. The duration of the season can be between 8 weeks to 10 months and the practice to competition ratio should be 90:10. The type of periodization will determine the number of competition opportunities during the season. A single periodization will give opportunity for 10-15 competitions and double periodization 12-18 competitions. At the end of this stage the Performance Enhancement Team concept is introduced to the athlete. Performance Enhancement Team is the group of professionals (physiotherapist, psychologist, doctor, etc) assisting the athlete, in collaboration with the coach to achieve elite performance (Canadian Sport Centres, 2011).

Stage 6: Train to compete (Chronological age = males ±18-21; females ±17-21)

The first objective for this stage is to optimize event specific preparation for competition. The second objective is to refine the area specifications for the event. The integration of the physical, mental, cognitive and emotional development as in the previous stages is the third objective. The fourth objective is to start performing event specific testing and monitoring. During this stage periodization is very important and single, double and multiple periodizations are used. The specific motor skills are refined during this stage and the mental preparation becomes more important because of the stress relating to competition. The mental preparation is supported by the optimized competition modeling and that of the secondary capacities. The number of sessions spend on the specific event increases to 6-15 and the sessions spend on other events are put on hold. The number of competitions as well as practice to competition ratio is similar to stage 5 namely 90:10. The season in this stage is year round with an annual rest period of one month. During this period the importance of the Performance Enhancement Team is critical and the implementation and the integration are important for the preparation of the athlete to participate at national or international level. During this stage the athlete might start to think of him/herself as a 'full-time athlete' and the lifestyle educations is very important and specific to each athlete and prepare athletes for stage 7 (Canadian Sport Centres, 2011).

Stage 7: Learn to win (Chronological age = males ±20-23; females ±20-23)

This stage has 4 objectives of which the first is to maximize the event specific preparation for high performance results. The second objective is to formally introduce the Performance Enhancement Team. Continuous integration of physical, mental, cognitive and emotional development is the third objective and the final objective is to teach the athlete to compete when it is important to excel. During this stage the athlete becomes a full time athlete where all available resources and energy are used to ensure top performance. To ensure top performance the improvement of physical, technical, tactical and mental capabilities is maximized. To prepare the athlete for top performance when competing internationally, testing and monitoring systems should be of high quality and assist the athlete physically, psychologically and medically. During this stage it is critical that the Performance Enhancement Team should be fully integrated (Canadian Sport Centres, 2011).

Stage 8: Win for a living (Chronological age = males ±23; females ±23)

The first objective of this stage focuses on the specific preparation for Olympics and World level participation and to maximize performance at this level. The second objective is to support the professional athlete's career with training, competition and recovery. A professional support team is the third objective and will help achieve the fourth objective namely ensuring repeated performance when it counts. The last objective is to plan for retirement from competition. All systems, including preparation, testing, monitoring and other supportive systems are refined at this stage to ensure best performance at the highest level. At the end of this stage the athlete will start planning retirement and entering the 'normal' world (Canadian Sport Centres, 2011).

Stage 9: Active for life (After retirement)

This stage has only one objective and that is to prepare the athlete for integration into the society. This stage is when the athlete retired from main stream competition and competitive sport. This is a critical stage of the retired athlete's life because of the difficulty of adjusting their lives to society. After the retirement from competitive sport there are many opportunities for the athlete to stay in sport. Sharing knowledge by coaching, mentoring, administrating and being an official are some of the opportunities for the retired athlete. Competing in the masters level or taking up

a different sport or hobby they never had time for are also an option. This is a critical stage for the athlete to consider lifelong participation.

As mentioned previously, TID is a complex and diverse process with various factors that might have an influence on the process. Consequently, a discussion of various factors which might have a direct or indirect impact on TID.

2.6 Factors which need to be taken into account during the talent identification and development process

2.6.1 Anthropometric characteristics

Anthropometry is defined by Malina *et al*. (2004:42) as 'a set of standardized techniques for systematically taking measurements of the body'. Anthropometric characteristics include body weight, stature, sitting height, skeletal breadths and lengths, circumferences and skin folds (to determine fat percentage) (Malina *et al*., 2004:42-45). According to Bompa (1999:278) anthropometric characteristics play an important role in a variety of sports in different ways and therefore needs to be part of the main criteria of a TID model. Malina *et al.* (2004:633) also state that the physique is an important selection criterion in TID because of the effect it has in adult sport as well.

Malina *et al*. (2004:627) suggested that two stages in youth sport are crucial to monitor: the first stage is 9-14 years when body size changes and varies because of maturity that takes place and the second stage is between 15 and 17 years when the late developers are in their 'catch-up' phase and the difference between the early and late developers consequently gets smaller. These anatomical differences is the reason early developers master motor skills easier (Bompa, 2000:10). According to Wilmore *et al*. (2008:384) the maximum change in height occur in females at 12 years and in males at the age of 14 years and the maximum change in body mass follows at the age of 12.5 years in females and 14.5 years in males.

2.6.2 Biological maturation and physiological characteristics

During childhood and adulthood, performance in sport depends on various physical characteristics of the athlete and these characteristics change according to the athlete's age and

maturation status (Armstrong & McManus, 2011:18). The development and maturation in an individual occur according to a unique biological clock each child has up until adulthood (Kruger, 2006:18). Malina *et al.* (2004:627) emphasize the importance of maturation and growth as factors that play a role in success in youth sport. TID is mostly executed during the vigorous growth and development phase of maturation during which considerable changes take place when the child is moving into the adolescent phase and during growth spurt (Malina *et al.*, 2004:628). Physiological characteristics undergo major changes during adolescence and should be kept in mind when evaluating the physiological test results (Pearson *et al.,* 2006:279). When regular aerobic training is done over a period of time (several years) the child's aerobic capacity increases because of the increase in blood volume, heart and lung size enlargement and oxygen carrier count in blood that increases but sometimes the increase in aerobic capacity is just a result of change in body size (Malina *et al.*, 2004:636). Adolescent's anaerobic power also improves mainly because of muscle power that changes through growth as well as body size-anaerobic power ratio (Pearson *et al.,* 2006:280). Optimal power production is defined by Pearson *et al.* (2006:280) as 'the incorporation of neural control of contracting muscle, muscle cross-sectional area, length and the arrangement of fibers'. The power production, as with anaerobic power, is not a single characteristic and the outcome relies on a combination of body parts and actions (Pearson *et al.,* 2006:280). Power development is also influenced by testosterone in boys, the size of the physique as well as training and in the adolescent phase these factors change and consequently power increase takes place (Pearson *et al.*, 2006:280). Other aspects that undergo change during adolescence, which is especially crucial for team sports, are skills and agility. These two are also characteristics that are multi-dimensional when striving for optimal performance (Pearson *et al.*, 2006:280). From the above mentioned literature it is clear that all these changes in adolescents make the physiological characteristics an important factor during TID.

2.6.3 Heredity

According to Bompa (1999:278) heredity is a 'complex biological phenomenon' and is an important aspect in sports and training. The influence of heredity on an athletes' physiological development can be changed to some extent by measures of education, training and the social environment but will be limited by the genetic potential of the athlete (Bompa, 1999:278). According to Klissouras (2001:6), with optimal environmental factors, the only difference

between two athletes is the genotype and the total development of an athletes' genetic potential depends on deliberate practice.

2.6.4 Sociological, economical and environmental factors

Sport provides youth with various social opportunities like being part of a team or a group, making friends and developing close relationships, social status and social acknowledgment (Allen, 2003:561). These factors, as well as parental pressure, are often reported by youth as the reasons for participating in sport (Allen, 2003:551). Youth sport takes place in various social contexts and the outcomes of the psychological aspect can be influenced by parents, siblings and peers and each has a different impact on the child's psychological aspect (Partridge *et al*., 2008:270). It is also reported that children from a two-parent house are more likely to participate in school sports than children from a single-parent house (Harrison & Naranyan, 2003:118).

With regards to economical factors, Uys (2009:52) confirmed that children brought up in poor socio-economical environments show poor gross and fine motor development compared to children brought up in high socio-economical environments. These disadvantages can have an influence on the future development of the child. Malina and Bouchard (2004:626) stated that limited economic resources is one of the main factors for athletes not reaching success due to the absence of the best facilities, coaches and support.

Environmental factors might also influence the development rate of children or the rate at which development of the child occur (Bompa, 2000:10). These environmental factors include geographic location, terrain, type of weather and urban or rural area (Bompa, 2000:10).

2.6.5 Gender

Gender is an important interpersonal factor in competitive sport (Katsikas *et al*., 2009:31). The differences in development and growth between males and females are important to take into account during TID (Armstrong & McManus, 2011:40; Malina *et al*., 2004:623-649). Body composition and shape is very important in competitive sport (Armstrong & McManus 2011:4) and differences and changes in the fat mass are apparent in both sexes at different ages (Malina *et al*., 2004:113). The change in body fat in females is mainly due to the increase in estrogen levels when reaching puberty and this consequently stimulates the deposition of fat (Wilmore *et*

al., 2008:386). Damsgaard *et al.* (2001:59) found differences in 9-13 year old sport participants regarding anthropometric data and body composition in swimming, tennis, team handball and gymnasts in both sexes but the differences were more evident in females.

According to Beunen and Malina (2008:5) the difference in strength between the two sexes is minimal through childhood but increases during adulthood until 16 years. After 16 years of age only a few females will compete at the same level as males. Males show an increase in several other standardized tests such as shuttle run, speed, vertical jump, sit ups, agility and distance throw while going through adolescence and females improve until 13-14 years where after they reach a plateau (Beunen & Malina, 2008:4). Flexibility follows a different growth pattern where females' flexibility is better than males with decreases in males' flexibility through adulthood (Beunen & Malina, 2008:4).

2.6.6 Sport psychological skills (SPSS)

Peak performance is defined by Krane and Williams (2010:169) as a moment when an athlete reaches top performance through mental and physical components collectively. Nigram (2010:20) is of the opinion that TID models can only be effective if psychological aspects are included. Research has also shown that there can be distinguished between successful and less successful athletes by means of SPSS (Elferink-Gemser *et al.*, 2005:97). In contrast with physical development which is concrete and visible, cognitive development is less concrete and visible (Louw *et al.*, 2005:417). Cognitive development leads to a change in the adolescent's thinking process. It changes from concrete thinking to the ability to analyze and reason on concrete as well as abstract concepts (Louw *et al.*, 2005:418). According to Piaget (1972) the adolescent enters the formal operations stage, the final and highest level of cognitive development, and this is when the adolescent is able to think abstractly. Nicholls *et al.* (2009:312) also confirmed that pubertal status and chronological age has an effect on the development of SPSS during growth. Cognitive development has a transformation effect on emotional and social behavior as well as psychological aspects. This transformation is mostly applicable when the child makes decisions towards certain sports and these decisions takes place from late childhood into adolescence (McCarthy *et al.*, 2010:159).

From the above mentioned literature it is clear that there are numerous factors which should be taken into account with TID due to the impact it has on the adolescent athlete. With this

information on the factors which plays an important role in the TID process as background, a detailed discussion of the relationship between SPSS and performance in sport will follow.

2.7 Sport psychological skills (SPSS) and performance in sport

The importance of sport psychology in youth sport is emphasized by Cox (2007:135) due to the negative effect it can have on the dropout rate of youth in sport, especially when too much focus is placed on the outcome of competition. Performance in sport is dependent on physical, morphological, environmental, perceptual-motor factors as well as psychological factors (Booysen, 2007:220). A number of sport psychological skills have been identified to assist the sport participant in personal growth and reaching performance. The table below (Table 1) represents a summary of research with regards to the sport psychological skills exhibited by successful sport participants in different sporting codes. The studies used for the summary in Table 1 include successful and elite athletes which are considered as the same. The successful or elite athletes were selected in the specific studies by different criteria for the specific group. The studies include various sport codes. The age group was limited to adolescents and age range from 14 to 27 years old. Limited literature were found in this age group and no recent studies could be found.

Consequently a discussion of the most common SPS exhibited by successful athletes as indicated in Table 1 will follow.

Table 1: Summary of sport psychological skills of successful sport participants in different sporting codes.

Authors of different studies	Subjects and age	Type of sport	Goal setting	Self confidence	Imagery	Anxiety	Concentration	Motivation	Activation control	Worry/Fear	Emotional Control
Kruger (2012)	87 Male; 95 Female	Distance running	X				X				
Holland *et al.* (2010)	Male (15.9±0.08)	Rugby		X							
Krane & Williams (2010)	Literature overview	No specific sport	X	X	X	X	X		X	X	X
Kruger (2010)	106 Female	Field hockey	X	X	X			X			X
Van Yperen (2009)	Male (16.58±1.40)	Soccer	X								
Katsikas *et al.* (2009)	241 Male; 123 Female (18.9±3.9)	Athletics	X		X			X			X
Bois *et al.* (2009)	177 Male; 164 Female (14.23±1.72)	Tennis and basketball	X			X			X		X
Andrew *et al*. (2007)	120 Male (18.78±0.28)	Rugby		X					X		
Robazza & Bortoli (2007)	99 Male (26.6±3.89)	High level rugby players		X		X					X
Niel *et al*. (2006)	115 Male (20.38±2.92)	Rugby		X	X	X					
Elferink *et al*. (2005)	244 Male; 214 Female (14.8±1.5)	Field Hockey, volleyball, speed skating, swimming					X				
Harwood *et al.* (2004)	573 Male and female	Elite youth athletes	X								
Golby & Sheard (2004)	115 Male (25.5±3.3)	Professional rugby league players		X				X		X	X

From Table 1 it is clear that SPSS have been repeatedly identified in the different studies, therefore indicate the importance of that specific SPSS. Consequently a discussion of the most common SPSS exhibited by successful and elite sport participants will follow.

2.7.1 Goal setting

Goal setting is an important SPS that influence performance of sport participants and also has a positive effect on confidence, motivation and anxiety control independent of age and skill level of the participant (Cox, 2007:155; Gould, 2010:201; Leuens, 2008:157). A goal is defined by Locke *et al.* (1981:126) as 'the object or aim of an action what an individual is trying to achieve'. Goal setting consists of a cognitive as well as a motivational part. The cognitive part is where the sport participants plan for the future and the motivational part is the energy the sport participants experience through achieving the set goals (Cox, 2007:274). Research stated that a challenging and detailed goal creates higher levels of performance compared to an easy or undefined goal (Mooney & Mutrie, 2000:278; Van Yperen, 2009:318) and when challenging goals are set and reached by a sport participant, the self-confidence of the participant is likely to increase and become more stable (Burton & Weiss, 2008:343; Martens, 1987:155).

Kingston and Hardy (1997:279) distinguishes between two types of goals namely outcome goals and performance goals. An outcome goal focuses on the outcome of the sport event as finishing first or winning and a performance goal is more specific to the athlete as a personal best but also promotes the outcome goal (Kingston & Hardy, 1997:280). Leuens (2008:173) states that the optimal strategy for optimal performance is to use both outcome and performance goals. Research findings from previous studies showed that successful athletes is significantly better in goal setting than their less successful counterparts (Katsikas *et al.*, 2009:35; Weinberg & Gould, 2003:246).

2.7.2 Self-confidence

Self-confidence is defined by Vealey and Chase (2008:66) as 'the belief that one has in the internal resources and particular abilities to achieve success'. Self-confidence is stable and changeable with situations but should be stable as possible and a sport participant should not take the blame for bad results (Karageorghis & Terry, 2011:60). Self-confidence is also recognized by sport participants, coaches and sport psychologists as an important SPS necessary to reach

success in sport (Vealey & Chase, 2008:66). Several researchers stated that successful athletes have a higher confidence level than less successful athletes (Andrew *et al.,* 2007:9; Cox *et al.,* 2010:140; Gill & Williams, 2008:73; Woodman & Hardy, 2003:452 ; Zinsser *et al.,* 2010:329). Athletes who want to perform at their best need a high level of self-confidence, thoughts have a direct impact on your actions and the ultimate outcome (Zinsser *et al.,* 2010:305). Young athletes are easily turned down when they lose and the challenges get greater with higher levels of competing and the possibility of losing are more common (Karageorghis & Terry, 2011:62). Leuens (2008:157) further stated that self-confidence has an important effect on motivation and psychological barriers that prevent the athlete from performing can be overcome with self-confidence (Karageorghis & Terry, 2011:64). Tod *et al.* (2010:104) states that when an athlete has self-belief it can boost performance because of the effect it has on positive emotional thoughts and behaviors that contribute to successful performance. Youth with a low self-belief are more reliant on the support and encouragement from coaches than youth athletes with a high self-belief (Galucci, 2008:428).

2.7.3 Imagery

Imagery is defined as 'using one's senses to re-create or create an experience in the mind' (Vealey & Greenleaf, 2010:268). Imagery helps the sport participant to train physical skills and psychological skills without being in the real environment for practice or competition (Vealey & Greenleaf, 2010:268). According to Leuens (2008:116) imagery is a strategy to counteract anxiety and improve performance of the athlete. Imagery is also used to create and re-create scenarios and experiences but need to be controlled and guided in such a manner that the focus is on the positive and eliminate negative images and experiences (Vealey & Greenfield, 2010:268). Consequently, imagery can create the real event with similar physiological and psychological responses (Morris *et al.,* 2005:4). Imagery can also support recovery from an injury in such a way that the athlete can still train the specific sport skills mentally and leads to coping with adversity (injury) (Morris *et al.,* 2005:5). Leuens (2008:119) gives the following guidelines to improve the effectiveness of imagery: vividness and controllability, practice, attitude and expectation, previous experience, relaxed attention, internal versus external imagery and age. The following will contribute to the effectiveness of imagery. Images with detail, if the athlete believes in imagery and relaxed athlete in relaxed atmosphere (Leuens, 2008:119). Older athletes will also use imagery better than younger athletes (Leuens, 2008:120).

Imagery is also a SPS that discriminates between successful and less successful athletes (Weinberg & Gould, 2003:246).

2.7.4 Anxiety

Anxiety is one of the most common emotions in sport and exercise psychology (Gill & Williams, 2008:177). Anxiety as stated by Cox (2007:197) is 'an emotion that arises in response to how we interpret and appraise an environmental situation as competition and facing an uncertain, existential threat' (Cox, 2007:236). Weinberg and Gould (2003:78) defines anxiety as 'a negative emotional state characterized by nervousness, worry and apprehension associated with activation or arousal of the body'. Anxiety has a mind component (cognitive anxiety) as well as a physical component (somatic anxiety) and can also be state or trait related (Weinberg & Gould, 2003:78).

State anxiety is when an athlete's anxiety changes during different facets of the game whereas trait anxiety is part of the athlete's personality and therefore some athletes experience situations as threatening when in reality it is not threatening (Weinberg & Gould, 2003:79). Cognitive anxiety refers to the negative thoughts in an athletes' mind as how much worries the athlete experience while somatic anxiety is characterized by physiological responses and changes with the situation (Weinberg & Gould, 2003:78). Woodman and Hardy (2003:452) stated that cognitive anxiety has a negative effect on sport performance.

According to Weinberg and Gould (2003:93) there are two reasons why anxiety affect athletic performance namely the physiological changes such as tension, increased muscle tension, poor coordination and concentration and attention changes as well as changes in visual patterns. Hall and Kerr (1997:36) state that a low perceived ability in youth sport participants cause them to experience higher anxiety especially in competition. To support youth sport participants to cope with this anxiety and not withdrawing from competition coaches need to manage competition carefully.

2.7.5 Concentration

Concentration has been referred to as a very influential SPS because of the effect and control it has on other SPSs and it can eliminate negative reactions (Karageorghis & Terry, 2011:243).

Concentration is when a sport participant can stay focused on the task at hand either in practice or competition despite changes in the surroundings (Smith & Christensen, 1995). Concentration is dynamic and changes as the stimuli changes but the athlete needs to concentrate on the most relevant stimuli to be effective and will be ineffective if it is divided or influenced by inappropriate stimuli (Karageorghis & Terry, 2001:144). Selectivity is one of the dimensions of concentration. The brain receives a number of different stimuli in any situation and the sport participant consciously or unconsciously selects which stimuli to focus on and this might lead to a slip of concentration (Karageorghis & Terry, 2011:145). Concentration is a crucial psychological skill in all phases and aspects of sport and a slight loss of concentration can cause failure to perform (Dosil, 2006:275). Dosil (2006:141) also highlights the importance of concentration in football and states that the selectivity of concentration is very important as athlete receives various different stimuli during football match.

2.7.6 Motivation

Every athlete or person involved in sport or sporting environment knows the importance of motivational influences on the outcome of athletic performance (Leuens, 2008:87). Motivation is a SPS that is influenced by a variety of internal and external factors and that is why a specific definition is difficult to be set (Martens, 1987:18). According to Roberts (1992:5) 'motivation refers to those personality factors, social variables, and/or cognitions that come into play when a person undertakes a task in which he or she is evaluated, enters into competition with others, or attempts to attain some standard of excellence'. Achievement motivation is described by Tod *et al.* (2010:31) as the motivation that is experienced because of the drive to achieve success, master a skill or even to obtain a certain behavior, in other words setting a specific goal to achieve. According to Karageorghis and Terry (2011:33) motivation can be divided into two main categories namely external and internal motivation.

Internal motivation is when an athlete is motivated to participate and perform because of self-drive and achievement where external motivation is when an athlete finds motivation from external factors such as winning, medals or external rewards (Karageorghis & Terry, 2011:33). The difference between self-motivation and internal motivation is that internal motivation is not subjected to not have the pressure of performance and refers to pure enjoyment or interest (Karageorghis & Terry, 2011:33). Galucci (2008:36) identifies another category of motivation namely amotivation which means the absence of motivation. This usually happens when an

athlete quits since athlete do not perform or improve or sedentary people that show no motivation towards exercise (Galucci, 2008:36). Athletes that are externally motivated experience more anxiety and the absence of concentration because of too much focus on the outcome for example winning, whereas internally motivated athletes enjoys sport more than externally motivated athletes (Galucci, 2008:37). According to Silva (2006:216) motivation is a SPS that is associated with talented handball players older than 15 years.

2.8 Sport psychological skills and gender

Although a substantial amount of research examined the psychological skills of adult athletes (elite and non-elite) limited research exists regarding the gender differences in the sport psychological profile of adolescent athletes. Although few physical and biological significant differences between male and female adolescents have been identified it appears that differences regarding cognitive abilities and skills also exist (American Psychological Association, 2002:11).

According to Elferink-Gemser and co-workers (2005:95) male adolescent sport participants (14.8 years) obtained higher scores in sport psychological skills such as confidence, anxiety control, mental preparation and imagery while female youth sport participants outscored their male counterparts in concentration (Grossbard *et al.*, 2009:160). Furthermore, female adolescent sport participants in individual and team sports used more planning, communication and technique orientated coping compared to their male adolescent counterparts (Nicholls *et al*., 2009:1524). In addition, Nicholls *et al.* (2009:1527) found that adult females use emotionally driven coping more frequently while males tend to make use of problem orientated coping. According to Katsikas *et al*. (2009:35) female track and field athletes showed less emotional control and relaxation compared to their male counterparts.

Although only a few studies could be found regarding gender differences in the SPSs of adolescents, it is clear from the above discussion that male and female sport participants make use of different SPSs.

2.9 Conclusion

From the literature overview, it is clear that TID is influenced by various factors namely biological maturation, heredity and genetic factors, social factors, anthropometrical, gender, physiological and psychological aspects. Therefore, it is clear that TID is very complex process. Literature further indicated that cognitive development occurs during the adolescent phase and the adolescents' thoughts develop from concrete thinking to a more mature, analyzing and logical manner of thinking (Louw *et al.,* 2005:418). Moreover, the literature study brought to light that the sport psychological profile of the sport participating adolescent is not a well-studied subject. And since this is a critical phase for TID regarding selection it is important to take note of the sport psychological profiles of talented adolescents.

The SPSS that are highlighted across most sporting codes as being part of successful athletes' profile and important for performance are goal setting, concentration, confidence, imagery, low anxiety and high motivation. What cannot be discounted, however, is that there is a correlation between these SPSS and sport performance. The absence of these sport psychological skills will consequently have a negative effect on sport performance.

According to Fraser-Thomas and Cote (2006:20) when scientists, coaches and experts can work together in a mutual way towards the same goal, youth will experience sport more positively. Especially with regards to their development (physical, mentally and socially) there will be a positive shift and sustained participation in sport either professional or recreational.

With this above mentioned statement and the literature background it is very important to approach the adolescent sport participant with a holistic view and acknowledge all the factors which might have an influence in TID. A discussion with regards to certain aspects found from the literature study will subsequently follow in the next two chapters and focus on the SPSS talented sport participating adolescents.

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CHAPTER 3

SPORTPSYCHOLOGICAL CHARACTERISTICS OF TALENTED 13-YEAR OLD ADOLESCENTS

3 SPORT PSYCHOLOGICAL CHARACTERISTICS OF TALENTED 13-YEAR OLD ADOLESCENTS

Title:

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Sport psychological characteristics of talented 13-year old adolescents

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Abstract

Objective - To determine whether there is a difference between the sport psychological skills of 13-year-old talented and less talented sport participants.

Method - 162 grade 8 learners (79 boys and 83 girls) participated in the study. Participants were subjected to the Australian Talent Search protocol and completed the Athlete Coping Skills Inventory for Sport (ACSI-28) (Smith et al., 1995). Statistical Package for the Social Sciences (SPSS) was used to categorize the group in a talented group (TG) (n=16) and a less talented group (LTG) (n=146).

Results - The TG obtained higher means in all 7 sport psychological skills

Conclusions - From the results of this study it is clear that talented adolescent sport participants have significantly better sport psychological skill compared to their less talented counterparts.

Keywords: adolescent; athletes; elite; talent identification; sport performance

Sport plays an important role in modern society and is a cultural phenomenon, irrespective of ethnicity, geographical location or politics (Headly, 1993). The important role of sport in South Africa is evident from its prominence in newspapers, sports channels and television programs and also from the high attendance rate of spectators at sport events, despite television broadcasting of the games. The importance of sport performance, but also the talent of the South African population, is unmistakable from the fact that South Africa won the Rugby World Cup in 1995 and 2007, the African Soccer Trophy in 1996 and more recently the excellent performance of South African swimmers Chad le Clos and Cameron van den Berg at the 2012 Olympic Games.

Every athlete strives to achieve excellence in the sport he/she participates in. Successful performance in sport has a strong positive correlation with the accumulated hours of practice (Goncalves, Coelho-e-Silva, Carvalho, & Goncalves, 2011). According to the 10 000 hour rule, it can take an athlete up to 10 years or 10 000 hours to reach his/her full potential (Ericsson, Prietula, & Cokely, 2007). Therefore, sport talent identification should commence relatively early in a sport participant's life in order to optimize their sporting talent (Pienaar & Viljoen, 2010).

The South African Government, in collaboration with the Department of Basic Education, Sport and Recreation South Africa and the National Sport Council (NSC), emphasize the identification of talent in sport (Department of Basic Education & Sport and Recreation South Africa, 2009). The aims are that talented learners from all backgrounds must be identified early and be nurtured as well as given the opportunity to progress to an elite level (Department of Basic Education & Sport and Recreation South Africa, 2009). In the new National sport and recreation plan (2011) the fourth strategic objective is to identify and develop talented athletes by means of the implementation of a structured system. The document also states that an effective talent optimisation programme will certainly lead to successful sporting teams, federations and nation. It is furthermore emphasized in the document that a proactive approach needs to be implemented to identify, select and develop talent to ensure that South African sport can progress. Various studies have been conducted in South Africa on talent identification and development in adolescents (Badenhorst, 1998; Du Randt & Headly 1993; Hare, 1997; Nieuwenhuis, 1999 & Nieuwenhuis, Spamer & Van Rossum, 2002; Pienaar, 1987; Pienaar & Spamer, 1995, 1996, 1998; Pretorius, 1996; Van der Merwe, 1997). These studies included sport codes such as athletics, gymnastics, rugby, soccer and hockey.

Most of the above mentioned models focus mainly on anthropometric and physical aspects and do not mention the psychological aspect or little of the contribution of sport psychology to the success in sport. Since 2003 not much was found in research with regard to talent identification models in South Africa. Durandt, Parker, Masimla, and Lambert (2011) mentioned that rugby in South Africa uses tournaments for talent identification and development. Durandt et al. (2011) mention that the traditional models, popularised in the 80's and 90's are now being challenged as it is not just about the inborn abilities, but also the environment in which these inborn abilities develop. Therefore a model which keeps all the aspects (physical and psychological) in mind, as well as the different development stages in each aspect (age specific) needs to be followed in South Africa.

Performance in sport depends on physical, morphological, environmental, perceptual-motor factors, as well as psychological factors (Booysen, 2007). Various sport psychological skills (SPSs) are associated with performance in sport such as goal setting, confidence, coachability and freedom from worry (Cox, Shannon, McGuire, & McBride, 2010). In order to engage in a demanding, all year round training program participants also have to be highly motivated (Goncalves et al., 2011). A study conducted on talented handball players older than 15 years revealed that motivation is associated with talent in the sport (Silva, 2006). Various researchers further indicated that a mastery achievement orientation is crucial for overcoming difficult motor tasks (Duda, 2001; Roberts, 1992) and a competitive ego achievement orientation may improve enjoyment in practice and the drive to continue with sport (Sarrazin & Guillet, 2001; Sage & Kavussanu, 2007). A study on Greek track and field athletes identified goal setting as an important SPS which discriminates between successful and less successful athletes (Katsikas, Argeitaki, & Smirnitiou, 2009). Confidence is also a SPS associated with successful adult athletes and several researchers supported this notion that successful adult athletes have a higher level of confidence compared to their less successful counterparts (Cox et al., 2010; Zinsser, Bunker & Williams, 2010; Gill & Williams, 2008; Andrew, Grobbelaar, & Potgieter, 2007; Woodman & Hardy, 2003). Gezci, Toth, Sipos, Fugedi, Dancs, and Bognar (2009) found in a study on national young ice hockey players that anxiety control is a characteristic of talented players and that the talented group revealed high scores on the coachability subscale of the Athletic Coping Sport Inventory-28. Freedom from worry was further identified as a significant differentiating variable between successful and less successful u/18 ice hockey players (Geczi et al., 2009).

From the above mentioned literature it is clear that psychological factors play an important role in physical activity and sport performance.

Despite the fact that literature emphasizes the importance of sport psychological aspects for sport performance as well as development, only a few TID studies have taken sport psychological skills into consideration in their models (Pienaar & Spamer, 1995, 1996, 1998; Badenhorst, 1998; Nieuwenhuis et al., 2002).

The aim of this study is therefore to determine the possible differences in the sport psychological skills of talented and less talented youth sport participants. The results of such an investigation could be of great value to the Sport Science community and could be used to support the importance of the inclusion of sport psychological skills in TID models and intervention programs specific for adolescent sport participants. Furthermore it can assist coaches to make more effective predictions of the future success of adolescents in a specific age group. A more detailed and specific selection profile that can be used for the identification and development of an athlete will also help the club/institution to save expenses by investing in the 'most likely to perform' athlete.

Methods

Research design

A quantitative cross-sectional research design was used in which the data was obtained by means of a set of questionnaires and a TID protocol consisting of anthropometrical, physical and motor tests.

Participants

A convenience sample of all the grade 8 pupils (N=204) with a mean age of 13.2±0.33 years from a High School in Potchefstroom in the North-West province of South Africa, whose parents gave consent, voluntarily participated in the study. The principal of the school as well as each learner gave written informed consent for the study. The group consisted of 99 boys and 105 girls. Only the results of the adolescents who participated in sport (n=162) were used for the purpose of this study. The data of the non-participating subjects was omitted from further analysis. The Statistica for Windows computer programme (StatSoft, 2010) was used to categorize the participants into a talented (TG) and less talented group (LTG) according to the median split of all the physical and motor tests of the TID protocol. Those participants who were

above the median in all eleven of the physical and motor tests were regarded as the more talented group. The median split resulted into a talented group of 16 adolescents (7 girls and 9 boys) and a less talented group of 146 (76 girls and 70 boys). The participants had the right to withdraw from the research project at any time without giving an explanation.

Test procedures

For the purpose of this study, only the baseline data of the first year of a 3 year longitudinal study (2010-2012) was used. The test procedure was conducted in January 2010 during school hours. The tests took place at the Human Movement Science Building at the Potchefstroom campus of the North-West University. Two questionnaires (a demographic and sport psychological questionnaire) were completed in approximately 30-45 minutes. The participants also had to state their top performance in sport at school level. Upon completion of the questionnaires the participants were subjected to the anthropometrical measurements. After the anthropometrical measurements the participants were subjected to the physical and motor tests. Ethical approval for this study was obtained from the Ethical Committee (NWU-00142-11-A1) of the Potchefstroom Campus of the North-West University.

Questionnaires

Demographic, general information, sport and training habits, physical activity and maturity determination questionnaire.

A questionnaire was developed in which participants had to provide the following information:

- Name and surname;
- An indication of the participants' general level of physical activity over the past three months;
- An indication of the participants' physical activity level in comparison with their friends' levels of physical activity;
- An indication of the participants' involvement in an organized sport and training program during the previous six months;
- An indication of the participants' opinion with regards to his/her level of physical activity;
- An indication of what the participant did during the previous seven days;
- An indication of the reasons, if the participant felt he/she was not physically active enough;
- An indication of the type of transport the participant uses to get to school;
- An indication of the sport the participant currently participates in;

- The best performance/s that the participants achieved in their sport;
- An indication of the participants' three favorite sports;
- An indication of injuries the participant obtained during his/her sport participation.

Sport psychological skills questionnaire

The sport psychological skill level of each participant was measured by means of the Athletic Coping Skill Inventory for Sport (ACSI-28) of (Smith, Schutz, Smoll, & Ptacek, 1995). The ACSI-28 questionnaire consists of 28 statements measuring 7 subscales namely: coping with adversity, peaking under pressure, goal setting, concentration, freedom from worry, confidence, ability to be coached and an average coping ability score can also be derived (average value of the seven subscales). Each of the seven subscales is scored according to a 4-point Likert scale ranging from 0 (*never*) to 4 (*always*). In some cases, reverse scoring applies and the subscale scores are expressed as a percentage in which higher values reflect better sport psychological skill levels. The test-retest reliability of the ACSI is r = 0.84 (Smith et al., 1995).

Talent Identification Battery (physical and motor ability tests)

All the participants were subjected to the 'Australian Talent Search Protocol'. This is an existing Australian protocol used for the identification of general sports talent. This protocol consists of 10 tests which includes anthropometrical, physical and motor ability tests. The anthropometrical measurements were body mass, stature, sitting height and arm span. The physical and motor tests in this protocol included: basketball throw, throw and catch, vertical jump, 40m sprint, agility run and aerobic endurance.

Anthropometric measures

The anthropometrical measurements for stature and body mass were obtained according to the measuring procedures of the International Society for the Advancement of Kinanthropometry (ISAK) (Marfell-Jones, Olds, Steckler, & Carter, 2006) while for sitting height and arm span the procedure as described by Simons (2000) was used.

Stature was measured with a stadiometer (Seca Stadiometer 217). The participants had to stand upright with hands hanging at the sides and the head in the Frankfort plane. The Frankfort plane is an imaginary line passing through the external ear canal and across the top of the lower bone of the eye socket, immediately under the eye.

Body mass was measured with a weight scale (Beurer PS 07 Personal scale). The participant had to stand with minimum movement with his/her hands by his/her side and shoes and excess clothing removed.

Sitting height was measured using the stadiometer (Seca Stadiometer 217) and the participant sitting flat on the base plate with his/her legs pulled towards the buttocks.

For arm span, a measuring-tape was fixed on a wall at shoulder height of each participant. The zero end was in the corner of the room. Participants had to stand as near as possible facing the wall with their heads turned to the right with their arms stretched out along the measure tape. The left middle finger with open hand was in the corner on the zero of the tape. The reading was taken at the end of the right hands' middle finger on the measure tape.

Physical and motor tests:

Basketball throw: This test determines explosive upper body power. The subject sits with his/her back and buttocks against a wall with the legs straight and slightly apart. A maximal push from the chest is executed by keeping the shoulders and back against the wall while straightening the arms during each attempt. Each subject had two trials and the best attempt was recorded.

Throw and catch: The purpose of this test is to measure the subject's hand-eye-coordination. A circular target (30 cm in diameter) is fixed against a wall with the bottom edge at the level of the subject's shoulder. A line, 2.5 meters from the wall, is marked on the ground. The subject stands behind the line facing the wall. A tennis ball is thrown with the dominant hand to the target and the subject has to catch the tennis ball with the same hand. Practice trials should be allowed until the subject understands what he/she has to do. The throw should be executed by an underarm throw and the ball is not allowed to bounce. A successful throw was considered as one that hits the target and was then successfully caught again. Ten attempts were executed by throwing and catching with the dominant hand and 10 attempts throwing with the dominant hand while catching with the non-dominant hand. The total for the left and right sides was calculated.

Vertical jump: Explosive power of the lower body was determined by means of the vertical jump test. Each subject had to stand flat footed and had to reach as high as possible with the preferred hand while the feet remained flat on the ground. A measure tape was fixed against the wall. The reach height was firstly recorded. The subject then moved into a crouch position (depth doesn't matter) and then jumped as high as possible to touch the wall at the highest point.

The subject had two attempts and the highest score was recorded. The vertical jump score was then determined by subtracting the reaching height from the best jumping height.

Speed: The sprint test requires from the subject to run at maximum speed from point A to point B in a straight line. Each subject was given one trial run and two test runs. The subject had to start on the 0m mark and a flying start was not allowed. The subject had to start on his/her own time. The maximum speed test was done across 0-5; 0-10; 0-40m and electronic speed lights were used to record the time. Smartspeed® timing gates were used (Fusion Sport Smart Speed, Brisbane, Australia).

Agility run: Agility was measured by an agility run. Parallel markers were placed 5m apart. The subject had to stand behind one line facing the other with the front foot exactly on the line. On the command of the tester the subject had to run to the opposite marker as fast as possible, pivot and return to the starting position, which represents one set. The subject had to touch behind the line with both feet each time except for the last when the subject had to run past the finish line without slowing down. The tester started the stopwatch on the command and stopped when the subject crossed the line after 5 sets. Two trials were allowed for each subject and if the subject slipped he/she had to stop and repeat the test. The best time of the two attempts was recorded.

Cricket ball throw: Arm speed and shoulder strength is measured by the cricket ball throw test and consists of two maximum attempts. The subject takes a 20m run-up before throwing a standard cricket ball as far as possible with the preferred hand. The subject had to run towards the marker that indicated the point of release and then release the ball while performing a maximum attempt. The better of 2 attempts was recorded.

Beep test: The Beep test was done to determine the aerobic capacity/fitness of the subjects. The test is executed across a marked distance of 20m. This test required the subject to run back and forth between two parallel lines until the next beep sounded. At the start the subject stood behind the line facing the opposite line and had to start running when instructed by a prerecorded CD. If the line was reached before the beep sounded, the subject had to wait until the beep sounded. The speed at the start is quite slow but increases as the time intervals get shorter and the levels increase (Baumgartner, Jackson, Mahar & Rowe, 2007). If the line was not reached in time for a beep, the subject received a warning. The participant was not allowed to start before the beep, turn short at the beacon or reach the beacon after the beep. If any of the above mentioned occurred, the participant was also warned. The participant was allowed two warnings. The test was stopped if the subject failed to reach the line or was warned for the third time. The subject had to reach the markers in time as the pace increased and when the participant failed to reach the level, the previous level which was completed successfully was recorded. The participants executed the test bare feet. Participants were encouraged by data collectors.

Statistical procedures

The Statistical Consultation Services of the North-West University determined the statistical methods and procedures for the analyses of the data. The descriptive statistics (standard deviations, mean, minimum and maximum values) of each test variable was calculated using Statistica for Windows computer programme (StatSoft, 2010). The talented group was identified as the subjects who scored above the median for all physical and motor tests. The group identified as talented was compared with the less talented group according to the SPSs by means of an independent t-test using SPSS for Windows (Version 15.1). The practical significance of differences between the talented and less talented group was determined by means of effect sizes (ES). Effect sizes were expressed as Cohen's d-value and can be interpreted as follow: ES of ±0.8 is large, an ES of ±0.5 is moderate and an ES of ±0.2 is small (Thomas & Nelson, 2001). The gender difference was taken into account by calculating each gender's median split separately to determine the talented subjects in each gender group.

Results

Table 1 represents the demographic information of the participants. It is clear that the talented boys and girls had a significantly higher general physical activity level than their less talented counterparts. Furthermore, none of the less talented boys and girls recorded top performances in any sport. The participants across the 'Did not participate' heading were the subjects that did not participate in sport and were removed from further data analysis.

Table 1: Demographic information and sport participation characteristics of the group

Group	**N**	**Mean Physical Activity Level**	**Participated in organized sport for last 6 months**	**Top Performance* (first/inter)**
Talented Boys	9	4.67	9	7
Less Talented Boys	90	3.87	76 14 Did not participate	No top performance in this group
Talented Girls	7	4.43	7	6
Less Talented Girls	98	3.49	70 28 Did not participate	No top performance in this group

Activity level: 1=Inactive 2=Not very Active 3=moderately active 4=Active 5=Very active; *Top performance was defined as being part of a first team of the chosen sport or competing in inter-high school competition.

In table 2 the descriptive statistics of the physical and motor tests for the talented (A) and the less talented (B) groups are presented.

Table 2: Descriptive statistics of physical and motor tests of the group

Variable	Group	N	Mean	Minimum	Maximum	SD
Mass	A	16	54.89	43.40	73.40	73.30
	B	146	55.43	35.70	103.30	11.13
Stature	A	16	167.16	155.70	178.70	7.36
	B	146	161.66	142.00	186.10	8.01
Sitting height	A	16	84.16	77.70	90.00	3.41
	B	146	81.86	71.30	97.60	4.37
Arm span	A	16	170.31	156.70	184.50	9.09
	B	146	163.76	146.10	188.00	8.39
Basketball push	A	16	6.66	5.33	7.90	0.88
	B	146	5.56	3.10	8.43	0.98
Cricket ball throw	A	16	43.96	24.10	68.80	12.78
	B	146	30.87	9.29	65.90	12.43
Throw and catch (left)	A	16	6.06	2.00	10.00	2.69
	B	146	4.08	0	9.00	2.32
Throw and catch (right)	A	16	5.19	1.00	9.00	2.10
	B	146	2.69	0	9.00	2.15
Throw and catch (total)	A	16	11.25	5.00	17.00	3.19
	B	146	6.76	0	18.00	3.85
Vertical jump	A	16	39.81	32.00	54.50	6.58
	B	146	32.38	16.50	49.50	6.01
Agility	A	16	18.74	17.50	19.58	0.69
	B	146	20.32	17.01	24.88	1.34
Speed (10m)	A	16	1.96	1.74	2.10	0.09
	B	146	2.13	1.76	2.61	0.15
Speed (40m)	A	16	6.09	5.68	6.65	0.29
	B	146	6.85	5.48	9.32	0.65
Beep Test	A	16	8.39	5.50	11.30	1.42
	B	146	5.84	1.50	11.10	1.92

$p \leq 0.05$ = statistically significant; Effect size: *=small; **=medium; ***=large; Group A=Talented group; Group B=Less talented group

The results in Table 3 show that the talented adolescents outscored their less talented counterparts in all seven sport psychological variables. The talented group obtained statistically significant better scores in 5 of the subscales (*coping with adversity* (p=0.0003), *peaking under pressure* (p=0.0123), *goal setting* (p=0.0190), *confidence* (p=0.0106), *coachability* (p=0.0001) and in the average *coping ability* (p=0.0001). Although *concentration* and *freedom from worry* did not statistically differ significantly between the two groups, the talented group revealed a better mean value in both sport psychological variables compared to the less talented group. Furthermore a small effect size was revealed for freedom from worry (0.19), and medium practical significance for four of the seven sport psychological variables namely *peaking under pressure* (0.63), *goal setting* (0.62), *concentration* (0.46) and *confidence* (0.68). Three of the sport psychological variable differences revealed a large practical significance namely *coping with adversity* (0.95), *coachability* (1.00) and *average coping ability* (1.03). In the table below a comparison of the sport psychological skills of talented and less talented adolescent sport participants is presented.

Table 3: Descriptive statistics and effect size results of the talented (A) and less talented (B) adolescent sport participants

Variable	**Group**	**N**	**Mean**	**SD**	**t-value**	**Df**	**P**	**Effect Size**
Coping with adversity	A	16	82.81	12.72	-3.68	160	0.0003*	0.95***
	B	146	65.98	17.77				
Peaking under pressure	A	16	70.83	26.35	2.53	160	0.0123*	0.63**
	B	146	54.28	24.65				
Goal setting	A	16	68.75	19.12	2.37	160	0.0190*	0.62**
	B	146	55.31	21.77				
Concentration	A	16	77.08	21.19	-1.96	160	0.0513	0.46**
	B	146	67.35	18.56				
Freedom from worry	A	16	56.25	20.97	-0.71	160	0.4805	0.19*
	B	146	52.23	21.67				
Confidence	A	16	86.98	17.20	-2.59	160	0.0106*	0.68**
	B	146	74.49	18.45				
Coachability	A	16	91.15	8.32	-3.93	160	0.0001*	1.00***
	B	146	73.52	17.69				
Average coping ability	A	16	76.26	8.83	-3.99	160	0.0001*	1.03***
	B	146	63.31	12.64				

p≤0.05 = statistically significant; Effect size: *=small; **=medium; ***=large; Group A=Talented group; Group B=Less talented group

Discussion

The main findings in this study were that the talented sport participants outscored their less talented counterparts in all seven sport psychological variables as well as in average coping ability. Furthermore the effect size results indicated large practical significance in 3 sport psychological variables (coping with adversity, coachability and average coping profile), medium practical significance in 4 sport psychological variables (peaking under pressure, goal setting, concentration and confidence) and small practical significance in 1 sport psychological variable (freedom from worry). These results are in agreement with studies that highlighted that sport psychological skills are important for successful performance in sport and that a difference exists between successful and less successful athlete sport participants' sport psychological skills that they exhibit (Elferink-Gemser, Visscher, & Lemmink, 2005; Krane & Williams, 2010).

Coping with adversity refers to when an athlete can stay emotionally stable and positive during competition despite changing situations (Weinberg & Gould, 2003). From the results it is clear that the talented group coped significantly better with adversity compared to the less talented group. Various research findings agree with the results of the current study by indicating that coping with adversity as a sport psychological skill is associated with talented athletes and successful performance, and can be regarded as a predictor of success in elite athletes (Gould, Eklund, & Jackson, 1992b; Gould, Guinan, Greenleaf, Medbery, & Peterson, 1999).

Peaking under pressure is defined by Bourgeois, Loss, Meyers, & Leuens (2003) as when an athlete performs well under pressure and experiences the situation as a challenge rather than a threat. Peaking under pressure is of great value to reach top performance in sport and will help athletes to cope in specific stressful situations. The ability to cope in a specific situation and in competition situations will help an athlete to avoid choking under pressure and will consequently lead to top performance (Vickers & Williams, 2007). In this study peaking under pressure differs statistically significantly ($p=0.0123$) between the talented and less talented adolescents and is therefore in line with the results of previous studies. Regular participation in high pressure situations might lead to the this higher value in peaking under pressure in talented group as well as the experience in high pressure situations which might lead to control of emotions.

Goal setting is an important SPS that might influence sport participants' performance and also has a positive effect on confidence, motivation and anxiety control independent of the age and skill level of the participant (Cox, 2007; Gould, 2010; Leuens, 2008). A goal is defined by

Locke, Shaw, Saari, & Latham (1981) as 'the object or aim of an action that an individual is trying to achieve'. The difference that was found with regard to goal setting is supported by the literature which indicated a significant difference between successful and less successful athletes (Cox et al., 2010; Katsikas et al., 2009; Weinberg & Gould, 2003). When an athlete sets goals and reaches it, it might lead to the motivation of setting more and regular goals and might lead to the reason of the higher value for goal setting in talented group.

Concentration is regarded as a very influential psychological skill due to the effect and control it has on other psychological skills such as anxiety and if an athlete stays concentrated on the task at hand it can eliminate negative reactions (Karageorghis & Terry, 2011). Concentration is important when unexpected situations occur and the athlete can focus on the task at hand and not be distracted (Bourgeois et al., 2003). Although concentration statistics did not differ significantly ($p=0.0513$), the talented group revealed a higher mean score, with a medium effect size, compared to the less talented group and it corresponds with previously reported results by Dosil (2006b) which regarded concentration as an important SPS for top performance. The ability to stay concentrated in various situations might be easier for talented athletes because of the exposure to different situations and won't find a lot of situations as unexpected and can stay focused.

Bourgeois et al. (2003) defines freedom from worry as when an athlete does not feel pressured to perform or what other people will think of him/her and does not become anxious in pressured situations. In other words, freedom from worry can be seen as the absence of anxiety. Cox et al. (2010) stated that anxiety is experienced when an uncertain situation arises and it is perceived as a threat.

According to Dosil (2006a) freedom from worry is a sport psychological skill that will ensure top performance in sport because an athlete is able to focus on his or her own ability which will eliminate the external pressure. Freedom from worry did not differ statistically significant but the talented group outscored the less talented group with regard to the mean score obtained. This is substantiated by Mummery, Schofield & Perry (2004) who found that successful adolescent swimmers scored slightly higher in freedom from worry compared to their less successful counterparts. The talented group might have less anxiety because of belief in ability and this can lead to freedom from worry.

Self-confidence can overcome the barriers that keep an athlete from performing and is regarded as a very important sport psychological skill (Karageorghis & Terry, 2011). Confidence levels that are low will lead to tiredness and low energy levels which are required for performance (Karageorghis & Terry, 2011). In this study the talented group outscored the less talented group with confidence. This higher value for the talented group might be the result of performance and achievements that leads to higher confidence.

Coachability is defined as the ability to handle constructive criticism and not take it personally, as well as the ability to listen to instructions and learn skills (Bourgeois et al., 2003). According to Cox et al. (2010) coachability is a significant predictor of performance in sport and it is supported by the results of this study in which the talented group obtained a statistical significantly ($p=0.0001$) higher score in coachability in comparison to their less talented counterparts. This outcome might be the result of coaches that handle certain situations and criticism better with athletes and handle criticism together with solutions. Respect for coaches from the athletes' point of view might also influence the coachability of athlete.

The higher score that the talented group obtained in the average coping profile in this study is supported by literature (Andrew et al., 2007) which was executed on 60 top ranked and 60 lower ranked u/19 rugby union players where the top ranked players scored a higher mean value than the lower ranked players in average coping ability.

Conclusion

The primary objective of this study was to determine if differences exist in the sport psychological skills profiles of talented and less talented adolescent sport participants. The results indicated that there is a significant difference in the sport psychological skill profiles of the talented and less talented adolescent sport participants. These differences also showed practical significance which ranged between large, medium and small effects. The talented adolescent sport participants outscored the less talented adolescent sport participants in all the sport psychological variables from which it can be concluded that adolescents with more sporting talent, have a better SPS make up to support them during participation in sport.

At present the literature contains insufficient data with regard to the sport psychological skills of adolescent sport participants which make the results of this study a valuable contribution to the field of sport psychology, although more investigation is still needed.

Findings from this study can, however, enable coaches, sport psychological consultants and Sport Scientists to identify talented adolescents based not just on anthropometrical, physical and motor abilities, but also on sport psychological abilities, which play a significant role in sport performance and support a holistic approach in the identification and development of talented athletes. This study supports the importance of sport psychological skills and provides a foundation for further investigation into the contributing factors for excellence during adolescent sport participation.

Despite the benefits of the study, some limitations were also identified. Since the subject group was not randomly selected, effect sizes (ES) were used to determine the practical significant differences between the two groups. Therefore, caution should be taken when generalizing the results of this study to other adolescent sport participants. The study was also confined to no specific community or culture so the findings can also not be generalized to all cultures since all cultures were not equally represented.

It is therefore recommended that future research on adolescents should include different cultures, genders, different sporting codes and also that the participants should be randomly selected. It is also recommended that longitudinal studies be executed on adolescents to investigate the development of sport psychological skills among this specific population.

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CHAPTER 4

GENDER DIFFERENCES IN THE SPORT PSYCHOLOGICAL SKILLS PROFILE OF ADOLESCENT SPORT PARTICIPANTS

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Title:

Gender differences in the sport psychological skills profile of adolescent sport participants

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Gender differences in the sport psychological skills profile of adolescent sport participants

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Abstract

Objective - The aim of the study is to determine the difference in sport psychological skills between male and female adolescents sport participants.
Method - A quantitative cross-sectional research design with a convenient sample was used in which the data was obtained by means of a set of questionnaires. 162 grade 8 learners (77 boys and 85 girls) participated in the study. Gender differences were analyzed using an independent t-test, while effect sizes (d) were calculated to determine practical significance.
Results - Male and female groups did not differ significantly in any of the 7 subscales for sport psychological skills but a small practical significant differences were observed.
Conclusions - From the results of this study one can assume that 13 year old males and females exhibit the same sport psychological skills and can therefore be treated as a homogeneous group and be subjected to the same mental skills training program.

Keywords: adolescent; athletes; gender; talent identification; sport psychological skills

It is well known that successful athletes differ from less successful athletes regarding their sport psychological skills (Anshel, 2003, Elferink-Gemser, Visscher, & Lemmink, 2005; Krane & Williams, 2010). Despite the differences regarding the sport psychological skills, gender is also an important interpersonal factor in competitive sport that needs to be taken into account when dealing with male and female sport participants (Katsikas, Argeitaki, & Smirnitiou, 2009). Female adolescents need to deal with cognitive, social, emotional and biological puberty earlier than male adolescents (Hess & Ricards, 1999), which might contribute to female adolescents developing coping skills at a younger age compared to their male adolescent counterparts (Nicholls, Polman, Levy, Taylor, & Cobley, 2007). In addition, there is growing evidence that the maturational brain processes develop continuously during adolescence (Paus, 2005). The development of the brain (behavioral and cognitive systems) mature at different rates as a result of general and independent biological processes (Steinberg, 2005). Therefore, male and female adolescent sport participants might experience situations differently and respond accordingly on certain events. Regarding adolescents' cognitive development certain cognitive abilities and skills such as reasoning, way of thinking and confidence show distinct differences between gender (American Psychological Association, 2002). Although there are a number of variables that influence how the sport participant copes with competitive stress, gender might also be an important variable which can influence the way sport participants deal with stress (Anshel & Porter, 1996; Giacobbi & Weinberg, 2000; Ntoumanis & Biddle, 2000).

Elferink-Gemser and co-workers (2005) found that sport participants of different genders of similar ages (14.8 years, *sd*= 1.5) outscored one another in different sport psychological skills such as confidence, anxiety control and mental preparation where the males scored higher values which might be an indication that males and females at this specific age develop differently with regards to their sport psychological skills. Furthermore, female youth sport participants outscored their male counterparts regarding concentration (Grossbard, Smith, Smoll, & Cumming, 2009), while male adolescent sport participants in field hockey, basketball, volleyball, speed skating, and swimming achieved a significantly higher score regarding the use of imagery compared to their female adolescent counterparts (Nicholls et al., 2007, Elferink–Gemser et al., 2005).

Due to the limited number of studies regarding gender differences in adolescents' sport psychological skills similar studies on adult sport participants are also reported. Adult female sport participants showed more cognitive anxiety than their male counterparts and female

athletes are also more goal orientated and focus more on personal goals and performance whereas males tend to be more outcome orientated and more focused on competition and comparison with other athletes (Jones, Swain, & Cale, 1991; Katsikas et al., 2009). Adult female track and field athletes with a mean age of 18.9 ± 3.9 years showed less emotional control than their male counterparts (Katsikas et al., 2009). In addition, Nicholls et al. (2007) indicated that adult females are more likely to use coping driven by emotion, while males tend to make use of problem orientated coping.

Although a substantial amount of research exists with regards to the importance of sport psychological skills for successful performance in sport, only limited research focused on the differences in the sport psychological skills of male and female sport participants, especially during adolescence. To date no research on a South African adolescent population regarding gender differences in sport psychological skill profiles could be traced. From the abovementioned literature, it seems that male and female sport participants experience and deal differently with stress and anxiety relating to competition and might therefor make use of different sport psychological skills.

It is important for sport psychological consultants to know whether adolescent males and females perceive and cope with situations in sport differently or in similar ways to assist accordingly. Therefore, the aim of the study is to determine the difference in sport psychological skills between male and female adolescents sport participants. If there is an evident difference regarding the experience and coping of competition between genders it can help coaches and other sport practitioners to cognitively prepare the athlete according to their gender specific needs to cope better during competition and thus optimize performance.

Methods

Research design

A quantitative cross-sectional research design with a convenient sampling was used in which the data was obtained by means of a set of questionnaires. For the purpose of this study, only the baseline data (2010) of a 3-year longitudinal study (2010-2012) was used. The aim of the larger longitudinal study was to determine growth, motor and psychological changes over a 3-year period during the mid-adolescent period (grade 8 to 10).

Participants

All the grade 8 pupils (N=204) with a mean age of 13.2 ± 0.33 years from a High School in Potchefstroom in the North-West province of South Africa voluntarily participated in the study. The total group consisted of 99 boys and 105 girls. Only the results of the adolescents who participated in sport were used for the purpose of this study. The data of the non-participating subjects were subsequently omitted from further analyses and resulted in 162 subjects, with 77 males and 85 females.

Test procedures

Ethical approval for this study was obtained from the Ethical Committee (NWU-00142-11-A1) of the Potchefstroom campus of the North-West University. The principal from the participating school also gave permission for the study. Informed consent was provided by the parents as well as each participant. The testing was conducted in January 2010 during school hours at the testing laboratories of Phasrec at the Potchefstroom campus of the North-West University. Two questionnaires were completed by the participants (demographic and sport a psychological questionnaire). A detailed explanation was given on how to complete the questionnaires and the participants were ensured about the confidentiality of their results. The participants had the right to withdraw from the research project at any time without giving an explanation. The questionnaires were completed in approximately 30-45 minutes. A sport psychological consultant was present during the duration of the completion of the questionnaires to explain any unfamiliar terms and answer any questions.

Questionnaires

Demographic, general information, sport and training habits, physical activity and maturity questionnaire.

A questionnaire was developed in which participants had to provide the following information:

- Name and surname;
- An indication of the participants' general level of physical activity over the past three months; (Activity level: 1=Inactive, 2=Not very active, 3=Moderately active, 4=Active, 5=Very active)
- An indication of the participants' physical activity level in comparison with their friends' levels of physical activity;

- An indication of the participants' involvement in an organized sport and training program over the last past six months;
- An indication of the participants' opinion with regards to his/her level of physical activity;
- An indication of what the participant did physically the last past seven days;
- An indication of the reasons, if the participant felt he/she was not physically active enough;
- An indication of the type of transport the participant uses to get to school;
- An indication of the sport code/s the participant currently participate in;
- The best performance/s that the participant achieved in their sport (eg. school team, provincial, national);
- An indication of the participants three favorite sports;
- An indication of an injury the participant gained during his/her sport participation.

Sport psychological skills questionnaire. The sport psychological skill level of each participant was measured by means of the Athletic Coping Skill Inventory (ACSI-28) developed by Smith, Schutz, Smoll, & Ptacek (1995). The ACSI-28 questionnaire consists of 28 statements measuring 7 subscales namely: coping with adversity, peaking under pressure, goal setting, concentration, freedom from worry, confidence, ability to be coached and an average coping score can also be derived (average value of the seven subscales). Each of the seven subscales consist of a 4-point Likert scale ranging from 0 (*never*) to 4 (*always*). In some cases, reverse scoring applies and the subscale scores are expressed as a percentage in which higher values reflect better sport psychological skill levels. The test-retest reliability of the ACSI is r = 0.84 (Smith et al., 1995).

In the current study, the Cronbach alpha coefficient was 0.81, which suggest good internal consistency reliability for the scale with our sample.

Statistical procedures

The Statistical Consultation Services of the North-West University determined the statistical methods and procedures for the analyses of the data. The descriptive statistics (standard deviations, means, minimum and maximum values) of each variable was calculated using SPSS for Windows (Version 15.1). An independent t-test was used to determine the statistical significance of differences between the male and female adolescent sport participants. The practical significance of differences between the male and female group was determined by means of effect sizes (ES). Effect sizes were expressed as Cohen's d-value and can be interpreted as follow: ES of ±0.8 is large, an ES of ±0.5 is moderate and an ES of ±0.2 is small (Thomas &

Nelson, 2001). Practical significance was used to determine if a difference is large enough to be of value in practice. Practical significance was also used because of the convenience sample that was used in the study.

Results

Table 1 presents demographic information of the sport participants. The demographic information consists of the number of participants, the mean age, physical activity level and the number of top performances in each group. The average activity level of the male sport participants is 3.52 which revealed a moderately active to active level whereas the female group revealed a 3.55 activity level which is slightly higher but also between the moderately active to active level. The sport codes in which the subjects participated in were athletics, rugby (only males), hockey, netball (only girls), cricket (only boys) and tennis. The best performance's criteria was either being part of the first team of the school in the chosen sport or competing in Inter High athletics competition where the top athletes of 5 specific high schools of the North-West Province (South Africa) compete against each other. 7 males and 6 females reached this best performance criterion. In this study all the adolescent whom participated in sport were included in this study. The group consisted of 77 boys and 85 girls with a mean age of 13.63 for the boys and 13.68 years for the girls.

Table 1: Demographic information of the sport participants

Group	N	Mean age	Mean physical activity level	Participated in organized sport for last 6 months	Best performance*
Boys	77	13.63	3.52	77	7
Girls	85	13.68	3.55	85	6

Activity level: 1=Inactive 2=Not very active 3=Moderately active 4=Active 5=Very active *In this table, top performance was as being part of a first team of the chosen sport or competing in inter-high school competition

Table 2 presents the descriptive results of the sport psychological skills of the male and female adolescent sport participants and the significant differences between the two groups.

Table 2: Descriptive statistics and significance of differences between genders in SSS

Variable	Group	N	Mean	SD	t-value	df	p-value	Effect Size
Coping with adversity	M	77	69.02	17.67	- 1.09	160	0.2754	0.17*
	F	85	69.12	18.31				
Peaking under pressure	M	77	57.90	25.07	0.95	160	0.3420	0.15*
	F	85	54.12	25.38				
Goal setting	M	77	58.33	21.33	0.94	160	0.3480	0.15*
	F	85	55.10	22.31				
Concentration	M	77	67.75	17.80	- 0.36	160	0.7202	0.05*
	F	85	68.82	20.09				

p<0.05 = statistically significant; M=Male; F=Female; N=number of participants; SD=standard deviation; df=degrees of freedom; *= small effect size; ** = medium effect size; * = large effect size**

Table 2 (cont.): Descriptive statistics and significance of differences between genders in SSS

Variable	Group	N	Mean	SD	t-value	df	p-value	Effect Size
Freedom from worry	M	77	54.65	19.75	1.14	160	0.2555	0.17*
	F	85	50.78	23.06				
Confidence	M	77	76.08	17.80	0.23	160	0.8149	0.04*
	F	85	75.39	19.50				
Coachability	M	77	74.13	14.72	- 0.76	160	0.4458	0.11*
	F	85	76.27	20.19				
Average coping ability	M	77	64.98	12.03	0.37	160	0.7120	0.05*
	F	85	64.23	13.68				

p<0.05 = statistically significant; M=Male; F=Female; N=number of participants; SD=standard deviation; df=degrees of freedom; *= small effect size; ** = medium effect size; * = large effect size**

Table 2 indicates that the male and female adolescent sport participants did not differ significantly in any of the 7 subscales or average coping ability. However, a trend could be observed where the male group obtained better mean scores in *peaking under pressure*, *goal setting*, *freedom from worry*, *self-confidence* and *average coping ability*. The female group outscored the male group in *coping with adversity*, *concentration* and *coachability*. The effect sizes for all 7 sport psychological subscales as well as average coping ability revealed small practical significant differences between the groups.

Discussion

The aim of the study was to determine if differences exist in the sport psychological skills of male and female adolescent sport participants. The main findings from this study were that there is no significant difference between the SPS of the two genders. However, the male group outscored the female group in 5 sport psychological variables but these differences were not significant on a statistical or practical level and are therefore only reported as trends. These skills were *peaking under pressure, goal setting, freedom from worry, confidence* and *average coping*

ability. The female group outscored the male group in 3 sport psychological skills namely *coping with adversity*, *concentration* and *coachability*. When an athlete can stay emotionally stable and positive during a competition despite changing situations it can be said that the athlete copes with adversity (Weinberg & Gould, 2003). From the results of this study it is clear that there is only a slight difference between the male and female groups regarding coping with adversity with the female group scoring a higher mean value compared to the males with no statistical significance and a small effect size (0.17). This is contrary to the findings of Gábor, Géza, Miklós and József (2009) who found that young elite male ice hockey players between 16 and 20 years had a higher level of coping with adversity compared to the female ice hockey players. On the other hand Von Guenthner and Hammermeister (2007) found in their study on collegiate athletes, participating in various sports, that females scored higher values in coping with adversity than their male counterparts which supports the results of the current study. The results of this study might be ascribed to the age difference between the subjects in our study and those of others studies. The difference in age can refer to a different level of cognitive development due to the development in the brain that takes place at different rates (Steinberg, 2005). Furthermore, the level of participation between the subjects might also be a reason for the contrary results. Elite sport participants in other studies might have developed a better ability to cope with adversity as one can assume that sport participants experience a greater stress level and anxiety in high level competitions compared to competitions on a lower level such as school level.

Peaking under pressure describes an athlete who performs well under pressure and who experiences the situation as a challenge rather than a threat (Bourgeois, Loss, Meyers, & Leuens, 2003). This is considered an important sport psychological skill that helps the athlete to cope in specific stressful situations. Consequently, effective coping in stressful situations and competitions will help an athlete reach top performance (Vickers & Williams, 2007). In the current study, peaking under pressure does not differ statistically significant ($p=0.3420$) between the male and female groups although the male adolescents obtained a higher mean score in comparison to the females. Gábor et al. (2009) found that young elite male ice hockey players, between 16 and 20 years, achieved a higher score in peaking under pressure compared to their female peers, which supports the results of the current study. The higher score of the males might be as a result of their natural competitiveness and the urge to perform as they are more ego-orientated than their female peers (White, Duda, Sullivan & Liemohn, 1991).

Goal setting is an important SPS which has a positive effect on other SPSs such as confidence, motivation and anxiety control independent of the age and skill level of the participant (Gould, 2010; Cox, 2007; Leuens, 2008). A goal is an 'object or aim of an action that an individual is trying to achieve' (Locke, Shaw, Saari, & Latham, 1981). Young elite male ice hockey players, between the age of 16 and 20 years, obtained a higher level of goal setting compared to female ice hockey players which is in line with the results of the current study (Garbor et al., 2009). Contrary with the abovementioned results Von Guenthner and Hammermeister (2007) found that collegiate female athletes, participating in various sports, outscored their male counterparts in goal setting. These contrasting results might attribute to various factors such as type of sport, level of participation and age of the participants. Individual sports might lead to the development of better goal setting skills because the participant set personal goals and individual goals such as times or distances in athletics and these are sometimes easier to measure than team goals. We can assume that age will play a role as a result of the cognitive development that takes place resulting in setting reachable and realistic goals. Intrinsic motivation might also contribute to a goal orientated approach to sport.

Concentration refers to when unexpected situations occur and the athlete has the ability to stay focused on the task at hand and not be distracted (Bourgeois et al., 2003). This is regarded as a very influential SPSS due to the effect and control it has on other SPSS such as anxiety (Karageorghis & Terry, 2011). Therefore, if an athlete can stay focused on the task at hand, negative reactions could be eliminated (Karageorghis & Terry, 2011). Although the concentration of males and females did not differ statistically significantly ($p=0.7202$), the female group revealed a higher mean score compared to the male group. These results coincide with the findings of Von Guenthner and Hammermeister (2007) on collegiate athletes, participating in various sports, where females also outscored their male counterparts in terms of concentration skills. Elferink-Gemser et al. (2005) also substantiates in this regard that youth female athletes participating in field hockey, basketball, volleyball, speed skating and swimming outscored their male counterparts with regards to concentration. In contrast with these results Gabor et al. (2009) found that the male ice hockey players between 16 and 20 years of age, scored higher in concentration than the female players. The contrasting results of the above mentioned studies might be ascribed to the level of participation, age and exposure to competition where the amount of time and level of competition might lead to the development of better concentration.

Bourgeois et al. (2003) defines freedom from worry as a skill that the athlete exhibit which helps him or her not to get anxious due to the pressure of performance or freedom from worry can be seen as the absence of anxiety. According to Dosil (2006a) freedom from worry is a sport psychological skill that will contribute to top performance in sport as it supports the athlete to focus on his/her own ability and subsequently to ignore the external pressure. According to Cox, Shannon, McGuire and McBride (2010) when an athlete is in an uncertain situation and situations are experienced as a threat, anxiety occurs. Freedom from worry did not differ statistically significant ($p=0.2555$) between the two groups but the male group obtained a slightly higher mean value than the female group. Gabor et al. (2009) also found no statistical significant difference between young elite male and female ice hockey players, between 16 and 20 years old, regarding freedom from worry but the male group also scored a higher mean value than the female group, which is in line with the results of this study. In contrast with the results of our study Von Guenthner and Hammermeister (2007) found with a group of collegiate sport participants in various sports, that females outscored their male counterparts in freedom from worry. These contradicting results might be because of the developments such as cognitive development which takes place from adolescence to adulthood. In a pressure situation the anxiety might also be higher when the participant perceives his or her skill level lower than is required by the challenge, which might be the case with non-elite sport participants.

Confidence is a very important sport psychological skill and can help an athlete overcome the barriers that keep them from performing during pressure situations for example competition (Karageorghis & Terry, 2011). Low confidence levels might lead to tiredness and low energy levels which are the opposite of what is required for performance (Karageorghis & Terry, 2011). A meta-analysis done by Woodman and Hardy (2003) on 42 studies showed that 76% of the studies showed a positive relationship between confidence and sport performance which highlights the importance of confidence to reach top performance in sport. In this study there were no statistical significant ($p=0.8149$) differences in the confidence levels of male and female sport participants although the male group scored a slightly higher mean value compared to the female group.

These results are supported by a study done by Gabor et al. (2009) which indicated no significant difference between young elite male and female ice hockey players (16-20 years), with the male group showing a slightly higher score in the mean values with regards to confidence. The results of the current study are also contradicting with those of other studies which indicate that younger girls have a better self-esteem than boys (Bolognini, Plancherel, Bettwshart, & Halfon, 1996;

Watkins, Dong, & Xia, 1997). The differences in this study and others might be because of the difference in physical development where the females might be more self-aware of their physical appearance and subsequently less confident (Christi, 2005).

Coachability is a significant predictor of performance in sport (Cox et al. 2010) and refers to the skill where an athlete is able to listen to instructions and learn the skills as well as using criticism constructively and not take it personally (Bourgeois et al., 2003). In this study the female group scored higher mean values although this difference was not statistically significant (p=0.4458). A study done on various collegiate sport participants (Von Guenthner & Hammermeister, 2007) revealed similar results where the female athletes scored higher values than their male counterparts. In a study done on male and female amateur golf players with a mean age of 43.41 ± 12.55 the male golfers showed a statistical significant higher value in coachability (Deng, 2005) which is also contrary to the results of our study. These contradicting results might be due to the difference between the subjects' age and accompanying development which took place from adolescence to adulthood. Older sport participants might have higher scores in coachability because of better listening skills to interpret instructions, better skill levels to execute instructions and a better understanding of criticism.

Conclusion

The primary objective of this study was to determine if SPSS differ between male and female adolescent sport participants. From the results it is clear that there are no statistical significant differences in the sport psychological skills profiles of male and female adolescent sport participants. However, the male adolescent sport participants achieved higher mean scores compared to the female adolescent sport participants in 5 variables (*peaking under pressure*, *goal setting*, *freedom from worry*, *self-confidence* and *average coping ability*) and the female group scored higher mean scores in 3 variables (*coping with adversity*, *concentration* and *coachability*).

Research findings from previous studies, with regard to gender differences in psychological skills are conflicting. The contrasting results from previous gender specific SPSS research might be ascribed to different age groups, different sport codes, and different test batteries and questionnaires that were used. Age can have an impact on SPSS due to cognitive development, physical development, and experience in competition. It is evident from literature that differences exist between male and female athlete sport participants' regarding the use of SPSS. However, at present the literature contains insufficient data as well as contradicting results with

regards to the gender differences in SPSS of adolescent sport participants, which makes the results of this study a valuable contribution to the field of sport and exercise psychology. More longitudinal research studies is however needed on gender specific development of sport psychological skills during adolescence due to the fact that the psychological changes occur against a background of rapid physical change which influence the psychological development also taking into account that males and females develop differently (Christie, 2005).

Findings from this study can, however, enable coaches, sport psychological consultants and Sport Scientists to understand that although male and female adolescent sport participants differ significantly in anthropometrical, physical and motor abilities (Malina, Bourchard & Bar-Or, 2004) no significant differences exist regarding the sport psychological skills between 13-year old male and female adolescents. According to these results male and female adolescents at this specific age can be exposed to the same mental skills training programs as it seems that they have the same needs regarding SPSS.

Regardless of the benefits of this study, limitations were also identified. The group of adolescents was not randomly selected and therefore caution should be taken when generalizing the results to other adolescent sport participants. Some recommendations for future research regarding the SPSS of adolescents are to select the group randomly, make use of different sport codes with adolescents from different cultures and should be done over longer periods of time to investigate the influence of growth on the development of the SPSS of adolescents.

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CHAPTER 5

SUMMARY, CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

5 SUMMARY, CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

5.1 Summary

In conclusion of this study, a brief summary will be given as discussed in the previous chapters, where after the most important conclusions along with the proposed recommendations stemmed from the study will be discussed. In chapter 1 the problem statement and hypotheses of the study were presented.

The first objective of this study was to determine whether the sport psychological profiles of talented 13-year-old sport participants differ from less talented participants. The results were reported in Chapter 3. The second objective of this study was to determine the possible differences in sport psychological skills between male and female adolescents sport participants. The results regarding gender differences were reported in Chapter 4.

Chapter 2 contained a literature overview on talent identification and SPSS. Firstly sport in South Africa was briefly discussed where after the terms *talent identification*, *sport psychological skills* and *adolescence* were defined. Various existing talent identification models were subsequently discussed regarding their execution as well as principles and stages of each model. The following models were discussed: Gimbel (1976), Harre (1982), Bompa (1985), Regnier (1987), Du Randt (1993) and Hoare (2000). A detailed discussion of the Long Term Athlete Development was further deemed necessary and was done. Different factors that play a role in talent identification and development namely *anthropometric characteristics*, *biological maturation and physiological characteristics*, *heredity*, *sociological*, *economic and environmental factors*, *gender* and *sport psychological skills* were also discussed comprehensively. It is clear that talent identification is influenced by various factors namely biological maturation, heredity and genetic factors, social factors, anthropometrical, gender, physiological and psychological aspects. It was also clear from the literature overview that talent identification is complex process. Furthermore, existing research on different SPSS which were identified as important factors in successful sport performance were analysed and discussed. Subsequently, the following SPSS were identified and discussed accordingly namely goal setting, self-confidence, imagery, anxiety, concentration and motivation. Lastly, a discussion on literature regarding possible gender differences in SPSS among adolescents was discussed. The literature overview on SPSS profiles of adolescent sport participants indicated that, to date, very little research has been done on SPSS among young sport participants. Most of the talent identification models discussed in Chapter 2 acknowledged the contribution of sport psychology in performance

and suggest inclusion in talent identification models and processes. Although this is suggested it is not applied and no norms are set specific for adolescents for inclusion or exclusion during selection.

Chapter 3 reported the results regarding the differences in the SPSS profiles of talented and less talented adolescent sport participants. This article was submitted for possible publication in the South African Journal for Psychology. The 'Australian Talent Search' protocol was used to determine general sport talent in a convenience sample of 162 male and female adolescent sport participants in grade 8 with a mean age of 13.2 ± 0.33 years from a high school in Potchefstroom. This protocol consists of 10 tests which includes anthropometrical, physical and motor ability tests. The anthropometrical measurements were body mass, stature, sitting height and arm span. The physical and motor tests in this protocol included: basketball throw, throw and catch, vertical jump, 40m sprint, agility run and aerobic endurance. Cricket ball throw was added to the protocol. The Statistica for Windows computer programme was used to identify the most talented adolescents by means of a median split which was compiled for the group. The participants who were in the top half in all the physical and motor tests were classified as the talented adolescents. The median split resulted into a talented group of 16 adolescents (7 females and 9 males) and a less talented group of 146 adolescents (70 females and 76 males). The participants completed the Athletic Coping Skills Inventory-28 questionnaire to determine the sport psychological skills profile of the participants. The talented group was compared with the less talented group according to the sport psychological skills by means of independent t-testing. The results showed significant differences ($p<0.05$) between the talented and less talented group in *coping with adversity* ($p=0.0003$), *peaking under pressure* ($p=0.0123$), *goal setting* ($p=0.0190$), *confidence* ($p=0.0106$), *coachability* ($p=0.0001$) and in the *average coping ability* ($p=0.0001$). It was concluded that sport psychological factors are important for successful participation in sport among adolescents and it is therefore recommended that SPSS should be included in talent identification models which involve children in this age group.

In Chapter 4 the differences between male and female adolescent sport participants' SPSS were reported. This article will be submitted for possible publication in the South African Journal of Psychology. A convenience sample of 162 participants from a high school in Potchefstroom, South-Africa completed the Athletic Coping Skills Inventory-28 questionnaire to determine the SPSS profile of the males and females respectively. The male group (n=77) was compared with the female group (n=85) according to the SPSS by means

of independent t-testing and Cohen's d values that indicate practical significance. The results showed no statistical significant differences between the male and female groups in any of the sport psychological variables. However, the male group achieved higher mean scores in *peaking under pressure*, *goal setting*, *freedom from worry*, *confidence* and *average coping profile*. Effect sizes were determined in order to establish the practical significance for the selected variables. The male group revealed small practical significantly higher values in *peaking under pressure* (0.15), *goal setting* (0.15), *freedom from worry* (0.17), *confidence* (0.04) and *average coping profile* (0.05). On the other hand, the females achieved higher mean scores in *coping with adversity*, *concentration* and *coachability*. The female group also revealed mean values that indicated small practical significant differences from males in *coping with adversity* (0.17), *concentration* (0.05) and *coachability* (0.11). It was concluded that the sport psychological skills profile of males and females at the age of 13 did not differ statistically significantly. It was concluded from the results that males and females regarded the same SPSS as important in order to be successful in sport. Furthermore, one can assume from the results that 13-year old males and females could be subjected to the same selection criteria regarding SPSS.

5.2 Conclusions

5.2.1 Conclusion 1

Hypothesis 1 stated that talented adolescent sport participants will have significantly better SPSS than their less talented adolescent counterparts. The talented group obtained higher mean values in all 8 sport psychological characteristics and some SPSS differed statistically significant between the talented and less talented group. Thus, hypothesis is partially accepted due to the fact that only 6 out of the possible 8 SPSS showed statistically significant better values for the talented group compared to the less talented group.

5.2.2 Conclusion 2

Hypothesis 2 stated that 13-year old male sport participants will show significantly better SPSs compared to their female counterparts. No statistical significant differences were found between the male and female groups in any of the 7 sport psychological skills. However, the male group obtained higher mean scores compared to the female group in 5 subscales namely *peaking under pressure*, *goal setting*, *freedom from worry*, *confidence* and *average coping*

ability while the female group achieved higher mean scores than the male group in *coping with adversity*, *concentration* and *coachability.* Hypothesis 2 is therefore rejected.

The findings of this study provide insight into an area of research where a lack of information still overshadows the important contribution of sport psychological skills to sport performance, especially during adolescence. Information from this study and future studies similar to this one will provide coaches, sport scientists and to the multidisciplinary sport team direction concerning sport psychological skills and sport performance in adolescence. Furthermore this study contributed information specifically of the 13-year old adolescent sport participants' sport psychological and also indicates that there are no differences in the sport psychological skills profile of 13-year old adolescents and therefore, at this age, the males and females can be treated as a homogenous group during the application of mental skills training programs.

5.3 Limitations and recommendations of the study

From the results of this study it is evident that talented and less talented adolescent sport participants differ significantly with regards to their sport psychological profile. Regarding gender differences, no statistically significant differences between male and female adolescent sport participants do exist at the age of 13 years.

Although everything was done to make the study as valid and reliable as possible shortcomings are recognized and should be addressed in order to improve further studies in this regard. It is recommended that:

5.3.1 Although this study was part of a longitudinal study, the analysis was based on only one years' data with a convenience sample. A longitudinal analysis is however recommended to determine the on-going development of the sport psychological skills in adolescents in order to determine if significant differences between male and female adolescents develop over time.

5.3.2 The sample of this study did not represent all cultures and races. To improve the quality and specificity of the sport psychology criteria it was suggested that more cultures and races must be included and be randomly selected.

5.3.3 The small group sizes in this study could have had an effect on the outcome. A bigger group size must be used in future studies. The talented group and less talented group must also include the same sample size.

5.3.4 This study targeted adolescent sport participants from one school, in one province from South Africa, which means that the results cannot be generalized. More schools from different regions and with different backgrounds must be used for generalization of results.

5.3.5 Furthermore we would recommend repeating this study on specific types of sport in order to determine the sport psychological skills that are important for a specific sport and not for sport in general.

5.3.6 It is also recommended that a TID protocol should include other aspects such as anthropometry due to the fact that children of same age can differ in strength and size and that can influence confidence, etc.

It is recommended that a TID model should include the following:

- Anthropometry
- Biological maturation and gender
- Motor skills
- Psychological skills

APPENDIX

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28 Maart 2010

Aan wie dit mag aangaan

Geagte Mnr./Me.

Etiekaansoek: NWU-00142-11-A1

"Growth and sport psychological characteristics of talented adolecent ..."

Etiese goedkeuring word aanbeveel. Let egter daarop dat aanbeveel word dat statistiese "power analyses" gedoen kan word om te verseker dat voldoende proefpersone gewerf word.

Vriendelike groete

Prof. H.H. Vorster
Voorsitter

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
POTCHEFSTROOMKAMPUS

18 Januarie 2009

Ingeligte toestemming vir deelname aan sportprojek

Beste ouers,

Mnr. Oosthuizen het toestemming verleen dat die Graad 8 leerders van Gimmies aan hierdie projek kan deelneem. Die Noordwes Universiteit (NWU) se Skool vir Biokinetika, Rekreasie en Sportwetenskap bied aan alle Graad 8 leerders die geleentheid om kosteloos talentidentifiseringstoetse af te lê ten einde die onderbou van elke kind se liggamsamestelling, motoriese, fisieke en sportpsigologiese samestelling te kan bepaal. Hieruit kan elke deelnemer se moontlike potensiaal in sekere sportsoorte vasgestel word. Die toetsprotokol sal bestaan uit 11 fisieke (wat 4 groei metings insluit) en motoriese toetse asook ‘n sportpsigologiese en algemene sportdeelname vraelys om sodoende ‘n fisieke sowel as ‘n sportpsigologiese profiel van elke deelnemer te kan saamstel. Na afloop van die toetsings (nadat die resultate verwerk is), sal elke deelnemer ‘n verslag ontvang met betrekking tot die resultate wat hy/sy behaal het gedurende die toetsings. Aangesien die ouderdomstydperk waarin u kind tans verkeer, gekenmerk word aan geweldige groeiveranderinge wat veral die fisieke profiel van ’n kind (positief maar ook negatief) kan beïnvloed, sal die toetse weer in Graad 9 en 10 herhaal word ten einde hierdie effek op die kinders se ontwikkeling en sportdeelnameprofiel te monitor en aan die kind te kan verduidelik.

Die toetsings sal tydens skoolure op 25 Januarie (drie graad 8 klasse) of 26 Januarie (drie graad 8 klasse) in klasverband plaasvind by die Hoë Prestasie Sportinstituut (HPI) van die NWU (aan die oorkant van Gimmies en onder toesig van die skool). Kinders moet asseblief op die betrokke dag in sportdrag geklee wees. Deelname is vrywillig. Die kind en die skool kan egter net voordele uit deelname aan die projek verkry, en ons vra gevolglik dat u toestemming sal verleen vir u kind tot deelname. Voltooi asseblief die vorm en stuur asseblief dadelik saam met u kind terug skool toe.

Hiermee verleen ek, ouer van.....(naam van kind) toestemming dat hy/sy aan die sportprojek kan deelneem.

Handtekening van ouer: .....

Enige navrae kan gerig word aan:

Prof. Anita Pienaar (Kinderkinetikus) 018 299 1796

Dr. Ankebé Kruger (Sportwetenskaplike) 018 299 1793

Me. Ri-Ellen Kemp (Sportwetenskaplike) 018 299 2856

PROEFPERSOONNOMMER:

NAAM EN VAN:

- **OMKRING WATTER VAN DIE VOLGENDE STELLINGS BESKRYF JOU ALGEMENE VLAK VAN FISIEKE AKTIWITEIT OOR DIE AFGELOPE 3 MAANDE DIE BESTE ?**

A. **Onaktief.** Kyk televisie, lees, of doen huiswerk na skool, ry skool toe, geen buitemuurse sport.

B. **Somtyds aktief.** Verkies sittende/sedentêre aktiwiteite, maar speel soms buite.

C. **Matig aktief.** Raak betrokke in fisieke aktiwiteite wanneer die geleentheid hom voordoen en geniet dit.

D. **Aktief.** Doen moeite om deel te neem aan fisieke aktiwiteite/oefeninge en verkies dit bo sittende/sedentêre aktiwiteite. Is ten minste drie maal per week betrokke by oefeninge waartydens jy baie hard oefen.

E. **Baie aktief.** Neem gereeld deel aan buitemuurse sport en gebruik baie energie. Hou nie van aktiwiteite waar jy moet stilsit nie.

- **HOE VERGELYK JOU FISIEKE AKTIWITEIT MET DIE VAN JOU MAATS?**

1. Net so aktief
2. Meer aktief
3. Minder aktief

- **WAS JY GEDURENDE DIE LAASTE 6 MAANDE BETROKKE BY 'N GEORGANISEERDE SPORT OF 'N INOEFENINGSPROGRAM (SOOS ATLETIEK, RUGBY, NETBAL, SOKKER, KRIEKET, HOKKIE, GIMNASTIEK, DANSKLASSE ENS.)**

1. Ja Beskryf
2. Nee

- **WAS JY GEDURENDE DIE LAASTE 6 MAANDE BETROKKE BY ALGEMENE FISIEKE AKTIWITEITE (HARDLOOF, FIETSRY, SWEM ENS.)?**

Ja Beskryf

Nee

- **IS JY VOLGENS JOU OPINIE SO FISIEK AKTIEF AS WAT JY MOET WEES? (TEN MINSTE EEN UUR PER DAG GELYKSTAANDE AAN STAP TEEN 'N PAS (VOEL WARM, EN LIGGIES UITASEM).**

1. Ja
2. Te aktief
3. Nie aktief genoeg nie

- **WATTER VAN DIE VOLGENDE BESKRYF DIE BESTE WAT JY DIE AFGELOPE 7 DAE GEDOEN HET?** (Lees eers al 5 stellings voor jy besluit watter antwoord jou die beste beskryf)

A. Al my vrye tyd het ek aan aktiwiteite spandeer wat min fisieke inspanning vereis het

B. Ek het soms (1—2 keer laaste week) fisieke aktiwiteite in my vrye tyd gedoen

(bv. Sport beoefen, gedraf, geswem, fietsgery, aerobiese oefeninge gedoen)

C. Ek het gereeld (3—4 keer laaste week) fisieke aktiwiteite in my vrye tyd gedoen

D. Ek het nogal gereeld (5 — 6 keer laaste week) fisieke aktiwiteite in my vrye tyd gedoen

E. Ek het baie gereeld (7 of meer keer laaste week) fisieke aktiwiteite in my vrye tyd gedoen

- **INDIEN JY VOEL DAT JY NIE AKTIEF GENOEG IS NIE, WAT DINK JY IS DIE REDE(S)?**

Nie geïnteresseerd in oefen nie	Oefening is nie lekker vir my nie
Voel nie talentvol in sport nie	Te besig
Vriende is nie daarin geïnteresseerd nie	Het nie vervoer na oefengeleenthede nie
Siekte	Ander redes (spesifiseer)

- **Vervoerwyse. Hierdie vraag handel oor die tipe vervoer wat jy gebruik om by die skool te kom.**

Watter tipe vervoer gebruik jy om by die skool uit te kom? **(omkring slegs een)**

a) Loop	Tyd wat dit neem:	Afstand/area:
b) Punlieke vervoer (taxi/bus)	Tyd wat dit neem:	Afstand/area:
c) Motor	Tyd wat dit neem:	Afstand/area:
d) Fiets	Tyd wat dit neem:	Afstand/area:
e) Ander	Tyd wat dit neem:	Afstand/area:

• **NOEM DIE SPORT/TE WAARAAN JY TANS DEELNEEM**		
• **BESTE SPORT PRESTASIES (2011)**	SPORT:	PRESTASIE:
• **NOEM DIE 3 SPORTSOORTE WAARVAN JY HOU IN VOLGORDE VAN BELANGSTELLING**	1. 2. 3.	
• **HET JY AL BEGIN MENSTRUEER?**	JA	NEE

- **INDIEN JA, OMKRING OUDERDOM EN/OF GRAAD WANNEER JY BEGIN HET.**

10 jaar	11 jaar	12 jaar	13 jaar	14 jaar	15 jaar	16 jaar	17 jaar
Graad 1	Graad 2	Graad 3	Graad 4	Graad 5	Graad 6	Graad 7	Graad 8

- **DINK JY JY HET DIESELFDE TYD, VROEëR OF NA JOU MAATS BEGIN MENSTRUEER?**

Vroeër		**Gelyktydig**		**Later**	

ATHLETICS COPING SKILLS INVENTORY-28

Below you'll find a few statements which sportsman use to describe their sporting experiences. Read through each statement very carefully and try to indicate how often you tend to experience these experiences.

It is important to answer each question as **truthful** as possible **No** right or wrong answers exist, only the answer that is the most applicable to your current situation. Do not dwell on any one question for too long. Mark the applicable answer by crossing it out [x] on the questionnaire.

	ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
1. On a daily or weekly basis, I set very specific goals for myself that guide what I do.	❑	❑	❑	❑
2. I get the most out of my talents and skills.	❑	❑	❑	❑
3. When a coach or manager tells me how to correct a mistake I've made, I tend to take it personally and feel upset.	❑	❑	❑	❑
4. When I participate in sport, I can focus my attention and block out distractions.	❑	❑	❑	❑
5. I remain positive and enthusiastic during competition, no matter how badly things are going.	❑	❑	❑	❑
6. I tend to perform better under pressure because I think more clearly.	❑	❑	❑	❑
7. I worry quite a bit about what others think about my performance.	❑	❑	❑	❑
8. I tend to do lots of planning about how to reach my goals.	❑	❑	❑	❑
9. I feel confident that I will perform.	❑	❑	❑	❑
10. When a coach or manager criticises me, I become upset rather than helped.	❑	❑	❑	❑
11. It is easy for me to keep distracting thoughts from interfering with something I am watching or listening to.	❑	❑	❑	❑
12. I put a lot of pressure on myself by worrying how I will perform.	❑	❑	❑	❑
13. I set my own performance goals for each practise.	❑	❑	❑	❑
14. I don't have to be pushed to practice or compete hard; I give 100%.	❑	❑	❑	❑
15. If a coach criticises or yells at me, I tell myself to keep calm, and	❑	❑	❑	❑

this works for me.				
16. I handle unexpected situations in my sport very well.	❑	❑	❑	❑

17. When things are going badly, I tell myself to keep calm, and this works for me.	❑	❑	❑	❑
18. The more pressure there is during a competition, the more I enjoy it.	❑	❑	❑	❑
19. While competing, I worry about making mistakes or failing to come through	❑	❑	❑	❑
20. I have my own game plan worked out in my head long before the competition begins.	❑	❑	❑	❑
21. When I feel myself getting to tense, I can quickly relax my body and calm myself.	❑	❑	❑	❑
22. To me, pressure situations are challenges that I welcome.	❑	❑	❑	❑
23. I think about and imagine what will happen if I fail or screw up.	❑	❑	❑	❑
24. I maintain emotional control no matter how things are going for me.	❑	❑	❑	❑
25. It is easy for me to direct my attention and focus on a single object or person.	❑	❑	❑	❑
26. When I fail to reach my goals, it makes me even try harder.	❑	❑	❑	❑
27. I improve my skills by listening carefully to advice and instruction from coaches and managers.	❑	❑	❑	❑
28. I make fewer mistakes when the pressure's on because I concentrate better.	❑	❑	❑	❑

END

SPORT COPING VAARDIGHEIDSINVENTARIS (ACSI-28)

'n Aantal stellings wat sportlui gebruik om hulle ervarings in sport te beskryf, word hieronder aangetoon. Lees asseblief elke stelling noukeurig en probeer herroep hoe dikwels jy dieselfde ervaring tydens jou deelname aan sport beleef.

Dit is belangrik dat jy elke vraag so **eerlik** as moontlik beantwoord. Daar is **geen** regte of verkeerde antwoord nie. Moet asseblief nie te lank by een stelling stilstaan nie. Gee **slegs een** antwoord (wat korrek is vir jou) op elke stelling, deur die geskikte antwoord te merk [X] op die vraelys.

	OMTRENT NOOIT	SOMS	DIKWELS	OMTRENT ALTYD
1. Ek stel op 'n daaglikse of weeklikse basis spesifieke doelwitte vir myself om my te lei in wat ek moet doen.	❑	❑	❑	❑
2. Ek maak die beste gebruik van my talente en vaardighede.	❑	❑	❑	❑
3. Wanneer my afrigter of spanbestuurder 'n fout wat ek gemaak het korrigeer, neem ek dit persoonlik op en voel ek onsteld daaroor.	❑	❑	❑	❑
4. Ek kan my aandag fokus tydens sportdeelname en steurnisse uitskakel.	❑	❑	❑	❑
5. Ek bly positief en positief tydens kompetisies, ongeag hoe sleg dinge gaan.	❑	❑	❑	❑
6. Ek is geneig om beter onder druk te presteer omdat ek helderder dink.	❑	❑	❑	❑
7. Ek bekommer myself nogal heelwat oor wat ander van my dink tydens sportdeelname.	❑	❑	❑	❑
8. Ek is geneig om baie beplanning te doen oor hoe om my doelwitte te bereik.	❑	❑	❑	❑
9. Ek voel selfverseker dat ek goed sal presteer.	❑	❑	❑	❑
10. As 'n afrigter of spanbestuurder my kritiseer, onstel dit my in plaas daarvan dat dit my help.	❑	❑	❑	❑
11. Ek vind dit maklik om gedagtes wat my aandag aflei en wat inmeng met dit waarna ek kyk of luister, uit te skakel.	❑	❑	❑	❑
12. Ek plaas baie druk op myself omdat ek my bekommer oor hoe ek sal presteer.	❑	❑	❑	❑
13. Ek stel vir myself prestasiedoelwitte vir elke oefening.	❑	❑	❑	❑

BLAAI OM ASB.

14. Ek hoef nie gedruk te word om hard te oefen of te kompeteer nie, ek gee 100%.	❑	❑	❑	❑
15. Indien 'n afrigter my kritiseer of op my skreeu, herstel ek my fout sonder om daaroor ontsteld te raak.	❑	❑	❑	❑
16. Ek hanteer onverwagte situasies in my sport baie goed.	❑	❑	❑	❑
17. As dinge sleg gaan sê ek vir myself om kalm te bly en dit werk vir my.	❑	❑	❑	❑
18. Hoe meer druk ek tydens kompetisies ervaar, hoe meer geniet ek dit.	❑	❑	❑	❑
19. Ek bekommer myself tydens deelname dat ek foute sal begaan of nie sal misluk.	❑	❑	❑	❑
20. Lank voor die begin van 'n kompetisie het ek reeds my eie kompetisieplan in my kop uitgewerk.	❑	❑	❑	❑
21. Wanneer ek voel dat ek te gespanne raak, kan ek vinnig my liggaam ontspan en myself kalmeer.	❑	❑	❑	❑
22. Ek sien druksituasies as uitdagings hou daarvan.	❑	❑	❑	❑
23. Ek dink en visualiseer (sien in my gedagtes) oor wat sal gebeur as ek misluk of fouteer.	❑	❑	❑	❑
24. Ek bly in beheer van my emosies ongeag hoe dinge verloop tydens deelname aan sport.	❑	❑	❑	❑
25. Dit is vir my maklik om my aandag te rig en te fokus op 'n enkele voorwerp of persoon.	❑	❑	❑	❑
26. Indien ek misluk om my doelwitte te bereik, probeer ek net harder.	❑	❑	❑	❑
27. Ek verbeter my vaardighede deur aandagtig te luister na die advies en instruksies van my afrigters en/of spanbestuurders.	❑	❑	❑	❑
28. Ek begaan minder foute onder druk omdat ek beter konsentreer.	❑	❑	❑	❑

EINDE

TALENTIDENTIFISERINGSPROTOKOL

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Naam en van:								
Geboortedatum:	D	D	M	M	J	J	J	J
Ras:	B	S	K	I				
Skool:								
TOETSPROTOKOL								
Massa:	**kg**							
Lengte:	**cm**							
Sithoogte:	Bokshoogte	**cm**						
Armspan:	**cm**							
Basketbalgooi (m):	1	2						
Krieketbalgooi (m):								
Vangtoets (n):	R /10	L /10						
Vertikale sprong (cm):	Paalhoogte	Paalhoogte	Paalhoogte					
	Reik	1	2					
Ratsheid (sek):	1	2						
Spoed (sek)	**0-10m**	**0-40m**						
	1	1						
	2	2						
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